

April 24, 2013

VIA ECFS

EX PARTE

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW, Room TW-A325
Washington, DC 20554

Re: *Special Access Rates for Price Cap Local Exchange Carriers; AT&T Corp. Petition for Rulemaking to Reform Regulation of Incumbent Local Exchange Carrier Rates for Interstate Special Access Services, WC Docket No. 05-25, RM-10593*

Dear Ms. Dortch:

On April 22, 2013, Dr. Stanley Besen, Dr. Bridger Mitchell, Kelsi Reeves of tw telecom inc., Joe Cavender of Level 3 Communications, LLC, Sheba Chacko of BT Americas, Inc., Lisa Youngers of XO Communications, LLC, Charles McKee and Chris Frentrup of Sprint Nextel Corporation, Paul Margie of Wiltshire & Grannis LLP, Matthew Jones of Willkie Farr & Gallagher LLP, Tom Cohen of Kelley Drye & Warren LLP, and the undersigned met with Elizabeth McIntyre, Eric Ralph, William Layton, Ben Childers, Deena Shetler, and Luis Reyes of the Wireline Competition Bureau, Steven Wildman and Jack Erb of the Office of Strategic Planning, and Joel Rabinovitz of the Office of General Counsel. Belinda Nixon of the Wireline Competition Bureau, Rochelle Jones of tw telecom inc., Jennifer Taylor of BT Americas, Inc., Nirali Patel of Willkie Farr & Gallagher LLP, and Walter Anderson of Wiltshire & Grannis LLP joined the meeting via telephone.

During the meeting, Drs. Besen and Mitchell described the conclusions of their white paper, “Anticompetitive Provisions of ILEC Special Access Arrangements,” which was recently filed in the above referenced proceeding.¹ Specifically, Drs. Besen and Mitchell made the points set forth in the presentation attached hereto as Appendix A. In addition, Drs. Besen and Mitchell emphasized the importance and utility of relying on benchmarking in order to fashion an appropriate regulatory framework for the special access market, citing a declaration previously

¹ See Stanley M. Besen & Bridger M. Mitchell, “Anticompetitive Provisions of ILEC Special Access Arrangements” (Feb. 11, 2013) (*attached as Appendix A to Comments of BT Americas, Cbeyond, EarthLink, Integra, Level 3 and tw telecom, WC Dkt. No. 05-25 et al.* (filed Feb. 11, 2013)).

filed in another proceeding.² Pursuant to a request from Wireline Competition Bureau staff, that declaration is attached hereto as Appendix B.

Please do not hesitate to contact me if you have any questions or concerns regarding this submission.

Respectfully submitted,

/s/ Thomas Jones

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² Declaration of Joseph Farrell and Bridger M. Mitchell, “Benchmarking and the Effects of ILEC Mergers” (Oct. 14, 1998) (*attached as Attachment C to Sprint Communications Company L.P., Petition to Deny, CC Dkt. No. 98-141 (filed Oct. 15, 1998)*).

APPENDIX A

Anticompetitive Provisions of ILEC Special Access Purchase Arrangements

Stanley M. Besen

Bridger M. Mitchell

April 22, 2013

Our Conclusions

- The combination of loyalty provisions and long-term arrangements that special access purchasers are required to accept in order to receive substantial discounts and other benefits limits the ability of rivals to compete against ILECs in providing special access services, even when they are more efficient.
- Suggested remedies
 - Limiting the size of the volume commitment that an ILEC may require as a condition of providing a discount or benefit.
 - Limiting ILEC non-recurring charges and early termination fees to the amount of the customer-specific sunk costs associated with providing a service and requiring that these costs be billed in a transparent manner.

These Conclusions are Not New

- “[A] combination of terms in discount plans may be allowing ILECs unreasonably to cement their market power by limiting the ability of buyers to shift special access circuits to competitors *who may have better products, lower prices, or both.*”
 - National Regulatory Research Institute (2009) (emphasis added)
- “These types of contracts may inhibit choosing competitive alternatives because the customer does not receive the applicable discount, credit, or incentive if the revenue targets are not met and additional penalties may also apply. Unless the competitor can meet the customer’s entire demand, the customer has an incentive to stay with the incumbent and purchase additional circuits from the incumbent, rather than switch to a competitor or purchase a portion of their demand from a competitor – *even if the competitor is less expensive.*”
 - United States Government Accountability Office (2006) (emphasis added)

Some Examples of Restrictive Special Access Purchase Arrangements

- Under CenturyLink's Regional Commitment Plan (in legacy Qwest territory), a customer must commit to maintaining 95% of its previous purchase volume (in dollars) from CenturyLink throughout the legacy Qwest region in order to receive a discount from Month-to-Month (MTM) rates and to receive circuit portability.
- Under the "portability commitment" provision of AT&T's Term Payment Plan (in legacy Pacific Bell and Southwestern Bell territories), if a customer exceeds 124% of its initial purchase commitment, AT&T imposes a \$900 monthly "overage" penalty for each circuit in excess of this threshold unless the customer increases its commitment to make up for the overage.
- Under Verizon's Commitment Discount Plan (in legacy Bell Atlantic and NYNEX territories), a customer must commit to maintaining 90% of its purchase volume in service with Verizon for a period of up to seven years in order to receive a discount from MTM rates and to receive circuit portability.
- AT&T's and Verizon's rates for DS1 service under some of their long-term contracts are approximately 55% lower than their MTM rates.

“Road Map” to Presentation

- Effects on purchasers.
- Effects on ILEC rivals.
- Why these are loyalty contracts.
- ILEC terms are not “voluntary”.
- How best to recover customer-specific sunk costs.
- The effects of market power.
- Possible efficiency justifications.
- Benefits of benchmarking.
- Our recommendations.

How ILEC Special Access Arrangements Constrain Purchasers

Purchasers:

- Are penalized unless they make a very large percentage of their total purchases from ILECs.
- Lose significant benefits unless they make a very large percentage of their purchases from ILECs.
- Pay much higher prices unless they agree to long-term arrangements.
- Are subject to significant penalties if they terminate their purchases prior to expiration of these arrangements.

How ILEC Purchase Arrangements Limit Entry and Expansion by Rivals

- “[I]n markets where there is a dominant firm, that firm’s market share discounts may reduce the demand for its rivals’ goods to levels so low that these rivals cannot recover their fixed costs. The dominant firm’s market share discounts may deter small-scale entry for similar reasons.” - Mills
- “If tying by the monopolist serves to lower the rival’s output, then the anticipation of such tying tomorrow can lower the rival’s R&D expenditure today and in this way increase the rival’s marginal cost in subsequent periods.” - Carlton et al.

The Responses by the ILECs and Their Economists

- These are not loyalty contracts.
- The contracts are not exclusive.
- The contracts do not deter entry or induce exit.
- The contracts are tailored to the needs of individual customers.
- The contracts are voluntary.
- Term contracts are needed to recover up-front costs.
- Similar contracts are widely employed.
- ILECs do not have market power.
- The contracts promote efficiencies.

Critics Employ an Excessively Literal Interpretation of Loyalty Contracts

- A loyalty agreement need not contain an explicit requirement that the customer purchase a percentage of its total demand from the seller. “[T]he form of the threshold does not matter, as any market share target could be mimicked by an appropriately set volume threshold. For example, uniform market share discounts would allow small as well as large firms to participate in the loyalty programs. However, volume based thresholds could mimic such uniform market share targets by setting lower volume based targets for smaller firms.” - Kobayashi
- “An *example* of [Contracts that Reference Rivals] is a purchase agreement containing a market share discount ...” However, “the particular thresholds at which discounts kick in may . . . mimic market-share discounts, and thus make the contract similar to a [Contract that References Rivals].” - Scott Morton
- Loyalty contracts can involve a fixed dollar penalty or other penalties for failing to meet a specific commitment and do not necessarily require an explicit linkage of a discount to a “base” rate.

Exclusivity is Not Required to Achieve Anticompetitive Effects

- Even if loyalty contracts are not literally exclusive, they can still substantially limit the portion of the market for which rivals can compete: “...a supply or distribution contract that does not impose absolute exclusivity still can cause anticompetitive effects.” - Tom, Balto, and Averitt
- Courts have analyzed contracts that effectively (but not explicitly) require a customer to purchase a large proportion of its requirements from a given seller as *de facto* forcing the customer to purchase only from the seller. Such contracts “allow[] one supplier of goods or services unreasonably to deprive other suppliers of a market for their goods.” - ZF Meritor, LLC v. Eaton Corp., 696 F.3d 254, 270 (3d Cir. 2012)

The Problem is Not That Loyalty Provisions Induce Exit But That They Limit Entry and Expansion

- ILECs focus on the Commission's statement that "the presence of facilities-based competition with significant sunk investment makes exclusionary pricing behavior costly and highly unlikely to succeed." However, exclusionary pricing behavior **does** succeed if it prevents those sunk investments from being made in the first place.
- Level 3 "would construct fiber to many more buildings that are near its network, if AT&T's (and the other price cap LECs') lock up arrangements did not hinder it from doing so. Level 3 is forced to sit out more often than it would like not because it wants to, but because if it did incur the expense to build to these buildings, its prospective, large customers would be unable to buy more than a fraction of their demand from Level 3 as they are already locked in to buying from AT&T and the other price cap LECs instead." - Letter to FCC (filed June 27, 2012)

Tailored Purchase Arrangements Can Mimic Contracts that Reference Rivals

- “...AT&T has negotiated individualized tariffs that are tailored to customer’s specific needs.”
- “Another factor that is relevant is whether the quantity discount thresholds are common across buyers, which again would tend to reduce their precision. In contrast, a threshold that is buyer-specific may be more of a problem.” - Scott Morton

ILEC Contracts Are Not Voluntary

- "As I was coming home, in company with Mr. Andrews, within two fields of the new road that is by the gate-house of Lord Baltimore, we were met by two men; they attacked us both: the man who attacked me I have never seen since. He clapped a bayonet to my breast, and said, with an oath, Your money, or your life! He had on a soldier's waistcoat and breeches. I put the bayonet aside, and gave him my silver, about three or four shilling." — *The Proceedings of the Old Bailey*, 12 September 1781.
- Question: Was the money given “voluntarily”?

Up-Front Cost Recovery Does Not Require Long Contracts

- A multi-year contract “increases the likelihood that circuits will remain in service long enough to generate enough revenue to cover up-front costs associated with provisioning special access....” - Caves and Eisenach
- However, “...*if* a customer has paid a non-recurring charge for the costs that are specific to it and cannot be recovered if the customer were to cease taking a service...there is no justification for imposing a minimum contract term....” - Besen and Mitchell (emphasis added)

Loyalty Provisions and Long-term Arrangements Are of Special Concern When Used by Dominant Firms

- “If a dominant firm is in a position to foreclose such a substantial part of the market that the output of the smaller competitors is suppressed below the minimum efficient scale of production, retroactive rebates can cause anticompetitive harm by jeopardizing the viability of the dominant firm’s competitors.” - Zenger
- “...purchase requirements, coupled with a loyalty discount for buyers who comply with the purchase terms, can function as exclusionary behavior to the detriment of rivals firms and competition. This is of particular concern when the firm offering loyalty discounts is much larger than its rivals.” - Greenlee and Reitman
- “...the settings where [such contracts] are most likely to harm consumers and competition involve dominant firms possessing market power and a high market share.” - Scott Morton

ILEC Market Power

- Large ILEC market shares in the supply of DS1 and DS3 channel termination services are strong evidence of ILEC market power.
- As the Commission has consistently recognized, competitors face substantial barriers to deploying local transmission facilities.
- ILEC purchase provisions create additional barriers to the entry and expansion of rivals in the supply of special access services.
- Competition in the supply of some Ethernet services does not insulate purchasers of other special access services from the exercise of ILEC market power.

Do ILEC Terms and Conditions “Provide Significant Efficiency Benefits”?

- Greater revenue certainty?
- Economies of scale?
- Reduced transactions costs?
- Must they be efficient simply because they are used by an ILEC rival?
- Are the magnitudes of any efficiencies commensurate with the associated restrictions on competition?

The Effects of “Greater Predictability” of Output

- Verizon claims that it “gains much greater predictability regarding the overall volumes it will be required to provide when customers make commitments covering all of their purchases over a broad geographic area than it would if each localized purchase were subject to its own plan.”
- However, Verizon’s contracts cause “customers [to] make commitments covering all of their purchases over a broad geographic area...” and thereby disadvantage Verizon’s rivals when competing to serve particular geographic areas.

“Volume” Discounts and Economies of Scale

- Because the same discounts are not available to all customers that have the same purchase *volumes*, they cannot be attributed to economies of scale.
- To the extent that there are economies of scale in the provision of special access, those economies are more likely to depend on the ***number*** of circuits purchased by a customer, not on the ***percentage*** of the customer’s historic purchases that these circuits represent.

Reduced Transaction Costs

- Reductions in transaction (contracting) costs provide an efficiency justification for only modest discounts for multi-year contracts, much smaller than the term discounts provided in many ILEC contracts.
- Carlton and Shampine observe that “firms may make investment and network management decisions in reliance on the committed business.” However it is entrants, rather than the ILECs, that have the greater need for “committed business” to encourage investment. The ILECs’ networks have already largely been constructed.
- Moreover, sunk costs that are not customer-specific can be recovered from other customers.

CLEC Terms and Conditions

- CLEC purchase arrangements do not justify the terms and conditions in ILEC purchase arrangements. The sale of special access services by ILECs and CLECs occur in very different contexts.
- If a CLEC customer does not wish to commit to the terms and conditions in a CLEC purchase arrangement, the customer can purchase services from the ILEC instead. In contrast, in many locations the ILEC owns the only transmission facility; the customer has no choice but to agree to the ILEC's terms and conditions.
- If a CLEC requires a customer to continue to purchase the same volume of services it purchased in the past in order to obtain a benefit, the resulting volume commitment is likely to be extremely small. CLEC facilities do not reach most business locations.

Benchmarking Can Help to Overcome Information Asymmetries

- Use the non-recurring charges in ILEC tariffs to benchmark non-recurring charges for other ILEC service areas.
- Extend the use of regulatory benchmarking to require that, where an ILEC offers a purchase arrangement in one part of its territory, or for one of its special access services, it must offer that arrangement throughout its territory and across its special access service offerings.
- Benchmarking is a useful way for regulators to obtain information that would not otherwise be available to them. It does not impose a Most Favored Nation requirement.

Our Recommendations

- Limit the size of the volume commitment that an ILEC may require as a condition of providing a discount or benefit;
- Limit ILEC non-recurring charges and early termination fees to the recovery of the customer-specific sunk costs associated with providing a service and require that these costs be billed in a transparent manner; and
- Employ benchmarking to improve regulation of ILEC special access terms and conditions.

APPENDIX B

BENCHMARKING AND THE EFFECTS OF ILEC MERGERS

**DECLARATION OF
JOSEPH FARRELL AND BRIDGER M. MITCHELL**

October 14, 1998

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Benchmarking and the Effects of ILEC Mergers

Declaration of Joseph Farrell and Bridger M. Mitchell

Executive Summary. We discuss the role of comparative information, benchmarking, and relative-performance schemes, both in traditional telecommunications regulatory activities (including support of universal service) and in the active promotion of competition called for in the Telecommunications Act of 1996. As has been widely recognized in the United States and internationally, benchmarking is a powerful and beneficial tool in a wide variety of such contexts. We discuss average-practice benchmarking (as for price caps and high-cost support), best-practice benchmarking (as for number portability and interconnection), and heightened scrutiny of worst practices (as for interconnection and access reform). Mergers among large ILECs significantly weaken the power and effectiveness of benchmarking.

I. The Value of Benchmarking

Until facilities-based competition is widespread, regulators will be called upon to regulate Incumbent Local Exchange Carriers (ILECs). Benchmarking, also known as yardstick competition, or relative-performance evaluation, is a very valuable regulatory tool because it helps regulators, customers, and nascent competitors become better informed about incumbents' capabilities. This can enable society to achieve some of the benefits of competition even before workable market competition exists. In this report, we explain how the practice of benchmarking can and does work in U.S. telecommunications, and why the ability to compare the performance or behavior of large ILECs is therefore valuable and not lightly to be sacrificed.

A. The Fundamental Information Disadvantage

The modern economic analysis of regulation¹ starts from the view, which is wholly consistent with our own experience in telecommunications regulation, that regulators generally have much less accurate and less complete information about the opportunities and constraints facing a regulated firm than does the firm itself.

For example, the firm is likely to be much better informed than regulators about its economic costs (and perhaps even its accounting costs) and the extent to which the firm might be able to reduce those costs if given sufficient incentives to do so. The same is true of other aspects of performance, such as measurable service quality or delivery intervals. The firm will

¹ See, for example, David P. Baron, "Design of Regulatory Mechanisms and Institutions," p. 1347, in R. Schmalensee and R. Willig, eds., *Handbook of Industrial Organization*, Volume 2, p. 1347-1447, (Amsterdam: Elsevier Science Publishers), 1989.

also be better informed about “softer” qualitative indicators, such as the level and types of access to unbundled network elements, provisioning and ordering practices, and harder-to-measure quality characteristics of services. Most especially, a single regulated firm is likely to be far better informed than its regulators about the opportunities for innovation.

Modern economic analysis traces much, if not all, of the problems of efficient regulation to this fundamental information disadvantage. If regulators knew what the firm could, and could not, accomplish with efficient effort, they could design an incentive system that simultaneously brings prices close to costs and also creates efficient incentives for the firm.² Because the regulator is imperfectly informed, however, its efforts to control the firm’s pricing almost inevitably conflict with creating incentives for efficient behavior. Regulation in the public interest is the art of trading off these two goals. As a result, anything that reduces the regulator’s informational disadvantage is likely to help achieve more efficient outcomes.

B. The Ratchet Effect and Incentive Regulation

Regulation often aims to keep prices commensurate with costs and not to allow a firm to exploit its monopoly position by charging excessive prices. Because of the information problem outlined above, regulators have often used a dominant firm’s historic costs as a basis on which to set future prices; absent better information, past costs may be a sensible predictor of future costs.

² See, for example, David Sappington and Dennis L. Weisman, *Designing Incentive Regulation for the Telecommunications Industry*, The MIT Press and the AEI Press, 1996, p. 3.

However, this “cost of service” approach creates an incentive problem, known as the *ratchet effect*. Consider a regulated firm that, by exerting some unverifiable effort, or incurring some costs that are difficult to identify, can reduce its verifiable costs. If regulators adjust the prices the firm is allowed to charge, to keep them aligned with its verifiable or recorded costs, the firm’s incentive to undertake this effort, or incur these costs, will be weakened. A similar ratchet problem can arise if the firm’s prices for existing services are adjusted downwards by regulators – through a cost-allocation proceeding or otherwise – in response to the firm’s introduction of new and profitable services.

The ratchet effect is generally recognized as one of the most troubling inefficiencies associated with traditional “cost-of-service” or “rate-of-return” regulation. For this reason, and others, regulators have increasingly turned from cost-plus regulation to incentive regulation mechanisms, most notably price caps. For example, the Federal Communications Commission first used price caps to regulate the interstate retail prices of dominant Interexchange Carriers (IXCs) and currently applies price caps to the interstate access charges of large ILECs. Once the initial level of a firm’s price index has been established, the index (net of inflation) must be adjusted annually by the X-factor – the estimated annual rate of productivity gain – and by any exogenous changes in costs.

An *ideal* price cap would perfectly predict the *optimized* path of *future* productivity improvement by each ILEC and employ that as the X-factor. The firm’s future prices would then be independent of its actual productivity performance, and the firm would thus have the correct incentives to achieve productivity gains; at the same time, consumers would not have to pay charges or fees in excess of cost.

Regulators can, of course, only estimate this optimal X. Because they have very limited information, they cannot have complete confidence that the right value of X has been chosen.³ Given this (rational and proper) limited confidence, however, a further problem arises. If the monopolist's profits are higher than expected, it may be difficult to insist that the chosen X-factor was correct, and there will be pressure to revise the X-factor upward. Similarly, if the monopolist's profits are lower than expected, there will be pressure to revise the X-factor downward. There may also be perceived legal restrictions on the regulator's ability to sustain a price-cap constraint for a carrier whose rate of return falls too low.

However, any such *ex post* revision recreates the *ratchet effect* – a good performance today results in a higher target in the future. If a regulated firm anticipates this effect, it foresees that some of the rewards for good current performance will be counterbalanced later when a higher level of performance is demanded. Anticipating the adjustment, the firm will exert less effort to improve its performance than it would if its future prices were (as in the ideal price cap) independent of its own performance. Thus, the ratchet effect, in tandem with other “softenings” of incentives, such as sharing rules and low-end adjustments, undermines the desirable incentive properties of price-cap regulation for a single monopolist, and blurs the distinction between price-cap regulation and old-fashioned cost-plus regulation. If regulators lack the information needed to set and confidently adhere to a choice of X over a long period, a substantial portion of the potential gains from incentive regulation may be unattainable.⁴ Thus, *ideal* price caps are unrealistic, and

³ As FCC Chairman Kennard recently remarked, “[s]ome say the current X-factor of 6.5% is too low, others say it is too high.” Press Statement by Chairman William E. Kennard on Access Charge Reform, October 5, 1998.

⁴ See, for example, Statement of Stanley M. Besen, Reply Comments of the National Cable Television Association, Inc., *In the Matter of Policy and Rules Concerning Rules for Dominant Carriers*, CC 87-313, August 3, 1989.

realistic price caps for a single monopolist do not fully overcome the fundamental information and incentives problem.

These problems are by no means restricted to the regulation of interstate access. Another important area in which very similar issues arise is the following. To provide universal service support, regulators must determine an appropriate level of support for serving customers in a high-cost area. Clearly the revenues available from customers – not only for supported services, but also available “follow-on” revenues – should enter into this calculation. Yet, there would be a ratchet problem if a high-cost carrier’s subsidy were reduced dollar-for-dollar in response to increases in the per-line revenue that it achieves. Better information on the *potential* for such revenue increases, from sources that do not create such a ratchet effect, would allow the Commission and the Joint Board to calculate sufficient subsidies without adverse incentive effects.

C. Limiting Exclusionary Conduct

The Commission, of course, does much more than simply set the maximum prices for interstate access charges. In most or all of its activities, better information about the actual and potential abilities of dominant firms would help the Commission to combine efficient incentives with protection of consumers. We restrict ourselves here to one important and topical example.

Especially since the passage of the Telecommunications Act, the Commission has rightly been concerned to open up local exchange and exchange access markets to competition. Because of the special features of those markets, Congress judged that mere removal of legal barriers to entry would be insufficient, and instead set up a competitive scheme under which ILECs are required, even against their interests, to cooperate with competitors. ILECs control local network services and resources that are essential to rival Competitive Local Exchange Carriers (CLECs).

Similarly, IXCs and competitors offering combined local and long-distance voice and data services rely, to varying degrees, on interconnection and access arrangements with the ILECs. Until facilities-based local competition is sufficiently widespread (or can be rapidly created by these competitors), therefore, state and federal regulators must enforce ILECs' duties to provide such cooperation.

This is a very difficult regulatory task and requires information that is difficult to acquire. The ILECs' competitors – particularly those wishing to offer innovative services – often require new network services and access arrangements, in particular for interconnection to the local network and collocation of competitors' equipment at ILEC facilities. Especially in these cases, the Commission is unlikely to have sufficient independent information about what arrangements are technically feasible, how the particular arrangements affect the quality of service provided to rivals, and what costs the ILECs must incur to supply them. As a result of this information problem, there is a real risk that ILECs may refuse to provide access, engage in delay and slow deployment, and then finally only offer service at degraded quality, or (especially) offer new services in an inefficient manner.⁵

D. Benchmark Regulation Ameliorates the Information and Incentives Problem

Fortunately, telecommunications regulators in the United States have a powerful tool that can greatly improve their acquisition of information relative to that of a regulator facing a single monopolist. Using information about a number of similarly-situated ILECs, the regulator can set benchmarks or yardsticks by which to assess past performance of an individual ILEC and

⁵ See Declaration of Michael L. Katz and Steven C. Salop, "Using a Big Footprint To Step On Competition: Exclusionary Behavior and The SBC-Ameritech Merger," October 14, 1998 (henceforth Katz and Salop). See also B. Douglas Bernheim and R. D. Willig, *The Scope of Competition in Telecommunications*, The American Enterprise Institute for Public Policy Research, Working Paper, October 25, 1996, Chapters 3 and 4.

establish incentives for its future performance. Benchmarks improve the operation of incentive regulation for two closely related reasons.

First, comparisons against the performance of a number of other ILECs provide the regulator with more *information*. In the case of price caps, additional information increases the regulator's ability to estimate the actual, but unknown, efficiently-achievable performance (X^*) of a regulated ILEC. This not only tends to make the chosen X-factor closer to the correct level, but should strengthen the regulator's resolve (crucial to achieving the incentive benefits of price caps) not to renegotiate in the face of unexpectedly profitable or unprofitable results for an individual company. In other cases, comparisons with other ILECs allow the regulator better to assess what practices are technically feasible, to scrutinize unusually poor performance, or even to set as a standard the best practice. In short, the regulator's *information problem* is ameliorated.

Second, if future performance standards to be applied to an ILEC are based on a benchmark such as industry-wide average productivity, then an individual ILEC's own behavior affects those future standards to only a limited extent. As a result, the ILEC has less *incentive* to alter its current behavior to account for future revisions in the performance standard than it would if that standard were based primarily on the ILEC's own past performance. In short, the regulated firm's "ratchet" *incentive problem* is ameliorated.

E. Value of Benchmarking Widely Recognized

This observation that benchmarking is a valuable tool of efficient regulation is neither novel nor surprising. In contrast to "ideal" but infeasible price-cap mechanisms, the use of benchmarks based on average performance is a robust regulatory tool that greatly reduces the ratchet problem *without* the need for the regulator to obtain extraordinary levels of information.

Similarly, the use of benchmarks makes it much easier for regulators to make credible long-term commitments to desirable incentive mechanisms. Best-practice benchmarking and the use of comparative information to focus heightened scrutiny on poor practices are similarly robust and valuable tools of regulation and emerging competition.

Since the divestiture of the local bottleneck portions of the former AT&T into seven independent holding companies, the Commission has correctly recognized that the ability to make benchmark comparisons among BOCs, RBOCs, and ILECs in general constitutes an important regulatory tool. As described more fully in the attachment to this Declaration,⁶ since the 1984 divestiture of the Bell System the Commission, the Justice Department, and the Courts have all acknowledged and relied upon the ability of regulators to employ benchmarking. The existence of a number of large, independently-managed ILECs provides a range of technical, economic, and operating experience from which the Commission can draw to assess proposed regulatory actions, establish performance standards, and set parameters in incentive-regulation formulas.

The U.S. Court of Appeals for the District of Columbia Circuit noted:

[T]he existence of seven [R]BOCs increases the number of benchmarks that can be used by regulators to detect discriminatory pricing. . . . Indeed, federal and state regulators have in fact used such benchmarks in evaluating compliance with equal access requirements . . . and in comparing installation and maintenance practices for customer premises equipment.⁷

⁶ See "Benchmark Comparisons," Attachment A to Ameritech's Comments on the Report and Recommendations of the United States Concerning the Line-of-Business Restrictions (*United States v. Western Electric Co.*), 1987, D.C. Cir. Civ. Action No. 82-0192, filed Mar. 13, 1987.

⁷ *United States v. Western Electric Co.*, 993 F.2d 1572, 1580 (D.C. Cir.), *cert. denied*, 126 L. Ed. 2d 438 (1993).

Outside the United States, other regulatory bodies and competition authorities have also recognized the value of benchmarking in dealing with monopoly or dominant firms. For example, in the United Kingdom the regulator of the water and sewerage industry uses industry-wide data to set a price cap for each firm.⁸ The European Commission has adopted benchmarks for evaluating access prices that are based on the lowest interconnection rates charged in each Member State. These examples are discussed in more detail below.

II. Forms of Benchmarking

Although there are many ways in which benchmarking may be implemented, it is helpful to consider three categories: the use of *averages*, the use of *best practices*, and the use of *heightened scrutiny of worst practices*.

A. Average-Practice Benchmarking

In its price-cap regulation of interstate access charges, the Commission has rightly expressed concern that reviewing the level of the X-factor every two years and updating it periodically, if undertaken on an ILEC-specific basis, would substantially weaken the incentive for the ILEC to improve its productivity (the ratchet effect). However, different ILECs' capabilities for productivity improvement are highly correlated, because many of the same technological opportunities, new products, and demographic trends apply to all. Consequently, this is a suitable opportunity for a relative-performance scheme, in which price changes can be set based on industry-average rather than on carrier-specific productivity measures.⁹

⁸ Office of Water Services (OFWAT), "Future Charges for Water and Sewerage Services," July 1994, pp. 17-19.

⁹ FCC 97-159, *Price Cap Performance Review for Local Exchange Carriers*, Fourth Report and Order in CC Docket No. 94-1 and Second Report and Order in CC Docket No. 96-262, adopted May 7, 1997, released May 21, 1997, paras. 167 and 181 (henceforth *Price Cap Performance Review for Local Exchange Carriers*).

When the average is made up of a large number of ILECs, each constituting only a small share in the industry average, the resulting ratchet effect is small. That is, each single LEC's incentive to increase its productivity is only modestly weakened through the ratchet effect: its own productivity experience is only a small part of the industry averages that will affect the updated standard in the future. In setting X-factors in price caps for access services, the initial level of charges for each ILEC was established on the basis of that ILEC's historic costs, while the X-factor which that determines the annual reduction in the access price index is set based on *industry-wide* trends in productivity. Specifically, the Commission has adopted measures of annual productivity increases based on studies that estimate productivity changes using historical data for large LECs. Several studies use RBOC-only data or data for RBOCs plus several larger independents.

Similarly, in setting high-cost support for universal service, the Joint Board decided to base subsidies on the difference between an estimate of cost and an average of monthly revenue per residential line.¹⁰ The assumed "benchmark" customer revenue per line is intended to be based on *industry-wide average* figures that will evolve over time.

In this sub-section, we discuss the use and efficiency of such "average-practice benchmarking," in which each ILEC is held to a standard that depends on (past, or expected) industry-wide performance rather than its own.

To fix ideas, suppose that annual adjustments to each ILEC's access charges are constrained by an industry-wide benchmark — a price index based on an industry-wide average of all ILECs' productivity changes — rather than directly determined by the performance of the individual ILEC.

¹⁰ Federal Communications Commission, CC Docket 96-45, *In the Matter of Federal-State Joint Board on Universal Service*, Report and Order, adopted May 7, 1997, released May 8, 1997, para. 259.

Roughly speaking, the ratchet effect under such a price cap regime is proportional to the extent to which an ILEC's lower costs affect the access prices that it receives. Suppose, for example, that a large ILEC has 20% of the nation's access lines and that it reduces its own interstate access costs by \$1 per line. Under "average-performance" benchmark regulation, the firm's profits will initially rise by the amount of its lowered costs, \$1 per line.¹¹ In due course, the Commission will recalibrate the X-factor to account for the nationwide improvement in average productivity. How much of the gain from this productivity improvement is thus recovered from the more efficient ILEC?

First, we should note that under the access price-cap system as it exists, no change would be likely for some period of time. There are lags in reporting cost data, in estimating recent industry-wide productivity gains, and in implementing a new X-factor based on such estimates.¹² In addition, the Commission has tended to adjust the X-factor rather than the levels of access charges (thus bringing levels down only gradually).¹³ With all this in mind, it may be reasonable to suppose that, on average, the level of interstate access price responds to the hypothetical \$1 reduction in per-line costs some three to five years after that reduction takes place.¹⁴

¹¹ This assumes that the firm's prices do not change. If the firm instead chooses to lower its prices below the cap, profits will presumably rise by more – by a revealed-preference argument. When regulation is binding, however, this is unlikely to be a major consideration.

¹² In setting the currently applicable X-factor in May 1997, the Commission relied on a series of multi-year averages of the total factor productivity of the RBOCs and gave the most weight to averages calculated between 1987 and 1995. The new 6.5% X-factor was then made effective from 1996, the beginning of the interim access charge period. *Price Cap Performance Review of Local Exchange Carriers*, para. 139.

¹³ In principle, such a feedback could lead to all kinds of complexities. But it seems likely that in the medium- or long run there will tend to be convergence of levels. In this connection, the fact that the new X-factor set in 1997 was made effective from 1996 may suggest an interest in levels as well as in rates of change.

¹⁴ This analysis addresses only the Federal component of the problem. States differ in their treatment of ILEC productivity improvements. Many states apply price-cap regulation to the intrastate charges of large ILECs. In some, the rates mirror the interstate access rates, but in others it is not clear to what extent regulation relies on benchmarks.

A large ILEC with 20% of the nation's access lines keeps its \$1 per line saving for perhaps four years; after that it keeps just 80% of it, because recalibration based on industry-wide average performance recaptures 20% of the saving.¹⁵ At a real discount rate of 10%, the net present value of the ILEC's gross private return per line is the sum of these discounted savings for many years, or approximately

$$$(1 + .91 + .83 + .75) + .8*(.68 + .62 + .56 + \dots) = \$9.50$$

compared to the

$$$(1 + .91 + .83 + .75 + .68 + \dots) = \$11$$

that it would gain if its prices never had to respond to its cost reduction – the case of an “ideal price cap.”¹⁶ Thus, under these assumptions, the adjustment of the X-factor “taxes” away approximately 14% (i.e., $9.50/11 = .86 = 1 - .14$) of the ILEC's incentive to reduce its access costs.

This compares with a 68% tax if the price facing an individual ILEC were adjusted, with the same timing, based on its own recorded performance.¹⁷ In other words, the relative-performance scheme, in this case average-practice benchmarking, leads to a very substantial improvement in these incentives. As we will discuss below, however, as LECs consolidate by merger, the ratchet disincentive that concerns the Commission becomes considerably more severe.

¹⁵ Note that access lines that are not controlled by ILECs whose performance enters into the productivity estimates should not be counted in the assessment of these shares.

¹⁶ The numbers 1, .91, .83, .75, .68, ... are successive powers of the one-year discount factor (1/1.10).

¹⁷ The ILEC retains only the first four terms above, $$(1 + .91 + .83 + .75)$, or \$3.49, out of the gross present value of \$11.

B. Best-Practice Benchmarking

A second, and perhaps even more important, use of benchmark or yardstick techniques is less formal and can be applied to qualitative as well as quantitative characteristics of ILEC service offerings. Rather than calculating an industry-wide average figure and applying it to all ILECs, regulators may be able to use a "best" practice offered by one ILEC to learn what is possible for all and to require all ILECs to implement it.

Interconnection arrangements for rivals may be particularly suited to "best-practice" benchmarking. Under the 1996 Telecommunications Act, an ILEC has the duty to provide interconnection at any technically feasible point within its network.¹⁸ By probing the practices of individual ILECs, the Commission endeavors to assess whether ILECs' claims about technical feasibility are warranted, and to monitor the quality of interconnection. It can then establish as a standard for all ILECs a benchmark based on the best observed (or offered) practice.

Number Portability Example

A telling example of best-practice benchmarking is provided by the standards established for local number portability. In the Commission's proceedings, many ILECs claimed that the Location Routing Number (LRN) method was not a cost-effective way of implementing local number portability and instead proposed initially to implement a query-on-release (QOR) method. Specifically, six RBOCs, GTE, and USTA petitioned the Commission to be allowed to use the QOR implementation, claiming they would achieve significant cost savings by using this method.¹⁹ If implemented, however, the QOR method would result in lower-quality service on

¹⁸ Telecommunications Act of 1996, Sec. 251 (c)(2)(C).

¹⁹ FCC 97-74, *Telephone Number Portability*, First Memorandum Opinion and Order on Reconsideration, released March 11, 1997, para. 34.

calls to telephone numbers ported to competing local carriers and thus help ILECs to exclude rivals from local service markets. A single exception (Ameritech) planned to deploy the LRN method, which provides equal-quality service to calls of all carriers, at the outset.

The Commission concluded, on the basis of this experience, that it was feasible for all ILECs to implement the LRN method. It found that the LRN method would most likely result in long-run cost savings and that the QOR method, if implemented, would harm competitors who must rely on ILEC networks in order to route calls.²⁰ As a result, the Commission adopted best-practice performance standards based on the LRN method.²¹ Had Ameritech joined the other large ILECs in claiming that LRN was impracticable, it seems unlikely that the Commission would have had the knowledge or confidence to require such standards, or to do so on the same timetable. Depending on the relative strength of Ameritech's motive for implementing LRN and SBC's motive for not doing so, LRN might well have been substantially delayed had the proposed merger of SBC and Ameritech been accomplished (or even contemplated) at the time.

Effects of Best-Practice Benchmarking

Broadly, we analyze the effects of best-practice benchmarking by considering two aspects. First, setting aside incentive issues for the moment, best-practice benchmarking diffuses "best practice" across ILECs. If the practice judged best is indeed best, this is a desirable effect, and the more so, the greater the diversity in ILECs' initial practices or proposals. Second, we must consider incentive effects.

²⁰ Id., paras. 13 and 38.

²¹ Id., para. 38.

The incentive effects of best-practice benchmarking differ from those of average-practice benchmarking. Suppose that an ILEC knows that best-practice benchmarking will ultimately be applied, and that there is no reward for initially employing what turns out to be the “best” industry-wide practice and no sanction for initially using other practices. Then, although many complexities could arise, a first cut is that the ILEC’s incentive would be the same as that of a single monopolist. The reason this is true, of course, is that any one ILEC’s choice matters only if it turns out to be “best,” in which case that choice will be applied to all ILECs, including the one who chose it. So, each ILEC has an incentive to select a practice as if its own choice will apply to it (even though, in fact, that may not happen). The prospect that this kind of best-practice benchmarking will be uniformly applied after all ILECs’ choices are observed does not then affect each ILEC’s incentives.²²

Because the incentive effects are likely to be modest or unclear, if ILECs were identical, there would be no gain from best-practice benchmarking. However, experience shows that there is often considerable diversity among ILECs’ choices.²³ These differences might result from differences in (a) strategy (e.g., one ILEC may seek early Section 271 approval whereas another

²² This analysis assumes that there is no reward to being the best nor punishment for not being the best, but simply a low-cost *ex post* dissemination of best practice. Obviously, other possibilities could be considered.

²³ Entrants seeking to purchase unbundled network elements from ILECs propose that regulators set detailed performance standards for maximum times for quotations and for delivery of service, cost-sharing arrangements, and similar service conditions. They frequently document a wide range of actual practices across large ILECs. For example, Northpoint Communications observes that some ILECs’ requirements for ordering collocation require a CLEC to have state certification, and that these conditions delay collocation by a minimum of six months compared with other ILECs that have tariffed physical collocation. Northpoint also notes that obtaining collocation quotations from SBC in Texas required almost four months, whereas Ameritech provides quotes within 10 days. Similarly, charges for collocation-related services vary greatly across ILECs. For example, application fees range from \$0 (Pacific Bell) to \$7500 (Bell Atlantic North); cage construction charges vary from \$10,000 (Georgia) to more than \$100,000; power, heating and ventilation and installation charges vary from \$2,000 to \$12,000; and charges for OSS access vary from \$0 (Florida) to \$4700 per month (SWBT). Ex Parte, Letter from Steven Gorosh, Vice-President and General Counsel, Northpoint Communications, to Ms. Magalie Roman-Salas, Secretary, Federal Communications Commission (July 7, 1998), (transmitting attached document, *Proposed Remedies for Promoting DSL Competition*, on file with Federal Communications Commission in CC Docket Nos. 98-11, 98-26; 98-32; and 98-91.

seeks to maximize barriers to local competition), (b) demand structure, (c) previously established state regulatory requirements, or other factors. Whatever the source, it is clear that ILECs often make rather different choices from one another.

The next question then becomes whether the differences primarily reflect different efficient choices, or whether they reflect different degrees of candor or of cooperation, in addressing a fundamentally similar problem. If they reflect different efficient choices, it could be inappropriate to impose a “one-size-fits all” policy. If, however, the differences reflect different attitudes towards cooperation, then promulgating the “best” of the ILECs’ initial choices throughout the industry is desirable (provided any costs of changing other ILECs’ behavior are not too large). Moreover, given the complex and novel problems sometimes posed by interconnection requests, different responses may simply reflect different arbitrary choices.

Thus, in the case of number portability, the Commission found that the observed diversity was not a matter of different efficient choices, but rather that Ameritech’s proposal could be taken as indicating that there was scope to implement LRN generally.

Recognition of the Value of Best-Practice Benchmarking

The value of best-practice benchmarks has been recognized by the Commission, the Department of Justice, competitors of the ILECs, and the ILECs themselves. In particular, the Commission has relied on the diversity of ILEC practices to determine the feasibility of regulatory standards and yardsticks for a wide variety of practices, as the following examples illustrate:

- *Technically feasible interconnection.* The Commission concluded that interconnection or access at a particular point in one LEC network is evidence of the

technical feasibility of providing the same or similar interconnection in another ILEC network.²⁴ Further, the Commission found that successful interconnection at a particular level of quality in one network is substantial evidence of the feasibility of interconnection at the same level of quality in another network.

- *Access to OSS functions.* The Commission found that ILEC competitors would be severely disadvantaged, if not precluded altogether, from fairly competing if they are unable to obtain the functions of pre-ordering, ordering, provisioning, maintenance and repair, and billing for network elements and resale services in substantially the same time and manner as the incumbent. The Commission observed that ILECs now provide IXCs with different types of electronic ordering and trouble interfaces, and that some ILECs are testing and operating interfaces for real-time access to OSS functions. These performance yardsticks enabled the Commission to conclude that providing nondiscriminatory access to OSS functions is technically feasible.²⁵
- *Shared transport.* The Commission observed that Bell Atlantic, NYNEX, and PacTel offer shared transport in conjunction with unbundled local switching, and rejected Ameritech's objection that it was unable to measure and bill for shared transport.²⁶
- *Open architecture.* In commenting favorably on a DOJ consultant's report, the Commission observed that "reliance on benchmarking also improved the

²⁴ FCC 96-325, *Implementation of the Local Competition Provisions in the Telecommunications Act of 1996*, First Report and Order, CC Docket No. 96-98, adopted August 1, 1996, released August 8, 1996, para. 204 (henceforth Local Competition Order).

²⁵ Local Competition Order, para. 518-520.

²⁶ FCC 97-295, *In the Matter of Implementation of the Local Competition Provisions in the Telecommunications Act of 1996*, Third Order on Reconsideration and Further Notice of Proposed Rulemaking, adopted August 18, 1997, released August 18, 1997, para. 26, fn 77.

Commission's regulation of interconnection and monitoring of network performance.”²⁷ That report²⁸ cited a plan by Ameritech to introduce a new type of “Feature Node Service Interface” interconnection at local switches which led the Commission in its Third Computer Inquiry proceeding to require other RBOCs to submit open-architecture proposals.

- *Trunk-side interconnection.* The Commission received an extensive cellular industry report on cellular interconnection and requested public comments on that report. Based on the information collected, the Commission concluded that trunk-side Type 2 interconnection is the most efficient method of interconnecting a cellular carrier’s network to an ILEC’s wireline network. Finding that some LECs had made Type 2 interconnection facilities available to cellular carriers, the Commission concluded that Type 2 interconnection was feasible. The Commission also found that, even if delays were incurred to lay cable or obtain equipment, a carrier should require no more than six months to provide Type 2 interconnection.²⁹
- *Cageless collocation.* In the current Section 706 proceeding, the Commission observed that US West currently offers a cageless collocation arrangement. The Commission also noted that SBC permits CLECs to share collocation space instead of requiring each CLEC to occupy a dedicated cage. The Commission requested

²⁷ FCC 97-286, *In the Applications of Nynex Corporation Transferor and Bell Atlantic Corporation Transferee, For Consent to Transfer Control of NYNEX Corporation and Its Subsidiaries*, Memorandum Opinion and Order, adopted August 14, 1997, released August 14, 1997, fn 175.

²⁸ Peter W. Huber, *The Geodesic Network: 1987 Report on Competition in the Telephone Industry*, 1987.

²⁹ 2 FCC Rcd 18, *In the Matter of The Need to Promote Competition and Efficient Use of Spectrum for Radio Common Carrier Services*, Declaratory Ruling, adopted April 30, 1987, released May 18, 1987, 2914 (paras. 31-33).

comments to determine whether such arrangements should be presumed to be technically feasible at other LEC premises.³⁰

- *Operating expenses.* A Commission staff analysis of models submitted for use in estimating the costs of supplying universal service and unbundled network elements evaluated the input requirements of cost proxy models. The staff found that much of the variation in the models' estimates of the monthly cost of network elements is accounted for by differences in the treatment of operating expenses.³¹ One approach suggested by the staff for improving the cost estimates is to use, as a yardstick for operating expenses, the minimum actual costs achieved by a sample of companies that report annually to the Commission.³²
- *Line-of-business restrictions.* In support of its 1987 comments recommending elimination of the line-of-business restrictions, Ameritech provided an extensive summary of "the widespread and effective use of benchmark comparisons" since the divestiture established seven independent RBOCs.³³ It noted that in proceedings before the Department of Justice, the District Court, and the Commission, private-sector firms compared deployment and end-office conversion schedules, presubscription activities, ordering procedures, and rate levels for wholesale services,

³⁰ FCC 98-188, *In the Matters of Deployment of Wireline Services Offering Advanced Telecommunications Capability...* Memorandum Opinion and Order, and Notice of Proposed Rulemaking, adopted August 6, 1998, released August 7, 1998, para. 139.

³¹ J. Atkinson, C. Barnekov, D. Konuch, W. Sharkey, and B. Wimmer, *The Use of Computer Models for Estimating Forward-Looking Economic Costs: A Staff Analysis*, January 9, 1997, para. 64.

³² *Id.*, para. 68.

³³ A copy of Ameritech's summary is included as an attachment to this Declaration. Attachments to Ameritech's Comments on the Report and Recommendations of the United States Concerning the Line-of-Business Restrictions, March 13, 1987, Civil Action No. 82-0192.

among others. As one example, Ameritech observed that the Commission imposed on all RBOCs an allocation plan for routing of default traffic that was modeled after the practice proposed by a single company, Northwestern Bell, whereas all other RBOCs proposed routing the default traffic to AT&T.³⁴

- *Equal access.* In evaluating RBOCs' compliance with the divestiture decree, the Department of Justice has tended to define regional company equal access obligations based upon the highest level of performance achieved by *any* of the regional companies. The DOJ compared and contrasted the equal access progress of the RBOCs on issues including: (1) availability of equal access; (2) conversion of conforming end offices; (3) cellular radio equal access; (4) equal access for 800 and 900 services; and (5) equal access from public telephones. For each issue, the DOJ used the highest level of performance achieved by an RBOC as a benchmark in assessing the progress of the others.³⁵
- *Overhead costs.* The levels of overhead costs included in the rates for unbundled network elements, including collocation services, are of particular concern to carriers that must interconnect with ILECs. In a California Public Utilities Commission proceeding, Sprint recommended that a markup for overhead costs be limited to 15%. To reach this proposed standard, Sprint analyzed ARMIS data filed with the Commission and noted that two RBOCs consistently had markups less than 15%.³⁶

³⁴ Id., para. A-16.

³⁵ Report of the United States to the Court Concerning the Status of Equal Access (D.D.C.; Oct. 31, 1986).

³⁶ PUC of the State of California, R.93-04-003, I.93-04-002, Direct Testimony of David T. Rearden on Behalf of Sprint Communications Company L.P. on Pacific Bell UNE Pricing Issues, redacted version April 8, 1998, p. 10.

Best-Practice Benchmarking Abroad

Best-practice benchmark regulation is not limited to the United States. The European Commission has adopted a type of best-practice benchmark approach to assessing prices for access to public switched telecommunications networks and recommending maximum interconnection charges. The Commission established “best current practice” interconnection charges that are based on the three Member States with the lowest interconnection rates (the UK, France, and Denmark). The Commission’s methodology establishes a benchmark range, with the low rate set somewhat below the lowest access price available. Starting January 1, 1999, the best current practice rate for local interconnection, for example, is the range 0.5 – 1.0 Eurocent (0.6 to 1.2 US cents) per minute (at peak rate). The interconnection benchmark rate will establish an incentive for national regulators in a number of countries to reduce high interconnection rates. As of May 1998, eleven of the fifteen Member States had local interconnection rates that exceeded the upper end of the benchmark range and in five of those states the rates were more than 80% above the upper benchmark value.³⁷ In the context of antitrust cases brought under the European Union’s competition law, an interconnection price that is more than 100% above a best practice rate will be taken to signal a substantial likelihood of an abuse.

In the United Kingdom, the Director General of Water Services uses comparative information on water and sewerage companies in a variety of ways, but with particular emphasis on best practices.³⁸

³⁷ European Commission 98/511/EC, Recommendation Amending Recommendation 98/195/EC on Interconnection in a Liberalised Telecommunications Market (Part 1 – Interconnection Pricing), July 29, 1998.

³⁸ See the Monopolies and Mergers Commission’s discussion of the Director General’s comments, in its analysis of the proposed merger of Wessex Water Plc and South West Water Plc: Monopolies and Mergers Commission, *A report on the proposed merger*, October 1996, para. 2.70 (henceforth Monopolies and Mergers Commission).

C. “Heightened Scrutiny for Poor Performance” Benchmarking

A third form of benchmarking is the identification of problem cases. The Commission makes extensive use of comparative data that it collects from ILECs to assess the performance of individual companies in setting rates, delivering service of satisfactory quality, and enforcing existing regulatory standards. In its investigations, the Commission frequently relies on several years of data for each ILEC and buttresses preliminary findings concerning individual companies with comparisons across companies. In this way, the Commission is able to identify extremes of sub-standard performance. The Commission can require the poorly-performing ILEC to “catch up,” impose regulatory sanctions or, at a minimum, instigate heightened regulatory scrutiny of the laggard ILEC. Not only does this potentially improve outcomes *ex post*, but the possibility that regulators may discipline sub-standard performance should improve ILECs’ incentives *ex ante*. Again, absent multiple ILECs, the Commission would often lack the information to do any of these things with much confidence. Below we list the factors at issue.

- *Collocation*. The Commission has evaluated the reasonableness of LECs’ charges for physical collocation services provided for interexchange access in terms of an industry-wide benchmark.³⁹ Collocation was a relatively new service for which little or no historical cost data and operating experience were available and for which LECs must make estimates of costs. For its statistical investigation, the Commission relied on direct cost estimates of 14 LECs⁴⁰ that offered collocation and had at least one

³⁹ FCC 97-208, *In the Matter of Local Exchange Carriers’ Rates, Terms, and Conditions for Expanded Interconnection Through Physical Collocation for Special Access and Switched Transport*, Second Report and Order, CC Docket No. 93-162, released June 13, 1997.

⁴⁰ Pacific Bell, Nevada Bell, Southwestern Bell Telephone Company, Southwestern New England Telephone Company, Ameritech Operating Companies, New York Telephone and New England Telephone and Telegraph Company, BellSouth Telecommunications, Inc., US West Communications, Inc., GTE Telephone Operating

physical collocation customer. The Commission aggregated the LEC data for seven collocation functions: floor space, DC power, cross-connection and termination equipment, security installation, security escort, construction, and entrance facility. To minimize the impact of LEC estimation errors, it first excluded any cost estimate that exceeded the sample mean by more than two standard deviations (for that collocation function). The Commission then calculated the simple (unweighted) mean of the direct costs for each function and the sample standard deviation of the mean.

Deciding that it should recognize that some LECs may reasonably provide service somewhat less efficiently than other LECs, the Commission set the mean plus one estimated standard deviation as a maximum cost standard. Direct costs that exceed this value are disallowed, unless the LEC could justify the higher costs. The Commission used this methodology to ensure that the LECs' direct costs would fall within a "zone of reasonableness" and stated that the strict use of an average or median as the standard of reasonableness might not reflect the relative imprecision of the LECs' cost estimates for a new service.⁴¹ In doing so, the Commission rejected a more lenient standard, observing that "all LECs have ample incentive to inflate the direct cost of physical collocation because these are the rates that they are imposing on the interconnector-customers against which the LECs compete in the interstate access market."⁴² Thus, the Commission's procedure sets a benchmark for identifying poor

Companies, Cincinnati Bell Telephone Companies, Lincoln Telephone and Telegraph Company, Rochester Telephone Corporation, and Central Telephone Companies.

⁴¹ Id., para. 147.

⁴² Id., para. 148.

performance that is based on both the average and the variance of industry-wide experience.

- *Overhead costs.* ILECs recover their common costs and costs of overhead activities by marking-up the direct costs of services. The Commission observed that assigning high overheads to the LEC facilities upon which interconnectors rely to provide competitive services, while assigning low overheads to services against which interconnectors seek to compete, is anticompetitive and that actions to raise rivals' costs through this mechanism can be profitable.⁴³ In its review of tariffs for virtual collocation, the Commission issued a detailed request for overheads and cost support data. Using the data submitted by the ILECs, the Common Carrier Bureau selected point-to-point DS1 and DS3 services as a yardstick to evaluate the overhead loadings assigned to virtual collocation services.⁴⁴ The Commission found that the LECs' loadings for DS1 and DS3 services varied widely, and observed that three RBOCs that used some of the highest overhead loadings also impose the highest total charges for virtual collocation services.⁴⁵ On the basis of this investigation, the Commission concluded that most of those LECs' virtual collocation rates were likely to be unreasonably high, and prescribed maximum permissible overhead loadings for virtual collocation services equal to the loadings for the comparable DS1 and DS3 services. By collecting comparative data on ILEC practices, the Commission was better able to detect and remedy potentially exclusionary conduct.

⁴³ FCC DA-94-1421, Order, December 9, 1994, para. 23.

⁴⁴ *Id.*, para. 17.

⁴⁵ The LECs proposed to assign generally high loadings to collocation charges while assigning low loadings to comparable services.

- *Non-primary lines.* In its Access Charge Reform Order⁴⁶ the Commission modified the method for recovering common line costs and instituted a new flat, per-line charge (the Presubscribed Interexchange Carrier Charge – PICC) assessed on the customer’s presubscribed IXC. The new access charge regime requires LECs to distinguish between primary residential lines and non-primary residential lines. The rates for both the Subscriber Line Charge, which is paid by the end user, and the PICC are higher for non-primary residential lines. As a result, an ILEC with lower penetration of non-primary lines may be allowed to charge higher per-minute access fees.

The Commission investigated the penetration ratios for non-primary residential lines and found that several ILECs’ reported penetration ratios were increasing over time, but that the penetration ratios of SNET (now part of SBC) were much lower than expected. As “an initial test of reasonableness” the Commission calculated the average penetration of non-primary (second) residential lines for all price-capped LECs. The Commission tentatively concluded that SNET had under-represented the number of non-primary residential lines and ordered SNET to document in detail the procedures and data used to estimate non-primary residential lines and to present evidence to justify its low penetration ratio.⁴⁷ SNET has contended that it should not be required to undertake further measurements until the Commission formally establishes a definition of non-primary residential lines in a current proceeding.⁴⁸

⁴⁶ FCC 97-158, *In the Matter of Access Charge Reform*, First Report and Order, CC Docket No. 96-262, adopted May 7, 1997, released May 16, 1997.

⁴⁷ FCC 98-104, *In the Matter of 1998 Annual Access Tariff Filings, Southwestern Bell Telephone Company Revisions to Tariff FCC No. 73*. Memorandum Opinion and Order, Order Designating Issues for Investigation, and Order on Reconsideration, CC Docket 98-104, adopted July 29, 1998, released on July 29, 1998, paras. 15-19.

⁴⁸ CC Docket 98-104, Direct Case of the Southern New England Telephone Company, *In the Matter of 1998 Annual Access Tariff Filings*, August 31, 1998.

Surely, however, the availability of this kind of comparative information places the Commission in a much stronger position to defend consumers against the possibility that an ILEC understates the penetration of second lines.

Again, we note that U.S. telecommunications is not the only forum for such comparisons. For instance, the U.K.'s Director General of Water Services has promised stricter scrutiny for companies reporting relatively high costs.⁴⁹

III. Effects of Mergers on Benchmarking

In this section we use the analysis and discussion above to assess the effects of mergers among large ILECs on the efficacy of benchmarking. The Commission has recently clearly recognized that a merger of two RBOCs weakens its ability to use benchmarking to regulate effectively:

A reduction in the number of separately owned firms engaged in similar businesses will likely reduce this Commission's ability to identify, and therefore to contain, market power. One way that this can happen is by reducing the number of separately owned and operated carriers that can act as "benchmarks" for evaluating the conduct of other carriers or the industry as a whole.⁵⁰

In this section we discuss the effects of ILEC mergers on the forms of benchmarking we have discussed above. We confirm that mergers can harm benchmarking – both through reducing available information even if ILECs do not change their substantive behavior, and also by worsening their incentives under benchmarking.

⁴⁹ Office of Water Services (OFWAT), UK, *Setting Price Limits for Water and Sewerage Services: The Framework and Approach to the 1994 Periodic Review*. November 1993, p. 19.

⁵⁰ FCC 97-286, para. 147.

A. A Merger Reduces Information from Benchmarking Even When Behavior is Unchanged

Even ignoring incentive effects, if a merger leads to more aggregated reporting, valuable information is lost. In this sub-section we give a statistical formulation of this common-sense observation, intended to help analyze when it is likely to be important. After establishing the formulation, we discuss a rather stark best-practice example inspired by the number portability example above. Then we discuss effects on the use of average-practice benchmarking, both in terms of accuracy of the “average” as an estimate of an underlying parameter, and in terms of the effect of loss of observations on the confidence with which the Commission can wield this important tool. Finally, we note that these effects have been recognized elsewhere.

In many cases, after a phase-in period, the merged firm may adopt a common practice in such matters as pricing of services, availability of network components, and provisioning practices. Post-merger, only a single data point for these practices is then available for the two previously independent firms. In particular, useful financial information is likely to be reported at the firm level (aggregating across the merged operating companies). Even where the merged firm also reports company-by-company results, those values can be less useful than data from independent firms. Thus, the U.K.’s Monopolies and Mergers Commission (MMC), in considering the potential loss of independent observations through the merger of two water and sewerage companies, found that “the use of sub-company data is very much a second best ... first, that there are major cost allocation difficulties in the use of sub-company data and secondly, ... such data exhibit less variation and are hence less informative than they would be if they reflected the input of independent management.”⁵¹

⁵¹ Monopolies and Mergers Commission, para. 2.76.

Our setting is the following: Each of n ILECs (prior to a merger) reports a statistic x_i , where $i = 1, \dots, n$. Each x_i is drawn from a distribution with some parameter(s), say b , and thus contains information about b .⁵² The Commission wishes to learn something about b , perhaps in order to set a performance standard. We note that because different errors in establishing a benchmark (setting too stringent a performance standard versus too lax a standard) often have asymmetric costs, the Commission should care not only about a posterior mean of b but also about measures of posterior dispersion (such as variance). In other words, as we remarked above in the concrete context of “ideal” price caps, (warranted) confidence in the benchmark is important.

We then ask: How does a merger that effectively aggregates some of the x_i before they are reported affect the Commission’s ability to infer b from the information it receives? While there are cases in which such a merger has no effect (at this level of analysis), the conditions for such neutrality are stringent and unlikely to hold in many regulatory contexts.

A Best-Practice Example

Let us begin with an example in which one can see quite starkly how information can be lost in going to a single “merged” report based on what would otherwise have been independent observations x_1 and x_2 . Consider once again number portability as an illustration of best-practice benchmarking. Here, a model that captures our (and perhaps the Commission’s) thinking is that an unknown (to the Commission) parameter b is equal to 1 if LRN is reasonably implementable

⁵² The analysis is simplest if the x_i are independent and identically distributed, but that is not necessary for the basic insights.

in the near future, and is equal to 0 if it is not. For each firm i the observation x_i is, with probability p , equal to b (which may of course be 0 or 1), and, with probability $1 - p$, equal to 0.⁵³

Then, a sufficient statistic for b is the maximum of the x_i . An admissible (and sensible) decision rule is to require LRN implementation if and only if that maximum value is 1: this is best-practice benchmarking. If instead of independent reports, only a merged report $x_{1\&2}$ is available, the information on b is undamaged only in the special case where the merged report $x_{1\&2}$ is constructed so as to equal $\max[x_1, x_2]$.

However, that is an unlikely form of aggregation. When, in fact, LRN is practicable, but only one of the merging partners wishes to offer it, it would be remarkable if the joint decision were always to offer LRN. A more reasonable hypothesis would be that when the partners have differing preferences it is equally likely that the merged firm would offer LRN or not. In our notation, if (say) $x_1 = 0$ and $x_2 = 1$, then $x_{1\&2}$ is equally likely to be 0 or 1. In that case, as with almost any aggregation rule, observing $x_{1\&2}$ is strictly less informative than observing both x_1 and x_2 .

With this “equally-likely” aggregation rule, we can rather easily quantify the loss of useful information from such a merger. The key observation is that $x_{1\&2}$ has the same distribution as a single draw x_i . To see this, note that with the “equally likely” aggregation rule, the probability that $x_{1\&2} = 1$, conditional on $b = 1$, is given by $p^2 + 0.5[p(1-p) + (1-p)p] = p$.⁵⁴ Conveniently, in this formulation, from the point of view of best-practice benchmarking, the

⁵³ That is, with probability p firm i offers LRN, if indeed, it is practicable, and with probability $1-p$ it does not, even if it would be practicable.

⁵⁴ Pre-merger, the probability that at least one of these two firms would reveal the feasibility of LRN is $1 - (1 - p)^2$.

merged firm is just like one of the original firms: mathematically, the merger then is equivalent (from this point of view) to a simple reduction in n .

For example, if pre-merger $n=8$ and $p=.125$ (perhaps a natural value to look at if we think in terms of the number portability experience, where one firm out of eight voluntarily implemented LRN), the probability that LRN is made available is given by $1 - (1 - p)^n$. Substituting for p and n , we see that this probability is 0.66. Now, suppose that two of the eight firms merge. Then, the probability falls to $1 - (1 - p)^7 = 0.61$. Similarly, if the eight original firms are reduced to four through four mergers, the probability falls from 0.66 to $1 - (1 - p)^4 = 0.41$. These are substantial effects.

Effects of Merger in the Use of Averages

Next, consider the reduction in information due to merger as it affects the use of average-practice benchmarking. We develop two points. First, the best point estimate of the underlying parameter b – loosely, an “average” – may in fact depend on more than a simple weighted average of firms’ reports, so that “the average” may be less accurately calculated after a merger. Second, losing information on variation among ILECs may rationally cause a loss of the confidence needed to use an average as a benchmark, and may make regulators or competitors more tentative in their use of such averages.

For a concrete example, we examine price-cap performance. We can view x_i as firm i ’s productivity performance, and model this performance as the sum of two terms – a “normally achievable” performance b , plus an idiosyncratic “error” e_i with mean zero. Thus, from the information point of view, the Commission is comfortable in applying the average-performance benchmark to firm i to the extent it believes that benchmark is a reasonably good estimate of what firm i is capable of achieving.

With standard assumptions, a consistent estimate of b is obtained simply by averaging the observations x_i . If the error terms are uncorrelated across firms and their variances are known and proportional to the squared sizes of the ILECs (where size is measured, say, by number of lines), then an efficient estimate of b is the size-weighted “sample mean” or average of the x_i .

In this special case, the “neutrality” result mentioned above holds: the estimate of b , and its statistical precision, are unaffected by a merger between firms 1 and 2 even if achieved productivity following a merger is reported only at the consolidated level. Intuitively, since the optimal use of all the x_i was merely to take the weighted average anyway, nothing has been lost if two observations were merged into a “within-group” weighted average before being reported.

But even modest changes in these assumptions bring us back to the fact that, in general, it is strictly more informative to observe all the diversity. For instance, consider the case where, as is the case for price caps, the covariance structure of the e_i cannot be taken as known and diagonal. Some unobserved effects in the error term may be common to several firms in a given year and other unobserved effects may persist for several years for a single firm. Because the covariance structure cannot be taken as known *a priori*, an efficient estimate of the performance *will not* use solely the weighted mean of the observations x_i .⁵⁵ The Commission’s inferences about b will then be predictably less accurate if it has reliable access only to the weighted mean of x_1 and x_2 rather than to both of these variables. In other words, a merger hurts the process.

More generally, the Commission often lacks strong *a priori* knowledge of the variance with which the observations x_i are distributed around the unknown b . This is particularly likely in a *sui generis* proceeding as compared with one designed to measure recent changes in

⁵⁵ For example, generalized least squares estimation uses the observations x_i to estimate a covariance structure and thus to construct a more efficient estimate of the unknown parameter b .

productivity. Specifically, consider the standard Bayesian model in which the x_i are independent draws from a normal distribution with unknown mean b and unknown standard deviation σ , and in which the prior distribution of b and of $\log(\sigma)$ is the improper uniform.⁵⁶ The observer's point (posterior mean) estimate of b is the average of the x_i . As above, this is unaffected by the reporting only of average information. But nevertheless the posterior distribution of b depends on the separate observations x_i . Observing only pre-averaged data increases the posterior variance of b , because the observer has less information and thus must be less confident.

For example, suppose we begin with $n=8$. Then the posterior variance is given by⁵⁷ $[(n-1)/(n(n-3))]s^2$, an expression that depends on the sample variance s^2 , but whose prior expectation is equal to $(7/40)\sigma^2$. Now if a series of mergers⁵⁸ reduces n to 4, we will have half as many observations, each of which is now normally distributed around the unknown b with (unknown) variance $\sigma^2/2$. The prior expectation of the posterior variance of b is now equal to $(3/4)\sigma^2/2 = (15/40)\sigma^2$. The result of this (semi-hypothetical) wave of ILEC mergers is that (in prior expectation) the posterior variance on b more than doubles. As a result, the Commission must be less confident in its estimate of industry performance and more circumspect in establishing any performance standard.

As this conclusion suggests, the Commission often wishes to make a rule but to be reasonably confident that it is not unduly harsh. In many problems, including price caps and

⁵⁶ See, for instance, George G. Judge, R. Carter Hill, William E. Griffiths, Helmut Lütkepohl, and Tsoung-Chao Lee, *Introduction to the Theory and Practice of Econometrics*, 2nd Edition, 1988, p. 150.

⁵⁷ See Judge et al., p. 152.

⁵⁸ We make this version of the comparison to avoid the analytical complexity of having just one pre-averaged (paired) observation. However, we note that if the SBC/Ameritech and Bell Atlantic/GTE mergers were to take place, since the passage of the Telecommunications Act, the eight largest ILECs would in fact have been reduced to four.

universal service support, this can be formulated as a desire to set a performance standard y as demanding (say, as low) as possible but such that the probability that y is less than the unknown b is acceptably low. Statistically, this amounts to finding a confidence interval.

In most instances, the degree of variability will not be known in advance, and the Commission must generally rely on experience reported by the ILECs to arrive at a suitable confidence interval (in estimation terms) or band of tolerance (in behavioral terms). In this way, the data will be used for more than a point estimate of b .

An example that comes close to explicitly formulating the problem as the choice of a confidence interval is the FCC's proceeding on physical collocation. In this proceeding, which began in 1993, the Commission analyzed the cost estimates of 14 ILECs. The Commission had available different numbers of observations for the different collocation functions, depending on the types of facilities used by the companies.⁵⁹ The number of observations ranged from 12, for DS1 cross-connection and termination equipment, to just 3 for one type of security installation.

Four of the companies (Pacific Bell, Nevada Bell, Southwestern Bell, and SNET) are today part of SBC, and two others (Bell Atlantic and NYNEX) are merged into Bell Atlantic. If Ameritech and SBC merge, what was 14 will become 9; if, in addition, Bell Atlantic and GTE merge, the number drops to 8. If the Commission's calculations were repeated beginning from just 9 ILECs, the number of observations would decline to 8 for DS1 cross-connection and termination, and remain at 3 for the security installation. A merger of Bell Atlantic and GTE would further reduce the range for some collocation functions.

⁵⁹ And after removing very high cost estimates (those that exceeded the sample mean plus two sample standard deviations).

The reduced number of direct cost estimates increases the variability of the Commission's cost standard for a zone of reasonableness – the sample mean plus one sample standard deviation.⁶⁰ In a framework of Bayesian estimation of a parameter b and its distribution, the Commission must have reduced confidence that its mean-plus-one-standard-deviation interval actually covers the range of costs of efficient ILECs. To achieve the same degree of confidence with fewer observations, the Commission would have to increase the size of the interval. However, the Commission rejected such a lax interval.

As the number of ILEC observations is reduced by mergers, the Commission's power to constrain excessive pricing by this kind of benchmarking is weakened and the tools for setting bands of reasonable costs ultimately become ineffective. To make this point most starkly, consider an industry with just two firms, and suppose that the Commission were to stick to the "mean plus one standard deviation" standard. Let the two observations be x_1 and $x_2 \geq x_1$, so that the sample mean is $(x_1 + x_2)/2$, and the sample standard deviation is $\sqrt{2} (x_2 - x_1)/2$. The Commission's zone of reasonableness, which allows everything up to one sample standard deviation above the sample mean, is now so large that even the maximum observation, x_2 , is *certain* to be judged reasonable! In other words, the technique now has no bite whatsoever. The standard would have to be even more lax, if that were imaginable, if the Commission took account of the lower probability that a one-standard-deviation allowance would truly cover sampling variation because of the low numbers.⁶¹

⁶⁰ We simulated the sample mean plus 1 sample standard deviation in repeated trials with 12 observations and then with 9 observations drawn from a normal population with mean and variance equal to the sample mean and sample variance for DS1 cross-connection and termination. We found that the reduced number of observations increased the standard deviation of the mean plus 1 standard deviation by 15.9%.

⁶¹ With $n=2$ and independent normal errors, the classical probability that the sample mean plus 1 sample standard deviation exceeds the population mean is only 0.75. (75% of the standard t distribution with one degree of freedom

Regulators Recognize the Problem

In summary, we have seen how mergers reduce the flow of information for benchmarking purposes, even if we assume away all incentive effects of the merger. Indeed, this effect has been recognized both by the Commission and by others. For instance, the Commission has noted, “[m]ergers between incumbent LECs will likely reduce experimentation and diversity of viewpoints in the process of opening markets to competition.”⁶² Similarly, in the U. K., benchmark comparisons are used to compare the efficiency of monopoly water and sewerage companies operating in different geographic districts and to set company-specific price caps. The essential value of having comparative data from independent firms is recognized in the statutory requirements. Under the 1989 Water Act, the Monopolies and Mergers Commission (MMC) is required to take account of the loss of comparative information that would result from a merger of water companies.⁶³ The MMC recently examined a proposed merger between two water and sewerage companies and applied this standard.

Two studies submitted to the MMC provided estimates of likely losses due to (1) loss of the observation of a best-practice firm at some stage in the future, and (2) setting of less stringent price benchmarks because of greater uncertainty. The MMC noted that many other dimensions in which comparators are used in the comparative process had not been valued, and it recognized that individual companies also make particular contributions in specific comparative exercises. In summary, the MMC found that, although it was unable to quantify exactly the loss from removal of one firm (South West Water) from the comparative process, “we are satisfied that it

lies below 1.) To define a zone of reasonableness that would have 90% probability of including the population mean one would have to allow variability of 3 standard deviations.

⁶² FCC 97-286, para. 152.

⁶³ Water Industry Act, 1991, Part II, 34 (3).

would be a substantial one.”⁶⁴ The MMC blocked the proposed merger that would have reduced the number of independent sewerage services companies from ten to nine. It found that “no remedy, even in the shape of very significant price reductions, would be sufficient to compensate for the loss of [South West Water Services] as a comparator.”⁶⁵

B. Unilateral Incentive Effects

A merger between firms with market power that compete in a product market has anticompetitive incentive effects that are well understood by competition authorities.⁶⁶ The “unilateral” effects stem from each merging party’s new incentive to help, or not hurt, its new partner.

When two firms compete in a product market, each has opportunities to engage in behaviors that (i) are socially desirable, (ii) are profitable for that firm, (iii) reduce the profits of the other firm, and (iv) therefore are less likely to take place after a merger between the firms. In the case of product-market competition, “lowering price towards marginal cost” is the paradigmatic example of such behavior, although quality improvements, innovation, and other effects are also (and in some cases more) important. For this reason, antitrust authorities will challenge a merger between such firms if consumers lack adequate other alternatives, and if the change in incentives is likely to lead to significant worsenings of the firms’ offers to consumers.

When two regulated, geographically-separated ILECs face competition-by-comparison through benchmark regulation, similar economic forces are at work. The socially desirable actions

⁶⁴ Monopolies and Mergers Commission, para. 2.83, 2.85.

⁶⁵ Monopolies and Mergers Commission, para. 1.14; quoted in S.G.B. Cowan, “Competition in the Water Industry,” *Oxford Review of Economic Policy*, Vol. 13, No. 1, Spring 1997, p. 85.

⁶⁶ U. S. Department of Justice and the Federal Trade Commission, *Horizontal Merger Guidelines*, April 2, 1992 (revised April 8, 1997).

to consider now include: (a) lowering recorded access costs, (b) introducing new services that raise the average revenue per line, (c) cooperating more fully with regulation and with the introduction of local competition, and (d) once ILECs are offering in-region long-distance service, cooperating in difficult-to-enforce ways with rival IXCs. In each case, each ILEC may sometimes be willing to take such actions, but in general such actions would hurt other ILECs. After a merger, the merger partners internalize those cross-effects and become less likely to take such actions. In addition, as Katz and Salop argue, a merged firm may have stronger incentives to deny competitive accommodations and engage in exclusionary conduct toward rivals than has either merger partner separately.⁶⁷ When reflected in discriminatory conduct, these incentives worsen the comparative information available and impair average-practice, best-practice, and other forms of benchmarking.

1. Unilateral Incentive Effects of Merger under Average-Practice Benchmarking

Average-practice benchmarking sets firms into a form of competition with one another even if they do not compete in any conventional product market. As John Vickers has expressed it, if two agents face a similar incentive scheme in which each agent's rewards are based both on its own and another's performance, the agents "are in competition in the sense that the reward of each partly depends on performance relative to that of the other agent."⁶⁸ The establishment of benchmarks thus creates "competition-by-comparison" between firms that do not directly compete with each other in the same geographic markets.

As one might expect from this observation, mergers between firms whose performance is regularly compared under benchmarking can have adverse unilateral incentive effects that are

⁶⁷ Katz and Salop, Section VI.

⁶⁸ John Vickers, "Concepts of Competition," *Oxford Economic Papers*, January 1995, Vol. 47, No. 1, p. 10.

very similar to the corresponding anticompetitive effects of mergers among direct product-market competitors. Thus, consider the effect of a merger on the benchmark used for price-cap regulation. After the merger, each of the original firms will internalize the effect of its productivity improvements on its partner's profits. Compared to before the merger when the firms were competitors-by-comparison, this effect is a negative one.⁶⁹

If (say) SBC lowers its recorded access costs, it is likely that the X-factor(s) set at a subsequent price cap performance review will be greater as a result. The increased X-factor will make Ameritech (as well as other price-cap ILECs) less well off. Post-merger, the incentive for the merged firm to reduce its costs in the former SBC's area will therefore be lower than the incentives SBC faced pre-merger. Symmetrically, Ameritech's incentive to increase efficiency also declines.

To continue the example used earlier, after a merger of two ILECs, each of which has 20% of the total access lines, a larger ILEC, with 40% of the access lines, keeps only 60% (i.e., 100% - 40%) of the cost reduction after the readjustment has taken effect. Thus, this larger ILEC's gross private present-value return per line becomes

$$$(1 + .91 + .83 + .75) + .6*(.68 + .62 + .56 + \dots) = \$ 7.99$$

so that this larger ILEC faces a "tax" of 27% (i.e., $7.99/11 = .73 = 1 - .27$). The point is that a cost-reducing action by one of the original firms will reduce the access price that can be charged by its partner. The prospect that access charges will be adjusted in the light of the firm's own productivity experience creates a "tax" on the increased profits that each of the merged ILECs

⁶⁹ Although ILECs in different geographic areas are also suppliers of complements – each supplies originating access for calls terminating in the other's territory – this effect is surely small compared to the effects considered here.

realizes from investments that increase its productivity. As a result of the merger, the amount of “tax” increases because the effect on the merging partner is internalized.

We note that a simple comparison of these illustrative numbers – a 27% “tax” versus a 14% tax – may not fully convey to non-economists the difference in impacts. Economic logic tells us that the harm caused by a tax, or by a distortion of incentives away from the efficient level, is broadly proportional to the *square* of the distortion. Thus, a “tax” that is twice as large causes not twice as much, but approximately *four* times as much, economic loss.⁷⁰

Clearly these numbers are illustrative, rather than precise, calculations. However, we believe that they correctly suggest that an increase in the share of nationwide lines controlled by a single company, such as would occur under the proposed SBC/Ameritech merger, substantially worsens the ratchet effect created by periodic revision of the X-factor. Under a system of benchmarking that uses industry-wide averages of cost performance, the larger the ILEC, the worse the ratchet effect.

Studies of the effect of corporate tax rates and tax credits on research and development spending suggest that R&D expenditures are relatively price-elastic with respect to tax rates.⁷¹ This

⁷⁰ This observation is a staple of economic analysis. Roughly, it can be explained as follows, for the simple case in which projects’ gross returns are approximately uniformly distributed (at least in expectation). In expectation, a tax that is twice as large will discourage about twice as many efficient projects, because it puts twice as large a range “below the threshold.” In addition, the average discouraged project is approximately twice as valuable in pre-tax (i.e., efficiency) terms.

⁷¹ See, e.g., Bronwyn Hall, “R&D Tax Policy During the 1980s: Success or Failure?”, *Tax Policy and the Economy* 7: 2-35, 1993; Philip Berger, “Tax Incentives for R&D: What Do the Data Tell Us?”, *Council on Research and Technology*, Washington, photocopied, 1992; James Hines, “On the Sensitivity of R&D to Delicate Tax Changes: The Behavior of U.S. Multinationals in the 1980s,” in Alberto Giovannini, Glenn Hubbard, and Joel Slemrod (eds.), *Studies in International Taxation* (University of Chicago Press: Chicago), 1993; Theofanis Mamuneas, and M. Ishaq Nadiri “Public R&D Policies and Cost Behavior of the U.S. Manufacturing Industries,” *Journal of Public Economics* 63: 57-81, 1996.

effect makes it more likely that, as a result of a merger, the firms will allocate fewer resources to activities that would reduce costs but would also affect a benchmark.⁷²

Finally, while a merger between SBC and Ameritech does not affect the immediate *incentives* of “third” ILECs (such as Bell South) under an average-performance scheme, there is nevertheless a plausible effect on their *actions*. In particular, Bell South may be less likely to trim its own excess costs if SBC and Ameritech face weakened incentives to trim theirs.⁷³ The net result can be expected to be a slower rate of productivity improvement throughout the industry, and consequent harm to consumers, as competition-by-comparison is weakened through merger.

The merger of SBC and Ameritech would also impair the effectiveness of average-practice benchmarking in the universal service support program, and for very similar reasons. To illustrate, suppose that SBC introduces new services that are valued by consumers, and thereby raises its average revenue per line. In due course, this will be reflected in a higher revenue-per-line benchmark for calculating high-cost support. As a result, carriers collecting high-cost support funds based on the difference between their estimated costs of serving high-cost areas and the benchmark revenue per line will receive less support. If SBC’s merger partner, Ameritech, is such a carrier, post-merger SBC will internalize this effect and it will have less incentive to introduce such new services. In the same fashion, Ameritech will have a reduced incentive to introduce new revenue-increasing services because it will take into account the potential for reduced support that could flow to SBC in its high-cost service areas.

⁷² This effect must be set against any merger-specific economies of scale in innovation. We note, however, that because licensing of innovations among ILECs faces no obvious barriers, one might be suspicious of claims that such economies of scale are merger-specific.

⁷³ Although there is no first-order effect on Bell South’s incentives to cut its costs, if it becomes richer and “fatter” (as it will if merging ILECs cut back on their cost-reduction), it may nevertheless (perhaps because of managerial principal-agent problems) experience cost inflation itself. See Michael Jensen, “Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers,” *American Economic Review*, 76:2 (May, 1986), pp. 323-329.

2. Unilateral Incentive Effects of Merger under Best-Practice Benchmarking

A merger will similarly weaken the effectiveness of best-practice benchmarking because of the adverse (unilateral) *incentive* effects of taking a merger partner's interests into account. In our analysis of this problem, we distinguish two cases: (a) the merged firm sets a common practice for both partners, and (b) formerly independent (now merged) firms maintain two different practices. Although the analysis is somewhat different, the key themes and qualitative result – a loss of effectiveness for best-practice benchmarking – are the same in both cases.

When the merged firm sets a common practice, if firms' practices can be represented numerically (as with collocation charges or overhead rates), the common practice value of the merged firm is likely to lie strictly between the practices that the parties would have set separately absent the merger. As noted above, under best-practice benchmarking, only the best observation among all firms ultimately counts. Thus, either the merger makes no difference (because neither merging party would have provided that best observation), or the merger moves the firm with the best practice toward the other partner's preferences (because the best-practice firm now internalizes the effect on its partner). In the latter case the merger produces an undesirable change.

For example, suppose that Ameritech as a stand-alone RBOC would offer collocation charges of \$X, an offer that turns out to be "best practice" among the ILECs, while SBC as a stand-alone entity would offer higher charges of \$Y. In the absence of a merger, Ameritech's offer would be imposed as the benchmark, and SBC would be limited to charges of \$X. Post-merger, decisionmakers for the merged company select a common charge for both partners that maximizes their total net benefit. As we noted above, one would expect this single policy to be set somewhere between the two pre-merger policies, \$X and \$Y, which implies that it would be higher than \$X.

Consequently, post-merger the observed best practice is inferior to the best practice absent the merger.

In some cases, the merged firm will maintain different practices. In this case, too, there is an incentive to “shade” the previously independent choice in the direction of the less cooperative merger partner’s preference. To illustrate this incentive, suppose that the Commission were to use a best-practice standard to establish maximum rates for collocation services and that each ILEC recognizes in advance that best-practice benchmarking is likely to be applied to collocation charges. Acting independently, each ILEC would offer collocation charges reflecting its own cost conditions and strategic goals, as well as other factors such as the intensity of state regulatory scrutiny.

However, if the firms merge, Ameritech's decision-makers would take into account that SBC’s preferred charges are \$Y and that the practice that Ameritech sets, \$X, may be selected by the regulator as best-practice and applied to SBC as well. The decision-makers who maximize the joint profits of the merged companies, or even take SBC’s preferences into account more weakly, would shade the offer of \$X towards \$Y – that is, the offered collocation rate would be higher. As a result, the benchmark charges would end up higher: either the shaded offer remains best practice, or another ILEC's offer, (by assumption higher than \$X), is now best practice.

It is important to note that even if (in this example) Ameritech’s influence brings SBC’s preferred charge down from \$Y towards \$X, under best-practice benchmarking this reduction does not matter.⁷⁴ While a merger between an ILEC that (in a particular matter) is cooperative with new competitors and one that is intransigent may moderate the behavior of both, under best-

⁷⁴ Assuming, that is, that Y is not so “moderated” as to fall below X.

practice benchmarking it is only the merger's effect on the cooperative ILEC that affects the final result.

In summary, then, there is an adverse incentive effect of a merger when the merging firms' practices are compared by regulators and best practices are promoted. This is distinct from, although analogous to, the adverse incentive effect of the merger under average-practice benchmarking.

C. Coordinated Effects and Risk of Collusion

Recall from our discussion above that, under competition-by-comparison (as under product-market competition), each ILEC can undertake actions that are socially desirable and profitable but that harm the interests of other ILECs. A merger can increase the threat that a common understanding will develop (explicitly or implicitly) not to engage in such behavior. We believe that a substantial decrease in the number of relevant independent firms (and for some purposes only large ILECs may be relevant firms) can significantly increase this threat.

This, too, is not a novel point. Indeed, the Commission has observed that, although ILECs have a common interest in minimizing their cooperation with regulators and competitors who are seeking to open their local markets to competition, "On any particular issue, however, one incumbent LEC may have an incentive to cooperate with its competitors, contrary to the interests of other LECs," an incentive that may arise from regional differences between the ILECs.⁷⁵ The Commission rightly observed that if two major ILECs merge, the incentive for an individual ILEC to "break ranks" and cooperate with pro-competitive processes may be reduced. The number-portability example that we described earlier strikingly illustrates such a possibility.

⁷⁵ FCC 97-286, para. 154.

As in the product-market case, such parallelism is more likely the smaller the number of large ILECs. In large part, this is because of the diversity discussed above in the context of best-practice benchmarking. That is, with many ILECs, it is more likely that there will be one or two mavericks on any complex issue. With a large number of players, an ILEC contemplating aggressively cutting costs or boldly innovating will be less inclined to worry about offending the others by breaking an otherwise united front. By contrast, as the number of ILECs is reduced by merger, they become more likely to be able to coordinate their behavior and refrain from socially desirable actions. In this sub-section, we expand on this point.

As above, suppose first that each of n independent ILECs will, with probability p , take the socially desirable action. We next investigate the tradeoff between unilateral incentives to do so and coordinated incentives to maintain a united front. Suppose that an ILEC may, for its own reasons, prefer to take the socially desirable action in a matter at hand, but would also derive future value if a united position is maintained that would provide benefits in future regulatory matters. By hypothesis, if this ILEC goes along with the putative united front, it incurs some private cost c . This private cost, and even the fact that it is positive, are likely to be difficult for others to observe.

An ILEC in this position trades off c against the possibility that its action determines whether the united front – which it values at B – is maintained. (It may value this because of the prospect of preferring the united front on future matters, for instance.) Then this ILEC will reflect that, apart from its own action, with probability $q_n = (1 - p)^{n-1}$ the front is united, so that its own action determines whether the united front is maintained. As a result, it will cooperate with the united front if, and only if, $q_n B > c$.

Observe now that the probability q_n is decreasing in n for a given value of p , so that q_n increases with a merger. Also recall that (under a reasonable symmetric model of how conflicts between merger partners are resolved) a merger can be modeled simply as a reduction in n . So, a merger will make it more likely that a united front is maintained, conditional on each ILEC's choice of p . This effect, which we discussed above in subsection III.A, has nothing to do with incentives (it holds p constant), but is purely a statistical (information) effect.

There is *also* an incentive effect, however. This is best seen in a Bayesian equilibrium of an incomplete-information game among the ILECs. Suppose for instance (plausibly enough) that each ILEC's value of maintaining a united front, B , and/or its value of c for a particular matter, are private information. Then this ILEC will maintain the united front if and only if, for its particular values, c/B is less than the perceived probability q_n that all others will maintain the united front. As a result, the probability that it chooses, instead, to be a maverick is $p(q_n)$, a decreasing best-response function.

Taking as given other ILECs' choices of p , any one individual ILEC's incentive to maintain the united front is increased by a merger. Because there is no point in playing on the team if others fail to do so, an increase in the perceived probability q_n that all others will do so – such as follows from a reduction in n holding p constant – therefore also makes each individual ILEC more inclined to go along with the (perhaps) united front and less inclined to be a maverick. Thus, the merger causes each ILEC's optimized p to fall, even if it takes others' values of p to be fixed (unaffected by the merger). Furthermore, if the ILEC recognizes this effect, it will know that others' values of p have, in fact, fallen, so that q is now even higher, further reinforcing its own incentive to reduce its p .

This analysis illustrates how a reduction in n can make maintenance of a united front more likely, both statistically, given each ILEC's p (as analyzed above), and also behaviorally, through the effect on p . Thus, a decrease in the number of firms through merger can increase the likelihood that the ILECs will achieve a united front inimical to cooperation with regulators and competitors.

D. Effects of Merger on “Purified” Benchmarks.

Yardstick competition can in principle eliminate the ratchet effect in average-performance benchmarking by setting a separate firm-specific benchmark for each firm. The Commission appears generally to have avoided this practice, possibly because of the difficulty of arguing persuasively that a common standard is being applied to all firms. Another problem is that, to the extent there are durable firm-specific effects or modest numbers of firms, as an estimate of what an individual firm is capable of achieving, a purified benchmark is statistically inefficient – although efficient in incentive terms.

Whatever the merits and defects of purified benchmarks, our goal here is to understand the effects of a merger among large ILECs. The primary effect of such a merger on purified benchmarking is that each merging ILEC's “target” or performance standard must become “noisier,” because purified benchmarks impose the constraint that (for instance) Ameritech's performance receive zero weight in setting a target for SBC, and vice versa. Since it would be very unlikely absent the merger that no weight would be given to Ameritech's performance in setting an efficient purified benchmark for SBC, this is a loss.

This analysis applies when the regulator sets a very simple “average” purified benchmark. A related effect, however, applies to non-merging parties as well. That is, the ability to adjust a benchmark for firm-specific effects is impaired. “Where econometric analysis is needed before

comparisons can be drawn between companies with diverse operating environments, it is important that the number of separate observations relative to the number of explanatory variables that should be included in any model is sufficient.”⁷⁶

IV. Conclusion

Our discussion of the use of comparative and benchmark techniques by telecommunications regulators illustrates one of the important losses from mergers among large ILECs. We note again that not only regulators but also customers and suppliers of complements (such as IXCs), as well as nascent competitors, can and do compare ILECs against one another. The loss of one of a relative handful of large ILECs would substantially damage efficient regulation, including the interconnection regulation necessary for the growth of competition in local exchange and exchange access markets.

⁷⁶ Monopolies and Mergers Commission, para. 2.43.