

AT&T's Strategic Response to
Competition: Why Not Preempt
Entry?

David Gabel
Joan Nix

Do not quote without permission of the author.
c 1992. Columbia Institute for Tele-Information

Columbia Institute for Tele-Information
Graduate School of Business
809 Uris Hall
Columbia University
New York, New York 10027
(212) 854-4222

AT&T's Strategic Response to Competition: Why Not Preempt Entry?

David Gabel and Joan Nix

Microeconomics theory provides a penetrating, analytical framework for the understanding of market behavior. The theory focuses on how the rational behaviors of firms and consumers interact to determine market prices and quantities. This analytical framework has also been employed to determine the rational response of incumbents to the threat of entry. [Milgrom and Roberts, 1982; Selten, 1978; Kreps & Wilson, 1982]. One of the literature's primary conclusions is that when a strategy exists which would preempt entry, and the payoff to the incumbent from choosing such a strategy exceeds his payoff in ignoring entry, it is rational for the incumbent to block entry. Entry may also be impeded by the adoption of sustainable prices, sustainable in the sense that there are no profit opportunities for potential entrants [Baumol, Panzar and Willig, 1982].

The telephone industry during the period 1894-1917 is illustrative of an industry where an incumbent firm had the opportunity to devise a strategic response to entry. In this paper we address whether the microeconomics paradigm provides a credible explanation of the behavior of the main economic actors in this period: the incumbent, AT&T, its rivals-the Independents, and consumers. We first turn to the black box view of the firm, in which the firm is treated as "an exogenously specified cost function or production possibilities set, and market structures (also exogenous) determine how it will fare." [Kreps, p.91]. We

argue that the black box view of the firm is particularly ill suited for explaining the strategic response of AT&T to competition. We provide reasons why AT&T did not preempt entry. They are based on what we perceive as the commitment of AT&T's management to a particular vision regarding its product and market. Using a framework based on the New Institutionalism, we argue that by loosening the rationality postulates associated with the microeconomics paradigm, a more credible explanation of AT&T's strategic response to competition emerges. Furthermore in order to explain consumers behavior during this period, the analytical framework must acknowledge transaction costs, risk aversion, and bounded rationality. Once these factors are recognized, a broader understanding of pricing strategies emerges.

CONSUMERS' PREFERENCES FOR FLAT RATE SERVICE

The years 1879-1894 was a prosperous period for AT&T. The patents issued to Alexander Graham Bell insured that no other company would provide telephone service, and the strong demand for the new communications technology provided stockholders with a return that was well in excess of the market rate. During this era AT&T experimented with two pricing strategies, flat rate and local measured service (LMS). With flat rate service, customers paid a uniform charge regardless of the intensity of usage. LMS is an example of a two-part tariff--there were separate prices for usage and access. AT&T found pricing under local measured service to be

the more profitable method in large cities.¹ At the turn of the century switching was handled by an operator. This made the marginal cost of usage high, especially relative to today's automatic switching environment.² The high marginal cost of usage made LMS a prudent pricing method for rationing scarce switching facilities. Furthermore, the firm believed that LMS was a sound method for developing the market. The two-part rate structure lowered the price of joining the network, and AT&T officials hoped that this would encourage the development of the service.³

In 1894 AT&T was faced with entry into its market. The newcomers, known collectively as the Independents, started off primarily in small cities and towns in the Midwest, but quickly spread out around the nation and into larger cities. The Independents employed a different pricing strategy than AT&T, they sold service only on a flat rate basis.

¹Bell did not offer measured service in small cities. According to one of AT&T's leading rate design specialists, U.N. Bethell, measured service was not implemented in small cities because the market was served by one central office. The cost of an interoffice call was considerably higher than a message that originated and terminated on the same switch. One of the primary objectives of measured service pricing was a reduction of the incidence of interoffice calls. "Respecting Rate Plan for Manhattan," December 19, 1898, box 12, "Telephone Rates--Basis," American Telephone and Telegraph Corporate Archive (hereafter AT&TCA).

²Compare [Wenders, 1989] with W.S. Ford, "Memorandum: Concerning Certain Peculiar Features of Telephone Exchange Service," September 10, 1901, "Telephone Rates--Basis--1880-1908," box 12, AT&TCA.

³Department of Commerce: Bureau of the Census, Telephone and Telegraphs: 1902 (Washington: Government Printing Office, 1906), pp. 53-4, 59; and American Telephone and Telegraph Company, 1901 Annual Report, p.7.

Based on the "black box" view of the firm, the incumbent firm, AT&T, had little reason to be concerned with the Independents. The type of pricing policy adopted by the entrants, flat rate service, carries its own seed of destruction. For purposes of illustration, consider a market where there are two rivals using different pricing structures. The first firm charges a uniform, flat rate to all customers regardless of the intensity of usage. Its rival sells local service through a two-part tariff. The charge for usage is based on the marginal cost of a call. Under the flat rate service-pricing structure, low volume users are subsidizing the more frequent users of the network. Since all subscribers pay the same fixed price, and the fixed price must cover the average cost of production, the low use customers pay a rate which exceeds the cost of providing them service. This creates the incentive for the low usage customers to gravitate towards the firm which employs the local measured service pricing structure. Eventually the entrant, who is selling service on a flat rate basis, will be left with only high volume users. The remaining relatively high-volume customers would be paying a rate that is less than the cost of production. This forces the firm to raise the flat rate for the subscribers who remain on its network. The price increase for flat rate service further drives relatively low usage customers to the supplier which has cost based rates. In an analysis based on this logic, Wenders(1989) concludes that flat-rate pricing is "unsustainable" because "where competition is present...the individuals for whom it is not beneficial will turn to competitors,

and this will destroy flat-rate pricing."[p.342]

The self-selection by consumers and the ultimate unsustainability of flat rate service is firmly rooted in rational actor methodology. This methodology applied to the time period we are studying implies that customers would have exited from LMS. This did not happen--flat rate service did not self-destruct. Contrary to the rational actor model, customers migrated to the flat rate pricing structure.⁴

We can explain the evolution of the market during this period, in part, by acknowledging transaction costs.⁵ The logic behind the unsustainability of flat rate service is that low usage customers opt for measured service after they have calculated that their usage is lower than the average calling rate. With flat rate service pricing, the telephone utility would not record the number of calls placed by an individual customer. Consequently in order to determine the volume of calls, the customers would have to keep a record of how many calls they had placed. Collecting this information was costly, and likely seen as a nuisance. This suggests that the selection by customers of local measured service versus flat rate service depended on calculations that were not easy to accomplish. Calculating costs could have impeded the unraveling of the flat rate customer base.

There are additional reasons why rational, low-user consumers

⁴Thayer/Durant, February 24, 1909, and Pickernell/Thayer, June 2, 1909, "Missouri," box 4, AT&TCA.

⁵In Wenders' analysis he chooses to "ignore...complicating things such as demand-side transactions costs...[1989, p.342].

may have preferred flat rate service. Suppose that over the course of a year a customer monitors her usage and concludes that it is below the network's average. However, she also observes some month-to-month fluctuations in her calling patterns. During some periods her usage may be below that of average users, while other times her usage may exceed this norm. Thus, if we assume that some customers are risk averse, they may choose the certainty of flat rate service despite the potential cost savings of LMS [Kahn, 1:192, 1971; Roby, 1947, p.10].

The presence of transactions costs and risk aversion provides reasons why a rational low usage consumer would not exit from the firm employing flat rate service. Another account of consumer behavior during this period emerges from the concept of bounded rationality (Simon, 1955, 1956; March, 1978, p. 590). For our purposes, acknowledging that human beings, as decision-makers, face inherent informational and computational constraints enables us to perceive of the situation differently. The dissatisfaction of customers with LMS, is, partially explained by the fact that some consumers found the two-part tariff confusing. While they could understand paying a flat fee for unlimited use of the local network, or no connection charge and a usage charge for each call, the combination of paying an entry and usage fee met with consumer resistance. E.J. Hall, the vice-president of AT&T, addressed this problem in 1898:

The claim that [a two-part tariff] is easy for the customer to understand, and would therefore be popular, is not justified by history nor will it stand logical analysis. No compound proposition [i.e. two-part tariff] can be as easily understood as

can either one of the simple ones from which it is composed.⁶

Thus, another explanation of why customers did not through self-selection destroy flat rate service is that customers did not fully understand the costs and benefits of local measured service.⁷

We have offered a number of explanations as to why customers preferred flat rate service and, therefore, why customer dissatisfaction with local measured service created entrepreneurial opportunities. Flat rate service was perceived as a crucial component of the Independents' strategy. In 1905, the Independents applied to the Milwaukee City Council for a service franchise. Appearing before the Council, the President of the Wisconsin Independent Telephone Association addressed the proposition that the franchise include a requirement that service be sold on a measured basis:

We do not believe [an entrant who must price on a measured basis] would be successful in any city where the competition is strong...There is no doubt but that a measured service is a might good thing for a

⁶Hall/Hudson, December 10, 1898, "New York City--Rates--Changes in Basis--1898-1899," box 1287, AT&TCA.

⁷Although one might argue that market segmentation in the pricing of flat rate service is another reason why a low usage customer would remain with the firm providing flat rate service, we do not believe that to be the case in this situation. The Independents were able to attract low usage customers by offering residential customers a rate that was less than the charge for business services. But since Bell offered a similar access price discount to residential customers, and since there would still be an intra-market subsidy between high and low residential customers, as well as high and low business customers, the unraveling, according to the rational actor model, still should have occurred.

[monopolist]. There is more money in it...I do not think any of us could compete with the Bell company for a month using measured service.⁸

The pricing strategy of the Independents took into account the desire of many customers for flat rate service. But a striking aspect of the historical record is AT&T's failure to adopt a strategy designed to preempt entry. AT&T had experimented with different pricing strategies and had observed customer dissatisfaction with LMS [Macmeal, pp.110-111]. Confronted with potential rivals there were two courses of action available to the incumbent. One was to disregard customers sentiment and maximize short-term profits with LMS. The drawback to this approach is that it created entrepreneurial opportunities because of customer dissatisfaction. Alternatively, AT&T could have confronted customer dissatisfaction, in part, by selling service on a flat rate basis. The drawback of this approach is a sacrifice of short term profits.

In any industry with the potential to be competitive, it is irrational to ignore customer dissatisfaction. In addition, delaying the provision of flat rate service until post-entry was risky because once the entrant had constructed his exchange, the combination of fixed costs and non-fungibility of the capital, created the potential for the type of price wars that were observed in other capital intensive industries [Lamoreaux, 1985].

There was a clear incentive for AT&T to address customer dissatisfaction by adopting flat rate service in the midwest. In

⁸Telephony, 11 (January 1906), p. 28; and Milwaukee Daily News, December 21, 1905.

this territory there was a strong anti-monopoly sentiment, and therefore it was likely that a potential entrant would be granted a franchise and well received by consumers. By making a preemptive move AT&T would have avoided some of the losses that did occur from rivalry. In addition, a preemptive move in one market may have prevented entry in other markets [Kreps & Wilson, 1982]. In neoclassical models involving the strategic response of incumbent firms to competition, the emphasis is on the rationality of pre-entry moves. AT&T did not pursue this strategy, instead the firm waited until it lost market share before switching to flat rate service.⁹

Once the switch to flat-rate service was made, competitive market forces made it unprofitable for AT&T to return to LMS. W.S. Allen was responsible for monitoring the Independents for the President of AT&T. He wrote to his superior in 1903 that "So long as competition exists in the shape in which it does in [Ohio, Indiana, and Illinois, the stronghold of the competitive movement,] we will be obliged to pay little attention to measured service..."¹⁰ Figure One illustrates that in those markets that AT&T was most interested in using LMS, large cities, the likelihood of serving customers on a measured basis was affected by the degree of rivalry. As the Independents market share in a city increased,

⁹Thayer/Durant, February 24, 1909, and Pickernell/Thayer, June 2, 1909, "Missouri," box 4, AT&TCA.

¹⁰February 11, 1903, box 1333, AT&TCA. See, also, Fish/Wallace, February 18, 1903, Presidential Letter Books (hereafter PLB), v.26 AT&TCA.

the proportion of AT&T's customers served with LMS declined.

INSERT FIGURE ONE

In the next section, we examine why the incumbent failed to preempt competition by adopting flat-rate service.

UNDERSTANDING THE RESPONSE OF THE INCUMBENT

Models of entry deterrence do not predict AT&T's behavior during this period. In this section we offer an explanation of AT&T's behavior that departs from the rational actor model. We abandon the perspective that organizations consist of well-defined choice situations, where the outcome of such choice situations is understood in terms of actions taken by agents with stable and given preferences making choices based on expectations of future consequences. The account we offer of AT&T's response to competition during this period is rooted in a perspective associated with the New Institutionalism. In the New Institutionalism ambiguity and imperfect causal connections provide an organization with an interpretative role to play.

At the start of the twentieth century the telephone was a relatively new industry. AT&T had to establish a network for a service that had not yet established itself in a definite way. Thus the usefulness of a telephone network and its purpose was open to debate. The nature of the debate was influenced by the past experiences of AT&T's management. New Institutionalists, such as March and Shapira, argue that

It is possible to see individuals or organizations as learning from their experience. Rather than being oriented to expectations about the future, current behavior can be seen as reflecting the lessons of the past. The experiences of a particular history are transformed into propensities to act in ways that will be sensible if the experiences are correctly understood and the world is stable. [1982, p.94]

Many of the key officials in AT&T learned their marketing skills while employed by telegraph companies. The telegraph was used almost exclusively for business purposes and the service was sold on a per-message basis. The telegraph was not used for socialization. Thus, the prior job experience of AT&T's leaders in telegraphy made the notion of using a communications network for socialization anathema to many officials within the Bell System [Fischer, 1988, pp. 56-60; AT&T, 1901 Annual Report, p.7]. Management's perspective on the appropriate use of the network is reflected in a notice that explained to the firm's patrons why flat-rate service would be replaced with measured service:

The unlimited use of the telephone leads to a vast amount of unnecessary occupation of the wires, and to much borrowing of telephones by parties who are not subscribers. Thus the telephone system is so encumbered with calls which are unnecessary, and largely illegitimate, that the service is greatly impaired, and subscribers, to whom prompt connection is essential,

become dissatisfied.¹¹

By having a non-zero price for usage, local measured service discouraged social usage of the telephone. Thus, for AT&T to recognize the preemptive value of a move away from local measured service would have required a fundamental change in the way it perceived the product it was selling.

An outgrowth of perceiving the product as being similar in nature to telegraphy was a decision that the products should be sold in a like way. In the firm's 1901 annual report, AT&T's management lauded the advantages of measured service. The report points out that the measured service was based on the same "principle" used by the "postal, express and telegraphic" companies.

LMS was also favored by AT&T's management because of the belief that it would encourage membership. The president of AT&T, Frederick Fish, believed that one of the attractive features of LMS was that it would attract customers:

That the system be complete and of the greatest utility, it is necessary that as many persons as possible should be connected to it as to be able to talk or be talked to by telephone....[The user's] advantage as a telephone subscriber is largely measured by the number of persons with whom he may be put in communication [1901 AT&T

¹¹"Notice to Public," July 1880, box 12, "Telephone Rates Basis," AT&TCA.

Annual Report].

Membership was encouraged by charging a low price for access to small users. Prices to residential customers were set below the marginal cost of service in order to encourage membership and this loss was made up through increased charges to large users.¹² We believe that Fish's perspective that value was created "largely" through customer access, rather than the actual placement of a call, made it difficult for him to acknowledge the appropriateness of flat rate service as a pricing policy to preempt entry.

We have argued that AT&T's reluctance to switch away from local measured service evolved out of AT&T's management perception of its product and market. Such concerns broaden and deepen the matter beyond that of a simple decision to preempt entry. There are reasons to doubt that AT&T's management even believed that a decision to preempt entry was necessary. This is because of management's expectation that what worked in the past would be effective seventeen years later. When Alexander Graham Bell's patents expired in 1893 and 1894, it appears that AT&T's top management thought that it could ward off competition in the same manner that it had eliminated the threat of Western Union in the 1870s--through strategic use of the patent process. AT&T's leaders believed that inventions made subsequent to Bell's initial patents would provide AT&T protection, and therefore there was little need

¹²Fish/Wallace, November 26, 1904, PLB v.36. See also W.S. Ford, "Memorandum: Concerning Certain Peculiar Features of Telephone Exchange Service," September 10, 1901, "Telephone Rates--Basis--1880-1908," box 12, AT&TCA.

to align its rates in a manner which was responsive to customers' desires.¹³

Employing a strictly rational actor perspective, it is difficult to explain why AT&T placed such reliance on the patent system to protect its monopoly. Anti-monopoly sentiment was strong during this era, as evident by the passage of the Sherman Anti-Trust Act. Consequently, AT&T should have had some reason to doubt that entry would be blocked by patent litigation. In the late 1890's the courts actually surprised AT&T's management by giving a loose interpretation to a crucial AT&T patent, a decision which effectively ended the firm's effort to protect itself through litigation [Bornholz and Evans, p.14].

At this point, confronted with the court's decision and evidence from the market that customers preferred flat rate service, microeconomic reasoning suggests that AT&T would have changed its pricing strategy. But, instead of addressing customers preference for flat rate service, the firm increased its commitment to local measured service. In 1901, six years after the advent of competition, a leading figure within AT&T commented that there was "a persistent effort to get away" from flat rate service.¹⁴

We do not believe that AT&T's failure to act in way consistent with models of preemptive moves was because the information pertaining to customers' dissatisfaction was costly

¹³Garnet, p. 44-45, 92; Hudson/Payne, May 17, 1895, volume 6 PLB, AT&TCA.

¹⁴Bethell/Fish, December 24, 1901, box 12, AT&TCA.

to discover and understand. There was an abundance of evidence to suggest that customers disliked measured service. The extent to which customers preferred flat rate service is illustrated by the reaction of Rochester, New York to the introduction of LMS. In November 1886 Bell announced that measured service would replace flat rate service. The customers opposed the rate change and, with few exceptions, disconnected service. For a period of eighteen months Rochester was essentially without telephone service. In May 1888 Bell recanted and committed itself to sell local service on a flat rate basis until its patents expired in 1893 [MacMeal, pp. 110-11]. In other cities, things did not reach the point of a customer strike, but there were clear signs that customers preferred flat rate service.¹⁵

For a number of years the Bell Operating Company at St. Louis relied on LMS while its rival, Kinloch Telephone, marketed service on a flat rate basis. In 1909 the average number of calls per telephone on Bell's network was 6.4, significantly less than the 11.5 messages per station on Kinloch's network. In a belated recognition that the number of calls was the primary driver in determining the value of network membership, and the strong growth of Kinloch relative to Bell's local operations, AT&T was compelled to adopt flat rate service in 1909.¹⁶ Once Bell made this change

¹⁵See, for example, Milwaukee Journal and Milwaukee Sentinel, October 27, 1895; Milwaukee Daily News, November 4, 1895; and Jackson/French October 29, 1895, box 1298, AT&TCA.

¹⁶Thayer/Durant, February 24, 1909, and Pickernell/Thayer, June 2, 1909, "Missouri," box 4, AT&TCA.

to its rate structure it was able to regain control of the market.

AT&T did not preempt entry because the firm was committed to using LMS to develop the market. AT&T's commitment to measured service evolved out of a belief that the pricing structure that had been used by prior network technologies were equally appropriate for telephony. This vision was rooted in AT&T's subjective frame of reference, but there were other possible visions of network formation. Alternatively the value of network participation could have been seen as largely based on the number of connections, rather than the number of members connected to the network.¹⁷ Maximum use of the network for a given number of subscribers would have been achieved under flat rate service. Facing a zero usage price, consumers would use the telephone for both business and social purposes. This was the perception of the entrants which led them to consider flat rate service as the appropriate pricing policy.

AT&T's emphasis on the appropriateness of LMS, and its blindness regarding customer dissatisfaction with LMS, raises the issue of whether AT&T should have acted differently. The perspective offered by the New Institutionalism suggests that it is far from clear whether decision processes which do not resemble the rational choice model are by definition inferior and should be changed [March and Shapira, p114]. The kinds of processes organizations follow may actually lead to greater productivity,

¹⁷Communications theory emphasizes this view of network membership [Mulgan, pp. 5-6, 21].

even though they do not fit squarely with a rational choice model. In the case of AT&T versus the Independents, it appears that proper decision-making would have inhibited the kind of competition which occurred. If AT&T had preempted the Independents by adopting low, flat rates it is doubtful that the same societal gains would have been achieved. Rivalry forced the firms to actively solicit new customers--this type of effort was not observed either prior to competition, or after AT&T regained control of the market. As a leading official of AT&T noted, competition had forced his firm to "go after the business."¹⁸

Conclusion

Microeconomic reasoning applied to the period we are examining implies that AT&T could have counted on the rationality of consumer behavior and continued offering LMS, while the Independents should have taken into account the rationality of consumer behavior and not entered with flat rate service. This did not happen; the entrants pricing structure was well received. Belatedly AT&T responded to the consumers' preferences by increasing its effort to market exchange service on a flat rate basis.

The perception of AT&T's management regarding the appropriateness of LMS made the value of flat rate service as a preemptive move difficult to recognize. The commitment of AT&T's management to develop the market with the pricing policy of local

¹⁸Allen/Fish, May 16, 1906, Allen Letter Books, AT&TCA.

measured service survived even in the face of customer dissatisfaction. Such a commitment is not that difficult to understand when placed in context. The turbulence that AT&T faced during the competitive period stands in stark contrast to the former period during which AT&T was, in many ways, the owner of the telephony market. It is not surprising that such a period did not provide AT&T with learning experiences regarding the importance of customer satisfaction.

We do not believe that AT&T'S belated response to competitive pressures is an isolated event with no relevance for those who seek to understand why the behavior of firms does not always match the strict rationality postulates of the microeconomics paradigm. Turning to more recent times, there is evidence documenting the struggle of firms in industries undergoing substantial change (Kotter & Heskett, (1992). Regarding the current problems of General Motors, Kotter comments: "Those shifts in its business environment have created a surge in competitive intensity, which in turn is forcing a reluctant (and often very clumsy looking) G.M. to try to change its way" [Kotter, 1988, p.6].

The relative turbulence of the 1894--1917 period suggests that focusing on how exogenously determined and stable preferences interact with constraints to produce equilibrium outcomes is not a particularly fruitful approach for understanding the pricing strategy of AT&T. We take the position that an explanation should not be considered inadequate because it can not be measured by a yardstick which is based on rational choice behavior, stable

preferences, and equilibrium outcomes. Similarly, an explanation should not be considered inadequate because it can be so measured. Whether the contextual details of the situation are amenable to such a framework is an open matter to be determined by the researchers. In terms of the pricing strategy of AT&T during the competitive era, we have argued that the underlying phenomena are better captured by a perspective which loosens the rationality postulates of the microeconomics paradigm.

References

- Baumol, William, John Panzar, and Robert Willig, Contestable Markets and the Theory of Industry Structure (New York: Harcourt Brace Jovanovich, 1982).
- Bornholz, Robert and David S. Evans, "The Early History of Competition in the Telephone Industry," in David S. Evans, ed. Breaking Up Bell: Essays on Industrial Organization and Regulation (New York, 1983).
- Fischer, Claude S. "Touch Someone: The Telephone Industry Discovers Sociability, 1876 - 1940," Technology and Culture 29 (1988), pp. 32-61.
- Garnet, Robert W. The Telephone Enterprise: The Evolution of the Bell System's Horizontal Structure, 1876-1909 (Baltimore: John Hopkins, 1985).
- Kahn, Alfred. The Economics of Regulation: Principles and Institutions (New York: John Wiley & Sons, 1971).
- Kreps, David. "Corporate Culture and Economic Theory", in J. Alt and K. Shepsle, eds. Perspectives on Positive Political Economy, (Cambridge: Cambridge University Press, 1990).
- Kreps, David and R. Wilson. "Reputation and Imperfect Information". Journal of Economic Theory 27 (1982) pp. 253-279.
- Kotter, J. The Leadership (New York: The Free Press, 1988).
- Kotter, J. and J. Heskett. Corporate Culture and Performance (New York: The Free Press, 1992).
- N. Lamoreaux, The Great Merger Movement in American Business, 1895-1904 (NY: Cambridge U. P., 1985).
- March, James, G. "Bounded Rationality, Ambiguity, and the Engineering of Choice, Bell Journal of Economics 9 (1978).
- March, James G. and J. Olsen, "The New Institutionalism Organizational Factors in Political Life", American Political Science Review, 1984, 78, pp. 734-749.
- March, James G. and J. Olsen. Rediscovering Institutions: The Organizational Basis of Politics (New York: Free Press, 1989).
- March, James G. and J. Olsen. "Organizational Learning and the

- Ambiguity of the Past", in Ambiguity and Choice in Organizations, J. March and J. Olsen, eds., (New York, Columbia University Press, 1976).
- March, J. and Shapira, "Behavioral Decision Theory and Organizational Decision Theory," in Decision Making: An Interdisciplinary Inquiry, G. Ungson & D. Braunstein eds., (Boston: Kent Publishing Co., 1982).
- MacMeal, Harry. The Story of Independent Telephony (Chicago: John F. Cuneo, 1934).
- Mulgan, G.J. Communications and Control (New York: The Guilford Press, 1991).
- Milgrom, P. and J. Roberts, "Limit Pricing and Entry under Incomplete Information," Econometrica 50 (1982), pp.443-459.
- Roby, William. "History and Development of Plant and Rates of the Telephone Industry." Paper presented at the June 1947 Conference of State Utilities Commission Engineers.
- Selten, Reinhard "Chain Store Paradox," Theory and Decision 9 (1978): 127-59.
- Simon, H. "A Behavioral Model of Rational Choice." Quarterly Journal of Economics Vol. 69, 1955, pp. 99-118.
- Simon, H. "Rational Choice and the Structure of the Environment." Psychological Review 63 (1956) pp.129-138.
- Wenders, John T., "Two Views of Applied Welfare Analysis: The Case of Local Telephone Service Pricing," Southern Journal of Economics 57 (1989): 340-48.

The fitted line on the figure is based on the following regression results:

$$\begin{array}{rcl} \text{LMS} & = & 70.08 - 1.28 * \text{INDEPSHARE} \\ & & (11.50) \quad (-6.18) \end{array}$$

Where: LMS = Percent of AT&T's customers served with LMS
INDEPSHARE = Percent of City Market Share Held by
Independent

t-statistics in parenthesis

Sources: DuBois/Vail, August 20, 1909, box 1375, AT&TCA; and "Relation Between Bell Telephones and Population in Cities of Over 50,000 Population," (New York, American Telephone and Telegraph Company, 1913).

RELATIONSHIP BETWEEN MARKET AND
PRICING STRUCTURE IN CITIES WITH
OVER 125,000 CITIZENS: 1912

FIGURE ONE

