

The Road to Nowhere:

Regulatory Implications of the FCC's Special Access Data Request

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Introduction

Special Access services—the dedicated communications paths purchased by businesses and telecommunications carriers—have been regulated by the Federal Communications Commission (“FCC”) for decades. In 1999, the Commission provided for and began granting pricing flexibility for such services in Metropolitan Statistical Areas (“MSAs”) where the purveyors of these circuits, the Local Exchange Carriers (“LECs”), could demonstrate that certain competitive conditions were satisfied.¹ The propriety of the deregulatory policy has been questioned by purchasers of those services ever since.² To this day, the Commission has wrestled with the issue, although with irregular attention driven by a paucity of quality data and a lack of any apparent solutions.³

An unrelenting campaign to more strictly regulate Special Access services would eventually find a sympathetic audience; in December 2012 the Commission ceased considering pricing flexibility requests and sought once more to obtain data from the industry with which the deregulatory implications and competitive nature of Special Access services could be evaluated.⁴ Though the Agency planned for the creation of a rich dataset of facility deployment and prices across multiple years, it would settle on a scaled-back data request following the Office of the Management of the Budget’s (“OMB”) unfavorable review of

the questionnaire.⁵ The FCC has received the data (dated 2013) and has attempted to wrestle it into a useful form (but has yet to fully succeed). Select parties have been given access to the data under strict non-disclosure rules and the Commission has plans to conduct an empirical analysis using extra-agency academic researchers.⁶

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The first round of comments based on the data have been submitted to the Commission, but the comments and reports aren't terribly helpful to the general public; the Commission, perhaps concerned the data would not support its pro-regulatory agenda, has not only restricted access to the data but those with access are required to redact from their comments and reports even the most summary of statistics indicating the

extent of competition and other facts.⁷ (Some commentary alludes to a great deal of competition, others not, but it is impossible to learn much from the highly-redacted, publicly-available reports.⁸) As we are left to ponder what is actually in the data, perhaps it is time for a little conceptual thinking about what the data can actually say about expanding Special Access regulation.

As detailed here, I predict the Commission's data collection effort is not going to provide the proverbial "silver bullet" that the proponents of strict Special Access price regulation are hoping for; quite to the contrary, using standard economic theory, I demonstrate that the FCC's Special Access data will likely show that regulation is unnecessary in many geographic areas and already adequate, if not too strict, in others. I do not believe these data, or any legitimate analysis of them, permit the Commission to make any claims about the extent of market power and the need for more regulation of Special Access services.⁹ Although these data may prove very useful in revealing the presence of competition in the sector, these data are not well-suited for much else. While I commend the Commission for recognizing that it lacked the data necessary to evaluate Special Access services and for attempting to remedy that shortfall, the Commission should have first developed a solid theoretical foundation for its analysis before it went off blindly into the collection of data.

The FCC's Plan

According to the Commission's initial *Order and NPRM*, using its newly collected data (from year 2013), the Agency intends "to perform a one-time, multi-faceted market analysis of the special access market designed to determine where and when special access prices are just and reasonable, and whether our current special access regulations help or hinder this desired outcome."¹⁰ Moreover, the Commission plans to avoid "a simple market share or market concentration analysis," and instead provide

evidence that "prices tend to decline with increases in the intensity of various competition measures, holding other things constant."¹¹

Although these data may prove very useful in revealing the presence of and expanding competition in the sector, especially from the cable television operators, these data are not well-suited for much else.

It's not just a price story, however, since the Agency also intends to seek out "evidence as to what leads firms, including competitive providers, to undertake infrastructure investments," and is open to the idea that the "current regulatory regime may be hindering ... by keeping prices low ... competitive investments that would reduce or obviate the need for regulation."¹² Furthermore, the "analysis will help the Commission determine whether any market participants have market power and, if so, where such market power exists [] and how to construct (where required) targeted regulatory remedies."¹³ The Commission provided no details on exactly how these data can be used to measure market power or the just and reasonableness of rates.

The Commission's efforts can be condensed into two primary motivations: (1) quantifying where competition exists and why;¹⁴ and (2) determining the effect of competition on prices.¹⁵ In light of the OMB-mandated revision to the data request, which limited pricing information to a single year (2013), the analysis of prices will be much more limited and cursory than the Commission originally intended. Also, pricing of such services can be quite complex given the particular arrangements needed by businesses and other telecommunications firms and the widely varying costs of providing service.

To add a little formality, the relationships of general interest to the Commission are:

$$P_{ij} = f(N_j, R_j, Z_j), \quad \text{and} \quad (1)$$

$$N_j = f(R_j, X_j), \quad (2)$$

where P is price, N is the number of competitors, R is the regulated price, Z are cost and demand conditions, X are factors that determine entry, and i is an indicator for firm and j an indicator for market. Equation (1) says price is taken to be a function of the number of rivals, other factors like costs, local conditions, and business density, and price regulation. Equation (2) says that the number of rivals is assumed to be a function of the regulated price and demand- and supply-side factors that determine the profitability of entry.

Using the data collected from its request, the FCC hopes to shed light on the nature of Equations (1) and (2). What is not so obvious, however, is what these data can say about market power, just and reasonable rates, and the prudence of regulation. The Commission has failed, thus far, to shed any light on these most relevant questions. I'll try to fill that gap here.

Assessing Competition and Pricing

This structure suggested by Equations (1) and (2) fits nicely into the modern approach to Industrial Economics; the market structure analysis of Sutton (1995) and Beard, et al., (2007), for example, have been frequently cited by the Commission.¹⁶ These modern models of competition do not support the standard thinking about competition, prices, and regulation, in that the number of competitors is not exogenously or randomly determined. Without any regulatory restraint on competitive entry—and I am not aware of any meaningful constraint in force today—the number of competitors is an *equilibrium outcome* determined by the level of profits available in the market. It is this insight of modern Industrial Economics

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To put a finer point on my arguments, let's consider a linear Cournot Competition model with a demand function $P = A - Q$. For convenience, marginal cost is assumed to be zero and all firms are identical and share the market equally. The equilibrium outcomes for price and the number of competitors is:

$$P^* = \frac{A}{N^* + 1}, \quad \text{and} \quad (3)$$

$$N^* = \frac{A}{\sqrt{f}} - 1, \quad (4)$$

where f is the fixed/sunk entry cost of serving the market. The equilibrium market quantity (which will be divided evenly for the N providers) is

$$Q^* = \frac{N^* \cdot A}{N^* + 1}. \quad (5)$$

The A term captures the demand-side conditions of the market (X from Eq. 1) and f the supply-side conditions (Z from Eq. 2). These equilibrium expressions are derived from a two-stage game. In the first period, firms decide whether or not to enter. In the second, they compete for customers.¹⁷

The model's predictions should be familiar. Looking at Equation (3) in isolation, price falls and approaches marginal cost as the number of rivals increases.¹⁸ These price declines are subject to diminishing marginal returns; the larger is N , the smaller the effect of an additional firm.¹⁹ This type of thinking dominates the discussion of the data, including the "market power" and "just and reasonable" considerations proffered by the Commission.

Equation (3) is but one part of a complex story, however. What is critical to grasp here is that both P and N are equilibrium values; they are determined within the system. Equation (4) shows that the number of firms depends on the size of the market (A) and the fixed cost of serving it (f). N is not unbounded; firms enter when it is profitable to do so, meaning the post-entry profits margins are adequate to cover fixed costs. For any given fixed/sunk cost of entry (f), the larger is the market (A), the larger is the number of firms that can serve the market. And, for a given market size, the lower are entry costs, the larger is the number of equilibrium firms serving the market.

Given the demand- and supply-side conditions of deploying and operating telecommunications networks, Equation (4) implies that N will be small. As a result, Equation (3) indicates that P will exceed marginal cost, perhaps by a large amount, but it does so because of the need to recover f . Importantly, a high margin is not necessarily indicative of the presence of undue market power; a welfare-maximizing regulator will also set a large markup over marginal cost if fixed costs are high and must be recovered through prices (i.e., no subsidy). The regulator will set price equal to average cost, so with fixed costs the markup over marginal cost may be quite large (even though profits are zero).²⁰ This is no cause for concern. As observed in the seminal paper on market power and antitrust by Landes and Posner (1981),

When the deviation of price from marginal cost [] simply reflects certain fixed costs, there

is no occasion for antitrust concern, even though the firm has market power in [terms of a markup of price over marginal cost.]²¹

Theoretically, given the assumption of zero marginal cost, the regulated price would be set equal to f/Q , or average incremental cost of serving the market.²²

Note that the expressions above do not incorporate a regulated price in either monopoly or competitive markets. Such conditions can be derived (and have been), but I do not present them here. Suffice it to say that the equilibrium number of firms does depend on the expectation of price (whether regulated or not). As the Commission observed in its *Order and NPRM*, its regulations may be hindering entry "by keeping prices low," which is a theoretically valid consideration (as demonstrated below).

Price Differences Across Monopoly and Duopoly Markets Mean Nothing

Let's turn now to the implications of this type of economic model to the analysis of the FCC's data and what it can say about the regulation of Special Access services. In light of the data request, the analysis will focus mainly on the number of providers in a given geography (N), some rough data on prices (P), and possibly the regulated price (R).²³

What can this data tell us? Perhaps the easiest way to illustrate its potential is to use Equations (3), (4), and (5), to construct a simulation, which is simply a complex numerical example. To construct such a simulation, a dataset is generated (using Microsoft Excel[®]) as follows. There are 1,000 geographic markets. For each market, we assign a value A by drawing from a uniform distribution with values on the interval $[1, 30]$. All markets are served by at least one firm. The profits to the firm(s) are $PQ/N - f$; if this condition is positive for the second firm, then the equilibrium industry structure is duopoly. Fixed costs (f) are set so that the market is served either by a monopoly ($N = 1$) or

a duopoly ($N = 2$) based on the integer value of Equation (4).²⁴ Once N is determined, the equilibrium values of P and Q can be determined using Equations (3) and (5). Both P and Q are unique to each market.

In this simulation, about half of the markets are duopolistic.²⁵ By Equation (3), the prices in duopolistic markets are about one-third lower than in monopolistic ones. If the Commission’s data were to reveal such large price differences between monopoly and duopoly markets, then I suspect some parties would tout such evidence as proof that more regulation of Special Access services was needed. In fact, the mere presence of monopoly would lead to calls for more regulation. Such claims, however, are entirely misguided.

Why? Because a monopoly outcome implies that the ratio of market size to fixed costs is relatively small. In duopoly markets, however, the ratio of market size to fixed costs is relatively large, thereby attracting additional entry. The relatively high price in monopoly markets is necessitated by the need to recover the relatively large fixed cost. There are no formal regulations blocking competitive entry into the sale of Special Access services. With free entry, a price differential between monopoly and duopoly markets alone says nothing about the presence of undue market power and the need for regulation in monopoly (or duopoly) markets. I can show this using two different versions of the simulation. In the first case, I consider a very extreme example where fixed costs (f) are chosen such that exactly one or exactly two firms serve the market. Thus, profits are zero regardless of market structure. In the second case, I relax the zero-profit constraint.

Scenario A: Zero-Profit Outcomes

In this scenario, the fixed cost for each market are selected so that whether or not a monopoly or duopoly exists, profits are zero (revenues are just sufficient to cover f). This is an admittedly extreme example, but it is useful in that clearly

reveals the problem with using the Special Access data for regulatory purposes.

Table 1. Simulation Scenario A

N	Number of Markets	P	Profit $(PQ/N)/f - 1$
1	497	\$7.61	0%
2	503	\$5.13	0%

Table 1 summarizes the results of the simulation, including the number of firms, the average prices, and the net profit divided by the fixed cost of entry. About half the markets are monopoly and the other half duopoly. Prices in duopoly markets are 33% lower than they are monopoly markets—a result of the Cournot assumption. I suspect the Commission’s Special Access data may show something similar to what we see in the first two columns of Table 1: (a) there are markets with one firm and some with two firms (perhaps more); and (b) there are price differences between them. And, using such information, various parties would demand that the Commission increase regulation on Special Access services. But such demands are in error.

With free entry, a price differential between monopoly and duopoly markets alone says nothing about the presence of undue market power and the need for regulation in monopoly (or duopoly) markets.

Table 1 also shows that profits are zero in both market types. Thus, costs are just being covered by revenues, so the rates are just and reasonable (i.e., cost-based) in both the monopoly and duopoly markets. While price is above marginal cost in both (marginal cost is assumed to be zero), the markup is only sufficient to cover the fixed costs. So, there is really no “market power” in the sense of super-competitive profits.

Any attempt to reduce prices via regulation in either the monopoly or duopoly market will lead to losses and possibly entry deterrence. Let’s consider a few regulatory scenarios.

First, if the Commission were to regulate the price at the monopoly level specific to each market, then there would be no effect on profits or competitive entry. The regulation is non-binding since no firm wishes to charge above the monopoly price.

Second, if the Commission were to regulate the price at the duopoly level specific to each market, then there is no effect on entry, but the monopolist will lose profits in all those markets where only one firm is financially viable. Tighter regulation of monopoly markets based on duopolistic outcomes cannot result in just and reasonable rates since costs are not covered in those markets.

Third, if the regulated price is below the duopoly price specific to each market, then all entry is deterred, one firm serves all markets, and losses are realized in all markets. If the FCC is concerned that its regulation is deterring entry and creating monopoly, then it must be that its regulation has set price below the duopoly level.

From this zero-profit scenario, we see that there is nothing for regulation to do. At best, it deters entry and forces below-cost prices. We can also see that price differences between monopoly and duopoly markets are utterly devoid of meaning. The prices are lower where there is competition, but this observation says nothing about the reasonableness of prices in monopoly markets or about market power; there are no profits. Now, let’s soften up the simulation a bit and allow for positive profits in equilibrium to see if any of this guidance changes.

Scenario B: Allowing Positive Profit Outcomes

In Scenario B, I permit positive profits in equilibrium for both duopoly and monopoly markets. These profits occur when the

calculation of Equation (4) produces non-integer values. For example, if the computation of Equation (4) equals 1.5, then there is profit under single-firm supply but not enough to induce the second firm to enter. The implications of this version of the simulation parallel those of Scenario A. Table 2 summarizes the results.

Table 2. Simulation Scenario B

<i>N</i>	Number of Markets	<i>P</i>	Profit $(PQ/N)/f-1$
1	502	\$7.39	55%
2	498	\$5.28	68%

Again, we have about half the markets being duopolistic, with lower prices in the duopoly markets (a 29% difference, on average). Profit margins are approximately the same across the two structures. In fact, the margins (as defined) are lower under monopoly conditions (55% versus 68% under duopoly); the profit potentials of the duopoly markets are greater than the monopoly markets (in this simulation).²⁶ Once more, we see that the presence or absence of entry does not permit any meaningful conclusion about the relationship between price and cost in monopoly markets. An absence of entry could be a sign of very low profit potential, both for the incumbent and the potential entrant.

As in Scenario A, let’s consider the effect of regulation on the equilibrium values.

First, let’s take the uninteresting case of setting the regulated price at the monopoly level specific for each market. As in the prior scenario, this type of regulation has no effect on the amount of entry or prices. Regulating at the monopoly price (for each market) does not alter the equilibrium.

Second, let’s consider the effect of setting a regulated price in each market at the duopoly level for that market. As in the prior scenario, the regulated price does nothing to deter entry since the duopoly price is the price on which the

entrant makes its profit calculation. But, by applying the duopoly price uniformly in all markets, the monopolist earns a negative profit in some (but not all) markets where a single firm exists. This result is critically important—the presence of undue market power and the “just and reasonableness” of rates cannot be determined using only information on N and P .

Third, if the regulated price is set below the duopoly price, then competitive entry may be deterred in some but not all markets (a result of positive profits in the duopoly equilibrium). Setting a price below the duopoly level, however, ensure that the profits in the monopoly markets are always negative. As with Scenario A, to the extent the Commission believes its regulation impedes competition and produces monopoly, the Agency must conclude that its regulated price is below the duopoly price (i.e., the market prices). In markets without entry, it may be the result of a regulated price that is too low (i.e., below cost), since duopoly-price regulation would not deter entry.

Comparing Scenarios A and B reveals that permitting positive profits in equilibrium does not alter fundamentally alter the character of the results from Scenario A. The presence of monopoly and a price differential between monopoly and duopoly markets is not evidence that the monopoly (or duopoly) markets should be more strictly regulated. In fact, under free entry, there bias should be toward less regulation, not more.

Market Definition and the Irrelevance of Regulation

These simulations assume that Special Access services are sold in commodity-like markets. By the FCC’s reasoning, they are not. Historically, the Commission has defined the geographic market for Special Access services as a “particular customer’s location”²⁷ and the proponents of regulation describe the market as “location specific”²⁸ or, most recently, an “individual commercial building.”²⁹ While

narrow market definitions are often an attempt to shrink the market so as to inflate statistics of industry concentration to encourage regulatory or antitrust action, this strategy backfires in the case of location-specific markets.

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As detailed in Beard, Ford and Spiwak (2014), if the geographic market is a particular customer’s location, then there is only one buyer, so the worst-case scenario is bilateral monopoly (one buyer, one seller).³⁰ In a bilateral monopoly where one item is exchanged (a circuit or collection thereof), there is no deadweight loss of monopoly. Unlike the case where there are variable quantities (a downward sloping demand curve) and multiple buyers, the seller in a bilateral monopoly situation cannot reduce output to raise price and profits. Each circuit transaction is unique; it is either sold or left fallow. The monopoly seller does not have the incentive to restrict output.

As detailed by Beard, et al., if markets are geographically narrow, then many of the traditional arguments for price regulation are irrelevant. First, whether the market is served by one firm or many is irrelevant; under bilateral monopoly, *price regulation always reduces overall welfare*.³¹ Second, comparing prices across regulated and deregulated “markets”—which the FCC and other parties will try to do with this new dataset—cannot be used to justify renewed regulatory intervention. *Regulation is not welfare improving*. Third, given location specific markets the debate over price regulation is not about economic welfare, but rather is “a squabble over the distribution of rents between buyer and seller.”³² Regulation is

merely a costly redistribution tool effectuated by altering relative bargaining power.

The market definition question has many practical implications when it comes to analyzing the Special Access data. I think the market definition issue will be a knotty one as the debate over the proper use of the data proceeds.

Competitive entry is not a random event; it is profit driven. Thus, in areas without entry, the Commission's data will not permit the Agency to conclude anything about the just and reasonableness of prices or the presence or absence of market power.

Conclusion

Without getting drawn into the dispute about what the FCC's Special Access data actually say about the amount of competition, it's hardly contested that these data will show some areas have one provider and others have multiple providers. It may also be true that prices are lower when there are multiple providers (at least, on average).

So what? What do these observations tell us about regulation?

As shown here, not much. *Competitive entry is not a random event; it is profit driven.* Thus, in areas without entry, the Commission's data will not permit the Agency to conclude anything about the just and reasonableness of prices or the presence or absence of market power. In fact, there is good reason to believe that the where entry does not occur, the regulation is too tight; a hypothesis shown clearly by the analysis contained in the PERSPECTIVE. These data will not provide any evidence that prices are "too

high" and should be regulated downward. In areas with competitive entry, the FCC should back off its regulation and let the market work. Thus, the bias of these data, whatever they say, is toward less, not more, regulation. In fact, given the Commission's narrow definition of the relevant geographic market, price regulation is merely a costly transfer of profits from the seller to the buyer.

While these data say little about market power and the relationship between prices and costs, even a glance at this issue provides some practical guidance. Given that many of the largest buyers of Special Access services are, in fact, telecommunications carriers themselves, the evidence more clearly points to regulated prices being too low and not too high. Certainly, if prices were well above cost, then these carriers could deploy their own circuits with 100% probability of acquiring the customer (since they are the customer). This is a highly favorable demand-side condition, and strong evidence that observed prices are not "too high." Accordingly, while the Commission has gone to great lengths over the last several years to reverse its bi-partisan decision to grant pricing flexibility for Special Access services, I suspect it will be disappointed that its data collection efforts were, once more, a road to nowhere.

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¹ *In re Access Charge Reform*, FCC 99-206, *Fifth Report and Order and Further Notice of Proposed Rulemaking*, 14 FCC Rcd 14221 (1999) (hereinafter *Pricing Flexibility Order*), *aff'd sub nom. WorldCom v. FCC*, 238 F.3d 449 (D.C. Cir. 2001).

² *AT&T Corp. Petition for Rulemaking to Reform Regulation of Incumbent Local Exchange Carrier Rates For Interstate Special Access Services*, RM Docket No. 10593 (October 15, 2002) (available at: <http://apps.fcc.gov/ecfs/comment/view?id=5508448142>); J. Long, *Telecom Carriers Worlds Apart on Competition in Special Access Markets*, CHANNEL PARTNERS ONLINE (January 28, 2016) (available at: <http://www.channelpartnersonline.com/news/2016/01/telecom-carriers-worlds-apart-on-competition-in-s.aspx>).

³ G.S. Ford and L.J. Spiwak, *The Need for Better Analysis of High Capacity Services*, 28 JOHN MARSHALL JOURNAL OF COMPUTER AND INFORMATION LAW 343 (2011) (available at: <http://www.phoenix-center.org/papers/JCILSpecialAccess.pdf>).

⁴ Notice of Office of Management and Budget Action, OMB Control No. 3060-1197 (Aug. 15, 2014) (available at http://www.reginfo.gov/public/do/PRAViewICR?ref_nbr=201311-3060-001#section0_anchor) (last visited Jan. 30, 2016); *In the Matter of Special Access for Price Cap Local Exchange Carriers; AT&T Corporation Petition for Rulemaking to Reform Regulation of Incumbent Local Exchange Carrier Rates for Interstate Special Access Services*, FCC 12-92, REPORT AND ORDER, 27 FCC Rcd 10557 (rel. August 22, 2012) (available at: https://apps.fcc.gov/edocs_public/attachmatch/FCC-12-92A1.pdf); *Instructions For Data Collection For Special Access Proceeding*, WC Docket No. 05-25, RM-10593 (December 5, 2014) (available at: https://apps.fcc.gov/edocs_public/attachmatch/DOC-330865A2.pdf); see also, J. Eggerton, *FCC Takes Some Action on Special Access*, MULTICHANNEL NEWS (September 17, 2015) (available at: <http://www.multichannel.com/news/fcc/fcc-takes-some-action-special-access/393874>).

⁵ *In the Matter of Special Access for Price Cap Local Exchange Carriers; AT&T Corporation Petition for Rulemaking to Reform Regulation of Incumbent Local Exchange Carrier Rates for Interstate Special Access Services*, DA 14-1327, ORDER ON RECONSIDERATION (rel. September 15, 2014) (available at: https://apps.fcc.gov/edocs_public/attachmatch/DA-14-1327A1.pdf).

⁶ S. Buckley, *AT&T, CenturyLink, Frontier and Verizon Want More Time to Review Special Access Data*, FIERCETELECOM (December 14, 2015) (available at: http://www.fiercetelecom.com/story/att-centurylink-frontier-and-verizon-want-more-time-review-special-access-d/2015-12-14?utm_medium=nl&utm_source=internal&mkt_tok=3RkMMJWWf9wsRonvKvOd%252B%252FhmjTEU5z17eUpXqS3IMI%252F0ER3fOvrPUfGjI4DTsFIM6%252BTFawTG5toziV8R7LMKM1ty9MQWxTk); S. Buckley, *Sprint, Windstream, Industry Groups Applaud Public Availability of Special Access Data*, FIERCETELECOM (September 18, 2015) (available at: <http://www.fiercetelecom.com/story/sprint-windstream-industry-groups-applaud-public-availability-special-access/2015-09-18>).

⁷ AT&T has requested that the aggregate information be publicly available. See *Public Version of AT&T's Comments*, WC Docket No. 05-25 (filed January 27, 2016) (available at: <http://apps.fcc.gov/ecfs/document/view?id=60001416045>).

⁸ R. Quinn, *What the Data Shows: Special Access is Not Very Special Any More*, AT&T PUBLIC POLICY BLOG (January 20, 2016) (available at: <http://www.attpublicpolicy.com/special-access/what-the-data-shows-special-access-is-not-very-special-any-more>).

⁹ G.S. Ford, *Is the FCC's Regulatory Revival Deterring Infrastructure Investment?*, BLOOMBERG BNA (November 13, 2015) (available at: <http://www.phoenix-center.org/BloombergBNAInvestmentCounterfactual13Nov2015.pdf>).

¹⁰ *In the Matter of Special Access for Price Cap Local Exchange Carriers, AT&T Corporation Petition for Rulemaking to Reform Regulation of Incumbent Local Exchange Carrier Rates for Interstate Special Access Services*, FCC 12-153, REPORT AND ORDER AND FURTHER NOTICE OF PROPOSED RULEMAKING, 27 FCC Rcd 16318 (rel. December 18, 2012) at ¶ 67.

¹¹ *Id.*

¹² *Id.*

NOTES CONTINUED:

¹³ *Id.*

¹⁴ *Id.* at ¶ 69 (“a data-intensive market analysis will enable us to determine more precisely where, and to what extent, actual and potential competition for special access is likely to constrain prices as well as the factors that drive investment and competition, as described above”); *id.* at ¶ 70 (“a one-time, multi-faceted market analysis will benefit special access providers and purchasers by facilitating a thorough assessment of competitive conditions”).

¹⁵ *Id.* at ¶ 71 (“a one-time, multi-faceted market analysis supplements a structural market analysis with econometrically sound panel regressions [] to determine how the intensity of competition (or lack thereof), whether actual or potential, affects prices, controlling for all other factors that affect prices.”).

¹⁶ J. Sutton, SUNK COST AND MARKET STRUCTURE (1995); see also G. S. Ford, T.M. Koutsky, and L.J. Spiwak, *Competition After Unbundling: Entry, Industry Structure, and Convergence*, 59 FEDERAL COMMUNICATIONS LAW JOURNAL 331-368 (2007) (available at: <http://www.phoenix-center.org/papers/FCLJCompetitionAfterUnbundling.pdf>); J.B. Duvall and G.S. Ford, *Changing Industry Structure: The Economics of Entry and Price Competition*, PHOENIX CENTER POLICY PAPER No. 10 (April 2001) (available at: <http://www.phoenix-center.org/pcpp/PCPP10Final.pdf>); T.R. Beard and G.S. Ford, *Competition and Market Structure in Local Exchange and Long Distance Telecommunications Markets* in INTERNATIONAL HANDBOOK ON TELECOMMUNICATIONS ECONOMICS, Vol. I (Ch. M, Gary Madden ed., (2002); *In the Matter of Implementation of Section 19 of the Cable Television Consumer Protection and Competition Act of 1992, Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming*, FCC 94, 235, FIRST REPORT, 9 FCC Rcd 7442 (rel. September 28, 1994), Appendix H at ¶ 375.

¹⁷ Since post-entry profits determine whether or not firms enter, this two-stage game is played in reverse so that the entry decision is determined after the nature of competition is established.

¹⁸ An interesting implication of this type of model is that if price competition is more intense than Cournot, then N^* will be smaller than that indicated by Equation (4). Aggressive price competition in the second-stage of the game reduces profits and thus the number of competitors in equilibrium. (In the theoretic formulation, intense price competition shrinks A .) Somewhat paradoxically, a small number of competitors may imply intense price competition rather than a lack of it. Despite a solid theoretical foundation—one often cited to by the FCC—this somewhat counterintuitive idea has not been fully entwined into the regulation debate. For now, I simply assume Cournot Competition. See Duvall and Ford, *supra* n. 16.

¹⁹ Different models of competition make different predictions about the relationship between P and N and there is no reason to suspect precise relationship in Equation (3) will hold for Special Access services. I suspect the data will show that price is lower with two firms than it is with one (but for reasons other than those implied by these equations), but adding a third (or more) firm may not have much effect.

²⁰ See, e.g., J.A. Hausman, *Regulated Costs and Prices in Telecommunications*, in INTERNATIONAL HANDBOOK OF TELECOMMUNICATIONS ECONOMICS, VOL. II (eds., G. Madden and S.J. Savage) (2000) (“setting price equal to average cost [] seems to be the correct outcome if the regulated utility is to recover its costs.”).

²¹ W.M. Landes and R.A. Posner, *Market Power in Antitrust Cases*, 94 HARVARD LAW REVIEW 937-996 (1981).

²² If f is measured as economic (or forward-looking) costs, then f/Q is equal to the Total Element Long-Run Incremental Cost (“TELRIC”), the cost standard frequently applied by the FCC.

²³ Some demographic data may enrich the analysis as well.

²⁴ Fixed cost f is selected so that $1 \leq N < 3$ so that $\text{INT}(N)$ equals either 1 or 2. Given that N is an integer, it is possible for positive profits to exist in either the monopoly or duopoly outcomes (say, when the calculated N is 1.5 or 2.5 firms). These residual profits are not sufficient, however, to induce more entry.

²⁵ Given the stochastic elements of the simulation, the simulation is repeated until this outcome is obtained (for convenience).

²⁶ It is possible to get the reverse relationship by choosing a different set of random values for A and f .

²⁷ *In re Verizon Communications Inc. and MCI, Inc., Applications for Approval of Transfer of Control*, FCC 05-184, MEMORANDUM OPINION AND ORDER, 20 FCC Rcd 18433, 18,449 (Nov. 17, 2005).

NOTES CONTINUED:

²⁸ P. Bluhm & R. Loube, *Competitive Issues in Special Access Markets*, National Regulatory Research Institute (Jan. 21, 2009) (available at: <http://apps.fcc.gov/ecfs/document/view?id=7021922486>) (the authors recommend that regulators consider the possibility that markets for high capacity services may be a “building” or “city block[,]” or perhaps requiring GIS software to measure geographic market boundaries); August 8, 2007 Comments of Sprint Nextel Corporation, *In the Matter of Special Access Rates for Price Cap Local Exchange Carriers*, WC Docket No. 05-25 at 15 (“The relevant geographic market for special access, therefore, is the geographic area served by a route connecting the two points that a purchaser seeks to link with the dedicated facility (e.g., cell site and central office, or central office and access tandem).”); September 9, 2005 Response Testimony of Don J. Wood on behalf of XO Communications Services, Inc., and Covad Communications Company, *In Re Joint Application of Verizon Communications, Inc., and MCI, Inc. for Approval of Agreement and Plan of Merger*, *Washington Public Service Commission*, Docket No. UT-050814 at 13 (“the market also depends on aggregate end user demand at a given location or for a given facility.”); August 8, 2007 Declaration of Ajay Govil on Behalf of XO Communications, LLC, *In Re Special Access Rates for Price Cap Local Exchange Carriers*, WC Docket No. 05-25 at 6-7 (“By contrast, a loop facility is dedicated to the use of one customer or in limited instances a very small group of customers.”); United States Government Accountability Office, Report to the Chairman, Committee on Government Reform, House of Representatives, *Telecommunications: FCC Needs to Improve its Ability to Monitor and Determine the Extent of Competition in Dedicated Access Services* (November 30, 2006) (available at: <http://www.gao.gov/new.items/d0780.pdf>) at 1, 18, and 36.

²⁹ Comments of XO Communications, WC Docket No. 05-25, RM-10593 (January 27, 2016) at p. ii (“The Commission should find the relevant geographic market for purposes of analyzing the Dedicated Services market is the individual commercial building.”) (available at: <http://apps.fcc.gov/ecfs/document/view?id=60001420015>).

³⁰ T.R. Beard, G.S. Ford and L.J. Spiwak, *Market Definition and the Economic Effects of Special Access Price Regulation*, 22 *COMMLAW CONSPECTUS* 237-266 (2014) (available at: <http://scholarship.law.edu/commlaw/vol22/iss2/10>).

³¹ Welfare declines because some buyers get priced out of the market at the regulated price, some sellers refuse to sell at the regulated price, or the regulated price forces transactions that would not occur in market transactions. In some markets, however, the regulation may merely create a transfer. In other words, in no market does the regulation help, but in some it hurts.

³² *Market Definition*, *supra* n. 30 at p. 244.