

Cato Institute Briefing Paper No. 29: Reforming Universal Service: Competitive Bidding or Consumer Choice

May 7, 1997

Peter K. Pitsch

Peter Pitsch, an adjunct fellow at the Hudson Institute, is an attorney representing long-distance and other telecommunications companies. He served as chief of staff to the chairman of the FCC from 1987 to 1989 and chief of the FCC's Office of Plans and Policy from 1981 to 1987. The views expressed herein are solely those of the author.

Executive Summary

The 1996 Telecommunications Act, which was intended to remove barriers to competition in local and long-distance telephone services, maintained universal service subsidies for high-cost areas. Assuming that the act's requirements will remain in place, the challenge is to design a system for administering subsidies that does not give a special advantage to some competitors or some technologies.

Competitive bidding for subsidies is one answer; companies would bid against one another to serve an area at the lowest price--the lure is the subsidy and other benefits. But competitive bidding has anti-competitive effects, since it gives a special advantage to one company. Regulators should adopt a consumer choice system, under which any company would receive a set subsidy for each high-cost customer it served. If the customer moved to a competing carrier, the subsidy would move, too. This system would have fewer anti-competitive effects than competitive bidding and would allow subsidies to be phased down.

By opening local telephone markets to competition, the Telecommunications Act of 1996 has unleashed market forces that will require a fundamental restructuring of the current system of subsidy payments designed to keep residential telephone rates affordable in high-cost, usually rural, areas. Old sources of support--long-distance and business services--will dry up when competition gives lower priced choices to customers who are currently paying above-cost rates. Old methods of distributing those funds directly to existing local telephone companies, if continued, will discourage new entry by nonsubsidized companies.

Assuming that the universal service subsidies established by existing regulations and by the 1996 act will remain in effect for some years, any restructuring of the payment system must meet a number of statutory goals: (1) rates should be affordable and reasonably comparable in rural and urban areas; (2) service quality should be high; (3) service cost should be low; (4) the system should be competitively neutral; (5) the required level of subsidy borne by other telephone consumers should be minimized; and (6) the system should be administratively workable.

Currently, policymakers are considering two fundamental approaches to determining and distributing subsidies to high-cost areas. One approach involves setting support levels per customer administratively using agreed-upon cost models; the support payments are then distributed among companies on the basis of their ability to win the business of high-cost, usually rural, customers. The other approach under consideration employs a competitive bidding process to set subsidy levels per customer and determine which companies are eligible to receive them.

Both approaches employ competitive processes. Under the first approach, which relies on consumer choice, any

telephone company is free to compete for high-cost customers. The per customer subsidy received by a telephone company serving high-cost customers is administratively set and follows the customer from carrier to carrier. Such a subsidy is said to be portable. The second approach, which relies on competitive bidding, requires telephone companies to compete by participating in a reverse auction where bids are offered for the lowest per customer subsidy each company requires to provide high-cost service.

The 1996 Telecommunications Act mandated that the Federal Communications Commission convene an advisory group of federal and state regulators to consider different approaches to reform of universal service. The Federal-State Joint Board, in its "Recommended Decision" of November 8, 1996, discusses both approaches in detail. [\[1\]](#) While it resolved many issues, the Joint Board left unanswered crucial questions including whether a consumer choice or a competitive bidding approach would be preferable and under what circumstances.

This analysis evaluates those two approaches in light of the above criteria relying on the analysis and recommendations of the Joint Board where appropriate. It concludes that

- competitive bidding unduly raises entry costs;

- consumer choice better ensures competitive neutrality;

- consumer choice better ensures low prices and high-quality service;

- although both approaches can be used to minimize telephone service costs, consumer choice better ensures that rates are affordable and reasonably comparable in urban and rural areas at minimum cost to other telephone customers; and

- consumer choice is more easily administered.

As a long-time proponent of the use of competitive bidding to make initial assignments of spectrum, I was surprised to find that using competitive bidding to set high-cost subsidy levels and determine which companies are eligible to receive them was inferior to the alternative approach, which relies entirely on consumer choice. The consumer choice approach is preferable even though competitive bidding would probably reduce some subsidy costs by motivating companies to base their bids on forward-looking, economic costs rather than historical or accounting costs. The superiority of consumer choice may seem all the more surprising given the Federal Communication Commission's recent success in using competitive bidding to assign mobile radio and satellite licenses.

That result occurs because high-cost support payments, unlike spectrum frequencies, need not be assigned exclusively to be used efficiently, and limiting eligibility for those payments to a carrier or a group of carriers unnecessarily limits competition for the high-cost customer. The high-cost customer should be free to pick from competing local exchange carriers. He pays a significant portion of his service cost and like other telephone customers will have an incentive to pick the carrier that provides the best value. A principal goal of the high-cost subsidy system is to make the best value more affordable. As further explained below, assigning the subsidy payment among competing telephone companies by means of competitive bidding will require giving the winning bidder some competitive advantage over other companies that might wish to serve the high-cost customer. From the customer's standpoint, the competitive bidding process will limit his choice of carriers by giving certain carriers an advantage in competing for his beneficial interest in the high-cost subsidy payment. In effect, it will limit the customer's exclusive "ownership" of the support payment and thereby weaken the normal incentives that consumers and businesses have to act efficiently.

In contrast, assigning spectrum licenses through the use of competitive bidding does not limit or distort the use to which the spectrum is put, because in most cases spectrum frequencies, like a parcel of land, are used most efficiently if they are assigned to one entity. Without exclusivity, users would be reluctant to invest in the efficient use of the spectrum, because others could create harmful interference or "free ride" on their investments. Competitive bidding is more efficient than lotteries and comparative hearings in assigning this exclusive right, because it is a better means of picking from among competing applicants. Competitive bidding quickly and at lower cost gets licenses in the hands of those entities that are most likely to put them to their highest use. [\[2\]](#) The use of competitive bidding, comparative

hearings, or lotteries to assign spectrum licenses does not change the number of licensees the FCC creates for a particular service in a particular area. Nor does it change the number of licenses the FCC will allow one entity to acquire. Licensees compete in the same market against the same number of providers--all trying to produce a low-priced, high-quality service at minimum cost. Competitive bidding for spectrum licenses does not reduce competition at any level.

However, using competitive bidding for high-cost subsidy payments to set and determine which companies are eligible for high-cost subsidies requires giving a "bonus" to the winner that could undermine local telephone competition in high-cost areas to the detriment of customers. In contrast with competitive bidding, the consumer choice approach creates strong incentives for telephone companies to focus on the larger goal of satisfying telephone users rather than the narrower goal of minimizing subsidy payments. Consequently, it more straightforwardly achieves the major goals of the 1996 act and requires less regulatory oversight.

Consumer Choice Promotes Competition and Competitive Neutrality

A competitive bidding process that requires that the winner receive some bonus vis-à-vis those who did not win will raise entry barriers or costs for subsequent entrants into the affected markets. In contrast, the consumer choice approach treats all competitors neutrally and can be expected to foster competition.

Competitive Bidding Requires a "Winner's Bonus">

There will be little incentive to enter an auction if the winning terms then become available to everyone. For example, if the winning (low-cost) bid for a particular area is \$10 per month per subscriber but any company can then compete for subscribers on that basis, the companies that participate in the competitive bidding process will receive no benefit for having participated. Participants in a competitive bidding process incur costs in participating. The more vigorous the competition, the more expensive participation can become. To date, the FCC's auctions have often lasted months and involved tens of rounds of bids. Also, in order to bid intelligently, companies would likely incur the costs of evaluating the cost of service in each area and existing and future telephone rate levels. Consequently, without some bonus for winning, a competitive bidding process would attract few entrants or would not be likely to produce cost-minimizing results. [\[3\]](#)

However, giving the winner or a group of winners a competitive advantage over other competitors could raise the costs of entry. By so doing, competitive bidding could effectively impede competition and violate, at the very least, the intent of the 1996 act.

Proponents of using competitive bids as the means of assigning high-cost subsidy payments have put forward two ways of addressing those problems. First, eligibility could be given to a group of winners who offered bids within a predefined range of the winning bid. Each member of the winning group would be eligible to receive the winning subsidy payment per subscriber. For example, General Telephone and Electric's auction expert, Paul R. Milgrom, proposed the following decision tree for determining eligibility for the subsidy (at the lowest bid) for a three-year period:

all who bid within 15 percent of the lowest bid would be eligible;

if no competing bid were within 15 percent of the lowest bid, but one bidder were within 25 percent, then the two lowest bidders would be eligible; and

if no bid were within 25 percent of the lowest bid, the lowest bidder would be eligible. [\[4\]](#)

Second, the winning bidder could receive a larger subsidy per subscriber than that available to any other carrier. In that case, there is no absolute bar on eligibility, but one competitor would have an arbitrary price advantage for some period of time, possibly five years. That approach is advocated by Citizens for a Sound Economy Foundation, which has suggested reducing the subsidy per line for higher bidders by the amount that their bid exceeds the lowest bid. [\[5\]](#)

Competitive Bidding Will Reduce *Local Telephone Competition*

Neither of those approaches solves the problems posed by competitive bidding in this context. If there is little benefit in being the low bidder, then the competitive bidding process will not work effectively. Whether either approach provided a bonus to low bidders sufficient to achieve a vigorous competitive process would depend on the costs of participating in the competitive bidding and on the time periods, bidding ranges, and discounts that were selected to create the winner's bonus. There is little basis for estimating what those parameters should be, and they would probably vary over time and by area.

It is likely, however, that if the bonus is significant enough to attract meaningful participation in the competitive bidding process, it will also represent a significant limitation on customers' ability to choose carriers and an impediment to competition. For example, the GTE approach would create an absolute bar on entry for three years. Under that proposal, if one company bid very much lower than the others, it could achieve a monopoly or perhaps a duopoly for that period. Moreover, that approach would require a new entrant to participate in auctions in every area in which it wanted to compete. Similarly, the CSE Foundation approach would create asymmetric competition for a set period of time. The low-cost bidder would have a significant cost advantage that would not be available to any other competitor and would distort subsequent competition. [\[6\]](#)

Under both approaches, to the extent those advantages are significant to the winner, they are so because they give the winner an edge on other competitors. Access to the subsidy is likely to be essential to competing in high-cost areas. To the extent access is limited in a significant way, the ability of the high-cost customer to select the company of his choice could be impeded.

In that case, the level of competition may not adequately protect high-cost customers. To the extent that the use of competitive bidding undermines competition, the company or companies eligible for the high-cost subsidy will have an incentive to raise prices or reduce quality to increase profits. Regulators will have to monitor price and all dimensions of service quality rigorously to ensure that the winning bidder is not unduly cutting costs. Impeding potential entry could also encourage the development of tacit collusion among telephone companies eligible to receive high-cost subsidy payments, especially where the number of eligible companies is very limited.

Ironically, by limiting potential entry, competitive bidding could also cause regulators to further increase the costs of entry for service providers. Under current policy, antitrust review of mergers involves balancing the possible loss of competition due to a merger against the merger's competitive benefit due to such factors as cost reductions. Where new firms are prohibited from entering, as under the competitive bidding approach, regulators might see the need to adopt a more stringent merger policy. Yet a more lenient merger policy could lower the costs of entering local telephone markets by reducing the costs of mistaken entry; under a lenient policy, a failing entrant could be more easily rescued by new infusions of capital, or be bought out by a competitor.

Competitive bidding could also increase entry costs by making it more difficult to exploit cost synergies in serving adjoining geographic areas. That could be a significant problem where auctions for different areas are held independent of each other. GTE's proposal attempts to address that problem by allowing winners to withdraw if they pay a penalty for withdrawal. That approach also raises entry costs by requiring firms to enter auctions for all the areas in which they are interested. That could impose a significant cost on satellite services, which are generally deployed nationally. The other means of addressing this problem is open bidding on several high-cost areas at the same time. However, that method of competitive bidding is unlikely to be attractive in this context, because it increases the potential for collusion among auction participants.

In contrast, the consumer choice approach treats all competitors the same regardless of size, history, or technology. Where competition is permitted, any telephone company is free to offer service and receive the same high-cost subsidy payments based on the number of subscribers it can win in the marketplace. The Joint Board recognized that advantage when it recommended that the transitional support payments available to rural carriers be made portable. [\[7\]](#)

The consumer choice approach does not lend itself to manipulation or "gaming" of the process by telephone companies. The 1996 act requires that all carriers advertise their service throughout the relevant service area to be

eligible. Also, the act provides that firms cannot exit the market without state approval. [\[8\]](#) States could use their ability to deny exit requests to ensure that the incumbent local carrier or other remaining local carriers were not unfairly disadvantaged by an exiting company. Those statutory requirements should provide a sufficient check on possible abuse of process by companies under the consumer choice approach.

On the other hand, competitive bidding could be subject to potentially significant distortions and gaming problems. First, entrants with few financial reserves and therefore a much higher risk of failure could reduce the subsidy for all competitors even though some of those firms might be selling a service that was much more financially reliable. The ability of undercapitalized firms to reduce the subsidy to all could place pressure on other companies to adopt similar capital structures to reduce costs in order to bid successfully. Under the consumer choice approach all companies would be free to compete for customers by differentiating themselves on the basis of their reputation for high quality, reliable service, and financial stability as well as price. That ability would discourage entry by undercapitalized companies and in any event not allow entering companies to bid unrealistically low to do competitive harm to other carriers. For example, BellSouth suggests that a company with little capacity could bid unrealistically low to weaken the incumbent local telephone company's ability to compete in ancillary markets. [\[9\]](#)

Second, in the early years of competition, new entrants will rely heavily on purchasing unbundled elements from the incumbent carrier's network to provide service. Therefore, it is unlikely that any new entrant will bid significantly below a subsidy level equal to its cost of purchasing those unbundled network elements minus the price the high-cost customer pays for service. Under GTE's proposal, where the subsidy is set at the highest accepted bid (i.e., the highest bid within 15 percent of the lowest bid), the incumbent local carrier could confidently expect to be within 15 percent of the low bid if it bid at or slightly below the subsidy level implied by the prices for the unbundled network elements. Conversely, the entering carriers could bid toward the high end of the 15 percent range and expect to be within the group of winners. Under that scenario the cost-minimizing benefits of competitive bidding would be undercut because the highest accepted bid, and therefore the level of the subsidy payment, would tend toward 15 percent above the level implied by the prices of the unbundled network elements.

Consumer Choice Benefits Consumers

The use of competitive bidding or consumer choice could significantly affect the price and quality of service as well as the cost of providing service. The different approaches could also change the level of subsidy necessary to ensure that telephone rates remain affordable and reasonably comparable in urban and rural areas. The difference in the impact of the two approaches stems from their differing effects on competition for the high-cost customer.

Consumer Choice Empowers Telephone Customers

The consumer choice approach could be expected to empower high-cost consumers to secure low prices and high-quality telephone service. The competitively neutral access to the high-cost subsidy promised by consumer choice should keep prices low and quality of service high. Competition for subscribers in high-cost areas will require telephone companies to compete in terms of giving value, that is, by keeping prices close to actual costs minus the per customer subsidy and making those tradeoffs between price and the many dimensions of quality that are most preferred by high-cost customers. For example, among other aspects of quality, consumers will likely care about speed of repair, clear connections, and the size of local calling areas. [\[10\]](#)

To the extent that the use of competitive bidding undermines competition, the winning companies will have an incentive to raise prices or reduce quality to increase profits. That possibility will unfortunately require regulators to regulate or monitor price and service quality.

Consumer Choice Minimizes Service Cost

The consumer choice approach creates better incentives for telephone companies to minimize their costs consistent with their need to compete effectively for customers. For example, if scale economies are important, market forces will require companies to operate at an efficient scale in any one area and across adjoining areas. As long as the high-cost subsidies are not set too high, no company will knowingly enter a market where demand is not sufficient to support

another competitor, unless a new entrant believes that it can be a much more efficient provider and can therefore displace the existing carrier. The mere possibility of that competitive threat, of course, would encourage efficient operation. Where entry mistakes are made or inefficient firms are challenged, competition will encourage consolidation and discourage inefficient duplication of facilities. The use of competitive bidding would attenuate that competitive threat, because new entry would be effectively precluded for years. That and the other competitive problems discussed above could weaken normal business incentives that compel companies to operate efficiently.

Consumer Choice Can Minimize Subsidy Costs

If properly structured, the consumer choice approach does more to minimize the subsidy costs borne by other telephone customers than does competitive bidding. The optimal means of reducing overall high-cost subsidy levels while keeping rates affordable and comparable in rural and urban areas would be to adopt the consumer choice approach in conjunction with a phasedown and monitoring program. Initially, subsidy levels could be set using a cost estimate and a proposed multiyear phasedown of the subsidy tied to raising the benchmark rates the customer is expected to pay. By monitoring household penetration rates and absolute and relative price levels, regulators could accelerate or slow the phasedown of subsidy payments.

The consumer choice approach could ensure that the cost reductions due to local telephone competition were used to reduce the subsidy costs borne by other telephone customers. As noted above, those cost reductions should occur under either the competitive bidding or consumer choice approach. Arguably, they would be greater under the consumer choice approach. Phasing down the subsidy and monitoring rates would complement the consumer choice plan, because, without a phasedown of the subsidy, competition would reduce only the high-cost customer's rates, not the subsidy. If nominal rates were to fall or numerous companies were entering the market, regulators would have a market-based signal to reduce the subsidy per customer.

A cost estimate together with a phasedown is analogous to a price cap or incentive regulation. In this case, the productivity factor in the price cap model would become a competition factor. The cost calculation would need to be done only once every four or five years. That would reduce administrative costs as well as commit regulators to minimizing subsidy costs--the main attraction of the competitive bidding approach. (One reason competitive bidding would be expected to produce some cost savings is that the desire to win would motivate bidders to bid on the basis of forward-looking economic costs. The historical or accounting costs of an incumbent local telephone company would be largely irrelevant in a competitive bidding process. By necessity, the incumbent carrier would compare its forward-looking costs with those of its likely competitors. If its forward-looking costs were lower than its competitors', then it would be better off winning even if to do so it had to forgo recovery of some of its historical or accounting costs.) A phasedown and monitoring approach would also reduce the importance of perfecting a cost model and keep the focus on the primary goal of achieving affordable and reasonably comparable rates.

Moreover, the consumer choice approach is better able to accommodate adjustments in the high-cost subsidy where rates are abnormally low or should be raised consistent with statutory goals. Competitive bidding would be an effective means of minimizing the cost of providing service in a high-cost area *at today's rates*. But assuming the directives of the 1996 act remain in place, the goal must be to minimize the cost of achieving rates that are both *affordable and reasonably comparable in urban and rural areas*. Regulators do not yet know what rates are "affordable" and therefore should serve as benchmark rates. While the Joint Board recommended that the FCC set a national benchmark rate based on nationwide average revenue per line, it concluded that the final determination of the national benchmark must take into consideration the contribution base for the federal universal service mechanisms. [\[11\]](#) In many cases, the benchmark rate could be above existing rates.

Rural rates could be raised and remain comparable to urban rates for two reasons. First, in most states rural rates are significantly below urban rates. [\[12\]](#) Monitoring rates in urban and rural areas should be a straightforward matter. Second, urban rates and rates in general might remain affordable even if they were to increase. The principal determinant of affordability should be whether household penetration rates remain high. The Joint Board's finding, although not conclusive, was that a relatively high penetration rate suggests that rate levels are affordable. [\[13\]](#) Nevertheless, the Joint Board recognized that some regulators might wish to inquire whether increasing rates would

impose a hardship even if household penetration rates remained high. The highly inelastic demand for telephone access strongly indicates that household penetration rates would remain high even if local telephone rates were to increase significantly. [\[15\]](#) That point would be even stronger if the assistance were targeted to low-income households.

To minimize the cost of the subsidy borne by other telephone customers, regulators need to develop a plan that reduces subsidy levels to account for abnormally low rates and demand conditions as well as cost reductions from competition and new technology. The Joint Board recognized that reducing the amount of support is desirable. [\[16\]](#)

The consumer choice approach could be adapted to minimize the cost of the subsidy by raising rates in particular areas to an existing or phased-up national benchmark, while monitoring customer rates and household penetration rates to ensure that other statutory objectives were met. The consumer choice approach better accommodates the need to monitor rates and household penetration rates. If rate increases had to be postponed or reversed, subsidies could be increased under a cost model approach with no ill effects on the affected local telephone companies. Nor would the possibility of such reversals create perverse business incentives, because the telephone companies would have nothing to gain and plenty to lose if they lost customers.

In contrast, scheduling rates to increase incrementally over time could complicate the use of a competitive bidding process. The possibility that a monitoring process would postpone or reverse scheduled rate increases would increase the uncertainty facing auction participants. If companies were to bid on the basis of a schedule of proposed rate increases, they would have to estimate the chances that a rate increase would not be sustained. On the other hand, compensating successful bidders in those instances where customer rate increases were reversed might create an incentive to reduce service quality or otherwise take measures to reduce household penetration rates. With the flexibility inherent in the consumer choice approach, the FCC and state regulators could design plans that aggressively minimized subsidy cost knowing that a monitoring program could permit adjustments to ensure that rates remained affordable and reasonably comparable in rural and urban areas.

Consumer Choice Is Administratively Workable

Under either the consumer choice or the competitive bidding approach to handling the high-cost subsidy system, certain administrative tasks will be necessary. For example, urban and rural phone rates and household penetration rates will need to be monitored. Also, under a competitive bidding approach, a cost model will probably be needed to develop prices at which new entrants can buy unbundled network elements and for those situations in which auctions are not deemed appropriate. For example, GTE has proposed that auctions be used to set subsidy payments when a new entrant proposes to enter a market, but not if only one carrier serves the market.

As previously noted, the use of competitive bidding will probably entail greater administrative complexity and difficulty. Competitive bidding can also be expected to create perverse incentives for the high-cost telephone companies. The winner's bonus, however designed, will insulate the telephone company from competition. That fact may create the ability to increase profits by raising prices or reducing quality. If there is a bar on entry, it may also create the potential for tacit collusion among the eligible companies. All of those effects would require additional regulatory oversight.

Any competitive bidding procedures would have to be designed very carefully. Regulators would have to set the parameters of the winner's bonus. They would have to decide whether to give the option of serving to a group of winners within a percentage range of the lowest bid or to give the option of serving to any company but give the winner a larger subsidy per customer. Regulators would also have to make difficult design decisions, for example, what percentage range above the low bid or what percentage advantage to the low bidder would be appropriate. In either case, regulators would have to set the duration term. They would need to set those parameters so as to attract vigorous bidding but not create an unnecessarily large competitive advantage for the winner or group of winners.

Proper design of competitive bidding would also require balancing potential efficiencies in serving adjoining areas against the harm from facilitating tacit collusion among participants. High-cost areas should be designated narrowly to avoid extending the anti-competitive effects flowing from the winner's bonus to customers that do not reside in high-cost areas. In that case, it is more likely that there will be significant cost synergies in serving multiple, adjoining high-

cost areas. One solution is to allow winners to withdraw their bids, if they pay a penalty. A bidder could withdraw his bids if he did not win other areas necessary to provide service most efficiently. Of course, that would require setting the appropriate penalty. Alternatively, auctions could be constructed to allow participants to bid simultaneously on several areas over multiple rounds. That form of competitive bidding is called a simultaneous multiple round auction. By necessity such auctions allow each participant to see the other participants' bids. Where there are few bidders the possibility of their recognizing their collective interest in not competing aggressively in the auction is great. Milgrom believes that a multiple round auction is "exceptionally vulnerable to both explicit and implicit collusion." [17] For that reason, GTE's auction expert proposes that competitive bidders submit one-time sealed bids and winners be allowed to withdraw their bids if they pay a penalty. [18]

Conclusion

As long as the subsidy system for high-cost areas remains substantial, regulators will face the difficult task of minimizing the system's distortive effects on competition while promoting the efficiency of the telecommunications services receiving the subsidy. Both the competitive bidding and the consumer choice approaches to managing the high-cost subsidy system have desirable properties stemming from their use of competitive processes. Consumer choice is preferable, however, because it better ensures competitive neutrality, low prices, and high-quality service.

Under consumer choice, telephone companies will be encouraged to focus on the goal of satisfying telephone users rather than minimizing subsidy payments. Competitive bidding, on the other hand, requires a winner's bonus to work effectively and could unduly raise entry costs and otherwise impede competition to the detriment of high-cost telephone customers. Although both approaches can be used to minimize telephone service costs, consumer choice with an appropriate subsidy phasedown will better ensure that rates will be affordable and reasonably comparable in urban and rural areas at minimum costs to other telephone customers. Finally, the consumer choice approach is more easily administered, because it requires less monitoring of competitive distortions by regulatory officials.

Notes

[1]. Federal-State Joint Board on Universal Service, "Recommended Decision," *In the Matter of Federal-State Joint Board on Universal Service*, CC Docket no. 96-45, November 8, 1996. Available at http://www.fcc.gov/ccb/universal_service/welcome.htm.

[2]. Evan Kwerel and Alex D. Felker, "Using Auctions to Select FCC Licensees," Federal Communications Commission, Office of Plans and Policy Working Paper no. 16, May 1985.

[3]. Paul R. Milgrom of General Telephone and Electric states, "If one allows providers other than auction winners to provide basic service with support from the universal service fund, then that eliminates the bidders' incentive to bid for a low support levels [sic], leading to undesirable increases in the surcharge needed to fund universal service" (footnote omitted). Statement of Paul R. Milgrom, attached to GTE, "Comments in Response to Questions," *In the Matter of Federal-State Joint Board on Universal Service*, August 2, 1996, p. 5.

[4]. *Ibid.*, p. 13.

[5]. CSE Foundation, "Reply Comments," *In the Matter of Federal-State Joint Board on Universal Service*, May 7, 1996, p. 11.

[6]. Milgrom, p. 6.

[7]. Federal-State Joint Board on Universal Service, 296.

[8]. 47 U.S.C. §214(e).

[9]. BellSouth, "Comments in Response to Questions," *In the Matter of Federal-State Joint Board on Universal Service*, August 2, 1996, p. 45.

[10]. Federal-State Joint Board on Universal Service, 127.

[11]. *Ibid.*, 309-11.

[12]. Robert W. Crandall and Leonard Waverman, *Talk Is Cheap* (Washington: Brookings Institution, 1995), pp. 190-91.

[13]. Federal-State Joint Board on Universal Service, 127.

[14]. *Ibid.*

[15]. Robert W. Crandall, *After the Breakup, U.S. Telecommunications in a More Competitive Era* (Washington: Brookings Institution, 1991), pp. 111-12.

[16]. Federal-State Joint Board on Universal Service, 343.

[17]. Milgrom, p. 11.

[18]. *Ibid.*, p. 22.