

The Role of Incentives for Opening Monopoly Markets: Comparing GTE and RBOC Cooperation with Local Entrants

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Abstract

The Telecommunications Act of 1996 requires all incumbent local telephone companies to provide local entrants with access to various facilities and services of incumbents' local networks. In the case of Regional Bell Operating Companies (RBOCs) providing such cooperation is a pre-requisite for being allowed to offer long-distance services; GTE, however may offer long-distance services unconditionally, hence its incentives to cooperate should be weaker. Using an originally assembled data set, this paper compares the negotiations of AT&T, as a local entrant, with GTE and with the particular RBOC in various GTE states. The results suggest that differential incentives matter: despite the fact that regulatory *obligations* to cooperate apply to both GTE and the RBOCs, GTE is significantly less cooperative. Specifically, GTE litigates prematurely far more often, and negotiations with it take about seventy percent longer. Moreover, controlling for cost differences, GTE demands more favorable pricing from entrants for access to its networks. Tougher GTE demands are associated with better arbitration awards to both GTE and the RBOC in that state (perhaps because a state commission is reluctant to treat the incumbent carriers in its state very differently). Preliminary evidence from an FCC survey suggests that, consistent with GTE's greater resistance, there is less entry into GTE's territories.

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“The big difference between us and them [GTE] is they’re already in long distance...what’s their incentive?”

Ameritech’s CEO Richard Notebaert,
Washington Post, October 23, 1996.

I. Introduction

The Telecommunications Act of 1996¹ aims to open all telecom markets to competition, including the large and still mostly monopolized *local* markets. Traditionally, local telephone companies in the U.S. (Incumbent Local Exchange Carriers, or ILECs) had exclusive franchise areas, in which they alone provided local exchange services and exchange access for long-distance services. Section 253 of the Act strikes down legal barriers to entry.² Section 251 aims to remove artificial incumbency advantages. It requires all ILECs to provide, through an interconnection agreement, efficient access at cost-based prices to their local networks for any requesting competitor (Competitive Local Exchange Carrier, or CLEC).

In the case of the Regional Bell Operating Companies (RBOCs), which account for about 75% of LEC revenues nationwide,³ section 271 of the Act takes an additional step to open their local markets, beyond the obligations imposed under section 251 on all ILECs. Section 271 requires that an RBOC applying for authority to offer long-distance (interLATA) services originating in a state where it offers local service (*in-region* state) must first open its local markets in the state to competition.⁴ The RBOCs had been

¹ Pub. L. 104-104, 110 Stat. 56, February 8th 1996.

² Section 253(a) states that “No State or local statute or regulation, or other State or local legal requirement, may prohibit or have the effect of prohibiting the ability of any entity to provide any interstate or intrastate telecommunications service.”

³ See Schwartz (1997, Table 1).

⁴ An applicant RBOC must comply with a 14 point competitive checklist which largely parallels the requirements of section 251. Then the FCC, after consulting with the Department of Justice and the state commission, must determine if RBOC in-region interLATA entry is in the public interest. The Act allows the RBOCs to offer long-distance (interLATA) services immediately in *out-of-region* states, ones where they do not provide local service (and hence do not control local networks).

barred from interLATA services since the 1982 antitrust consent decree,⁵ which broke up the vertically integrated AT&T and resulted in the formation of the RBOCs.⁶

Section 271 and its implementation have been arguably the most contentious aspect of the 1996 Act. Supporters see 271 as an important tool for opening up local markets, because allowing an RBOC into long distance before it has opened its local market would diminish its incentive to cooperate with entrants. Incentives would diminish for two reasons. Most obviously, an RBOC will have less to gain from cooperating, having secured its desired entry authority (the so-called “carrot effect”). Secondly, it will have more to lose; because long-distance authority enables an RBOC to offer also one-stop shopping for local and long-distance services, cooperating in opening the local market would diminish the RBOC’s profits in these additional markets for one-stop shopping that become available to it only after obtaining long-distance authority.⁷ Critics, however, maintain that 271 needlessly delays the RBOCs’ entry into long distance, because it is superfluous for opening local markets given the obligations already imposed by section 251 on all ILECs.

Therefore, a key question in the 271 debate—and more broadly—is whether regulatory obligations alone are sufficient to induce incumbents in network industries to cooperate efficiently and expeditiously in establishing the requisite conditions for competition. If not, then incentive devices such as the 271 mechanism may play a useful role. This paper addresses that question by comparing the conduct of RBOCs towards

⁵ Modification of Final Judgment (MFJ). *U.S. v. AT&T*, 552 F. Supp. 131 (D.D.C., 1982). Judge Greene entered the MFJ on August 24, 1982, and the divestiture was consummated January 1, 1984.

⁶ The seven original RBOCs were Ameritech, Bell Atlantic, BellSouth, NYNEX, Pacific Telesis, Southwestern Bell and U.S. West. There are now five, following the mergers between Pacific Telesis and Southwestern Bell, and between NYNEX and Bell Atlantic. Pursuant to the MFJ, Judge Greene created Local Access Transport Areas (LATAs) and RBOCs were confined to only carry calls originating and terminating within the same LATA. There are about 160 LATAs in RBOC regions (thus, a state typically contains several LATAs).

⁷ The term “one-stop shopping” has been used in the industry to include both: i) a customer obtaining the same services as before, but from a single provider, and ii) acquiring bundled packages that combine and price the individual services in new ways. The ability to offer one-stop shopping is generally regarded as important. For example, GTE (discussed further shortly) credited its strong performance domestically in 1996 to its being “... the first among its peers to offer 'one-stop shopping' for local, long-distance and Internet services” (source: GTE's web page: <http://www.gte.com>). The RBOCs are currently unable to offer one-stop shopping because they lack in-region interLATA authority; whereas the Interexchange Carriers (IXCs, such as AT&T, MCI WorldCom and Sprint) are practically limited in their ability to offer local services.

local competitors with that of GTE—by far the largest non-RBOC ILEC. Unlike the RBOCs, GTE has been free since the 1996 Act to offer long-distance services jointly marketed with its local services;⁸ correspondingly, one expects it to be less disposed to cooperating with local entrants.

There is a widespread perception that GTE's differential incentives indeed make it more resistant than the RBOCs in dealing with local competitors. This aggressive stance is said to have included excessive requests in negotiations and premature litigation in the ensuing arbitration process, and to have resulted in less entry in GTE's territories. However, the supportive evidence for this view has been, so far, largely anecdotal (see, for instance, Burns and Kovacs, 1996, 1997). The aim of this paper is to test the differential conduct hypothesis more systematically.

Using a fairly comprehensive and originally assembled data set, I compare the negotiations of the same local entrant, AT&T, with GTE and with the RBOCs in GTE's states. AT&T is chosen because it has been one of the most active CLECs in seeking access to incumbents' networks, and has made available to me data on its negotiations. I concentrate on GTE because it is by far the largest non-RBOC ILEC and its size is comparable to the average RBOC.⁹ AT&T did not pursue negotiations with the other major non-RBOC ILECs (which, like GTE, are not subject to section 271's long-distance provisions governing the RBOCs), including Cincinnati Bell, Frontier, and Sprint. The exception is SNET, which provides local service only in Connecticut. AT&T's delay in reaching an agreement with SNET is far larger than the average I find for the RBOCs

⁸ GTE was never barred from long-distance services, but had been required to offer such services through a separate subsidiary, under the consent decree arising from its merger with Sprint. (Sprint was subsequently divested by GTE, and the separation requirements imposed on GTE were in litigation at the time of the 1996 Act.) The 1996 Act ended these separation requirements.

⁹ Before the NYNEX-Bell Atlantic and PacTel-Southwestern Bell mergers, GTE ranked as the fifth largest local service provider in terms of switched access lines, with 11% of the 155 million total lines (both residential and business) in the U.S. The complete ranking was as follows: 1) Bell South, 14%; 2) Bell Atlantic, 13.1%; 3) Ameritech, 12.4%; 4) NYNEX, 11.3%; 5) GTE, 11%, 6) Pacific Telesis, 10.7%; 7) US West, 9.9%; 8) Southwestern Bell, 9.4%. The remaining 8.2% of switched access lines were owned by several small companies. Source: FCC, 1996 Statistics of Communications Common Carriers, table 2.10 (data are as of December 31, 1996).

(see Section III), and therefore is consistent with the differential-incentive hypothesis due to section 271.¹⁰

Under the Act, interconnection agreements are negotiated on a state-wide basis. My data set covers negotiations between AT&T and GTE in 23 of GTE's 28 states. In 22 of these 23 states, an RBOC also offers local service (the exception is Hawaii), and my data set also covers AT&T's negotiations with the RBOC in each of these 22 states. The sample therefore provides a convenient natural experiment for comparing RBOC behavior with that of the largest ILEC lacking the section 271 incentives, in their negotiations with the same local entrant while facing the same state regulatory commission.¹¹

The paper's main findings are as follows: 1) GTE engages in significantly more premature litigation than do the RBOCs; 2) it takes significantly longer to obtain an interconnection agreement with GTE; 3) GTE's pricing requests are consistently "tougher"; 4) tougher GTE requests are not associated with systematically better awards to GTE than to the RBOC;¹² however, a tougher GTE request is associated with better awards to both it and the RBOC in that state (hence a worse outcome for entrants); 5) the FCC's survey of the State of Local Competition (which reports data as of June 1998), shows less competitive entry into GTE than into RBOC territories; moreover, such a difference remains after accounting for the main economic factors other than the differential cooperation incentives.

¹⁰ SNET's interconnection negotiations with AT&T went to arbitration and the arbitrator issued its decision on November 19th, 1996; but as of February 1999 parties had not still agreed on a final version to submit to the Connecticut commission (Section II of this paper explains the negotiation process under the Act).

¹¹ There is reason to believe that AT&T's experience is representative of at least the experience of other large IXCs in their role as local entrants negotiating with ILECs. The experience of smaller entrants may be less or more favorable. Smaller entrants could be an easier target for incumbent ILECs; but they also are less threatening than the large IXCs, hence ILECs may choose to be more accommodating toward smaller entrants for purpose of "window-dressing" their 271 applications. Comparing the experience of small and large entrants is not attempted here, but would be an interesting extension.

¹² An earlier version of this paper (December 1998) reported that GTE did receive better arbitrated awards than the RBOCs. Those findings, however, reflected nationwide averages, weighted by either the number of lines or revenues in various states. GTE's superior average award was mainly driven by two states, California and Florida. The present paper instead compares, across various GTE states, the award to GTE with the award to the RBOC in the same state.

These results support two conclusions. First, GTE is significantly less cooperative (as evidenced by results (1), (2), and (3) above). Second, GTE's less cooperative stance, which is likely to affect also important non-price terms outside the scope of this paper,¹³ appears to impede competitive entry (results (2), (4), and (5)).

The remainder of the paper is organized as follows. Section II summarizes the regulatory framework established to open up local telephone markets to competition, and further describes the originally assembled data set. Using this data, the next two sections compare GTE and RBOC behavior. Section III compares the negotiation process—its length and the accompanying litigation. Section IV reports and analyses parties' pricing requests in arbitration, for selected terms in the interconnection contracts, and arbitrators' decisions. Section V presents the evidence about competitive entry emerging from the FCC Common Carrier Bureau survey referenced above. Section VI concludes.

¹³ See Beard, Kaserman, and Mayo (1999a) for a discussion of the incentives of incumbent LECs to engage in such non-price "sabotage" of competitors.

II. The Interconnection Negotiation Process and the Data Set

Sections 251 and 252 of the Telecom Act require incumbent LECs to cooperate with entrants in reducing artificial barriers to local competition.¹⁴ Section 251 requires ILECs to enter into “interconnection agreements” with requesting CLECs to provide, among other things: (1) interconnection to the ILEC local networks (i.e., arrangements for the exchange of traffic); (2) access to unbundled elements of ILEC networks; and (3) ILEC retail services at discounted wholesale rates, for resale by the entrants. Section 252 sets streamlined procedures for negotiation, compulsory arbitration absent voluntary agreement, and final approval by state public utility commissions.

Imposing such obligations on incumbents reflects a judgement that removing legal entry barriers alone would not be enough for competition to develop rapidly and efficiently in local markets (Farrell, 1996). Incumbent LECs control the local networks in their regions, and still have the vast majority of local customers, and could use this control to discourage or delay entry by limiting the cooperation they extend to entrants. The requirements imposed by the Act seek to facilitate entry through any of three modes: entirely *facilities based*; leasing from the incumbent *unbundled network elements*; and through *resale* of the incumbent’s existing retail services. To succeed through any of these entry modes, an entrant requires significant cooperation from the incumbent LEC. Even an entirely facilities-based entrant needs interconnection between its own, newly established network, and the incumbent's.¹⁵ Moreover, Congress determined that relying only on competition from entrants that build entirely new facilities could result in a slower and possibly inefficient transition to competition. Accordingly, the Act requires

¹⁴ Sections 251-252 of the Act are codified at 47 U.S.C. §§ 251-252, providing a convenient reference to both the Act and the Code. Those provisions are hereafter cited by section numbers.

¹⁵ Absent interconnection, the entrant's subscribers would not be able to communicate with the incumbent’s subscribers. Since a network's value to a perspective customer depends critically on the number of persons who can be reached through it, an incumbent could stifle competition from entrants with a small installed base by setting price and non-price terms (e.g., quality) of interconnection, so as to deny an entrant’s customers access to the positive networks externalities from communicating with the incumbent’s more numerous subscribers. For a recent analysis of the strategic use of interconnection pricing, see Laffont, Rey, and Tirole (1998a, 1998b). For a survey of economic literature on network externalities and the relevant bibliography, see Katz and Shapiro (1994), and Besen and Farrell (1994).

ILECs to cooperate also in making available to entrants access to unbundled networks elements, and to their retail services at discount.¹⁶

(i) The Negotiation Process Under Section 252

In order to speed up the process of signing such agreements, § 252 mandates a four-step negotiation procedure with highly compressed deadlines, shown in Figure 1.

First, the parties may enter into a voluntary agreement within 135 days of the CLEC's request for interconnection, with any party entitled to request the state commission's mediation at any point. (47 U.S.C, § 252(a)(1), (a)(2).)

Second, between the 135th and the 160th day, either party may petition the state commission to arbitrate (as opposed to mediate) any unresolved issue. The choice of arbitration method is left to the state commission, and is discussed further in Section IV.

Third, the state commission must resolve each open issue within 9 months of the original interconnection request. (47 U.S.C, § 252(b)(1), (4)(C).) (This has not happened in practice, as discussed shortly.) The parties must then incorporate the arbitrated decision into an interconnection agreement and submit to the state commission for final approval.

Fourth, the commission must approve or reject the agreement within 30 days of submission by the parties of a contract adopted through arbitration; within 90 days if the contract was reached by voluntary negotiation. If the commission does not act within such deadlines, the agreement is deemed approved. No state court has jurisdiction to review a state commission's action in approving or rejecting the agreement. (47 U.S.C, § 252 (e)(1), (e)(4).) Any party aggrieved by the state commission's decision may bring an

¹⁶ ILECs are directed to "negotiate in good faith" (47 U.S.C, § 251 (b)(1)) interconnections agreements with any requesting telecommunications carrier to: i) "provide [...] *interconnection* with the LEC's network for the transmission and routing of telephone exchange service and exchange access, at any technically feasible point, [...] that is at least equal in quality to that provided by the LEC to itself, or to any subsidiary, affiliate, or any other party, [...] on rates, terms and conditions that are just, reasonable and nondiscriminatory [...]." (47 U.S.C, § 251(2)); ii) "provide [...] nondiscriminatory access to network elements on an *unbundled* basis at any technically feasible point on rates, terms, and conditions that are just reasonable, and nondiscriminatory, [and] in a manner that allows requesting carriers to combine such elements in order to provide [...] telecommunications services." (47 U.S.C, § 251(3)); iii) "offer for resale at *wholesale* rates any telecommunications service that the carrier provides at retail to subscribers that are

action in the appropriate federal court to determine whether the approved agreement meets the requirements of sections 251 and 252.

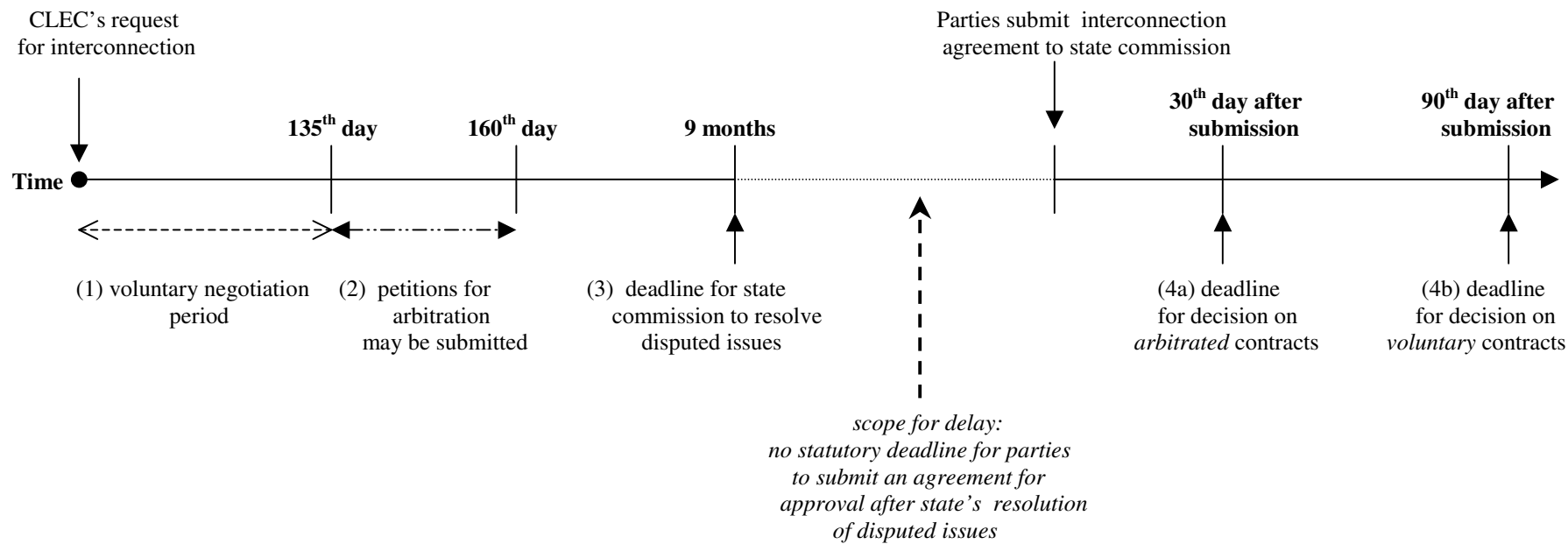
Within this framework, there remain several sources for delay. First, although the Act establishes a 9-month deadline for state commissions to resolve disputed issues and produce a final arbitrated decision, the Act is silent about what happens if a state commission exceeds this deadline; the Act sets no sanctions or alternative procedures to resolve disputes in such cases. In practice, commissions have issued decisions on the disputed issues within the 9-month deadline, but the decisions were often incomplete or required parties to file additional information. In my sample, it was not at all uncommon for arbitration proceedings to be still pending nine months after the original request.

Second, even where a commission ostensibly resolves all issues, the parties must incorporate the arbitration decision into a *voluntary* contract; this leaves room for disputes over fine points. Importantly, there is no statutory deadline for the parties to submit a revised voluntary agreement after the arbitrator has resolved the disputed issues, and no provision for the commission to intervene in preparing this revised contract.

Consequently, considerably more than 9 months can elapse from the CLEC's initial request to the submission of a final contract for approval to the state commission.

not telecommunications carriers; and not to prohibit, and not to impose unreasonable or discriminatory conditions or limitations on, the resale of such telecommunications service [...]." (47 U.S.C. § 251(4)).

Figure 1— Negotiation Process Under Section 252



(ii) The Data Set: AT&T's Negotiations with GTE and the RBOCs

Shortly after the passage of the Telecommunications Act in February 1996, AT&T embarked on a major national effort to take advantage of the provisions of sections 251 and 252 and enter local markets. Around March 1996, AT&T asked GTE for interconnection in 26 of the 28 states where GTE operates local networks. AT&T and GTE initially agreed to conduct negotiations at the national level, rather than for each state individually. This effort to reach agreement was unsuccessful, however, and state-by-state arbitration was invoked almost always.

My sample of negotiations between AT&T and GTE covers 23 of the 28 states where GTE offers local service. Excluded are two states where AT&T did not request interconnection (Alaska and Nevada), two states where AT&T decided to suspend its entry plans (Arkansas and Idaho), and one where no “independent” negotiations were conducted (Arizona). In all 23 states, the negotiations ended up in arbitration. In 22 of these 23 states, an RBOC also offers local service (the exception is Hawaii). I also gathered information on AT&T's negotiations with RBOCs in these 22 states. Negotiations in all 22 cases ended in arbitration. Table A.1 in the Appendix lists the relevant states, the particular RBOC (if any) that also provides local service in the GTE state, and the outcome of the voluntary negotiations (if any) between AT&T and that RBOC. The Appendix also describes the data collection process.

Regarding contract terms, it would be impossible to account for all the price and non-price issues on which parties negotiated; the technological intricacies of local networks are mirrored by the multi-dimensional, complex nature of interconnection agreements, which easily span several hundred pages. Therefore, I focussed on a few key prices: 1) resale discount rates; 2) prices for unbundled loops, and 3) prices for end-office switching. These prices are perceived as extremely important by the parties, at least judging from the extensive litigation record on those issues. In addition, the quantitative nature of pricing data makes comparisons easier than for qualitative non-price issues.¹⁷

¹⁷ Take, for instance, the case of *Branding of Resold Services* (e.g., operator services, directory assistance, repair and maintenance at customer's premise, and the like) which are provided by an incumbent LEC on the entrant's behalf (who is buying it at wholesale). The question is: in what fashion, if at all, should the LEC's and the entrant's names, respectively, appear during the provision? This question

In what follows, I report data on the RBOCs both individually and as a group. I consider the seven “original” RBOCs, that is, before the PacTel-SBC and BellAtlantic-NYNEX merger. However, since GTE is not active in any NYNEX states, no data is reported for NYNEX.

involves many aspects (standard greetings in live voice services, company logos on uniforms and vehicles, etc.), which can be solved in many different ways (anonymous provision, mentioning only the entrant’s name, etc.). In such cases, it would be very difficult to capture the differences among parties’ proposal and state solutions with a view to carry out meaningful quantitative comparisons.

III. Delay and Deadlock in Negotiations, and Premature Litigation

Section (i) below discusses the status and length of negotiations in my sample; section (ii) discusses the record on premature litigation.

(i) Delay and Deadlock in Negotiations

Deadloack

As of March 1999, AT&T had obtained approved interconnections agreements with the RBOCs in all my sample states except for two. Negotiations with GTE, however, had not been finalized in 10 out of its 23 states. Table A.2 in the Appendix provides the data by state, and Table I here summarizes the information on the status of negotiations for those 22 states where state-wide comparisons are possible.

Table I—Statewide Comparison on the Status of Negotiations

Number of States where:		RBOCs have		
		Approved Agreement	No Agreement	
GTE has	Approved Agreement	12	0	12
	No Agreement	8	2	10
		20	2	22

I use the McNemar statistic (see Marascuilo and McSweeney, 1977) to test the null hypothesis H_0 : “AT&T is equally likely to get to an approved agreement with GTE and the RBOC” against the alternative hypothesis H_1 : “The likelihood of reaching an approved agreement is higher with the RBOC.” The data reported in Table I leads to rejecting H_0 at the 0.1% (not 1%!) level of significance.

Delay in Negotiations

The length of the negotiations is measured here as the time between AT&T’s request for interconnection and the approval of the final contract by the state commission.

States where agreement reached. In the 12 states where AT&T has an approved agreement with both GTE and the RBOC, 11 times the agreement was reached with the

RBOC first (see Table A.2). Using a Sign Test one can reject the null hypothesis that GTE and the RBOC are equally likely to be the first to reach an approved agreement with AT&T at the 1% significance level. In these 12 states, the length of negotiations between AT&T and GTE is, on average, 243 days longer than that between AT&T and the RBOCs—657 and 414 days, respectively (here and below, averages are computed by assigning equal weights to each state). Using a t test for equality of means, this difference is statistically significant at the 5% level.¹⁸

Entire sample. I obtain a rough estimate of the difference in the length of negotiations with GTE and with the RBOCs *for the whole sample* as follows. In those cases where there was no approved agreement between AT&T and the ILEC, the length of negotiations process was calculated as the time between AT&T's initial request and the date of the most recent statement by the parties or by the commission stating that an agreement had not yet been approved.¹⁹ In the great majority of these states, AT&T was still attempting (as of March 1999) to obtain an agreement. Thus, under this procedure, the average length of negotiations reported for GTE is still likely to underestimate the true length of time ultimately needed to reach an agreement.

With these caveats, Figure 2 reports averages for the length of negotiations. The average length of negotiations with GTE is longer than with any RBOC except for Bell Atlantic, whose average delay is driven by a single observation.²⁰ Comparing GTE's delay with the RBOC average ("All RBOCs"), shows that it took AT&T 457 days to get an approved contract with an RBOC and 766 days with GTE—seventy percent longer with GTE. Using a t test for equality of means, this difference is statistically significant at the 1% level.²¹

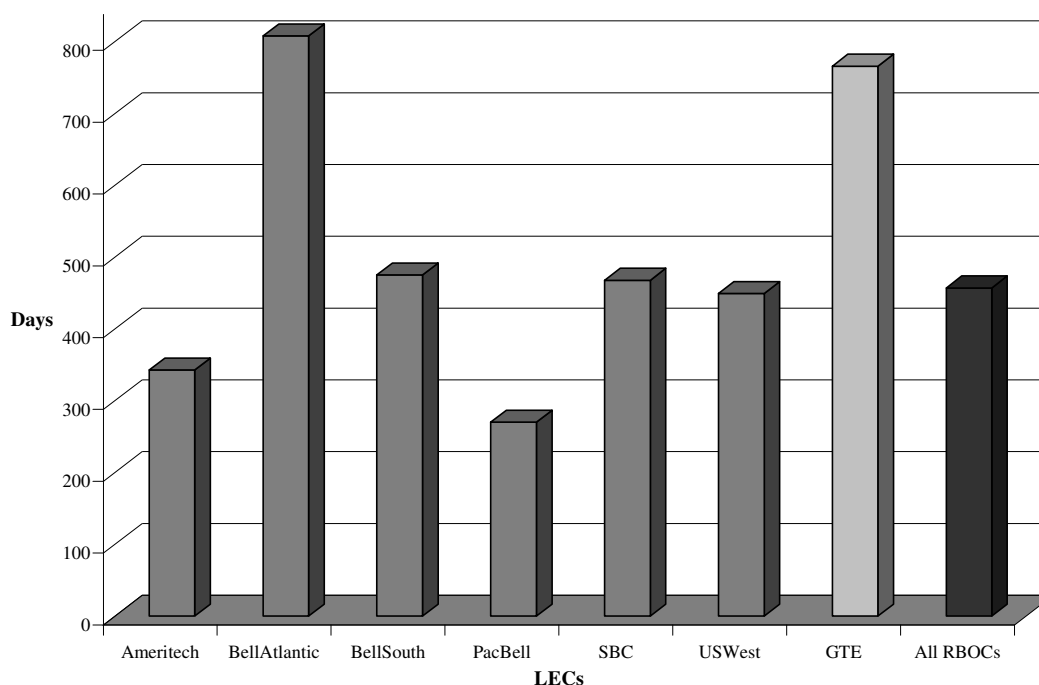
¹⁸ Here, and in what follows, t tests are carried out as one-tail tests, without assuming equal variances across the two groups of observations. In the case at hand, the statistic had 14 degrees of freedom, and its value was 2.61.

¹⁹ This was possible in all cases except for New Mexico, where information on AT&T's negotiations with both GTE and US West was not available.

²⁰ Bell Atlantic provides local service in only two of my sample states—Pennsylvania and Virginia—and Pennsylvania is one of only two states where AT&T and the RBOC did not reach an approved interconnection agreement as of March 1999. In the 20 States where AT&T and the RBOC reached an agreement as of March 1999, the average length of negotiations is 425 days.

²¹ The test statistic had 35 degrees of freedom, and its value was 4.17.

Figure 2—Average Number of Days Between AT&T’s Request for Interconnection and State Commission’s Approval of a Final Contract



Source: Author's calculations on originally assembled data set

Another way of testing for differences in the length of the negotiations is to examine the 22 states in the sample (all except Hawaii, where no RBOC operates), and ask how many times the RBOC was the first to reach an agreement with AT&T (counting as “successes” the times AT&T reached an approved agreement with RBOC, but not with AT&T). This happened 19 times out of 22 (the agreement with GTE was faster in Nebraska; the two tied cases—Pennsylvania and New Mexico—are assigned to GTE to make rejection of the null hypothesis more difficult). Using the Sign Test to test the null hypothesis H_0 : “GTE and the RBOC are equally likely to be the first to sign an interconnection agreement with AT&T” against the alternative hypothesis H_1 : “AT&T and the RBOCs are more likely to reach an agreement faster than AT&T and GTE,” H_0 can be rejected in favor of H_1 at the 1% significance level.

(ii) Premature Litigation

In order to speed up negotiations, the Act denies state courts jurisdiction to review state commissions’ actions in approving or rejecting an agreement (47 U.S.C. § 252(e)(4)). Parties may file claims only in federal court, and only after a state

commission has issued an order approving or rejecting the arbitrated (or negotiated) interconnection agreements (47 U.S.C, § 252(e)(6)). “Premature litigation” is therefore used here to include claims filed prior to a final commission order, challenging either the arbitrator’s decisions, or the commission’s interlocutory orders.²²

Table A.3 in the Appendix reports premature claims filed in states where AT&T requested interconnection from GTE and from the local RBOC. While GTE filed premature claims in 17 of the 23 sample states, the RBOCs did so in only 3 of the 22. Of GTE’s 17 premature claims, the courts dismissed 13, and GTE withdrew one.²³ All 3 premature suits initiated by RBOCs ended in dismissal, and AT&T withdrew all its premature motions.

Table II summarizes the information reported in Table A.3 for the 22 states where both GTE and RBOC provide local service, showing that GTE litigates prematurely far more often. A McNemar test performed on this data rejects the null hypothesis that GTE and RBOC are equally likely to file premature claims at the 0.1% level.

Table II—Statewide Comparison on Premature Litigation

Number of States where:	RBOC litigated prematurely		
	Yes	No	
GTE litigated prematurely	Yes	14	16
	No	5	
	3	19	22

The disproportionate amount of GTE’s premature litigation relative to the RBOCs is striking. What might GTE hope to gain from such premature litigation?

Premature litigation might well have caused some delay in negotiations because state commissions have limited resources, and having to defend their case in federal court could have slowed down their other activities to open local markets pursuant to the Act. However, it is safe to assume that the *direct* delay in negotiations caused by premature

²² The purpose of interlocutory orders was to request further studies on unresolved issues, to direct the parties on how to incorporate arbitrated decisions into a complete interconnection agreement, and to set deadlines for submission of a final draft agreement.

²³ As for the other three, I was unable to obtain information about their status.

litigation was not great: the average length of negotiations when GTE litigated prematurely is 626 days, versus 525 when GTE did not.²⁴

On the other hand, the *indirect* impact of GTE's premature litigation on the bargaining process might have been quite significant. While GTE likely knew that the premature claim would eventually be dismissed with little impact on the negotiations process, contesting many of the arbitrated issues signaled to AT&T that the process would be expensive, and that it should not count on the approved contract as being truly final. After all, the dismissals by the federal courts never questioned the merits of the claims (that is, whether GTE's requests were actually fair), but simply postponed such investigation to the time the action was ripe. In other words, GTE's premature claims might well have discouraged competitive entry by increasing the uncertainty facing entrants and by increasing their expected costs through signaling a tougher posture.

Before turning to the evidence on parties' pricing requests in arbitration and arbitrators' decisions, two points bear mentioning. First, the average number of days the federal courts took to dismiss the premature claims in my sample was 142 days.²⁵ It may appear surprising that courts did not dismiss those lawsuits immediately; given that the Act clearly permits appeals only after the approval of a final interconnection agreement, a mere checking of the arbitration dockets should seemingly have sufficed for dismissal. However, when most premature claims were filed (late 1996-early 1997), the Act was still a new piece of legislation, and federal courts were rather cautious in its application.

Second, it is conceivable that GTE might have been more aggressive than the RBOCs in challenging state commissions also prior to the 1996 Act. If so, some of GTE's observed litigiousness in the interconnection process since the Act could reflect idiosyncratic company characteristics, as opposed to the differential incentives created by section 271 of the Act. Investigating this question systematically is beyond the scope of

²⁴ For instance, some of GTE's claims were dismissed as premature by a federal court *after* the state had approved the underlying interconnection agreement (in Florida, Minnesota and Nebraska). This suggests that state commissions sometimes went on with their proceedings without waiting for federal court rulings (although perhaps not as quickly as they would have in the absence of premature litigation).

²⁵ This figure was computed based on the 16 dismissed cases (13 GTE, 3 RBOCs) in Table A.3.

this paper.²⁶ However, conversations with industry experts indicate that GTE's litigation record prior to the Act was *not* significantly different from the RBOCs'.²⁷

²⁶ Such a study would require not only collecting data on the number and the scope of claims filed by GTE and the RBOCs in rate case hearings, but also their relative merits.

²⁷ Source: Scott Bohannon, Sidley and Austin, and Thomas Spavins, FCC. According to Spavins, GTE had been less litigious than RBOCs in the regulated monopoly regime.

IV. Parties' Pricing Requests in Arbitration and Arbitrators' Decisions

For the selected contract terms—resale discounts, unbundled loops, and end-office switching—my data set covers not only the arbitrated awards, but also parties' initial offers. Therefore it can be used to examine whether—comparing GTE and the RBOC in a given state, hence controlling for the role of state commissions—there is any systematic difference between GTE and the RBOCs in their initial requests, and, if so, whether such differences are associated with different arbitration outcomes.

(i) Arbitration Methods

It is worth discussing briefly the arbitration methods used, as this may be relevant to interpreting the results. The FCC explicitly declined to establish arbitration rules,²⁸ so state commissions have been free to choose the arbitration mechanism to carry out their duties under the Act.

The two most common types of arbitration are *conventional arbitration* and *final-offer arbitration*. Under conventional arbitration, the arbitrator is free to impose any settlement (s)he sees fit; under final-offer arbitration, the parties submit final-offer to the arbitrator, who must pick one or the other. When there are two or more issues under arbitration, final-offer arbitration can take two different forms: “*package final-offer*” where the arbitrator must pick one party's final offer in its entirety, and “*issue-by-issue final-offer*”, where the arbitrator can fashion the settlement from the components of the parties' final offers.

In 18 of the 23 States in my sample, arbitration proceedings followed the conventional arbitration scheme. In the other 5 states (Iowa, Michigan, Minnesota, Pennsylvania and Washington), the state commissions ruled that the arbitrator should use “issue-by-issue” final-offer arbitration; however, if parties' final offers were clearly unreasonable or contrary to the public interest (that is, not consistent with federal and state law), the arbitrator had discretion to set contract terms different from either party's position. Thus, the arbitrators were free to revert to *conventional arbitration* as they saw fit. In four of these five states (the exception is Iowa), the arbitrators indeed reverted to conventional arbitration mechanism for at least one of the three issues I consider. In all

²⁸ See FCC's First Report and Order issued on August 8, 1996, Section 51.807, (a).

states in my sample, therefore, the form of arbitration pursued in practice can be viewed as conventional rather than final offer.

(ii) Parties' Pricing Requests

Parties' requests arguably provide the best evidence of relative aggressiveness. Consistent with the differential incentive hypothesis of this paper, I find that GTE systematically makes tougher requests than do the RBOCs. The evidence on arbitration awards is discussed later.

Resale Discounts

Resale of the incumbent ILEC's services is the quickest entry mode for a competitor planning to penetrate the local market, as it requires no network investment before a subscriber base is established (in contrast to facilities-based or unbundled-elements entry).²⁹ Under the Act, resale discounts are supposed to reflect the retailing costs an ILEC avoids when it sells to a CLEC at wholesale instead of to retail customers (costs of billing, marketing, etc.). Negotiations on resale discounts were carried out separately for residential and business subscribers. Resale discounts were quoted in *percentages* off the ILEC's retail price, both in parties' requests and in arbitration awards. Since retail prices might differ between GTE and RBOC territories in each state, comparing *percentage* discounts is problematic, as a given percentage discount can yield different dollar discounts depending on the prices.

To deduce the dollar discounts corresponding to the parties' requests in arbitration, and the arbitrators' awards, ideally one would apply those percentage discounts to the actual local rates (net of taxes) ILECs charge. Unfortunately, such data are not consistently reported.

However, using data from the Hatfield Model³⁰ and the FCC, I computed average monthly residential and business revenues per line, for each ILEC by state.³¹ I then

²⁹ See Beard, Kaserman and Mayo (1999b) for a discussion of the role of resale entry in promoting local competition.

³⁰ The Hatfield Model was developed by an independent consulting firm, Hatfield Associates Inc., on behalf of MCI and AT&T to provide cost estimates for basic local service on an element-by-element basis. I consider the latest version of the model, the HAI Model Release 5.0a, 1998.

applied the percentage discounts quoted by the parties in arbitration to these dollar revenues to estimate the implied dollar discounts. Comparing the estimated dollar discounts for GTE and the RBOC in a given state without adjusting for possible differences in their avoided retailing costs is appropriate under the assumption—widely supported in the industry—that differences in retail costs between GTE and RBOC territories in a given state (and probably even across states) are likely to be relatively small.

Based on these estimated dollar resale discounts, Table A.4 in the Appendix reports which ILEC in a given state (GTE or the RBOC) offered the lower discount, from which ILEC AT&T requested the lower discount, and which ILEC received a lower discount in arbitration. Table A.5 reports the same information for business resale discounts. Recall that a low resale discount is desirable for the ILEC and harmful for the entrant (here AT&T).

Given that GTE offers the lower residential discount 15 times and the RBOCs 3 times, a Sign Test rejects at the 1% significance level the null hypothesis H_0 : “GTE and the RBOC are equally likely to make the tougher offer” against the alternative H_1 : “GTE is more likely to make the tougher offer.” Conversely, the record on AT&T’s residential discount requests (8:10) shows that AT&T is equally likely to make the tougher request to GTE or the RBOC.

Similar findings arise for resale discounts for business customers (see Table A.5). As for GTE business discount requests, H_0 is rejected in favor of H_1 at the 5% level, and AT&T’s requests show no statistically significant bias toward either GTE or the RBOCs.

³¹ For each company in each state, the Hatfield Model reported the number of residential (n_1), business single-line (n_2), and business multi-line (n_3) switched access lines, along with the actual revenues from providing basic local service in 1996 (R). The FCC’s annual “Reference Book of Rates, Price Indices and Expenditures for Telephone Service” reports representative local residential and business rates in 95 urban areas. I used the data for 1997 to compute—net of the federally mandated subscriber line charge and average local taxes—tariffs ratios between: i) business single-line and residential (r_2), and ii) business multi-line to the resident, for each company in each state. This was done as follows: when there were one or more urban areas in the FCC’s sample for a given company-state combination, I used the corresponding average of r_1 and r_2 ; when the FCC had not sampled any company’s city in the state, I used the company-wide r_1 and r_2 averages in the FCC’s sample. Thus, I computed the residential average tariff as R/κ , and the business one as $[R(n_2r_2+n_3r_3)]/[\kappa(n_2+n_3)]$, where $\kappa=n_1+n_2r_2+n_3r_3$.

Prices of Unbundled Network Elements: Loops and Switching

The following comparison of prices of unbundled network elements does not suffer from the percentage problem arising for resale discounts, since price data were quoted directly in dollars in arbitration. On the other hand, it is essential to try and control for differences in costs across different service areas. Especially for loops, the cost of providing service depends critically on aspects such as customer density (which affects average loop length) and territory configuration, and it can vary quite dramatically between and within states.

To control for such differences, I use cost estimates from the Hatfield Model. The Hatfield Model provides cost estimates for loops and end-office switching for each LEC in each state. I use those company-state specific figures to compute price/cost ratios for those unbundled elements; comparisons between GTE and RBOCs are then carried out employing the computed ratios (rather than the raw price data).

It is not necessary that the Hatfield Model's cost estimates be exactly equal to the true cost of service for any LEC in any state. In particular, some have argued that the model understates LEC costs. However, as long as the Hatfield Model does not systematically over- or under-estimate RBOCs' costs *relative* to GTE's, it can serve as a meaningful benchmark for comparing the relative aggressiveness of GTE and the RBOCs in their pricing demands, after controlling for differences in costs.

Loops. Table A.6 reports state-wide comparisons of price/cost ratios for loops (parties' requests in arbitration and arbitrators' awards). GTE has a tougher position in arbitration 11 times out of 16, which allows to reject the null hypothesis of no difference relative to the RBOCs, but only at the 11% significance level.³² As with resale discounts, AT&T's requests do not seem to differ significantly between GTE and the RBOCs.

End-office switching. Table A.7 reports the record of state-wide comparisons price/cost ratios for end-office switching. Again, GTE's requests are tougher than the RBOCs' (the Sign Test rejects the null hypothesis of no difference at the 5% significance

³² The probability of GTE requesting the higher price/cost ratios 11 or more times is 10.5% under the null hypothesis the RBOCs and GTE are equally likely to make the tougher request in arbitration.

level). Although AT&T may appear as “responding” by making smaller price/cost offers to GTE as compared to the RBOCs (7 times out of 10), the null hypothesis that AT&T is equally likely to make the better offer to either GTE or RBOC can only be rejected at the 18% significance level.

Finally, I pooled the data on unbundled networks elements—loops and switching—and carried out Sign Tests as was done for loops and switching separately. The 17 times out of 23 where GTE rather than the RBOC requested higher price/cost ratios allows me to reject the hypothesis of equal conduct at the 5% significance level. The fact that AT&T made “tougher” (lower) requests to GTE 15 times out of 24 is not enough to reject the hypothesis that AT&T treated RBOCs and GTE equally at the 10% significance level.

(iii) Arbitration Awards

The data in Tables A.4 through A.7 can also be used to test whether GTE’s tougher requests result in correspondingly more favorable arbitration awards to it than to the RBOC. Interestingly, they do not. Combining business and residential resale discounts (Tables A.4. and A.5), GTE received a superior award exactly in half the cases (21 out of 42). Moreover, applying the Sign Test to residential and business resale discounts separately, the hypothesis of equal treatment by the arbitrator cannot be rejected at the 10% significance level. Similarly, there is no systematic difference in GTE and RBOC awards for loops and switches, both when these data are analyzed separately (Tables A.6 and A.7) and when they are pooled.

The fact that GTE’s awards were no better than the RBOCs’ might lead one to conclude that its tougher requests were inconsequential. Such a conclusion, however, would overlook a potentially important effect: a tougher request by GTE could result in better awards to *both* it and the RBOC in the state. In all my sample states, when a commission determined arbitration awards, it had access to both the GTE and RBOC requests. Under the plausible assumption that a commission might be reluctant to treat large ILECs—GTE and the RBOC—very differently in its arbitrated awards, one would not expect GTE’s requests to yield it significantly superior awards to those received by the RBOC. Nevertheless, tougher requests by GTE could induce better awards to both it

and the RBOC in the state. Focusing only on the difference would not capture this effect. To test this hypothesis, I examined how one ILEC's request affects both its award and that to the other ILEC.

Resale discounts. This is the contract term for which I have the most data points. I regressed the arbitrated dollar discount awarded to the RBOC in each state (ARBRBOC) on a constant, AT&T's requests to the RBOCs (ATTRBOC), and *both* the RBOC's and GTE's requests in that state (RBOC and GTE respectively). Table III reports Ordinary Least Squares results for this regression. All variables are expressed in logarithms, so the estimated coefficients represent elasticities.

Table III—OLS Regressions Explaining Arbitrated Awards: Resale Discounts

Dependent Variable: ARBRBOC		Dependent Variable: ARBGTE	
Constant	0.326* (2.891)	Constant	0.283 (1.175)
RBOC	0.286* (4.371)	GTE	0.480* (3.094)
ATTRBOC	0.438* (5.444)	ATTGTE	0.495** (2.685)
GTE	0.189* (2.859)	RBOC	0.044 (0.532)
R-squared	0.927	R-squared	0.926
Adjusted R-squared	0.919	Adjusted R-squared	0.918
No. of Observations	33	No. of Observations	33

Note: t-tests in parentheses; * significant at the 1% confidence level; ** significant at the 5% confidence level.

The coefficients on RBOC and ATTRBOC have the expected sign (the arbitrated award is positively related to both parties' positions), and are strongly significant. The coefficient on GTE's request is also positive and strongly significant, and has the same order of magnitude as the coefficients on AT&T's and RBOC's variables. (When AT&T's resale requests to GTE were included in the regression, the coefficient was not significantly different from zero). Note also that, notwithstanding the small size of the sample, the regression explains almost 93% of the variation in the data.

The regression explaining the resale discount awarded to GTE reveals an interesting contrast. While the coefficients on AT&T's and GTE's requests have the expected sign and are strongly significant, that on RBOC's request is statistically insignificant.

Loop price/cost ratios. I estimated the same regressions explaining RBOC and GTE arbitrated awards for loop price/cost ratios. Again, all variables are expressed in logarithms. (The same variable names used above now identify logarithms of price/cost ratios). Table IV reports the regression results. Regarding RBOC awards, while the coefficients on RBOC and ATTRBOC are not statistically significant, GTE's requests appear to affect the arbitrator's award to the RBOCs in the same way found above for resale discounts. In the regression explaining GTE awards, the RBOC's request is clearly insignificant, while GTE's and AT&T's are significant at the 10% level.

Table IV—OLS Regressions Explaining Arbitrated Awards: Loop Price/Cost Ratios

Dependent Variable: ARBRBOC		Dependent Variable: ARBGTE	
Constant	0.060 (0.539)	Constant	-0.339 (-1.155)
RBOC	-0.143 (-1.361)	GTE	0.603** (2.045)
ATTRBOC	0.307 (1.286)	ATTGTE	0.445** (1.920)
GTE	0.288* (2.421)	RBOC	0.130 (0.624)
R-squared	0.566	R-squared	0.685
Adjusted R-squared	0.421	Adjusted R-squared	0.590
No. of Observations	13	No. of Observations	14

Note: t-tests in parentheses; * significant at the 5% confidence level; ** significant at the 10% significance level.

A possible interpretation of these findings is as follows. The state commission pays more attention to GTE's request, recognizing that GTE is more willing to press its case (through legal challenges and otherwise) because—unlike the RBOC—it need not worry about long-distance entry authority. The reluctance to award significantly different prices to GTE as compared to the RBOC in the same state, however, results in both ILECs receiving higher awards than they would have had GTE made a “softer” request.

V. Evidence on Competitive Entry Into Local Telephone Markets

GTE's less cooperative stance (more premature litigation, longer negotiation delays, and tougher pricing requests) is likely to discourage entry in its territories more than into RBOC territories. Beyond the obstacles documented here (principally, delays or failure to reach interconnection agreement), GTE's less cooperative stance is also likely to involve other non-price conduct not explored in this paper but widely alleged to be important (e.g., inferior technical platform arrangements, constraints on bundling of networks elements, etc.). This section presents some evidence that GTE in fact has experienced less competitive entry, after controlling for other economic factors that might influence entry decisions.

In early 1998, the FCC's Common Carrier Bureau started collecting evidence on entry into local telephone markets, by asking ILECs and CLECs to provide—on a voluntary basis—data on various competition-related issues on a state-by-state basis. The first “Survey on the State of Local Competition” was published in February 1998; it reported information as of December 31, 1997, voluntarily provided by five RBOCs (Ameritech, Bell Atlantic, Bell South, Southwestern Bell, and US West), GTE, and three other large LECs (SNET, Frontier, and Sprint). The second survey, published in December 1998 and reporting information as of June 30, 1998, is based on the voluntary responses of 15 companies—those which took part in the first survey (except for Frontier) plus another 7 (Focal, Hyperion, ITC, MGC, RCN, Teleport, and USN).³³ Following the merger between Southwestern Bell and Pacific Telesis, the information regarding PacTel in California (the only PacTel state in my sample), was reported under Southwestern Bell in FCC Survey.

This section presents some suggestive evidence from the FCC data about the extent of local competition for the same states and ILECs analyzed earlier in this paper. The goal is to link the evidence on the arbitration process to the emergence of local competition in the corresponding states. It should be noted, however, that while my

³³ The FCC has made this information publicly available on its website: http://www.fcc.gov/cbb/local_competition/survey/responses.

arbitration data refers to *a single entrant*, AT&T, the FCC's information on entry pertains to *all* entrants. The evidence that follows is thus offered only as suggestive of the difference in the ease of entry into GTE as compared to RBOC territories, which may or may not be due to the same difficulties AT&T experienced (see sections III and IV).

This section also contains an econometric assessment—based on the whole FCC sample—of the relative importance of the main economic factors affecting competitive entry. The objective is to determine whether the observed differences in entry records across ILECs can be explained by factors different from the differential incentives of incumbents as GTE. Among these factors, I consider the following: size of the target ILEC, subscribers' density, and degree of cross-subsidization.

(i) Competitive Entry Record

Resale Discounts

Each carrier reported the number of switched access lines (broken down in “residential” and “business or other” customer lines) sold to competing carriers for resale, as a percentage of the carriers' switched lines in the state. The most recent information for RBOCs and GTE in my sample is reported in Table V.

Table V—Lines Provided by ILECs to Competitors for Resale

State	Resold Residential Lines as % of ILECs' Switched Lines			Resold Business and Other Lines as % of ILECs' Switched Lines		
	RBOC	GTE	company with larger %	RBOC	GTE	Company with larger %
Alabama	0.8157%	not reported	n/a	0.5263%	Not reported	n/a
California	0.7183%	0.8343%	GTE	0.6934%	0.0583%	RBOC
Florida	0.6029%	0.7407%	GTE	0.9031%	0.5263%	RBOC
Illinois	1.2228%	0.0002%	RBOC	1.5524%	0.0045%	RBOC
Indiana	0.0412%	0.0004%	RBOC	0.1926%	0.0002%	RBOC
Iowa	0.0030%	not reported	n/a	9.2916%	not reported	n/a
Kentucky	0.7135%	0.0205%	RBOC	0.9901%	0.1985%	RBOC
Michigan	2.0095%	0.0000%	RBOC	0.7547%	0.0000%	RBOC
Minnesota	0.1556%	not reported	n/a	2.3484%	not reported	n/a
Missouri	0.017%*	0.001%*	RBOC	0.3391%	not reported	n/a
Nebraska	0.0011%	not reported	n/a	0.2117%	not reported	n/a
New Mexico	0.0003%	not reported	n/a	0.0148%	not reported	n/a
North Carolina	0.2480%	0.0192%	RBOC	0.7661%	0.1451%	RBOC
Ohio	0.0320%	0.0007%	RBOC	1.8033%	0.0034%	RBOC
Oklahoma	1.0426%	not reported	n/a	0.2683%	not reported	n/a
Oregon	0.1329%	0.0146%	RBOC	3.2454%	0.0111%	RBOC
Pennsylvania	0.4788%	0.0025%	RBOC	0.6456%	0.0074%	RBOC
South Carolina	1.1175%	not reported	n/a	0.9372%	not reported	n/a
Texas	2.0594%	0.6437%	RBOC	0.9292%	0.0389%	RBOC
Virginia	0.0666%	0.0086%	RBOC	0.2026%	0.0146%	RBOC
Washington	0.0002%*	0.0007%*	GTE	1.331%*	0.001%*	RBOC
Wisconsin	0.1456%	0.0023%	RBOC	1.1547%	0.0002%	RBOC
# of times RBOC has larger %	12 out of 15			14 out of 14		

Source: FCC's Second Survey on the State of Local Competition, December '98, except for *; data for those states come from the First FCC survey, February '98.

I test the null hypothesis H_0 against the alternative H_1 :

H_0 : "RBOC and GTE are equally likely to have the larger % of resold lines in the state."

H_1 : "RBOC is more likely than GTE to have larger % of resold lines in the state."

The same hypotheses are tested subsequently replacing "*% of resold lines*" by "*% of unbundled loops*" (Table VI) and by "*% of ILEC lines served by switching centers where competitors have collocation*" (Table VII).

For *residential lines*, a Sign Test rejects H_0 against H_1 at the 2% significance level.³⁴ Applying the Wilcoxon Test (see Marascuilo and McSweeney), which takes into account the magnitude of state differences between RBOC and GTE, H_0 can be rejected at the 1%.³⁵

For *business and other lines*, H_0 is rejected without the need for any formal test since the RBOC has the greater % in all cases.

Unbundled Network Elements

Table VI reports data on lines provided by RBOCs and GTE to competing carriers as unbundled loops in my sample.

Table VI—Unbundled Loops Provided by ILECs to Competitors

State	Unbundled Loops as % of Total Switched Lines		
	RBOC	GTE	Company with larger %
Alabama	0.0491%	not reported	n/a
California	0.2928%	0.0146%	RBOC
Florida	0.0410%	0.0000%	RBOC
Illinois	0.1945%	0.0000%	RBOC
Indiana	0.0000%	0.0000%	Same
Iowa	0.0000%	not reported	n/a
Kentucky	0.0407%	0.0000%	RBOC
Michigan	0.6822%	0.0000%	RBOC
Minnesota	0.0062%	not reported	n/a
Missouri	0.0641%	not reported	n/a
Nebraska	0.0000%	not reported	n/a
New Mexico	0.2021%	not reported	n/a
North Carolina	0.0000%	0.0000%	Same
Ohio	0.3747%	0.0000%	RBOC
Oklahoma	0.0825%	not reported	n/a
Oregon	0.0042%	0.0000%	RBOC
Pennsylvania	0.3224%	0.0002%	RBOC
South Carolina	0.0057%	not reported	n/a
Texas	0.0035%	0.4262%	GTE
Virginia	0.0329%	0.0000%	RBOC
Washington	0.0003%	not reported	n/a
Wisconsin	0.0495%	0.0607%	GTE
# times RBOC (GTE) has larger %	9 (2) out of 13		

Source: FCC's Second Survey on the State of Local Competition, December '98.

³⁴ The probability of 12 or more "successes" on 15 tries when the probability of a success is $\frac{1}{2}$ is 0.0176. In what follows, I report the highest significance level for the Sign Test rather than the conventional significance level—10%, 5%, or 1%—at which H_0 can be accepted/rejected.

³⁵ The value of test statistic is 90, the lower bound for the 1% critical region is 81.9.

Note that in the two states—Indiana and North Carolina—where GTE and the RBOC are “tied,” this is because they both report 0%. In order to apply the Sign Test, ties must be assigned to one or the other group. Assigning to the RBOCs just one of these 2 “ties” is sufficient to reject H_0 at the 5% significance level. Moreover, using the Wilcoxon test, H_0 can be rejected at the 5% significance level.³⁶

Table VII reports information on collocation arrangements between ILECs and new entrants in my sample.

Table VII—Percentage of ILEC Lines Served by Switching Centers Where Competitors Have Collocation Arrangements

State	Lines in Switching Centers Where Competitors Have Collocation Arrangements, % of Total Switched Lines		
	RBOC	GTE	Company with larger %
Alabama	15.67%	not reported	n/a
California	53.66%	24.29%	RBOC
Florida	30.83%	10.82%	RBOC
Illinois	56.38%	3.40%	RBOC
Indiana	26.41%	0.00%	RBOC
Iowa	4.64%	not reported	n/a
Kentucky	24.89%	10.30%	RBOC
Michigan	49.83%	0.00%	RBOC
Minnesota	36.19%	not reported	n/a
Missouri	20.49%*	36.91%*	GTE
Nebraska	30.62%	not reported	n/a
New Mexico	32.53%	not reported	n/a
North Carolina	43.21%	20.01%	RBOC
Ohio	48.13%	0.00%	RBOC
Oklahoma	26.56%	60.55%	GTE
Oregon	22.87%*	0.00%*	RBOC
Pennsylvania	45.96%	7.58%	RBOC
South Carolina	18.28%	not reported	n/a
Texas	29.16%	15.68%	RBOC
Virginia	22.84%	5.14%	RBOC
Washington	38.06%*	56.67%*	GTE
Wisconsin	43.91%	0.29%	RBOC
# times RBOC (GTE) has larger %	13 (3) out of 16		

Source: FCC’s Second Survey on the State of Local Competition, December ’98, except for *; data for those states come from the First FCC survey, February ’98

³⁶

The value of test statistic is 59, the lower bound for the 1% critical region is 47.1.

The Sign Test statistic rejects H_0 at the 2% significance level; using the Wilcoxon test, H_0 is rejected at the 1% significance level.³⁷

(ii) Explaining Differences in Competitive Entry

Part of the observed differences in entry patterns could be explained by factors other than GTE's weaker incentives to cooperate with entrants. ILECs usually claim that new entrants are only attracted by the prospect of "cream-skimming" customers to whom prices are well above cost (especially business customers), and stay away from areas where subscribers' density is low (and the cost of developing own networks is higher). Moreover, there could be scale economies in entry (because of fixed set-up costs, advertising, etc.), so it would not be surprising to see more competition in relatively larger ILECs' territories. The limited entry in GTE's territories in a state could thus be due to GTE's being relatively smaller, more rural, and with a tariff structure closer to costs which makes it a less attractive competitive target.

I investigate this issue using the FCC data above, this time not limiting myself to the 22 states in my arbitration sample but employing information from all states in the survey.³⁸ Using the regressors reported in table VIII, I estimate regressions explaining resale and collocation penetration; for these items data is available separately for residential and business lines, thus allowing me to address the cross-subsidization issue.

Table VIII—Explanatory Variables in Entry Regressions

Variable	Definition and Source
RESLINES	Log of total residential lines ('000s), Hatfield Model
BUSLINES	Log of total business switched lines ('000s), Hatfield Model
RESLOWDENS	Log of percentage of residential lines in zones with less than 850 line per square mile, Hatfield model
BUSLOWDENS	Log of percentage of business lines in zones with less than 850 line per square mile, Hatfield model
RESCROSS	Log of residential tariff/cost ratio. Tariffs as calculated in Section 5, cost from Hatfield model
BUSCROSS	Log of residential tariff/cost ratio. Tariffs as calculated in Section 5, cost from Hatfield model
GTE	Dummy taking value 1 if company is GTE, 0 otherwise

³⁷ The value of test statistic is 98, the lower bound for the 1% critical region is 90.

³⁸ In addition to RBOCs and GTE, the responding ILECs include SNET (in Connecticut), and Sprint (in 15 states). However, in most cases Sprint data was withheld to maintain confidentiality. When available, the information on these companies was used in the regressions.

Entry Trough Resale

Table IX reports the results obtained regressing the variables on Table VIII on the log of the number of residential (business) resold lines per thousands of total residential (business) lines as reported by the FCC (RESRESOLD and BUSRESOLD respectively).³⁹

Table IX—OLS Regressions Explaining Entry Through Resale⁴⁰

Dependent Variable: RESRESOLD		Dependent Variable: BUSRESOLD	
Constant	-26.700* (-4.646)	Constant	-18.249* (-7.976)
RESLINE	1.975* (5.266)	BUSLINE	1.313* (6.090)
RESLOWDENS	-0.179 (-0.448)	BUSLOWDENS	0.074 (0.183)
RESCROSS	-0.065 (-0.037)	BUSCROSS	3.116* (2.893)
GTE	-1.917* (-2.373)	GTE	-2.897* (-5.859)
R-squared	0.547	R-squared	0.724
Adjusted R-squared	0.519	Adjusted R-squared	0.707
No. of Observations	69	No. of Observations	70

Note: t-tests in parentheses; * significant at the 1% confidence level.

In both regressions, the coefficient on the GTE dummy is negative and strongly significant; thus, the more limited entry into GTE territories cannot be explained solely on factors outside its control. Note also that ILECs' size is positively related to entry for both residential and business customers; however, cross-subsidization seem to be a factor only for business subscribers (with higher entry where "cream skimming" opportunities—larger tariff/cost ratios—are more attractive).

³⁹ In the case of resale entry, one could argue that the explanatory variables capturing subscribers density and cross-subsidization should not affect entry decisions *directly* (these depend on how resale discount compare to entrants' marketing costs, regardless of density and the difference between the tariffs ILEC charge to its customers and its actual costs). However, since resale entry is arguably the means to establish customer base with a view to facilities-based competition, these two factors indirectly affect resale entry plans.

⁴⁰ The residential entry regression required correcting for heteroskedasticity, which was done using the White heteroskedasticity-consistent covariance matrix.

Entry Through Unbundled Network Elements

Table X reports the regression results where the extent of entry through UNE is proxied by the log of the percentage of residential (business) lines in switching centers where competitors have collocation arrangements (PCRESCOLL and PCBUSCOLL, respectively).⁴¹

Table X—OLS Regressions Explaining Entry Through UNE

Dependent Variable: PCRESCOLL		Dependent Variable: PCBUSCOLL	
Constant	-1.266 (-0.550)	Constant	-3.043* (-0.616)
RESLINE	-0.009 (-0.059)	BUSLINE	0.022 (0.213)
RESLOWDENS	-0.040 (-0.203)	BUSLOWDENS	-0.433* (-2.724)
RESCROSS	1.156** (1.756)	BUSCROSS	1.012** (1.951)
GTE	-1.159* (-3.805)	GTE	-0.629* (-2.792)
R-squared	0.340	R-squared	0.438
Adjusted R-squared	0.288	Adjusted R-squared	0.394
No. of Observations	56	No. of Observations	56

Note: t-tests in parentheses; * significant at the 1% confidence level, ** significant at the 10% confidence level.

The above results are broadly consistent with those for resale entry. The GTE dummy is negative and strongly significant in both regressions. This time, cross-subsidization affects entry for both residential and business subscribers, while lower density is significantly correlated with less entry only for business subscribers. ILEC size plays no significant role in explaining entry.

⁴¹ The FCC reports the number of UNE loops provided to competitors, but not its break-down in residential and business ones. This prevented me from using this information in a regression where the role of cross-subsidization is explicitly taken into account.

VI. Conclusions

This paper presents findings from an originally assembled data set on the negotiations between AT&T with GTE and with the RBOCs, for entry as a CLEC into their local markets. The findings support the hypothesis that GTE's weaker incentives to cooperate with local entrants—arising because GTE, but not the RBOCs, already may offer long-distance services unconditionally—has a significant impact on its conduct towards entrants.

In particular, the main findings are as follows:

1. GTE engages in significantly more premature litigation than do the RBOCs.
2. It takes significantly longer to obtain an interconnection agreement with GTE than with the RBOCs.
3. GTE's pricing requests are consistently "tougher."
4. Tougher GTE requests are not associated with systematically better awards to GTE than to the RBOC; however, a tougher GTE request is associated with better awards to both it and the RBOC in that state (hence a worse outcome for the entrants).
5. The FCC's survey of the State of Local Competition (which reports data as of June 1998), shows less competitive entry into GTE than into RBOC territories, after controlling for standard economic variables likely to influence profitability of entry.

The fact that GTE experiences less entry can reasonably be attributed to its greater resistance to cooperate with entrants. Beyond factors documented here (points 1-3 above), this resistance is also likely to involve non-price variables that are not explored in this paper but that are important to entrants.

GTE's greater resistance arises despite the fact that all incumbent LECs are required, under section 251 of the Telecom Act, to cooperate fully in opening up their local markets to entry. Unless the difference can be attributed entirely to inherently greater aggressiveness by GTE—of which there is little supporting evidence prior to the

1996 Act—a reasonable inference is that section 271 of the Act provides at least part of the explanation. Section 271 creates differential incentives by requiring the RBOCs, but not GTE, to cooperate in opening their local markets to competition as a pre-condition for themselves being permitted to offer long-distance services originating in their regions. My findings therefore suggest that regulatory sticks alone are not sufficient to encourage timely and efficient cooperation by incumbents to open up their markets, and that additional incentive devices, such as those provided by section 271, can have a meaningful impact on incumbents' conduct and therefore on prospects for competitive entry.

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Appendix

GTE provides local service in 28 states; my sample covers 23 of them. Table A1 lists all GTE states, the RBOC in each state, and the outcome of the voluntary negotiations involving AT&T as a local entrant.

Assembling data on interconnection negotiations presented several difficulties. First, it involved collecting information from a large number of different sources: state commissions, parties' state coordinators, associations of industry members, and federal bodies.

Second, the vast majority of the information comes from lengthy legal documents, including: parties' memos and exhibits presented during arbitration; arbitrators' decisions; commission orders (ratifying, or modifying some of the arbitrators' decisions); and parties' complaints about arbitrators' or commissions' decisions. These documents had to be searched for relevant dates, parties' requests, and final decisions about contract terms; and this information then had to be recorded in an electronic format. The rest of the information was gathered by phone or via e-mail from the parties involved; or from the internet, especially from state commissions' web pages. The National Association of Regulatory Utility Commissioners keeps a list of them (www.naruc.org/stateweb.html).

The data collection was hindered by the fact that, in general, information about negotiations is proprietary. This is true both of the parties' requests going into arbitration, and of the terms in the arbitrated interconnection agreement. In many instances, litigants were able to obtain from state commissions the right not to make the terms in the final contracts known to third parties, even though the contracts are the object of state commissions' orders, which are themselves public documents. As a result, assembling a totally complete data set proved to be impossible.

Even when information was available, in a few cases some inconsistencies emerged, which required additional investigation. For instance, dates for the same order from different sources did not always match, or the incumbent LEC reported arbitrated prices different from AT&T's understanding of the arbitrator's decision. Therefore, where possible, each piece of information was cross-checked for reliability.

Finally, after collecting the raw data, additional work was required to enable meaningful comparison between pieces of information reported in different levels of aggregation. Take, for instance, the case of loop prices. In some cases a state-wide average loop price is reported; in others, no state-wide figure is available, and loop prices are quoted at different levels of disaggregation (usually by density zones and/or by type of physical support, e.g., 2-wire or 4-wire).

Table A.1— GTE States and Negotiations Outcomes

GTE State	Negotiations AT&T – GTE	RBOC in the State	Negotiations AT&T – RBOC
Alabama	Arbitration	Bell South	Arbitration
Alaska*	No request for interconnection ^A	No RBOC	Not Applicable
Arizona*	Adopt California proceedings ^B	US West	Arbitration
Arkansas*	See note ^C	Southwestern Bell	Arbitration
California	Arbitration	Pacific Telesis	Arbitration
Florida	Arbitration	Bell South	Arbitration
Hawaii	Arbitration	no RBOC	Not Applicable
Idaho*	See note ^D	US West	Arbitration
Illinois	Arbitration	Ameritech	Arbitration
Indiana	Arbitration	Ameritech	Arbitration
Iowa	Arbitration	US West	Arbitration
Kentucky	Arbitration	Bell South	Arbitration
Michigan	Arbitration	Ameritech	Arbitration
Minnesota	Arbitration	US West	Arbitration
Missouri	Arbitration	Southwestern Bell	Arbitration
Nebraska	Arbitration	US West	Arbitration
Nevada*	no request for interconnection ^E	Pacific Telesis	Arbitration
New Mexico	Arbitration	US West	Arbitration
North Carolina	Arbitration	Bell South	Arbitration
Ohio	Arbitration	Ameritech	Arbitration
Oklahoma	Arbitration	Southwestern Bell	Arbitration
Oregon	Arbitration	US West	Arbitration
Pennsylvania	Arbitration	Bell Atlantic	Arbitration
South Carolina	Arbitration	Bell South	Arbitration
Texas	Arbitration	Southwestern Bell	Arbitration
Virginia	Arbitration	Bell Atlantic	Arbitration
Washington	Arbitration	US West	Arbitration
Wisconsin	Arbitration	Ameritech	Arbitration

Note: * GTE states not included in the sample.

^A Due to GTE's limited presence in Alaska, AT&T did not ask for an interconnection agreement. Source: Robert Mahini, Sidley & Austin, Attorneys for AT&T. E-mail dated Feb 16, 1998 (rmahini@sidley.com).

^B The parties have stipulated they will accept the Arbitration Decision in California, but the contract has not been finalized. Source: Robert Mahini, Sidley & Austin. E-mail dated Feb 16, 1998.

^C AT&T petitioned for arbitration, but then requested withdrawal of its petition in April 1997. The Petition was granted on Apr 9, 1997. Source: Jim Moore, AT&T Law Division, fax dated Apr 30, 1998.

^D AT&T withdrew from arbitration, and has no plan to resume negotiations. Source: Robert Mahini, Sidley & Austin. E-mail dated Feb 16, 1998.

^E AT&T does not plan to ask for interconnection in the foreseeable future. Source: Robert Mahini, Sidley & Austin. E-mail dated Feb 16, 1998.

Table A.2—Negotiation Data

	Approved Interconnection Agreement by Mar. 1999?		AT&T Reached Agreement Faster with RBOC or GTE?	RBOC in the State
	RBOC	GTE		
Alabama	Yes	No	RBOC*	BellSouth
California	Yes	Yes	RBOC	PacBell
Florida	Yes	Yes	RBOC	BellSouth
Hawaii	Not applicable	Yes	Not applicable	Not applicable
Illinois	Yes	No	RBOC*	Ameritech
Indiana	Yes	No	RBOC*	Ameritech
Iowa	Yes	Yes	RBOC	USWest
Kentucky	Yes	No	RBOC*	BellSouth
Michigan	Yes	No	RBOC*	Ameritech
Minnesota	Yes	Yes	RBOC	USWest
Missouri	Yes	Yes	RBOC	SBC
Nebraska	Yes	Yes	GTE	USWest
New Mexico	No	No	Not applicable	USWest
North Carolina	Yes	Yes	RBOC	USWest
Ohio	Yes	Yes	RBOC	Ameritech
Oklahoma	Yes	No	RBOC*	SBC
Oregon	Yes	Yes	RBOC	USWest
Pennsylvania	No	No	Not applicable	BellAtlantic
South Carolina	Yes	No	RBOC*	BellSouth
Texas	Yes	Yes	RBOC	SBC
Virginia	Yes	No	RBOC*	BellAtlantic
Washington	Yes	Yes	RBOC	USWest
Wisconsin	Yes	Yes	RBOC	Ameritech
Totals	20 out of 22	13 out of 23		

Note: * indicates cases where AT&T reached an agreement with the RBOC but not with GTE.

Table A.3—Premature Litigation Record

State	Arbitration b/w AT&T & GTE Premature claim filed by		Arbitration b/w AT&T & RBOCs Premature claim filed by		RBOC
	GTE	AT&T	RBOC	AT&T	
Alabama	No	No	No	No	BSouth
California	Yes	No	No	No	PacTel
Florida	Yes*	No	No	Yes	Bsouth
Hawaii	Yes**	No	N/A	N/A	N/A
Illinois	Yes	No	No	No	Ameritech
Indiana	Yes	No	No	No	Ameritech
Iowa	No	No	No	No	US West
Kentucky	No	No	Yes*	No	BSouth
Michigan	Yes*	No	No	Yes**	Ameritech
Minnesota	Yes*	Yes**	No	No	US West
Missouri	Yes*	No	Yes*	No	SBC
Nebraska	Yes*	No	No	No	US West
New Mexico	No	No	No	No	US West
N. Carolina	No	No	No	Yes**	BSouth
Ohio	Yes*	No	No	No	Ameritech
Oklahoma	Yes*	No	No	No	SBC
Oregon	Yes*	No	Yes*	No	US West
Pennsylvania	Yes*	No	No	No	BAtlantic
S. Carolina	No	No	No	No	BSouth
Texas	Yes*	No	No	No	SBC
Virginia	Yes*	No	No	No	BAtlantic
Washington	Yes*	No	No	No	US West
Wisconsin	Yes*	No	No	No	Ameritech
Totals	17 out of 23	1 out of 23	3 out of 22	3 out of 22	

Note: * dismissed by a federal court as premature; ** withdrawn by the plaintiff.

Table A.4—Resale Discounts: Residential

State	ILEC offering the lower discount	AT&T requested lower discount from	Arbitrator awarded the lower discount to
Alabama	RBOC	n/a	RBOC
California	n/a	RBOC	GTE
Florida	GTE	RBOC	GTE
Hawaii	n/a	n/a	n/a
Iowa	GTE	GTE	GTE
Illinois	GTE	n/a	GTE
Indiana	GTE	RBOC	RBOC
Kentucky	GTE	GTE	GTE
Michigan	GTE	RBOC	RBOC
Minnesota	GTE	RBOC	RBOC
Missouri	GTE	GTE	GTE
North Carolina	GTE	RBOC	RBOC
Nebraska	GTE	GTE	GTE
New Mexico	n/a	n/a	n/a
Ohio	GTE	GTE	GTE
Oklahoma	n/a	GTE	GTE
Oregon	GTE	GTE	GTE
Pennsylvania	GTE	RBOC	GTE
South Carolina	n/a	n/a	RBOC
Texas	RBOC	GTE	GTE
Virginia	GTE	RBOC	RBOC
Washington	RBOC	RBOC	RBOC
Wisconsin	GTE	RBOC	GTE
<i>GTE lower</i>	<i>15</i>	<i>8</i>	<i>13</i>
<i>RBOC lower</i>	<i>3</i>	<i>10</i>	<i>8</i>
<i># of possible statewide comparisons</i>	<i>18</i>	<i>18</i>	<i>21</i>

Note: n/a indicates cases for which information on either AT&T-GTE or AT&T-RBOC (or both) arbitration proceedings was not available.

Table A.5— Resale Discounts: Business

State	ILEC offering the lower discount	AT&T requested lower discount from	Arbitrator awarded the lower discount to
Alabama	RBOC	n/a	RBOC
California	n/a	RBOC	RBOC
Florida	GTE	GTE	GTE
Hawaii	n/a	n/a	n/a
Iowa	GTE	GTE	GTE
Illinois	GTE	n/a	RBOC
Indiana	GTE	RBOC	GTE
Kentucky	GTE	GTE	RBOC
Michigan	RBOC	RBOC	RBOC
Minnesota	RBOC	RBOC	RBOC
Missouri	GTE	GTE	GTE
North Carolina	GTE	GTE	GTE
Nebraska	GTE	RBOC	GTE
New Mexico	n/a	n/a	n/a
Ohio	GTE	RBOC	GTE
Oklahoma	n/a	GTE	GTE
Oregon	RBOC	RBOC	RBOC
Pennsylvania	GTE	RBOC	RBOC
South Carolina	n/a	n/a	RBOC
Texas	RBOC	RBOC	RBOC
Virginia	GTE	RBOC	RBOC
Washington	GTE	RBOC	RBOC
Wisconsin	GTE	RBOC	RBOC
<i>GTE lower</i>	<i>13</i>	<i>6</i>	<i>8</i>
<i>RBOC lower</i>	<i>5</i>	<i>12</i>	<i>13</i>
<i># of possible statewide comparisons</i>	<i>18</i>	<i>18</i>	<i>21</i>

Note: n/a indicates cases for which information on either AT&T-GTE or AT&T-RBOC (or both) arbitration proceedings was not available.

Table A.6—Loop Price/Cost Ratios

State	ILEC requesting higher price/cost ratio	AT&T offered higher price/cost ratio to	Arbitrator awarded the higher price/cost ratio to
Alabama	GTE	n/a	GTE
California	n/a	RBOC	GTE
Florida	GTE	GTE	GTE
Hawaii	n/a	n/a	n/a
Iowa	RBOC	RBOC	RBOC
Illinois	n/a	n/a	RBOC
Indiana	GTE	RBOC	RBOC
Kentucky	GTE	GTE	GTE
Michigan	GTE	RBOC	RBOC
Minnesota	RBOC	RBOC	RBOC
Missouri	RBOC	n/a	GTE
North Carolina	GTE	n/a	RBOC
Nebraska	n/a	GTE	GTE
New Mexico	n/a	n/a	n/a
Ohio	GTE	RBOC	RBOC
Oklahoma	GTE	RBOC	RBOC
Oregon	GTE	GTE	GTE
Pennsylvania	GTE	RBOC	RBOC
South Carolina	n/a	n/a	RBOC
Texas	RBOC	GTE	GTE
Virginia	n/a	n/a	RBOC
Washington	RBOC	GTE	GTE
Wisconsin	GTE	n/a	GTE
<i>GTE higher</i>	<i>11</i>	<i>6</i>	<i>10</i>
<i>RBOC higher</i>	<i>5</i>	<i>8</i>	<i>11</i>
<i># of possible statewide comparisons</i>	<i>16</i>	<i>14</i>	<i>21</i>

Note: n/a indicates cases for which information on either AT&T-GTE or AT&T-RBOC (or both) arbitration proceedings was not available.

Table A.7—End-Office Switching Price/Cost Ratios

State	ILEC requesting higher price/cost ratio	AT&T offered higher price/cost ratio to	Arbitrator awarded higher price/cost ratio to
Alabama	n/a	n/a	n/a
California	n/a	GTE	GTE
Florida	RBOC	RBOC	RBOC
Hawaii	n/a	n/a	n/a
Iowa	n/a	n/a	RBOC
Illinois	n/a	RBOC	n/a
Indiana	n/a	n/a	RBOC
Kentucky	n/a	n/a	GTE
Michigan	GTE	RBOC	RBOC
Minnesota	GTE	n/a	RBOC
Missouri	n/a	n/a	RBOC
Nebraska	n/a	n/a	GTE
North Carolina	n/a	n/a	n/a
New Mexico	n/a	n/a	RBOC
Ohio	n/a	RBOC	RBOC
Oklahoma	n/a	RBOC	n/a
Oregon	GTE	RBOC	GTE
Pennsylvania	GTE	RBOC	RBOC
South Carolina	n/a	n/a	n/a
Texas	n/a	GTE	GTE
Virginia	GTE	n/a	RBOC
Washington	GTE	GTE	GTE
Wisconsin	n/a	n/a	n/a
<i>GTE higher</i>	6	3	6
<i>RBOC higher</i>	1	7	10
<i># of possible statewide comparisons</i>	7	10	16

Note: n/a indicates cases for which information on either AT&T-GTE or AT&T-RBOC (or both) arbitration proceedings was not available.