

## **Default Capacity Tariffs: Smoothing the Transitional Regulatory Asymmetries in the Telecommunications Market**

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### **SUMMARY:**

... Thus January 1, 1984, was not only the day of divestiture but also the day that telecommunications users and new market entrants mobilized in response and created a new factor in telecommunications: bypass. ... Whether or not the default capacity charge is mandatory or the bypasser elects to build redundancy, the costs of facility bypass are increased. ... And while the emphasis here has been placed on carrier access bypass, the logic underlying this proposal extends to all forms of competition within the local exchange where the local company must stand ready to provide default network capacity on demand. ... As a result, a facility bypasser who never utilized local company switched access facilities may expect to pay new construction costs for the provision of default capacity. ... The requisite amount of default capacity in a serving office will decline monotonically in relation to both the degree to which facility bypass system failures are independent of one another and the proportion of total serving office capacity required by the facility bypasser. ... The  $(n + 1)$ th bypasser in this serving area also has default capacity requirement,  $y$ , and probability of failure,  $p$ , but the facility bypass system employed by it is fiber optics. ... Second, irrespective of the quality of the bypass system deployed by the customer, reliability is unambiguously increased because there are now two telecommunications systems -- the private bypass system and the public switched network -- replacing one. ...

### **TEXT:**

[\*149] The divestiture of the Bell system on January 1, 1984, will likely be remembered as the day on which competition in telecommunications markets passed the point of no return. Although the Federal Communications Commission (FCC) had been attempting to encourage competition for several decades, <sup>1</sup> January 1, 1984, was the day on which the battle lines were drawn between parent and child. If competition had been only an experiment in selected telecommunications submarkets until that day, the experiment was over. Much like a spark in a dry forest that soon becomes a blazing inferno, the FCC learned there is no such thing as a little competition.

From an efficiency standpoint, competitive entry in telecommunications markets should have signalled the end of traditional rate design, which levied excessive charges on long distance service as a massive subsidy for basic exchange service. <sup>2</sup> But this traditional tariff structure, commonly known as the toll-to-local-subsidy, was so politically popular that ending it was considered almost a crime against the state. <sup>3</sup> Residual regulations left by the incomplete removal of cross-subsidization caused rate disparities [\*150] which competitive market forces rushed to exploit at a much faster rate than regulators could respond. Thus January 1, 1984, was not only the day of divestiture but also the day that telecommunications users and new market entrants mobilized in response and created a new factor in telecommunications: bypass. Bypass denotes those methods employed by users to partially or totally circumvent the conventional telephone services provided by regulated telephone companies, and it has become perhaps the most controversial and misunderstood issue facing the telecommunications industry today.

Faced with the prospect of large scale revenue losses from bypass, the local companies must now confront the fact that competitive rate reform is not occurring quickly enough to save the upper end of the carrier access market. The local companies have concentrated their efforts on various non-traffic sensitive (NTS) <sup>14</sup> cost recovery plans, while a significant proportion of business access minutes remain vulnerable to bypass on traffic sensitive rate elements alone. Competitive market forces are capitalizing on these transitional rate asymmetries much faster than regulatory rate reform is moving to eliminate them. The telecommunications industry is in need of a plan to smooth these transitional asymmetries.

The entities that regulate the telecommunications industry have not agreed upon the best way to manage the transition to greater competition or even whether to have a transition at all. The FCC, Congress, state public service commissions, and federal and state courts all play a role, sometimes overlapping, sometimes conflicting, in regulating telecommunications markets. <sup>15</sup> The result is a great deal of confusion and frustration on the part of both the regulated firms and their customers.

The prospects for the local companies in the carrier access market today [\*151] is bleak at best. The pieces are all in place for bypass to develop on a large scale. Regulators have set switched access charges at levels far above marginal cost with little likelihood of significant reduction in the near future. The interexchange carriers (IXCs) already have tariffs in place that allow end-users to bypass the local companies' switched access services. <sup>16</sup> American Telephone and Telegraph Company (AT&T), the largest IXC, has developed its capability to service the bypass market. <sup>17</sup>

The question arises as to what is the best course of action for the local companies. The answer may well lie in a rather inconspicuous place. In most jurisdictions today, local companies must assume the obligation to be the carrier of last resort. <sup>18</sup> In addition, it appears that most bypass networks are engineered to use local company switched access facilities for back-up in the event of system failure and for overflow during periods of peak utilization. As a result, regardless of the quality of the system purchased by the bypasser, overall telecommunications reliability is increased because the bypasser now has two telecommunications systems: the private bypass system and the public switched network. When bypassers do use local company facilities, they pay only usage sensitive charges. This is clearly a market failure since, under present tariff structures, local companies cannot charge for the option of use but only for actual use, though the great preponderance of the local companies' costs are incurred to provide the option of use. Facility bypassers are presently being subsidized.

If regulations were changed to allow local companies to charge for maintaining the default network capacity necessary to meet the back-up requirements of bypassers, bypassers would then have the options of either paying such charges or building redundancy or back-up capacity into their own bypass networks. The need to construct self-contained redundancy would significantly increase and perhaps even double the costs of facility bypass. Thus, whether or not a company chose to pay for (or build) its own back-up capacity, the incentives for widespread inefficient bypass would be reduced.

[\*152] This Article proposes the institution of Default Capacity Tariffs enabling the local companies to charge for the maintenance of back-up capacity which would discourage socially inefficient bypass and promote an improved post-divestiture telecommunications market. Specifically, facility bypassers would pay flat rate default capacity charges to ensure the availability of back-up capacity in the event of system failure or overflow during periods of peak utilization. These default capacity charges should be levied on a flat rate basis, much like insurance premiums, because capacity costs are incurred independently of usage levels. If these default capacity charges are not made mandatory, facility bypassers may opt to build their own back-up capacity or redundancy. In either case, the cost of facility bypass is increased, and the net cost to society from economically inefficient factor substitution is reduced. Part I of this Article presents a brief exposition of the telecommunications market at divestiture and describes the immediate effects on market structure that resulted. It also analyzes flexible pricing, an avenue through which to address the bypass phenomenon. Part II discusses the issue of residual regulatory obligations, viewing them as the result of a social contract between local companies and their regulators. Part III presents the proposal for Default Capacity Tariffs and explores its rationale on grounds of both economic efficiency and equity, showing that the plan would promote efficient network utilization while allowing general ratepayers to realize a positive externality from the use of default network capacity. Part IV identifies some of the subtle costing concepts underlying the proposal, emphasizing the need to go beyond efficient recovery of NTS costs, a point that may seem obvious, but that has been overlooked by many industry observers.

Part V elaborates the major pricing issues involved, revealing that default capacity charges will probably grant the local companies a degree of flexibility in the pricing of special access. Nonetheless, these charges should not be administered anti-competitively, nor can they serve as a substitute for driving switched access rates closer to economic cost.

Failure to heed these principles would violate both the spirit and economic logic upon which this proposal is based. In addition, there are multi-dimensional peak-load pricing considerations underlying this proposal that would allow non bypassing ratepayers to utilize default capacity during peak periods and yet avoid peak period charges. Part VI shows that the structure underlying these default capacity charges is not without regulatory precedent. Both the natural gas and electric industries in the United States are currently exploring similar themes. The Article concludes that the concept of default capacity charges presented herein represents a viable avenue through which society more readily may realize the [\*153] full benefits of competition while avoiding the prospectively large and irreversible inefficiencies of transitional rate asymmetries.

### I. Background

The regulatory requirement of cross-subsidization of local residential service by long distance service continues in the post-divestiture era for regulated local phone companies. To describe this situation we first need to examine the geographic division of the telephone system and define a number of terms. As part of the January 1, 1984, divestiture of the Bell system, the territorial United States was partitioned into 163 separate geographic areas or Local Access Transport Areas (LATAs). Calls within a LATA are termed intraLATA and are carried predominantly by local exchange companies, unless the appropriate state public service commission has sanctioned intraLATA toll competition. In the latter case the interexchange carriers (IXCs such as AT&T, MCI, and U.S. Sprint) may also carry intraLATA toll calls. Calls between two LATAs are termed interLATA and are carried exclusively by the interexchange carriers as the local exchange companies are expressly precluded from serving this market under the terms and conditions of the divestiture agreement.<sup>n9</sup>

For both intraLATA and interLATA calls the local exchange companies provide local distribution services termed carrier access. In other words, the switching and transport functions within the local exchange necessary to serve end-users at each end of the call are provided by the local exchange companies under a series of tariffs commonly referred to as switched access tariffs. The interexchange carriers pay the local exchange companies for the local distribution of their interLATA and intraLATA calls within the local exchange. For example, a typical long distance call from San Francisco, California to St. Louis, Missouri will generally involve two local exchange companies and one interexchange carrier. From the end-user's station set (telephone) in San Francisco, Pacific Telesis will distribute that call to the interexchange carrier's toll office or point-of-presence. The call will travel over a long haul microwave, satellite, or fiber optic network to the interexchange carrier's toll office or [\*154] point-of-presence in the Missouri area. From that point, Southwestern Bell will distribute that call within the local exchange to the end-user's station set (telephone) on the terminating end of the call. The interexchange carrier's bill to the end-user for the toll call will include payments to Pacific Telesis and Southwestern Bell for local distribution of the call. The payments to the local exchange companies are the switched access charges. The cross-subsidization is implemented by raising switched access charges -- and, indirectly, intraLATA and interLATA toll service rates -- to levels far above their marginal costs. The excess revenues are used to subsidize rates paid by local residential users. The resulting market distortions are clear as are the incentives to evade the excess cost the market distortion imposes by bypassing the local phone company's switched access services.

Similar rate and cost distortions exist with respect to pricing intraLATA toll services. It is not uncommon for intraLATA toll rates to be set at levels five to six times their estimated marginal cost. Consequently, medium and large toll users pay rates far in excess of the NTS costs they actually impose on the system. Competitive entry in the carrier access market now affords these customers an alternative to the payment of subsidy laden switched access charges and artificially inflated intraLATA toll rates. This alternative is bypass.

While there are many forms of bypass, perhaps as many as there are services that the local companies provide, the form most worrisome to local companies is carrier access bypass. Local companies perceive carrier access bypass as a major financial threat, as the IXCs have a clear economic incentive in its use. For expositional purposes, we define bypass as either a direct connection between a customer's premises and an IXC's point-of-presence or a self-contained end-to-end system using facilities that circumvent the switched access services of the local exchange carrier. This network architecture is illustrated in Figure 1. When this direct connection is established using special access lines that are actually owned by the local company, leased by the IXC, and not subject to usage-sensitive charges, the practice is referred to as service bypass. When this direct connection is established using private facilities (such as microwave radio or satellite) it is referred to as facility bypass.<sup>n10</sup> Both service and facility bypass cause significant revenue losses for the local companies. The economics of the bypass decision are illustrated in Figure 2. Initially, with the NTS costs loaded into switched access tariffs, all customers with usage [\*156] in excess of point A have economic incentives to bypass. When NTS costs are deloaded from switched access tariffs, the break-even usage level for bypass declines to point B.

Bypass as a form of competition in the local exchange has been and continues to be a troublesome problem for regulators.<sup>111</sup> Even if all parties to the regulatory process were to agree that the problem of bypass of the public switched network should be addressed, the solutions would not necessarily be politically palatable. For instance, under a fixed revenue requirement, rate-of-return regulation, if regulators allowed the local exchange companies sufficient pricing flexibility to retain large business customers on the switched network, basic exchange rates would generally rise, perhaps significantly. Regulators, therefore, are naturally sensitive to the political implications of raising concern over universal service<sup>112</sup> which surround such a pricing policy. Certainly, there are any number of political pressures that render it problematic for regulators to adopt pricing policies that significantly effect the rates charged for the vast majority of the electorate. One possible solution is to allow the local companies to have greater pricing flexibility in order to efficiently and effectively compete in the market. But denying the existence of competition in the short run obviates the need for politically unpopular rate reform.

One specific proposal to the bypass problem is to grant the local companies pricing flexibility in the form of a volume tapered rate schedule to keep large business customers on the switched network. While such a pricing plan would be most effective in retaining large users on the network, it too suffers from political problems involving equity. Such a pricing schedule would modestly raise rates for small business and residential customers. But criticism on these grounds would be naive because it gives no consideration to the greater effect on the bills of small business and residential customers when those moderate and large users bypass the public switched network stranding investment and forcing fixed costs to be [\*157] spread among a smaller customer base. As long as the lowest rate necessary to retain the would-be bypasser on the public switched network exceeds the per minute marginal cost, the burden on residual rate-payers is less than it would otherwise be if these users were to bypass the local company. In other words, as long as the rate charged to retain the potential bypasser makes some contribution, however small, to the common and joint costs of the network, the residual customers -- those who cannot take advantage of the bypass option -- are better off. The problem, in essence, is that regulators and rate-payers alike may directly attribute the increase in rates to flexible pricing, without realizing the greater increase in rates that would occur without flexible pricing. Similarly, the actual number of potential bypassers can only be estimated, and this estimation has not heretofore been determined with the degree of certainty satisfactory to most state regulators.

The FCC was very much aware of the bypass problem and made a valiant effort at proactive rate design through its own access charge plan.<sup>113</sup> This plan called for the transfer of most NTS costs to the end-user over a six year period. Despite numerous comprehensive studies that had shown that the local companies' carrier access revenues were highly vulnerable to bypass,<sup>114</sup> the FCC's access charge plan ran into turbulent waters on virtually every front.<sup>115</sup> The de facto local rate increases resulting from the FCC's plan were politically unpalatable. The plan, however well intended, stalled well short of its goal.

## II. Residual Regulatory Obligations

Key to understanding the problems inherent in the telecommunications industry's transition to competition is the local companies' historical acceptance of social responsibilities or obligations in return for the regulated local exchange franchises. These included two primary responsibilities: the promotion of universal service and the carrier of last resort obligation.<sup>116</sup> The [\*158] acceptance of these responsibilities may be viewed as an implicit social contract between regulators and the local companies; the implementation of which was facilitated by the development of the toll-to-local subsidy.<sup>117</sup> The express intent of this subsidy was to maintain residence basic exchange rates far below their average cost in order to promote subscription to the network in a manner consistent with the goal of universal telephone service.

The local companies were also required to maintain a ubiquitous telecommunications network throughout their franchised area, even if parts of that network were not cost effective. If an end-user desired service, the local companies were obliged to provide it, most frequently at a broadly averaged monthly rate. The regulator was acting as an agent for the ratepayer in negotiations with the local companies for the most favorable terms of service. The regulator, through the local franchise, was in turn asked to protect the local company's right to serve. Certainly one of the most critical observations to make with respect to the historical origins of regulation in telecommunications, is that the regulatory process was invoked as much for the purpose of social engineering as it was for the purpose of efficiently providing what was perceived to be a natural monopoly service.

Finding the most efficient market structure for a particular good or service is very much a process of discovery. Whether the telecommunications industry is in fact a natural monopoly is an issue about which the empirical studies have been decidedly inconclusive.<sup>118</sup> As John Haring has observed,<sup>119</sup> the only meaningful way to determine the optimal or most efficient market structure is to allow entry without imposing constraints such as residual regulatory obliga-

tions. Incumbent firms in the post divestiture market are still subject to residual regulatory obligations. Thus, it is difficult to infer clear conclusions about the most efficient market structure from the observance of what appears to be competitive entry into telecommunications markets. The only conclusion that can be drawn is that when rates are set without regard to actual underlying costs, competitive market forces will attempt to exploit the discrepancies. It cannot be known whether such competitors would have entered the market in the absence of the imposition of residual regulatory obligations on market incumbents. A [\*159] recent Federal Communications Law Journal article by authors including Mark Fowler, formerly Chairman of the FCC, acknowledged the societal costs of asymmetric regulatory policies:

The more specific questions concerning how best to manage this transition are not susceptible to easy answers. It can be argued for instance, that some of the commission's regulatory actions in the inter-exchange markets that were designed to promote competition during transition, such as highly discounted access pricing for other common carriers and restrictions on competitive pricing responses by AT&T, in fact have encouraged entry by uneconomic providers and uneconomic construction of excess capacity. If this is true, the gradualist approach to deregulation of inter-exchange markets will have resulted in substantial unnecessary costs for society that never would have been incurred in a truly competitive marketplace. Moreover, this approach will have directly increased consumer costs by requiring regulated firms to charge higher prices to protect competitors during the transition. <sup>n20</sup>

Thus it is apparent that market entry occurring solely because of residual regulatory obligations demonstrates a conflict between the social engineering and efficiency goals of regulation.

The advent of competitive entry in telecommunications markets has, of necessity, altered the terms of the social contract. Competitive entrants today are not subject to the residual regulatory obligations imposed upon the local companies. This asymmetric regulation leads to an inefficient market outcome since the true least-cost provider may be constrained from being the least-price supplier. The regulated local companies today must set carrier access tariffs so as to subsidize basic-exchange rates while competing with new entrants who are free to set efficient prices based on costs. The local companies must engineer for network ubiquity while their competitors are free to cream-skim, that is, to provide service on only the highest volume routes or for the most lucrative customers. As a result of this asymmetric regulation, the local companies are doubly penalized. They are required to price their services at above market rates which encourages the growth of bypass and must also provide the bypasser with back-up facilities at less than cost. <sup>n21</sup> Such a regulatory and tariff structure [\*160] is economically inefficient as well as inequitable. In fact, under present rate-of-return regulation, this form of asymmetric regulation forces general ratepayers to subsidize bypassers. In other words, the social costs of bypass exceed the private costs.

It is instructive to view the regulatory constraints on the local companies as a tax on the services they provide that must be recouped by artificially high rates for carrier access and toll services. The market outcome is predictable. Over time, the local companies will lose business to competitive entrants who are not similarly constrained. <sup>n22</sup> Such are the economic distortions of asymmetric regulation. <sup>n23</sup> Not only are such nonuniform regulatory policies economically inefficient and inequitable, but the economic distortions they create are largely irreversible since telecommunications networks are generally characterized by large sunk costs. Society will pay the cost of this inefficiency for a long time.

The rush of competitive entry in telecommunications markets today, in and of itself, says nothing about the underlying market structure or possible efficiency gains from such entry. What it indicates is that when rates are set without regard to underlying economic costs, entry occurs which may be uneconomical. <sup>n24</sup> Bypass, as a form of competition in the local exchanges, is not inherently bad. In certain situations, it may actually represent the most efficient network-serving arrangement and, therefore, should not be discouraged. Economic inefficiency results, however, when bypass is chosen because the incumbent's rates are higher than those of its competitors, even though its costs are lower. This is the situation that should be most troublesome to regulators because it represents a net loss in social welfare. From a social engineering or equity perspective, bypass adversely affects the residence and small business customers on whose behalf regulators initially adopted these social engineering goals. When bypass occurs, the remaining users on the network must cover the fixed costs previously spread over more ratepayers. This has a disproportionate effect [\*161] on residence and small business ratepayers. Under asymmetric regulation, the market is incapable of choosing the true least-cost provider. <sup>n25</sup>

The local companies have only two possible courses of action to insure their continued financial health: (1) convince regulators that sanctioned competitive entry was an ill-conceived idea and attempt to reverse the process; or (2) move toward cost-based pricing of their tariffed services including efficient pricing of the default capacity required by the carrier of last resort obligation. The second course of action is nearly as difficult as the first is impossible. It is this second course of action, however, which is the central theme of this paper and the subject of the next Part.

### III. Default Capacity Flat Rate Tariffs

In the previous Part, I discussed the inherent objections to asymmetric regulation based on both efficiency and equity. In this Part, I develop a plan that allows for a more efficient transition from regulation to competition while addressing the political and regulatory concerns of residential and small business customers.

Today most bypass networks are designed to utilize local company switched access services as back-up. When bypassers to utilize these switched access facilities they pay only usage sensitive charges based on actual traffic volumes. In addition, should such bypassers require additional access lines on an immediate or short-term basis, they may be required to pay emergency private branch exchange (PBX) <sup>n26</sup> trunk-installation rates.

Present tariff structure governing back-up capacity for facility bypassers creates at least two major problems. First, there is no guarantee under the regulatory rate averaging process that the tariff structure will actually allow the local company to recover the costs incurred in the construction and maintenance of additional network capacity required to provide back-up capacity for facility bypassers. <sup>n27</sup> Second, the local companies' network capacity costs are incurred whether or not this default capacity for facility bypassers is ever actually used. As a result, usage-sensitive recovery [\*162] of these network capacity costs is economically inefficient as it does not reflect the cost of maintaining idle stand-by capacity. Efficiency can be improved by recovering these default capacity costs in the form of flat rate charges, much like insurance premiums. This observation leads to the following proposal:

Levy default capacity flat rate charges on facility bypassers as a means of recovering capacity costs incurred by the local companies for maintaining default network capacity.

This proposal for default capacity charges centers on two key issues: <sup>n28</sup> (1) the option value the facility bypasser derives from having back-up capacity provided by the local companies; <sup>n29</sup> and (2) the implicit social contract under which the local companies originally agreed to incur construction and maintenance expense in the discharge of their obligation under the local exchange franchise. It is immaterial whether or not the default capacity is ever actually used. From the supply side of the market the vast majority of the costs incurred by the local company are those costs associated with providing the option of use of the network and not with actual usage on the network. From the demand side of the market bypassers should be willing to pay to ensure that this option of default capacity continues to be made available to them. <sup>n30</sup> These charges are very similar [\*163] to insurance premiums which are paid whether or not a claim is ever filed, since a pool of funds must be set aside to compensate the injured party in the event of a loss.

The regulatory authorities could decide the degree to which default capacity charges should be mandatory or optional and for what period of time. But the complexity of the issue goes beyond those choices to the distinction that must be made between sunk and incremental back-up costs and the resultant interplay with issues of economic efficiency and equity. <sup>n31</sup>

This dilemma arises from the fact that the local companies' historic revenue requirements, comprised of sunk and embedded costs incurred in the past in order to fulfill its obligation to serve, frequently exceed incremental costs. As a result, a customer who bypasses the public switched network without mandatory payment of default capacity charges will have shifted the burden of sunk cost recovery onto residual customers. Most regulators would consider this inequitable. This would force the rates charged to these residual customers even further above incremental costs, thus precluding any possibility of economically efficient rate design. Conversely, situations may arise where the costs of providing back-up capacity are truly incremental. This would occur in the form of variable costs of maintaining existing capacity or opportunity costs (because existing capacity can be used to supply residual customers) or costs associated with building additional capacity. In this context, default capacity may be priced in an economically efficient manner without residual customers experiencing an inordinate and inequitable burden in the form of rate shock.

The prospect that default capacity charges may be mandatory for a designated period of time may strike some readers as anti-competitive. A careful analysis will indicate this is not the case. In a competitive market, the local companies would naturally enter into contractual arrangements with their customers for the deployment of network capacity. Under the local exchange franchise, however, the local companies provided such network capacity under an implicit regulatory contract that was subsequently [\*164] broken by competitive entry. <sup>n32</sup> It may be appropriate and is certainly equitable to stockholders and residual rate-payers alike to make default capacity charges mandatory for a period of time sufficient to allow the local companies to recover their costs. <sup>n33</sup>

Whether or not the default capacity charge is mandatory or the bypasser elects to build redundancy, the costs of facility bypass are increased. This phenomenon is illustrated in Figure 3. The initial breakeven traffic volume level for facility bypass (without default capacity charges) is Q[0]. When the facility bypasser is required to pay default capacity

charges, the new breakeven level is increased to  $Q'[0]$ . As illustrated in the diagram, the default capacity charges also provide the local companies with added flexibility for pricing special access services. This latter point may be particularly critical during the transition to competition and will be discussed in greater detail below.

The proposed flat rate tariff structure for recovering default capacity costs has far-reaching implications. The option value that facility bypassers place on default capacity is likely to be high. And while the emphasis here has been placed on carrier access bypass, the logic underlying this proposal extends to all forms of competition within the local exchange where the local company must stand ready to provide default network capacity on demand. This would include, for example, Metropolitan area bypass,<sup>n34</sup> shared tenant services (STS),<sup>n35</sup> and end-to-end bypass.<sup>n36</sup>

A question arises concerning the appropriateness of levying default capacity charges on facility bypassers when the local companies are operating under conditions of excess capacity. For example, a plausible, though [\*166] incorrect, argument could be made that facility bypassers who default back onto the switched network when the local companies are operating with excess capacity actually cause no additional costs to be incurred, and, therefore, they should not have to pay for this stand-by service. But the argument is circular. The relevant question is not whether the local companies are operating under conditions of excess capacity; rather the crucial issue is to identify the underlying cause of the excess capacity. For example, if the local companies deployed plant and facilities in a prudent fashion under a "regulatory contract" that bestowed upon them an exclusive right to serve, and they now experience excess capacity because that contract was broken by allowing competitive entry, bypassers should not be able to default to the switched network for free because it is not used to capacity, when it is in fact the bypasser (as a competitor in the local exchange) who is, at least in part, the cause of this excess capacity. Conversely, if the regulatory authority deems that the local companies deployed plant and equipment in an imprudent manner, as judged in relation to the regulatory rules in effect when that plant was deployed, the local companies should not be able to recover their costs in the general rate base. The costs should in that case be written off against stockholder equity like any imprudent investment in a non-regulated market that failed to generate the expected return.

On the equity side of this issue of excess capacity is the question of how default capacity costs are recovered if bypassers are not required to compensate the local companies for stand-by facilities. Under rate-of-return regulation, the costs of the network capacity that the bypasser now utilizes on a default basis are fully embedded in the local exchange company's rate base and are primarily recovered on a usage-sensitive basis from regular, not default, users of the public switched network. This method of cost recovery results in a cross-subsidy from general ratepayers to bypassers. This situation is unlikely to be viewed favorably by the majority of regulators. The issue that lies in the balance is the degree to which the customer intending to bypass the local company retains an obligation for the costs of facilities deployed under the local company's obligation to serve. In other words, was the potential bypasser a party to the regulatory contract under which the local company was charged with the exclusive right to serve? If so, should the customer intending to bypass be allowed to disavow any recurring obligation for cost recovery by shifting that cost recovery to residual ratepayers, who consist predominantly of residential and small business ratepayers?

Finally, if the local companies deploy plant and facilities without considering stand-by or default capacity service, traffic engineering problems will arise. When a facility bypasser's primary system fails, the traffic that [\*167] normally flows over the bypass system would be diverted to the public switched network. If this system failure occurred during a peak period, traffic congestion for all customers served out of that particular central office would rise. The service levels that resulted for general ratepayers would probably be considered unacceptable by regulators. This is why it is critically important that the local companies' obligation to stand-by for facility bypassers be clearly defined and plant and equipment be deployed accordingly. otherwise, general ratepayers will pay for this stand-by service, first, by directly paying for the actual costs of plant and equipment necessary to provide default capacity to bypassers, or second, by paying in terms of higher congestion on the public switched network when facility bypass systems fail. In either case, general ratepayers are being asked to subsidize facility bypassers for stand-by service.

A case in point may help to clarify both the magnitude and complexity of the default capacity issue. McDonnell-Douglas Corporation, an aerospace firm with general headquarters in St Louis, Missouri, recently installed its own private telecommunications network.<sup>n37</sup> In fact, the size of this network makes McDonnell's system the twentieth-largest private telephone company in the United States. The \$ 58 million network connects 54,000 phones at ten sites in the St. Louis metropolitan area and in California. The McDonnell-Douglas system bypasses the local companies on both ends, Southwestern Bell in Missouri and Pacific Telesis in California. The revenue loss to Southwestern Bell resulting from McDonnell-Douglas's bypass was estimated at \$ 6 million annually.

Suppose that at some point McDonnell's system fails. The traffic that would normally flow over the bypass system could be engineered to default over Southwestern Bell switched access facilities. McDonnell-Douglas may pay for additional PBX trunks and the usage sensitive charges associated with these respective traffic volumes, but, as was discussed above, <sup>n38</sup> this is an inefficient avenue through which to recover capacity costs. This default capacity is available, however, only because the central office serving McDonnell-Douglas was virtually dedicated to serving McDonnell-Douglas's telecommunications needs prior to the implementation of their bypass system. The area in which this central office is located is not a high growth area, so there is little prospect of this network capacity being used for any purpose other than primarily to provide default network capacity for McDonnell-Douglas. It is also clear that the [\*168] plant serving McDonnell-Douglas is earning a prescribed rate of return that is in large part independent of actual levels of usage. <sup>n39</sup>

Two observations need to be made about the McDonnell-Douglas case. First, it is clear that Southwestern Bell would incur costs for maintaining default network capacity for McDonnell-Douglas and that these costs, assuming no failure by the McDonnell-Douglas system, are borne by Southwestern Bell's general ratepayers. <sup>n40</sup> Second, McDonnell-Douglas is a very large corporation utilizing telecommunications for all aspects of their business operations, including data processing, defense contracting, and even reselling of public telecommunications traffic. <sup>n41</sup> Intuition suggests that their demand for default network capacity is highly price inelastic. In other words, they would be willing to pay the economically efficient price to insure that their telecommunications traffic remain uninterrupted, either through self-contained redundancy or default capacity on the public switched network. Equivalently, the option value that McDonnell-Douglas places on default network capacity is probably very high indeed.

Unfortunately from the perspective of the local telephone companies, bypass of local exchange company facilities is not an isolated problem. In fact, it appears to be an accelerating phenomenon. A recent report by the FCC <sup>n42</sup> cited 1400 cases of bypass with estimated revenue losses ranging into the hundreds of millions of dollars. The realization that bypass appears to be an ever-increasing phenomenon is further substantiated in a report commissioned by the Justice Department (the Huber Report) <sup>n43</sup> to investigate the need for continued line-of-business restrictions on the local Bell Operating Companies. In the period between 1982 and 1986, the Huber Report shows a sharp rise in private microwave, private fiber, metropolitan area networks, and satellite earth stations.

#### IV. Costing Theory

One of the more subtle issues related to this concept of default capacity charges in the concept of economic costs and how they should be measured. This is certainly one of the more elusive issues in telecommunications [\*169] today and no doubt itself deserves a paper. <sup>n44</sup> We shall have to be content here with simply identifying a few of the central issues and concepts.

It is instructive to view access to local company facilities as an expandable pipe through which varying amounts of traffic may be carried. <sup>n45</sup> As a first iteration, capacity costs assignable to the facility bypasser would presumably be based upon dedicated plant plus that portion of common plant identified by the bypasser's determination of peak period traffic volumes and the respective probabilities of default.

The costs associated with the provision of default capacity should be differentiated on the basis of whether this capacity is provided through existing plant or new construction. For example, the planning period for switching equipment may be based on a one or two year forecast, while feeder cable layouts may be based on a twenty year forecast. As a result, a facility bypasser who never utilized local company switched access facilities may expect to pay new construction costs for the provision of default capacity. In this manner the costs associated with uncertain demand requirements are internalized to those customers who represent the source of the uncertainty.

As with insurance theory, <sup>n46</sup> network capacity built and maintained to serve default traffic customers would be based on expected demand for that capacity and the quality of service provided to default customers. <sup>n47</sup> Following this line of reasoning, it is apparent that default capacity costs will depend upon a number of different factors, including facility bypass penetration in a serving area and the probability of simultaneous demand [\*170] for the default capacity as well as the sum of the simultaneous demands at the peak.

The requisite amount of default capacity in a serving office will decline monotonically in relation to both the degree to which facility bypass system failures are independent of one another and the proportion of total serving office capacity required by the facility bypasser. That is to say, the law of large numbers works against facility bypassers whose system failures are not independent of other facility bypassers and whose default capacity requirements are a large proportion of total serving office capacity.

First, suppose that there are initially  $n$  facility bypassers in a given serving area, each with default capacity requirement,  $y$ , and probability of failure,  $p$ . In addition, suppose that these  $n$  facility bypassers all use microwave radio. The  $(n + 1)$ th bypasser in this serving area also has default capacity requirement,  $y$ , and probability of failure,  $p$ , but the facility bypass system employed by it is fiber optics. Suppose that a severe thunderstorm moves into the serving area and knocks out all microwave transmission.<sup>n48</sup> The serving office would be required to provide default capacity for all the microwave facility bypassers simultaneously. These are potentially large default capacity requirements, with costs that must be recouped through default capacity charges. Because these failures are not independent, serving office capacity requirements are larger than would otherwise be the case. Conversely, the bypasser utilizing fiber optics may experience a system failure when a fiber is cut by a construction crew. This is a type of system failure that is most likely to be independent of the microwave system failures. As a result, the bypasser utilizing fiber optics will pay lower default capacity charges than bypassers using microwave radio even though his default capacity requirements and probability of failure are identical.<sup>n49</sup>

Second, default capacity costs will vary directly with the facility bypassers' default capacity requirements as a proportion of total serving office capacity. Suppose there are two identical serving offices: A and B. Serving office A serves  $n$  facility bypassers, each with default capacity requirement,  $y$ , and probability of failure,  $p$ . Serving office B serves only one facility bypasser, with a default capacity requirement of  $ny$  and [\*171] probability of system failure,  $p$ . For both serving offices expected default capacity demand is  $np y$ , but the variance of default capacity demand over time is larger for serving office B than it is for serving office A.<sup>n50</sup> From a traffic engineering perspective, the large single facility bypasser appears as a large number of individual users who act in a totally dependent manner. Since these serving offices must be engineered for peak-load demand, the default capacity cost incurred per unit of traffic is greater in serving office B than it is in serving office A. Thus the law of large numbers works against the relatively large facility bypasser.

Data on the failure rates of bypass systems is not readily available, largely because there is little market experience with these systems. Cuts or breaks in fiber optic cable are purely random events which defy any precision in forecasting. Microwave radio transmission is subject to similarly unpredictable weather-related outages, obstructions in line of sight, and power failures.

There are two significant points to make with regard to the question of failure rates of bypass systems. First, many business customers who deploy bypass systems utilize these networks for critical voice and data transmission requirements. In some cases, excess capacity on these networks may even be resold to the public on a for-profit basis. Consequently, system outages in the firm's telecommunications network cannot be tolerated. As a result, the demand for default capacity, whether it be self-contained redundancy in the private bypass system or stand-by service on the public switched network, is likely to be quite inelastic. Second, irrespective of the quality of the bypass system deployed by the customer, reliability is unambiguously increased because there are now two telecommunications systems -- the private bypass system and the public switched network -- replacing one. Consequently, if the bypasser is allowed to default to the public switched network without compensatory payment for standby services, the economic incentives exist for that bypasser to purchase a bypass system with a suboptimal degree of reliability.

This incentive occurs because the bypassers' telecommunications network costs are not internalized. In fact, these circumstances present a classic free rider problem. The level of default capacity charges is dependent upon three primary factors: capacity requirements, probability of peak period default, and degree of independence of system failures within the area served by the central office.<sup>n51</sup> At least on a theoretical level, the local companies [\*172] can require the would-be bypasser to assume responsibility for informing them of peak-period default capacity requirements as well as the bypass technology employed. This would allow the local companies to deploy their trunking and switching capacity in an efficient manner. The local companies could ensure the accuracy of the information provided by the bypasser by imposing circuit breaker type monitoring equipment on the bypasser's default capacity facilities. If usage on the default capacity facilities exceeded the presubscribed capacity requirements, further usage could be blocked.<sup>n52</sup> Presumably, this monitoring would provide the facility bypasser with the proper incentives to report accurate capacity requirement information to the local companies, since the bypasser would bear the cost of incorrect information. This practice would presumably also protect general rate-payers from network congestion caused by the unforecasted network capacity requirements of bypassers.

## V. Pricing Concepts

The first and most critical point to make regarding the pricing of default capacity charges is that this structure for recovering capacity costs is not a substitute for moving toward cost-based pricing of switched access. This point is ir-

refutable.<sup>n53</sup> The economic logic underlying the implementation of default capacity charges is, to a large extent, independent of the need for cost-based switched access charges. The real problem, of course, is the usage-sensitive recovery of fixed costs. Are the local companies using this structure to exploit the local exchange bottleneck? Do the local companies have unlimited market power in providing default capacity? The answer to both questions is no. The rates the local companies set for default capacity are bounded from above by the facility bypassers' costs for building redundancy and back-up capacity in their own private networks. For example, recent advances in ku band satellite technology could make it a viable avenue through which facility bypassers could build redundancy.<sup>n54</sup> Hence, for the very same reasons the local companies have limited [\*173] market power with respect to carrier access, they have limited market power with respect to the provision of default capacity.

In Part III, I briefly discussed the prospect of raising local company special access rates in conjunction with the implementation of default capacity charges.<sup>n55</sup> This is a critical and controversial pricing issue. It should be made clear that in reality the market, and the market alone, sets the price for special access. The availability of facility bypass will set natural limits on the price charged for special access, thereby rendering the market contestible. Presumably at some point the perceived risk premium associated with facility bypass will be dominated by the market price differential for the two competing options.

There are at least two countervailing arguments that need to be carefully considered with respect to raising special access rates. First, raising special access rates in conjunction with default capacity charges will tend to retain would-be bypassers on switched access. This is a positive development, if and only if, switched access charges continue to fall toward underlying marginal cost. But paradoxically, once regulators and politicians see reduced levels of bypass, they are likely to conclude that bypass is no longer a significant problem and cease any further reductions in switched-access charges. This would allow them to avoid the political fall out resulting from increasing local exchange rates. From a cost-benefit perspective, there may be other arguments that could be used to justify increasing special access rates during the interim transition toward cost-based switched-access charges. Presently, there is a massive movement out of switched access and into high capacity special access facilities. To the extent that this movement is economically inefficient it may be anticipated that there will be corresponding movement back to switched-access once cost-based switched access charges are put in place. Depending on the cost of converting switched access trunks to special access trunks and vice versa, it may be justified from a cost-benefit perspective to keep special access rates high during this interim transition period.<sup>n56</sup>

It is crucial that the prospective pricing flexibility granted to the local companies through the implementation of default capacity charges not be used in an anti-competitive fashion. In markets where competitive alternatives have not evolved sufficiently to provide the requisite discipline, regulators [\*174] should take appropriate measures to ensure that these charges are used solely to counter uneconomic entry. The FCC has repeatedly stated that revenue losses incurred by the local companies are not in themselves a negative phenomenon.<sup>n57</sup> Thus, the FCC is not likely to approve these default capacity charges simply to prevent revenue losses by the local companies. This position is correct from the viewpoint of economic efficiency. Flat rate default capacity charges have interesting implications in the context of peak-load pricing theory.<sup>n58</sup> Suppose that a certain percentage of serving office capacity is purchased under a default capacity flat rate tariff by a facility bypasser. During periods when the facility bypass system is operational and not on overflow, default capacity may be utilized by general ratepayers without incurring peak period charges. Therefore, these ratepayers may realize an externality from the use of default capacity.<sup>n59</sup>

## VI. The Regulators' Perspective on Default Capacity Charges

The implementation of a default capacity tariff structure does have regulatory precedent. In 1984, Laclede Gas Company (Laclede) filed a general rate case before the Missouri Public Service Commission requesting, in part, permission to assess surcharges against customers using electric heatpumps.<sup>n60</sup> Laclede based its case on the contention that heatpump customers [\*175] display highly nonuniform gas consumption patterns. The vast majority of their consumption occurs during periods of extremely cold temperature when aggregate demand is at peak and the cost of gas is highest. Since Laclede's rates are based on average costs of gas, heatpump customers are not being assessed rates reflective of the underlying costs that they cause. Laclede succeeded in meeting the burden of proof that heatpump customers are subsidized by the average gas ratepayer. The Missouri Public Service Commission subsequently concurred with Laclede's heatpump surcharge tariff.<sup>n61</sup>

Two points are noteworthy with respect to the heatpump surcharge issue. First, Laclede was forced to stockpile a natural gas inventory sufficient to meet anticipated demand. As a result, the heatpump customers derived option value from back-up energy supplies provided by Laclede. Second, Laclede had earlier argued that its costs for meeting the

anticipated gas demand were largely fixed. <sup>n62</sup> Hence, it is economically efficient that this surcharge be in the form of a flat rate tariff.

In a related natural gas example, large business users of natural gas may soon be bypassing local gas distribution companies and connecting directly with the interstate natural gas pipelines. The local distribution companies (LDCs) put forth an argument strikingly similar to those frequently heard in telecommunications:

Load loss in turn can affect an LDC's allocation of fixed costs, which may be shifted to the LDC's remaining small volume commercial and residential customers, increasing their rates and allowing pipelines with no service obligation corresponding to that imposed by state law on LDCs to "skim the cream" from an LDC's service territory. <sup>n63</sup>

Within this context, regulators have been urged to adopt stand-by charges and exit fees. Under the stand-by proposal, a customer choosing to bypass the LDC would pay a standby charge to retain the right to demand service from the LDC in the future, based on the costs the LDC incurs for demand charges and storage costs necessary to provide service. There [\*176] would be no stand-by charges for a customer electing not to retain access to the LDC system. <sup>n64</sup>

A final analogous case is the treatment of cogeneration in the electric utility industry. <sup>n65</sup> Parties utilizing cogeneration cannot be assured of 100% reliability and normally require a source of backup electric power. The primary issue centers on the terms and conditions under which electric utilities provide this backup power. Regulatory authorities who have considered this issue have generally concluded that while electric utilities are required to provide back-up service to cogenerators, the utilities are not required to provide this service at the same rates and under the same conditions that electric power is made available to general customers. <sup>n66</sup> Thus, regulators have explicitly acknowledged that stand-by charges are to be based upon the cost of potential demand, rather than actual demand requirements. <sup>n67</sup>

Regulators have considered the problem of stand-by charges in the context of the provision of telephone service by other than certificated telephone corporations. <sup>n68</sup> A prime example of other than certificated phone companies are STS. STS providers are typically landlords or real estate developers who provide telephone service to the tenants of a building or office park. STS is generally provided through a customer owned PBX. The owner of the PBX will generally purchase PBX trunks from the local telephone company and resell local service to the various subscribing tenants in the building. One commission considering the specific problem of STS rules that an STS was not a regulated phone company within the [\*177] statutory definition because they did not offer phone service to the general public. <sup>n69</sup> However, they did rule that the local phone company was not required to serve as the carrier of last resort for tenants who voluntarily decided to occupy an STS building. The commission perceived that requiring Southwestern Bell to serve as the carrier of last resort in a competitive market was a residual regulatory obligation that unfairly impeded Southwestern Bell's ability to effectively compete in the market. <sup>n70</sup>

In what in essence constituted the second round of the first STS case, <sup>n71</sup> the STS industry raised the issue of the Missouri Public Service Commission's policy on the carrier of last resort issue. Specifically, the STS industry argued that its growth was stymied by the STS users' inability to require the local phone company to stand ready to provide back-up capacity. <sup>n72</sup> It is noteworthy, however, that the Vermont Public Service Commission has echoed very similar arguments with regard to the carrier of last resort obligation as it relates to STS providers. <sup>n73</sup>

## Conclusion

Regulators in telecommunications will likely look favorably upon the default capacity charge concept in that if administered prudently, default capacity charges will indeed serve the public interest. It may be instructive to discuss a few of the positive attributes of the plan. First, the default capacity tariff structure reduces the cross-subsidies that flow from general ratepayers to facility bypassers which exist under the present tariff structure. Under the proposal, facility bypassers would pay all costs directly attributable to providing back-up capacity. They currently do not. Second, the proposal is consistent with universal service objectives. The prospective rate flexibility the local companies will derive from default capacity [\*178] charges may prevent the dramatic and sudden local rate increases resulting from large-scale bypass while allowing for a more orderly and proactive development of local exchange pricing plans. Third, when implemented in conjunction with cost-based tariffs, this proposal will largely eliminate the prospect of economically inefficient bypass. Special access rate flexibility resulting from the implementation of default capacity charges may be used to counter bypass resulting solely from transitional rate asymmetries. This rate structure will allow prospective facility bypassers to evaluate alternative carrier access choices on a basis more accurately reflecting underlying cost differences. Fourth, the proposal complements the FCC's access plan in that it is perfectly consistent with efficient NTS cost recovery. A prime feature of the proposal is the extended, though by no means indefinite, time horizon it may allow for bringing local company switched access rates into closer alignment with underlying economic costs. Fifth, the

proposal promotes efficient network utilization, since it allows for reciprocal sharing of network capacity between facility bypassers and general ratepayers. The plan thus allows for an externality flow from bypassers to general ratepayers. When facility bypass systems are operational and not on overflow, general ratepayers may overflow onto the idle default capacity during periods of peak utilization which will result in lower call blockage and perhaps avoidance of peak charges. Sixth, competitive alternatives in the carrier access market will ensure these default capacity charges are not administered anti-competitively.

These are just a few of the positive attributes of the default capacity charges as seen from the regulators' perspective. There are certainly additional attributes, both positive and negative, which will undoubtedly be analyzed very carefully by all parties of record in subsequent filings before the FCC, the state public service commissions, and perhaps the Joint Board as well. The proposal for default capacity charges, as outlined in this Article, represents a step forward in providing a viable avenue through which society may realize the full benefits of competition while avoiding the prospectively large and irreversible inefficiencies resulting from transitional rate asymmetries. Most parties should agree that this is the goal. Only time and considerable debate will tell if this is the plan.

### Legal Topics:

For related research and practice materials, see the following legal topics:

Antitrust & Trade Law Industry Regulation Energy & Utilities State Regulation Transportation Law Carrier Duties & Liabilities Rates & Tariffs Communications Law Telephone Services General Overview

### FOOTNOTES:

n1. See G. BROCK, THE TELECOMMUNICATIONS INDUSTRY: THE DYNAMICS OF MARKET STRUCTURE 148-284 (1981).

n2. Basic exchange service is the traditional phone service for residential and small business customers. It generally includes access to the public switched network and flat-rate local calling.

n3. At divestiture approximately 14 per minute of every interstate toll call was a subsidy designed to keep basic residential exchange rates below cost. Similar subsidy flows occurred in the intrastate jurisdiction. See An Economic History of the U.S. Telecommunications Industry to 1985: A Public Choice Perspective: Hearings Before the Joint Select Comm. on Telecommunications, 1984 Wash. Sess. (statement of John T. Wenders); L. JOHNSON, COMPETITION AND CROSS-SUBSIDIZATION IN THE TELEPHONE INDUSTRY (Rand Corp. Publication No. R-2976-RC/NSF) (1982); Kahn & Shew, Current Issues in Telecommunications Regulation: Pricing, 4 YALE J. ON REG. 191 (1987); J. HARING, IMPLICATIONS OF ASYMMETRIC REGULATION FOR COMPETITION POLICY ANALYSIS 1, 6 & n.9 (FCC Office of Plans and Policy Working Paper No. 14, 1984); MacAvoy & Robinson, Winning by Losing: The AT&T Settlement and its Impact on Telecommunications, 1 YALE J. ON REG. 1 (1983); Weisman & Kridel, Competition in U.S. Telecommunications: Rejoinder to the Subsidy Myth, 11 TELECOMM. POL'Y 82 (1987); Wenders & Egan, The Implications of Economic Efficiency for U.S. Telecommunications Policy, 10 TELECOMM. POL'Y 33 (1986).

n4. Telecommunications costs are institutionally divided according to the separations process into non-traffic sensitive (NTS) and traffic sensitive (TS) costs. NTS costs are those generally associated with the provision of local loops, such as poles, conduits, and wire pairs. NTS costs are in essence access related costs because they refer to plant and equipment costs incurred in providing customers with access to the network. TS costs generally refer to local switching and transport costs. TS costs are in essence usage related costs because they refer to plant and equipment required for use on the network (as opposed to access to the network). It is critical to realize that this division of costs between NTS and TS does not parallel the economic classification of costs into fixed and variable. In fact, a large portion of TS costs are fixed.

n5. This situation in the telecommunications industry stands in dramatic contrast to the deregulation of the airline industry which was regulated by a single entity -- the Civil Aeronautics Board. For an analysis of the deregulation of the airline industry, see Levine, *Airline Competition in Deregulated Markets: Theory, Firm Strategy, and Public Policy*, 4 YALE J. ON REG. 393 (1987).

n6. See, e.g., AT&T Communications Tariffs Nos. 1, 9, 10, CC Docket No. 85-203, Memorandum and Order (FCC Mimeo No. 36262, released June 20, 1985).

n7. AT&T has entered the microwave market through a joint license agreement with Digital Microwave Corporation (DMC). Removal of a structural separations requirement between AT&T Communications and AT&T Information Systems allows AT&T to act as a single point of contact for both their customers' carrier access and long distance needs. Finally, AT&T now apparently has the capability to engage in terminating bypass through recent software enhancements to their 4ESS switches. For a description of 4ESS switches, see AT&T BELL LABORATORIES, *ENGINEERING AND OPERATIONS IN THE BELL SYSTEMS* 425-430 (R. Rey ed. 1983). For a comprehensive discussion of the technological viability of terminating bypass, see C. JACKSON, *ASSESSMENT OF THE TECHNOLOGICAL POTENTIAL FOR TERMINATING BYPASS*, (August 1986) (study prepared for Southwestern Bell Co. by Shooshan and Jackson, Inc.).

n8. The carrier of last resort obligation refers to the legal duty of the local phone company to provide exchange service to anyone, on a timely basis, anywhere in their certificated geographic area.

n9. The Modification of Final Judgment (MFJ) restricted the Bell operating companies to the provision of local exchange service and intra-LATA toll services, i.e., the Bell operating companies were restricted from the long distance market with the exception of providing toll service within their LATA boundaries. *United States v. American Tel. & Tel. Co.*, 552 F. Supp. 131 (D.D.C. 1982), *aff'd sub nom.*, *Maryland v. United States*, 460 U.S. 1001 (1983). Notably, while the inter-exchange carriers could provide intraLATA toll services in competition with the Bell operating companies, subject to state public service commission approval, in most cases the Bell operating companies were explicitly precluded from offering interLATA toll services by terms of the MFJ. This delineation was theoretically designed to separate competitive services from the bottleneck monopoly services of the local exchange companies.

n10. See MTS and WATS Market Structure: Establishment of a Joint Board: Amendment, 50 Fed. Reg. 939 (1985).

n11. See Weisman, *Transition to Telecommunications Competition Amid Residual Regulatory Obligations*, 120 PUB. UTIL. FORT., Aug. 6, 1987, at 14; In *Search of Industry Unity On Carrier Access Pricing: A Vision of the Future*, *TELEMATICS*, June 1987; *New England Tel. & Tel. Co. Petition with the FCC for Waiver of Various Sections of Part 69 Rules* (Dec. 3, 1986) (on file with author).

Technically, bypass could have been practiced before divestiture by the Other Common Carriers (OCCs) but the Exchange Network Facilities for Interstate Access (ENFIA) tariffs were set at such modest levels in the pre-divestiture market that there was little economic incentive to do so. In addition, end-to-end bypass, wherein the services of both the local companies and the interexchange carriers are circumvented, has been economically viable for almost three decades. With the exception of reselling opportunities, however, this form of bypass is limited to the very largest telecommunication users with high point-to-point calling volumes.

n12. Universal service refers to the goal of establishing on a nation-wide basis telephone service that is both available and affordable. See AT&T BELL LABORATORIES, *supra* note 7, at 821. This goal was established by Congress in the Communications Act of 1934, Pub. L. No. 73-416, 48 Stat. 1064 (codified at 47 U.S.C. §§ 151-609 (1982)).

n13. For a discussion of this policy, see Egan & Weisman, *The U.S. Telecommunications Industry in Transition*, 10 *TELECOMM. POL'Y* 164, 167-169 (1986).

n14. See BELL COMMUNICATIONS RESEARCH, INC., *THE IMPACT OF ACCESS CHARGES ON BYPASS AND UNIVERSAL TELEPHONE SERVICE*, (1984) (study estimated bypass vulnerability on nationwide basis in 1984 at over \$ 16 per access line per month which is equivalent to several billion dollars annually); UNITED STATES GEN. ACCOUNTING OFFICE, *TELEPHONE COMMUNICATIONS: BYPASS OF THE LOCAL TELEPHONE COMPANIES* (Aug. 1986); G. BROCK, *BYPASS OF THE LOCAL EXCHANGE: A QUANTITATIVE ASSESSMENT* (1984) (FCC Office of Plans and Policy Working Paper No. 12); United States Telephone Association (USTA), *Bypass Study* (Oct. 5, 1984) (filed in response to the FCC Public Notice of Mar. 28, 1984) (on file with author); D. Weisman & D. Kridel, *The Bypass Adoption Rate Study* (presented at the International Symposium on Forecasting, Paris, France, June 1986); Mo. Pub. Serv. Comm'n, Case No. TR-86-84 (Feb. 1986) (testimony of D. Weisman).

n15. Congress, many state public service commissions, and most consumer activist groups opposed the FCC's plan.

n16. See *supra* notes 8 & 12.

n17. The toll-to-local subsidy refers to the practice of cross-subsidization described *supra* at note 3 and accompanying text as imposing excess charges on long distance users to subsidize basic local exchange service.

n18. See A. KAHN, *THE ECONOMICS OF REGULATION* 127-52 (1971); 2 Evans & Heckman, *Multiproduct Cost Function Estimates and Natural Monopoly Tests for the Bell System*, in *BREAKING UP BELL: ESSAYS ON INDUSTRIAL ORGANIZATION AND REGULATION* 253 (D. Evans ed. 1983).

n19. See J. HARING, *supra* note 3, at 4.

n20. Fowler, Halprin & Schlichting, "Back to the Future": A Model for Telecommunications, 38 *FED. COMM. L.J.* 145 (1986).

n21. The observation that such responsibilities might well handicap the incumbent firm in competing effectively in the market was first made by Alfred Kahn. A. KAHN, *supra* note 18, at 238. The following passage is enlightening:

It is this problem that is the most troublesome aspect of the MCI case and others like it. If such ventures are economically feasible only on the assumption that when they break down or become congested subscribers may simply shift over to the Bell System for the duration of the emergency, they are indeed supplying an only partial service. If the common carrier is obliged to stand ready to serve and must carry the burden of excess capacity required to meet that obligation, it would seem that the average total costs would necessarily be higher than those of a private shipper or cream-skimming competitor who has no such obligation: the latter can construct capacity merely sufficient for operation at 100 percent load factors, with the expectation that it or its customers can turn to the common carriers in case of need. *Id.*

n22. The inequity of this process should be clear. It is similar to requiring one grocery store chain to bear the entire cost of maintaining and implementing the Federal Food Stamp Program. The results are predictable: over time customers will leave the grocery store chain bearing

the cost of the food stamp program and migrate to another grocery store chain not likewise constrained. The market outcome, of course, need have nothing to do with the underlying efficiencies of grocery provision.

n23. The economic inefficiencies inherent in asymmetric regulation are the subject of the article by J. HARING, *supra* note 3.

n24. See Fowler, Halprin & Schilcting, *supra* note 20, at 180.

n25. The Egan-Weisman-Wenders debate on this issue relates to the efficiency of the transition path in telecommunications markets. See Egan & Weisman, *supra* note 13; Wenders, *Throttling Competition*, 10 TELECOMM. POL'Y 177 (1986); Weisman & Egan, *Throttling Competition: A Reply*, 10 TELECOMM. POL'Y 271 (1986).

n26. A PBX is a switching device, similar to the local company's central office, which is capable of switching voice and data communication between employees in a single firm, tenants in a building, or in other contiguous areas such as an office park or campus.

n27. It should be noted that this cost recovery issue is exacerbated by the local companies' capital reserve deficiency problems, which result from unrealistically slow depreciation schedules that were set in a precompetitive era and were, therefore, never designed to recover capital costs in a competitive market.

n28. It may be asked why default capacity charges should be levied against facility bypassers (using private facilities) and not against service bypassers (using special access lines owned by the local company and leased by the IXC). There are both network-engineering and institutional justifications for this arrangement. A service bypasser will utilize switched access facilities to serve traffic requirements when special access circuits fail. In this case, aggregate network capacity will not necessarily change; it may only be the form in which that capacity is accessed (special access to switched access) that has changed. This occurs because switched access and special access share multiple common facilities. See AT&T BELL LABORATORIES, *supra* note 7, at 91. In fact, as technology moves in the direction of virtual private lines, the distinction between switched access and service bypass should become increasingly blurred. From an institutional perspective, the local company may have an obligation to provide back-up in the event that its own special access equipment goes down, but why should it provide uncompensated back-up in the event some competitor's equipment fails? It would be analogous to requiring Ford Motor Company to provide free loaner cars to General Motors customers whose cars have broken down. This would not be a natural outcome in a competitive market.

n29. For seminal works on the theory of option value, see Kahn, *The Tyranny of Small Business Decisions: Market Failure, Imperfections, and the Limits of Economics*, 19 KYKLOS 23 (1966); Weisbrod, *Collective-Consumption Services of Individual-Consumption Goods*, 78 Q.J. ECON. 471 (1964). Kahn discusses option value in terms of market failure. A train running from New York City to Ithaca, New York terminates service because it cannot cover costs, yet this train is the only mode of transportation during inclement weather. Kahn maintains that prospective train passengers would have been willing to compensate the train line for maintaining service to Ithaca whether or not they ever rode the train. Market failure occurred in that no mechanisms were in place for extracting option payments from prospective train passengers. Additional examples of option demand include fire protection services and precautionary cash balances. The option value on the liquidity of precautionary cash balances is equal to (at least) the interest income forgone on these cash balances.

n30. Professor Lester Taylor of the University of Arizona has suggested that it may be possible for the local companies to negotiate with bypassers for the provision of default capacity on mutually agreeable terms outside the regulatory environment.

n31. I am indebted to Alfred Kahn for pointing out the importance of this distinction to me and for providing an extremely lucid and insightful analysis of the critical economic issues.

As a pricing matter, if the local telecommunications company is subject to a carrier of last resort obligation, then, in a perfectly logical world, default capacity tariffs would be mandatory for all bypassers regardless of whether the bypasser had built redundancy into its bypass system. The reason for such mandatory tariffs is straightforward -- the application of the carrier of last resort obligation is independent of the existence of private redundancy. Thus, private redundancy does not eliminate the possibility that the bypasser will use the public switched network; it only reduces the likelihood of such use (and the tariffs could be priced accordingly). However, in actuality, regulators will set tariffs that reflect equity as well as economic efficiency.

n32. A local exchange franchise can reasonably be characterized as a government decree. For an interesting discussion of the right to serve versus the right to be served, see Goldberg, Regulation and Administered Contracts, 7 BELL J. ECON. & MGMT. SCI. 426 (1976). With respect to the argument that the local companies should have foreseen competitive entry and adjusted accordingly, note that the depreciation schedules that the local companies operate under require virtually infinite foresight with regard to the risk associated with capital deployment.

n33. For an interesting analysis of a similar issue as it relates to the electric power industry, see Kahn, Who Should Pay for Power Plant Duds?, Wall St. J., Aug. 18, 1985, at 26, col. 3.

n34. Metropolitan area bypass refers to the point-to-point or point-to-multi-point transmission of telecommunications traffic within exchange boundaries using private facilities that circumvent the services of the local exchange companies.

n35. The telecommunications dimensions of STS generally involve the resale of local service in an office or campus environment by a third party utilizing a PBX in combination with local exchange company trunks. See supra note 26 and infra notes 68-73 and accompanying text.

n36. End-to-end bypass refers to the point-to-point or point-to-multi-point transmission of telecommunications traffic across exchange boundaries using private facilities that circumvent the services of the local exchange companies and frequently the local interexchange carriers. See supra p.154 and supra Figure 1.

n37. See Net Gain: Firm Finds Multimillion Dollar Solution, COMPUTER WORLD, Aug. 12, 1985, at 10; McDonnell Rings Up a Money Saver, St. Louis Globe-Democrat, July 31, 1985, at 6c.

n38. Recovery of the costs of the network capacity by usage-sensitive charges results in a cross-subsidy from general ratepayers to bypassers.

n39. The rate of return on this plant is determined by the jurisdictional distribution of actual usage through the separation process.

n40. Note once again the importance of making the distinction between sunk and incremental back-up costs. McDonnell's default capacity requirements will likely be provisioned out of existing capacity which represents a problem of sunk cost recovery. The maintenance of this existing capacity for their default use is a matter of incremental costs.

n41. See Newsfront, DATA COMM., Feb. 1985, at 50.

n42. See COMMON CARRIER BUREAU, FCC, THIRD REPORT ON BYPASS OF THE PUBLIC SWITCHED NETWORK (May 26, 1987).

n43. P. HUBER, THE GEODESIC NETWORK: 1987 REPORT ON COMPETITION IN THE TELEPHONE INDUSTRY (June 1987) (published by Antitrust Div., U.S. Dep't of Justice) Table L-23 (following page 2-23).

n44. Lester Taylor has begun some innovative and path breaking research in this area. See L. Taylor, On Marginal Cost and Marginal-Cost Pricing (Jan. 1987) (unpublished manuscript) (on file with author).

n45. This is a perfectly reasonable interpretation given that the plant necessary to increase capacity for a given customer exists, at least in the ground, and is earning a prescribed rate of return, whether or not the customer is actually being billed for the maximum number of trunks this plant can serve. Thus, for the most part, the customer's demand for capacity is truly variable. The facility bypasser's default capacity requirement will probably be defined in terms of so many Hundred Call Seconds (CCS) per unit of time which translates into so many dedicated circuits and hence definitive NTS and TS cost levels.

n46. Insurance premiums, in general, are based upon the probability of loss and the monetary value of the loss that must be compensated in the event the loss occurs. F. KNIGHT, RISK, UNCERTAINTY AND PROFIT 247 (1971).

n47. For example, quality of service can be characterized in terms of blocking probability, which is the probability of encountering a situation where a call cannot be completed because all circuits are busy. See AT&T BELL LABORATORIES, supra note 7, at 149. Default capacity costs will assume one level if blocking probabilities are  $P=.1$  and quite higher levels if blocking probabilities are  $P=.01$ . It may be appropriate to offer default capacity customers varying levels of service quality. Along similar lines, transponder capacity on satellites may be purchased on a protected, unprotected or preemptible basis. The rates vary widely across these three types of service. See Nelson, Satellite Appraisals, TELECOMMUNICATIONS, June 1986, at 53.

n48. The local companies use emergency microwave restoration equipment today in the event a central office facility fails.

n49. Note that there are some rather interesting game-theoretic dimensions to this result. Specifically, the prospective facility bypasser may have an economic incentive to differentiate the type of system it selects from the most common form employed in the serving area. See Weisman, Tobin on Keynes: A Suggested Interpretation, 6 J. POST-KEYNESIAN ECON. 411 (1984), for a discussion of the informational requirements necessary to affect an optimal economic choice in the presence of this type of simultaneous decision making.

n50. I benefited from helpful discussions with Dr. Donald Kridel of the Southwestern Bell Tel. Co. on this point.

n51. Knowledge of the various bypass technologies employed would provide the local companies with the ability to assess the degree of system failure independence.

n52. This function can be performed in all central offices equipped with stored program control switches that allow for line usage monitoring.

n53. There is a common misconception among many industry observers that solving the NTS cost recovery problem is synonymous with solving the bypass problem. This is false. A large proportion of Southwestern Bell's business access minutes remain vulnerable to bypass on the traffic sensitive switched access rate elements alone. Similar results no doubt hold for other local companies. This scenario arises because in many cases the marginal cost per access minute lies far below average traffic sensitive revenue requirements. For example, the average traffic sensitive rate is approximately two and one half to three cents per minute while the incremental cost is approximately one cent per minute on a statewide average basis. See Development of Intrastate Access Charges: Hearings on Cause No. 28309 Before the Corp. Comm'n of the State of Oklahoma, (Apr. 1986) (testimony of Gary L. Mann).

n54. While ku band satellite technology is probably not yet cost-effective for voice traffic alone, it is more than capable of handling a firm's critical data transmission requirement. See C. JACKSON, LONG HAUL BYPASS TECHNOLOGY AND COSTS (1985) (Study Prepared for Southwestern Bell Telephone Company by Shooshan & Jackson, Inc.); K-Mart Picks GTE for Satellite Net, COMM. WEEK, June 16, 1986, at 24.

n55. See supra p. 164 and supra Figure 3.

n56. These pricing issues should be analyzed very carefully from both an economic and political perspective. The above discussion is offered merely to stimulate further thought on these pricing issues and certainly not to provide a definitive map as to what level these rates should or should not be.

n57. On December 20, 1985, Southwestern Bell filed alternative local transport rates with the FCC, citing recent studies that showed large revenue vulnerability to so called POP Proliferation. In rather strongly worded language, the Common Carrier Bureau argued, incorrectly I believe, that to the extent this type of bypass was occurring, it was economic bypass and, hence, in the public interest. The Common Carrier Bureau's argument is valid, of course, if, and only if, local transport rates are set at true marginal cost. Generally they are not. See In re Southwestern Bell Telephone Co., Revision to Tariff, F.C.C. Transmittal No. 1330 (Feb. 14, 1986).

n58. See W. BAUMOL, ECONOMIC THEORY AND OPERATIONS ANALYSIS 173 (1977); Bailey, Peak-Load Pricing Under Regulatory Constraint, 80 J. POL. ECON., 662 (1972); Wenders, Peak Load Pricing in the Electric Utility Industry, 7 BELL J. ECON. & MGMT. SCI. 232 (1976).

n59. This assumes that at least some bypassers are subscribing to preemptible default capacity which entails the right to interrupt or preempt residual ratepayers on demand. Analogously, suppose we initially have a four lane highway engineered for a 40 mile per hour average rate of speed during peak periods. A fifth lane is built to provide buses and taxis with secondary routes when their primary routes are unavailable. When this fifth lane is in use by buses and taxis, general commuters may not use this lane, but if this lane is not in use, then general commuters may use all five lanes. Since the use of all five lanes will increase the average rate of speed during the peak period above 40 miles per hour, general commuters realize an externality from the availability of the fifth lane. In addition, general commuters may realize an externality in terms of higher average rates of speed on the original four lanes of the highway when taxis and buses initially vacate the original four lanes in favor of their primary routes.

n60. See *In re Laclede Gas Co., Mo. Pub. Serv. Comm'n*, Case No. GR-84-161 (April 16, 1984). A heatpump is a device which provides space heating by using electrical energy to power a motor driven pump which extracts heat from the lower temperature outside air. At temperatures above about 35 degrees Fahrenheit it is more economical to provide space heating by utilizing the electrically powered heat pump than by combusting natural gas. At lower temperatures the economic incentives reverse and the heat pump is turned off and gas consumed instead. As a result the heat pump/gas furnace combination exhibits gas demand only at low temperatures where the entire delivery system is being subjected to maximum demand.

n61. *Id.* However, imposition of the heat pump surcharge was overruled by the Missouri State Appeals Court in *Marco Sales, Inc. v. Public Serv. Comm'n*, 685 S.W.2d 216 (Mo. Ct. App. 1984). Reversal was based on the limited grounds that there had been insufficient evidence to determine that 34 degrees Fahrenheit was a reasonable estimate of the temperature at which heat pump users switched to natural gas.

n62. See *In re Laclede Gas Co., Mo. Pub. Serv. Comm'n*, Case No. GR-82-158 (Jan. 15, 1982) (statement of Robert M. Davis).

n63. See Lambert, *Bypass in the Natural Gas Industry: The Fruit of Regulatory Change*, PUB. UTIL. FORT., Apr. 3, 1986, at 12.

n64. *Id.* at 17.

n65. Cogeneration is defined as the simultaneous or sequential production of power and useful thermal energy from one fuel at a single site. In an effort to promote cogeneration, the Public Utility Regulatory Policies Act of 1978 (PURPA), Pub. L. No. 95-617, 92 Stat. 3117 (codified at 16 U.S.C. §§ 2601-2708 (1982)) was signed into law. PURPA mandated, among other things, that utilities purchase electric energy and capacity made available from qualifying cogeneration and small power production facilities at just and reasonable rates while being required to provide stand-by and back-up service to these facilities at nondiscriminatory rates. In assessing what amounts to default capacity charges for this latter service, utilities generally have been allowed to set charges under the assumption that outages will occur during the system peak. See also Paul, *Cogeneration, After Slow Start, Quickly Coming of Age*, Wall St. J., Mar. 2, 1987, at 6, col. 1.

n66. See *Electric Utility Forum: Competition*, PUB. UTIL. FORT., May 28, 1987, at 70. For example, in California, Southern California Edison has proposed that stand-by users of electric power pay considerably higher rates per kilowatt hour than general rate-payers.

n67. See *Trends and Topics: Standby Service Options and Rates*, PUB. UTIL. FORT., Sept. 3, 1987, at 42.

n68. For example, on May 11, 1984 Southwestern Bell Telephone Company filed a petition with the Missouri Public Service Commission for an investigation of provision of local exchange telephone service by entities other than certified telephone corporations, including entities who may resell local exchange telephone service. See Order Denying Motions and Applications for Rehearing, Mo. Pub. Serv. Comm'n., Case No. TC-84-233. (Jan. 27, 1986); Report and Order, Mo. Pub. Serv. Comm'n., Case No. TC-84-233 (Sept. 23, 1985) (testimony of Dennis L. Weisman); Mo. Pub. Serv. Comm'n., Case No. TO-86-53. (Nov. 1986, Jan. 1987, June 1987) (testimony of Charles B. Blumenkamp).

n69. Report and Order, In re Investigation of the Provision of Local Exchange Telephone Service by Entities Other than Certificated Telephone Corporations, Including Entities Who May Resell Local Exchange Telephone Service, Mo. Pub. Serv. Comm'n, Case No. TC-84-233 (Sept. 23, 1985).

n70. See Order Denying Motion and Application for Rehearing, Mo. Pub. Serv. Comm'n, Case No. TC-84-233 (Jan. 27, 1986).

n71. See Mo. Pub. Serv. Comm'n, Case No. TO-86-53, established by commission order to develop permanent tariffs for the provision of STS in Missouri.

n72. Southwestern Bell contended in opposition that the commission had correctly decided the carrier of last resort issue in the first STS case. Specifically, the commission had recognized that imposing residual regulatory obligations on Southwestern Bell in the face of open competition was itself anticompetitive. Southwestern Bell should not be required to provide stand-by facilities to serve tenants in an STS building in case the STS provider should liquidate the operation or otherwise cease to serve the tenants. It remains Southwestern Bell's policy in this case that it should not be required to serve as the carrier of last resort without due compensation. General ratepayers should not be asked to subsidize the STS providers' financial ventures by paying for plant and equipment which is deployed in a stand-by mode with little or no prospect for revenue generation. The order in this case is pending.

n73. Report and Order of the State of Vt. Pub. Serv. Bd. in Docket No. 4946, at 51 (Feb. 21, 1986).