

[proprietary begin] [proprietary end] percent. Alternatively, when addressable monthly spending in target buildings is defined as buildings within [proprietary begin] [proprietary end] of Time Warner Telecom's fiber plant, AT&T's current footprint covers about [proprietary begin] [proprietary end] percent of Time Warner Telecom's target market. When MSAs served by BellSouth are added to AT&T's footprint, this figure becomes about [proprietary begin] [proprietary end] percent, an increase of about [proprietary begin] [proprietary end] percent. These increases are likely substantial enough to affect the merged AT&T-BellSouth's incentives in its dealings with Time Warner Telecom and other competitors.

56. Most of Time Warner Telecom's customers have multiple locations.³⁵ Indeed, there are [proprietary begin] [proprietary end] current Time Warner Telecom customers with locations in *both* AT&T and BellSouth territories³⁶ and a [proprietary begin] [proprietary end] of the revenues that Time Warner Telecom obtains in the AT&T and BellSouth territories are derived from these customers.³⁷ The importance of these customers makes Time Warner Telecom especially vulnerable to increased exclusionary behavior by a merged AT&T-BellSouth because these customers are particularly likely to switch to another

³⁵ See Taylor Declaration, ¶ 20.

³⁶ This figure was provided to us by Time Warner Telecom.

³⁷ Petition to Deny, p. 5, reports that the customers that Time Warner Telecom serves in both the AT&T and BellSouth regions currently account for [proprietary begin] [] [proprietary end] percent of its billed revenues across the two regions.

carrier if Time Warner Telecom's costs increase, or the quality of its service declines, in *either* the AT&T or the BellSouth service territory.

57. Significantly, one of the effects of increased exclusionary behavior by AT&T-BellSouth may be to reduce the incentives of carriers such as Time Warner Telecom to invest in their own facilities. As Time Warner Telecom points out in its Petition to Deny:

...the need to provide IP service offerings to all or most of a business customer's locations is making competitors more reliant on ILEC transmission facilities. Even if it is possible for a competitor to construct loops to one or more of a business customer's locations, the competitor will need to obtain ILEC loops to serve the remaining locations. Without access to ILEC inputs, competitors are increasingly unlikely to be able to serve the customer at all and are therefore less likely to construct facilities even to the largest of the customer's locations.³⁸

In economic terms, CLECs are less likely to be willing to invest in their own facilities if they are unable to obtain the complementary inputs that they need from ILECs on reasonable terms.

5. Carlton and Sider's Measure of CLEC Competitive Activity Has Many Shortcomings

58. In conducting its review of the proposed SBC-Ameritech merger, the Commission reviewed evidence introduced by Carlton and Sider concerning whether the larger SBC-Ameritech footprint "will give the merged firm greater incentive to discriminate against downstream rivals."³⁹ According to the Commission, Carlton and Sider

³⁸ Petition to Deny, pp. 19-20.

³⁹ Federal Communications Commission, Memorandum Opinion and Order, 99-279, October 8, 1999 [SBC-Ameritech Order], ¶251.

claimed “that competitive LEC activity in LATAs within the merged RBOCs’ regions, as measured by the number of firms that have been assigned numbering codes, is not lower than competitive LEC activity in other RBOCs’ regions, or lower than it would have been but for the relevant mergers, controlling for differences in population size, population growth, and area.”⁴⁰

59. The Commission found Carlton and Sider’s claims “unpersuasive” for three basic reasons. First, the Commission noted that Carlton and Sider themselves recognized that the fact that a carrier has been assigned a numbering code in a particular area does necessarily mean that the carrier is providing service in that area.⁴¹ Second, the Commission observed that, even if a carrier is providing service, the variable used by Carlton and Sider “provides no indication of the number of customers that each competitive LEC is serving. Therefore, this variable does not adequately reflect the degree to which competitive LEC activity in one region may or may not be affected by incumbent LEC discrimination.”⁴² Finally, the Commission questioned whether the variables used by Carlton and Sider “adequately control for ‘economic and demographic characteristics’”⁴³ that differ across regions.

60. In their Declaration in this proceeding, Carlton and Sider note that the Commission had not accepted the conclusions of their earlier analysis. Nevertheless, they state that they “continue to hold the views that our analysis was reliable and that the

⁴⁰ Ibid.

⁴¹ Ibid. ¶ 252.

⁴² Ibid.

⁴³ Ibid.

available empirical evidence is inconsistent with the footprint theory.”⁴⁴ As justification for this claim, Carlton and Sider note that “a number of other researchers, including both academics and FCC staff members, have relied on the same measure of CLEC activity in several peer-reviewed studies of CLEC entry and have endorsed its use for such purposes.”⁴⁵

61. We have examined what each of the studies cited by Carlton and Sider states about the variable -- carrier numbering codes held by CLECs -- used to measure CLEC activity. Each study takes care to discuss the significant shortcomings of this variable. The following statements are taken from these studies:

Although data on the actual number of CLECs in operation does not exist, the FCC monitors the number of CLECs holding numbers by state and LATA. Although not a perfect measure of competitive entry, this measure represents the closest one can come given the data resources currently available.⁴⁶

An alternative measure of entry in local telephone markets might be the number of lines held by CLECs. However, our market-level analysis precludes using this measure since it is only recorded at the state, rather than the LATA, level.⁴⁷

Data on the number of CLECs in operation do not exist; however, the FCC records the number of CLECs that hold numbers by state and LATA. Although not a perfect measure of firm entry or fringe size, this measure

⁴⁴ Declaration of Dennis W. Carlton and Hal S. Sider, March 29, 2006, ¶ 125.

⁴⁵ Ibid.

⁴⁶ J.R. Abel and M.E. Clements, “Entry under Asymmetric Regulation,” *Review of Industrial Organization*, 19, 227-242, 2001, p. 232.

⁴⁷ Ibid. footnote 6, pp. 232-233.

represents the closest one can come given the data resources currently available.⁴⁸

Following passage of the 1996 Act, information reporting requirements imposed on new providers of local telephone service by state and federal regulators were kept to a minimum. What limited information was collected largely received proprietary treatment. While many new providers report local service levels to share holders and stock analysts, these reports are not comprehensive, systematic, or detailed enough to allow one to address the questions examined here. Therefore, we have employed the number of new carriers with numbering resources as a proxy for the number of new carriers providing local telephone service on their own facilities.

While the counts of carriers holding numbering resources are consistently and systematically collected in the LERG and can be determined at the LATA level, they may not perfectly reflect the number of new carriers providing local telephone service on their own facilities. Carriers may acquire numbering resources prior to providing service. Therefore, counts of new carriers with numbering resources may exceed the number of firms actually providing local telephone services.⁴⁹

...the fact that an entrant has obtained a numbering code does not necessarily imply that it is actually offering service in a particular market and to this extent our entry measure may actually overstate the number of actual entrants.... Ideally, we would like to distinguish among the different types of entrants and size of entry – for examples, facilities-based versus reseller for the former, number of lines that new CLECs control for the latter. However, the

⁴⁸ J.R. Abel, "Entry into Regulated Monopoly Markets: The Development of a Competitive Fringe in the Local Telephone Industry," *Journal of Law and Economics*, 45, 289-316, p. 299.

⁴⁹ J. Zolnierok, J. Eisner, and E. Burton, "An Empirical Examination of Entry Patterns in Local Telephone Markets," *Journal of Regulatory Economics*, 19, 159, 2001, pp. 147-148. In the working paper version of this paper dated August 23, 1999, the authors also stated (p. 7) the following: "Competitors that purchase telephone service from incumbents for resale, and do not rely on their own facilities, may choose to either obtain their own numbering resources for billing purposes or rely on the incumbents' numbering resources. Therefore, counts of new carriers with numbering resources may include some non-facilities based providers."

requisite data for making these types of determination were unavailable during our sample period.⁵⁰

62. Not only do these studies note, as do Carlton and Sider, that the assignment of numbering codes to a carrier does not mean that it is providing service, they also observe that a carrier with its own numbering codes may simply be a reseller. Most important, they all recognize that the measure they employ reflects, at best, the existence, but not the scale, of entry.⁵¹ We conclude that there is no reason for the Commission to change its finding that the results of the Carlton-Sider empirical analysis are “unpersuasive.”

6. Benchmarking is an Essential Regulatory Tool

63. Benchmarking, also known as yardstick competition or relative performance evaluation, is a valuable regulatory tool because it helps telecommunications regulators, customers, and nascent competitors become better informed about an incumbent’s capabilities to cooperate with entrants. In the following sections, we explain how the use of benchmarking can and does work in United States and why the ability to compare the performance or behavior of large ILECs is, therefore, not lightly to be sacrificed.

⁵⁰ D.L. Alexander and R.M. Feinberg, “Entry in Local Telecommunications Markets,” *Review of Industrial Organization*, 25, 107-127, pp. 113-114. Interestingly, the authors point out (p. 123) that their results “suggest that the [1996 Telecommunications Act] did induce entry, but this was limited by strategic non-price behavior by incumbents.”

⁵¹ T. Quast, “An Analysis of the Extent and the Means of Entry into Local Telecommunications Markets,” 2005-07-26, a recent working paper, employs the number of UNE-L and UNE-P lines leased by CLECs from RBOC to measure the extent of CLEC entry. Because this reflects the scale of entry, it is likely to be a better, although still imperfect, measure than that employed by Carlton and Sider and in the articles that they cite.

6.1. Benchmark Regulation Ameliorates the Information and Incentives Problem

64. Regulators generally have much less accurate and complete information about the opportunities and constraints facing the firms that they regulate than do the firms themselves. For example, a regulated firm is likely to be much better informed than its regulators about its economic costs and the extent to which it can reduce those costs if given sufficient incentives. The firm will also be better informed about the quality of service that it can provide and the speed at which it can do so. Most significantly, the firm is likely to be far better informed than its regulators about the opportunities for innovation.

65. Modern economic analysis traces much, if not all, of the problems of efficient regulation to this fundamental information asymmetry. If regulators knew what the firms that they regulate could, and could not, accomplish with efficient effort, they could design incentive systems that simultaneously bring prices close to costs and create appropriate incentives for the regulated firms to perform efficiently.⁵²

However, because regulators are imperfectly informed, their efforts to control pricing and performance often create incentives for inefficient behavior. Reducing the regulator's informational disadvantage is, therefore, likely to result in more efficient outcomes. In the case of telecommunications regulation, by applying benchmarking to the behavior of ILECs, regulators are able to achieve some of the

⁵² See, for example, David Sappington and Dennis L. Weisman, *Designing Incentive Regulation for the Telecommunications Industry*, Cambridge, MA: The MIT Press and the AEI Press, 1996, p. 3.

benefits of competition in local services even where it does not actually exist. This is so for two closely related reasons.

66. First, comparisons against the performance of other ILECs provide regulators with more *information*. In the case of price caps, for example, additional information increases a regulator's ability to estimate the actual, but unknown, efficiently-achievable performance of an ILEC. The additional information not only tends to improve the estimate but it also strengthens the regulator's resolve (crucial to achieving the incentive benefits of price caps) not to renegotiate rates if the ILECs profits are unexpectedly high or low. In other cases, comparisons with other ILECs allow the regulator better to determine which practices are technically feasible, to scrutinize unusually poor performance, or even to set the best practice as a standard for all ILECs. In short, the regulator's *information problem* is ameliorated by the availability of relevant benchmarks.

67. Second, if future performance standards that are to be applied to an ILEC are based on industry-wide performance, and if the number of independent firms is reasonably large, an individual ILEC's own behavior will have only a limited effect on the standards against which its performance will be judged. As a result, the incentive of each ILEC to alter its current behavior to affect the standard may be substantially attenuated.⁵³ In short, the significance of the *incentive problem* is

⁵³ Basing the standard against which a firm is judged on its own behavior gives rise to what is known as a "ratchet effect" because a good performance today results in a higher target in the future. If a regulated firm anticipates this effect, it will exert less effort to improve its performance than it would if the standard against which it is judged is independent of its own performance.

reduced if regulators can observe, and take into account, the behavior of a *sufficiently large number of comparable firms*.

68. For both of these reasons, the Commission and other regulators benefit if they can use benchmarking to increase the amount and quality of information they have about the actual and potential abilities of dominant firms and, in turn, to use that improved information to enhance their ability to regulate these firms. In fact, telecommunications regulators have made effective use of benchmark regulation in the past, and continue to do so.

6.2. Forms of Benchmarking

69. Although there are many ways in which benchmarking may be implemented, it is helpful to consider three categories: the use of *average performance*, the use of *best practices*, and the use of *heightened scrutiny of worst practices*. In average performance benchmarking, the performance of an ILEC can be compared to, and the standard against which it is judged can be based on, the performance of all ILECs. When the number of ILECs is large, the behavior of each individual ILEC has only a small effect on the average performance, thus attenuating the incentive problem that would otherwise exist. As discussed below, regulators have used averages in regulating *rates* for access.

70. Regulators can also judge the performance of all ILECs against that of the best performing ILEC. Best practice benchmarking diffuses superior performance among ILECs by holding all to the same high standards. This is likely to be especially

important where ILECs have differing attitudes toward cooperating with CLECs, perhaps because of differences in competitive circumstances. As discussed below, regulators have used best performance in regulating *conditions* for access.

71. Finally, regulators can require poorly-performing ILECs to improve their performance even if it does not reach the level of best practice. Moreover, the possibility that regulators may discipline ILECs with subpar performance should give ILECs the incentives to improve their performance in the first place. Significantly, in each of these cases, the ability of regulators to make use of these tools depends on the availability of information from a number of other similarly situated ILECs.

6.3. Using Benchmarking to Limit Exclusionary Conduct

72. Especially since the passage of the Telecommunications Act of 1996, the Commission has rightly been concerned to open 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, established a regime under which ILECs are required to cooperate with their competitors by providing access on reasonable terms to their local network services and resources. Because it is not in the interests of ILECs to provide these facilities to their competitors, regulators must continue to oversee the rates and other terms at which they do so.

73. An ILEC's 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 their equipment at the ILEC's facilities. Especially in these cases, the Commission is unlikely to have sufficient independent information about the arrangements that are technically feasible, how particular arrangements affect the quality of service that is provided to rivals, and the costs that ILECs must incur to supply these services. In these cases, there is a real risk that an ILEC may refuse to provide access, engage in delay and slow deployment when compelled to do so, and, finally, to offer services only at degraded quality, or, especially in the case of new services, in an inefficient manner.

74. Fortunately, telecommunications regulators in the United States have been able to use benchmarking to address some of these problems. The Commission, the Department of Justice, 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, and other regulators, can draw to assess proposed regulatory actions, establish performance standards, and set parameters in incentive-regulation formulas.

75. As the U.S. Court of Appeals for the District of Columbia Circuit has 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.⁵⁴

7. Benchmarking in Practice

76. As noted above, average practice benchmarking has been used by regulators primarily in setting rates. For example, in a proceeding involving TELRIC pricing, the California Public Utility Commission recently set SBC's cost of capital by relying on a "proxy group" of similar companies. Although SBC initially proposed that Qwest and Broadwing be included in the proxy group, AT&T and MCI argued that these ILECs should be excluded because "they are much smaller, experiencing major financial difficulties, and investors perceive greater risk from these two companies."⁵⁵ The PUC agreed with AT&T and MCI and excluded both Qwest and Broadwing, leaving only SBC, Verizon, and BellSouth in the proxy group.⁵⁶
77. In establishing the rates that Cincinnati Bell Telephone could charge for interconnection and unbundled network elements, the Ohio Public Utility Commission employed a cost of capital from "proxy groups [that] consist of telecommunications

⁵⁴ *United States v. Western Electric Co.*, 993 F.2d 1572, 1580 (D.C. Cir.), *cert. denied*, 126 L. Ed. 2d 438 (1993).

⁵⁵ See *Joint Application of AT&T Communications of California, Inc. (U 5002 C) and WorldCom, Inc. for the Commission to Reexamine the Recurring Costs and Prices of Unbundled Switching in Its First Annual Review of Unbundled Network Element Costs Pursuant to Ordering Paragraph 11 of D.99-11-050 et al.*, Opinion Establishing Revised Unbundled Network Element Rates for Pacific Bell Telephone Company DBA SBC California, Application 01-02-024 *et al.*, Decision 04-09-063, 2004 Cal. PUC LEXIS 476, at *220 (Sept. 23, 2004).

⁵⁶ *Ibid.* at *221.

*companies that are the most reasonable comparison of CBT's business ventures.*⁵⁷

Similarly, the District of Columbia Public Service Commission concluded: "Of the two options presented for selection of a group of proxy companies, the group of telecommunications companies provides a more appropriate starting point for the purposes of developing UNE rates" for Verizon DC.⁵⁸

78. Best practice benchmarking allows regulators to impose a performance requirement on all regulated firms if that level of performance has been achieved by any comparable regulated firm. An important example of the use of this type of benchmarking occurred when the Commission concluded that interconnection or access at a particular point in one ILEC network is evidence of the technical feasibility of providing the same or similar interconnection in another ILEC network.⁵⁹ 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. Best practice benchmarking in this regard is now embodied in FCC Rule 51.321 (c), which states:

...a previously successful method of obtaining interconnection or access to unbundled network elements at any particular premises or point on any incumbent LEC's

⁵⁷ Application of Cincinnati Bell Telephone Company for Approval of a Retail Pricing Plan Which May Result in Future Rate Increases and For a New Regulatory Plan, Supplemental Opinion and Order, Case No. 96-899-TP-ALT, 1000 Ohio PUC LEXIS 620 at *36 (November 4, 1999).

⁵⁸ Implementation of the District of Columbia Telecommunications Competition Act of 1996 and Implementation of the Telecommunications Act of 1996, Opinion and Order, Formal Case No. 962, Order No. 12610, 2002 D.C. PUC LEXIS 421 at *179 (December 6, 2002).

⁵⁹ 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, ¶ 204 (henceforth Local Competition Order).

network is substantial evidence that such method is technically feasible in the case of substantially similar network premises or points.

79. *Exchanging traffic over a single trunk group.* Relying on this approach, the Indiana Utility Regulatory Commission, observing that BellSouth had voluntarily agreed with Level 3 to exchange all traffic, including interLATA toll and IP Enabled traffic, over a single trunk group, concluded that this “completely justifies” Level 3’s request to receive the same treatment from SBC.⁶⁰ Of course, had SBC and BellSouth been parts of the same company, and had BellSouth adopted SBC’s approach, Level 3 could not have relied on BellSouth’s behavior to obtain the relief that it sought.

80. *Splitter functionality.* Similarly, in a proceeding in 2000 before the Illinois Commerce Commission, Covad was able to rely on the fact that BellSouth had provided splitter functionality on a bulk basis to obtain the same functionality from Ameritech, which was by then part of SBC. In particular, the Commission found that Ameritech “has not provided any convincing evidence that the BellSouth method is technically infeasible in Illinois.”⁶¹ As in the Indiana matter discussed

⁶⁰ In the Matter of Level 3 Communications, LLC’s Petition for Arbitration Pursuant to Section 252 (b) of the Communications Act of 1934, As Amended by the Telecommunications Act of 1996, and the Applicable State Laws for Rates, Terms, and Conditions of Interconnection with Indiana Bell Telephone Company D/B/A SBC Indiana, Cause No. 42663 INT-01, Indiana Utility Regulatory Commission, 2004 Ind. PUC LEXIS 465, at *67 (Dec. 22, 2004).

⁶¹ Covad Communications Company Petition for Arbitration Pursuant to Section 252 (b) of the Communications Act of 1934, As Amended by the Telecommunications Act of 1996 to Establish an Amendment for Line Sharing to the Interconnection Agreement with Illinois Bell Telephone Company d/b/a Ameritech, and for an Expedited Arbitration Award on Certain Core Issues; Rhythms Links, Inc. Petition for Arbitration Pursuant to Section 252 (b) of the Communications Act of 1934, As Amended by the Telecommunications Act of 1996 to Establish an Amendment for Line Sharing to the Interconnection Agreement with Illinois Bell Telephone Company d/b/a Ameritech, and for an Expedited Arbitration

immediately above, it is likely that the BellSouth benchmark would have been unavailable to Covad had Ameritech and BellSouth been part of the same company.

81. *Dual-purpose line cards.* In a proceeding that demonstrates that either AT&T or BellSouth can be the source of the best practice, Covad requested that the Tennessee Regulatory Utility Commission order BellSouth to install dual-purpose line cards in its Next Generation Digital Loop Carriers. The Commission noted that Covad had argued “although it may be true that BellSouth cannot begin installing NGDLC line cards *today*, it is absolutely clear based on the SBC example that it could begin doing so in the near future.”⁶² The Commission ordered BellSouth to install the technology in Tennessee by the end of a six month waiting period.

82. *Collocation arrangement time.* The Louisiana PUC’s staff found that BellSouth’s allowed total elapsed time to provide collocation to a CLEC would be increased if the time required to obtain a building permit was excluded from the collocation provisioning standards and instead included as a separate and additional time allowance. Noting that neither Bell Atlantic-New York nor Southwestern Bell Telephone excluded permit time from their collocation provisioning standards, and that apparently no other ILEC had proposed such an exclusion, staff recommended

Award on Certain Core Issues, Arbitration Decision, 00-0312 – Consol. 00-0313, 2000 Ill. PUC LEXIS 660, at *36.

⁶² See Generic Docket to Establish UNE Prices for Line Sharing Per FCC 99-355, and Riser Cable and Terminating Wire as Ordered in TRA Docket 98-00123, Order on Petition for Stay and Requests for Reconsideration and Clarification, Dkt. 00-00544, 2002 Tenn. PUC LEXIS 196, at *9 (June 27, 2002).

that the PUC include permit time in the calculation of average collocation provisioning times, but to allow for a case-by-case waiver process.⁶³

83. *Hot cuts measurement period.* As still another example, AT&T criticized the length of the measurement period used by Southwestern Bell Telephone Company to assess the extent to which competitors were experiencing installation difficulties on lines provisioned by CHC's [coordinated hot cuts] and FDT [frame due time] hot cuts.⁶⁴ In responding to this criticism, SWBT "submitted trouble data for the 7 day period following installation identical to the standard discussed in the *Bell Atlantic New York Order*."⁶⁵ Based on SWBT's submission of data in accordance with the Bell Atlantic benchmark, the Commission was able to conclude that "SWBT installs hot cuts of quality sufficient to provide an efficient competitor with a meaningful opportunity to compete."⁶⁶

84. More generally, telecommunications regulators and antitrust authorities have relied on benchmarking in a wide variety of settings. A previous report by Farrell and

⁶³ Louisiana Performance Metrics Order: *BellSouth Telecommunications, Inc. Service Quality Performance Measurements*, General Order, Docket No. U-22252-(Subdocket-C), 2000 La. PUC Lexis 234, at *20-21.

⁶⁴ Federal Communications Commission, Memorandum Opinion and Order In the Matter of Application by SBC Communications Inc., Southwestern Bell Telephone Company, And Southwestern Bell Communications Services, Inc. d/b/a/ Southwestern Bell Long Distance, Pursuant to Section 271 of the Telecommunications Act of 1996 To Provide In-Region, InterLATA Services in Texas, CC Docket No. 00-65, Adopted June 30, 2000, ¶ 274.

⁶⁵ *Ibid.* footnote 777.

⁶⁶ *Ibid.* ¶ 274. In its Qwest Colorado et al., 271 Order [*Application by Qwest Communications International, Inc. for Authorization To Provide In-Region, InterLATA Services in the States of Colorado, Idaho, Iowa, Montana, Nebraska, North Dakota, Utah, Washington and Wyoming*, Memorandum Opinion and Order, 17 FCC Rcd 26303 (2002)], the Commission also relied on benchmarking to *approve* Qwest's performance. In particular, the Commission found: "Although Qwest's commercial data show low monthly total flow-through rates, Qwest's total flow-through rates are *comparable to those of BOCs that the Commission has previously approved.*" (¶ 110, emphasis added)

Mitchell⁶⁷ recounted the application of benchmarking to: access to OSS functions, open architecture, trunk-side interconnection, cageless collocation, operating expenses, line-of-business restrictions, equal access, overhead costs, collocation, and non-primary lines. In these instances average-practice benchmarks, best-practice benchmarks, and scrutiny of worst-practices were all considered or employed.

8. Effects of Mergers on Benchmarking

85. In this section, we explain why mergers between large ILECs reduce the effectiveness of benchmarking as a regulatory tool. We begin by analyzing the effects of a reduction in the number of separately owned and operated carriers that can serve as benchmarks for evaluating the conduct of other carriers or of the industry as a whole.⁶⁸ We then explain how this reduction worsens the incentives for efficient behavior by the regulated firms.

8.1. Effects of Mergers on Available Information

86. 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. As a result, after the merger, regulators will be able to observe only the behavior of the merged firm where previously it had available two

⁶⁷ See Declaration of Joseph Farrell and Bridger M. Mitchell, "Benchmarking and the Effects of ILEC Mergers," October 14, 1998, filed on behalf of Sprint Corporation In the Matter of the Application for Consent of to the Transfer of Control of Licenses and Section 214 Authorization from Ameritech Corporation to SBC Communications, Inc.

⁶⁸ FCC 97-286, ¶ 147.

independent observations. Moreover, even where the merged firm retains somewhat different practices in each of its previously separate entities, it may report information at the firm level, thus providing less information about the range of performance than when the two firms were separate. Finally, even where the merged firm reports separate results for each of its entities, the information can be less useful than the corresponding data it provided when the entities were independent.⁶⁹

87. Consider the following case: 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 .⁷⁰ The Commission wishes to learn something about b , perhaps in order to set a performance standard. Suppose that the parameter b is equal to 1 if a particular practice has been successfully implemented on at least a trial basis, 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 0.⁷¹

⁶⁹ In this regard, 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." 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. 2.76.

⁷⁰ The analysis is simplest if the x_i are independent and identically distributed, but that is not necessary for the basic insights.

⁷¹ That is, with probability p firm i implements the practice, if it is indeed practicable, and with probability $1-p$ it does not, even if it would be practicable.

88. In employing best practice regulation, a sufficient statistic for b is the maximum of the x_i . An admissible (and sensible) decision rule is to require the practice to be implemented 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 $\max[x_1, x_2]$.
89. However, if the merging firms operated differently prior to the merger, it is as likely as not that the merged firm would implement the particular practice after the merger. 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, observing $x_{1\&2}$ is strictly less informative than observing both x_1 and x_2 .
90. In this case, we can rather easily quantify the loss of useful information from the 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 $p^2 + 0.5[p(1-p) + (1-p)p] = p$.⁷² Conveniently, in this formulation, from the point of view of best-practice benchmarking, the 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 the number of observations, n .

⁷² Pre-merger, the probability that at least one of these two firms would reveal the feasibility of the particular practice is $1 - (1 - p)^2$.

91. For example, if pre-merger $n=4$ and $p=.125$ the probability that the particular practice is successfully implemented by at least one firm is given by $1 - (1 - p)^n$. Substituting for p and n , we see that this probability is 0.41. If two of the four firms merge, the probability falls from 0.41 to $1 - (1 - p)^3 = 0.33$. Note that when the 7 original RBOCs and GTE were independent firms, the probability would have been 0.66. Thus, the series of mergers that began with SBC-PacTel and culminated in SBC-Ameritech and Bell Atlantic-GTE has reduced the calculated probability that at least one firm successfully implemented the practice – so that the Commission can employ it as a best practice standard – from .66 to .41, or by more than a third. An AT&T-BellSouth merger would further reduce the probability by 20 percent – to just half of the value that existed before the series of mergers took place.

92. AT&T's and BellSouth's own comments in this proceeding suggest that there are currently differences in the practices of the two companies. For example, in their Joint Opposition, AT&T and BellSouth state: "To the extent the practices of AT&T and BellSouth *in fact* differ, they reflect different responses to marketplace conditions...."⁷³ If, for example, BellSouth has been more cooperative than has AT&T in its dealings with entrants, our analysis indicates that this difference in "responses to marketplace conditions" would diminish or disappear altogether.

⁷³ Joint Opposition, p. 100, italics in original.

8.2. Effects of Mergers on the Use of Averages

93. 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 reduce the confidence needed by regulators to use an average measure as a benchmark, and thus may make them more tentative in their use of such averages.
94. Consider the case in which the Commission wishes to use the average cost of all ILECs for providing a given type of access as the benchmark for all ILECs. We can view x_i as firm i ’s 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 an 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.
95. If the error terms are uncorrelated across firms and their variances are known and proportional to the square of the 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 estimate of b , and its statistical precision, are unaffected by a merger between firms 1 and 2 even if, following the

merger, costs are reported only at the consolidated level. Intuitively, since the optimal use of all observations 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 value before being reported.

96. However, in the more general case, this result does not hold. For example, 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 *will not* use only the weighted mean of the observations x_i .⁷⁴ 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 each of these values separately. In other words, a merger impairs the average benchmarking process.

8.3. Effects of Mergers on Confidence in Performance Benchmarks

97. More generally, the Commission often lacks strong *a priori* knowledge of the variance with which the observations x_i are distributed around the unknown parameter b . This is particularly likely in a *sui generis* proceeding as compared with one designed to measure well-established performance, such as recent changes in ILEC productivity. Specifically, consider the standard Bayesian model in which

⁷⁴ For example, the method of generalized least squares estimation first uses the observations x_i to estimate a covariance structure that is then used to construct a more efficient estimate of the unknown parameter b .

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.⁷⁵ The observer's point (posterior mean) estimate of b is the average of the x_i . As above, this is unaffected when only average information is reported. 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 in the estimate of b .

98. For example, suppose we begin with $n=8$. Then the posterior variance is given by⁷⁶ $[(n-1)/(n(n-3))]s^2$, 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 mergers reduces n to 4, there will be 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 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 be more cautious in establishing any performance standard. Even if the Commission had data about the performance of smaller carriers, the additional loss of information that would result from the

⁷⁵ 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, New York: John Wiley & Sons, 1988, p. 150.

⁷⁶ See Judge et al., p. 152.

proposed AT&T-BellSouth merger would further increase the variance and reduce the confidence in any benchmark that the Commission might establish.⁷⁷

99. 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, this can be formulated as a desire to set a performance standard y as demanding 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.

100. 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). Thus, the Commission will use the data for more than a point estimate of b .

101. The reduced number of observations of, say, ILEC costs increases the variability of the Commission's cost standard for a zone of reasonableness – the sample mean plus one sample standard deviation. In a framework of Bayesian estimation of a parameter b and its distribution, the reduced number of observations diminishes the Commission's confidence that a mean-plus-one-standard-deviation interval actually covers the range of costs of efficient ILECs.

⁷⁷ Even where the Commission has not relied specifically on benchmarking to establish performance standards, it has used benchmarks to confirm the appropriateness of the standards that it has established, thus increasing its confidence in adopting them. For example, in its Colorado 271 Order, the Commission noted: "We find that the recurring charges in Colorado comply with section 252 (d) (2) on their own merit and not based on a comparison to any other state. *We take comfort, however, in the fact that the rates established by the Colorado Commission are in the range of rates in states that have already received section 271 approval.*" (Qwest Colorado et al., 271 Order, footnote 693, emphasis added.)

102. 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 attempt to employ the "mean plus one standard deviation" standard to establish a maximum value for a performance measurement. 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 small number of observations.⁷⁸

9. Parity Standards Do Not Eliminate the Need for Benchmarking

103. In their Joint Opposition, AT&T and BellSouth argue that benchmarking is no longer necessary. We have addressed the first of the reasons given for this

⁷⁸ 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 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.