AN ECONOMIC FRAMEWORK FOR ESTIMATING STRANDED COSTS AND IMPLEMENTING A SYSTEM OF RECOVERY THROUGH COMPETITIVE TRANSITION CHARGES

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I. INTRODUCTION

This paper develops an analytical framework for determining the amount of embedded investments that are "stranded" or no longer recoverable as a result of the Telecommunications Act of 1996. Given that implementation of the Act may generate rates for service that are not sufficient to allow full cost recovery, we propose to establish a new set of competitive transition charges. The nature and extent of these charges are explained and then illustrated with estimates of stranded costs for an example local exchange telephone system.

Complete recovery of stranded costs is necessary if franchised utility systems are to operate in the long run so as to replace existing capacity: any one-time regulatory decision to not allow recovery (regulation "opportunism") is followed by corporate decisions to disinvest. Incumbent local exchange carriers make investments to meet regulatory requirements for service, based on the agreement that in turn they have the opportunity to recover the costs, including a competitive return, from such investments. Carriers would not make important investments based on the expectation that their returns would be limited to less than that amount because of a policy of fostering entry of duplicative suppliers. Changing policy, after investments have been made, by fostering entry so as to strand costs, would constitute opportunism; it would not be successful in producing the desired level of investment in competitive markets because future investment would be curtailed.

Under a range of realistic conditions, stranded costs could constitute a significant percentage of the incumbent firm's total cost of doing business. Developing a new method of stranded cost recovery is important because that method can affect the operating performance of the incumbent and other carriers. We propose a *competitive transition charge*, by which an incumbent local carrier would have an opportunity to recover and earn a fair return on its already invested capital. This outcome would enable the carrier to continue to offer existing retail services as well as new wholesale services to competing local exchange carriers, thus ensuring that consumers and other suppliers gain the benefits of competitive markets.

Our paper is organized as follows. Section II provides the economic analysis of stranded costs and the rationale for competitive transition charges. The resulting approach to stranded costs is compared with those used to justify stranded cost recovery in various federal and state proceedings involving the restructuring of the electric and natural gas industries. Section III provides a conceptual framework for estimating transition costs and applies that framework using an example telephone system as a case study. Section IV proposes a method for the recovery of stranded costs through competitive transition charges

and discusses the relationship between that charge and those for funding universal service. Conclusions are presented in Section V.

II. THE ECONOMICS OF STRANDED COSTS

Recent attempts of regulatory agencies to achieve reform in public utility regulation have centered on separating potentially competitive activities of incumbent firms from other "utility" activities. Where there is the potential for competition, these agencies have introduced new policies that allow duplicative entry and reduce the extent of price regulation. In many instances, a new regulatory transition process has provided potential entrants access to the facilities of incumbent suppliers as one way of bringing in additional sources of supply. The terms and conditions of access have been set by these agencies. Frequently, these terms make it impossible for incumbent suppliers to generate revenues sufficient to recover past investment in facilities dedicated to providing all of their public utility services. The unrecoverable portion of such outlays are stranded costs.

The full recovery of these costs is necessary for the incumbent firm to realize "an opportunity to earn a competitive rate of return on invested capital". That "opportunity" is what has been agreed upon between regulatory agency and company, as requisite for making continuous investments, to expand and improve service. That "opportunity" has been diminished by zero probability of recovery of that portion of invested capital. To restore it requires a specific additional charge on consumers to generate cash flow equal to depreciation and return on these costs.

There is widespread agreement that stranded costs have been present in the electric and gas industry.[1] Table One indicates the nature of stranded costs specified in various federal and state regulatory decisions on restructuring and cost recovery in these industries. Table Two summarizes the justifications offered

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[1] See *Recovery of Stranded Costs by Public Utilities and Transmitting Utilities, Notice of Proposed Rulemaking*, 59 Fed. Reg. 35,274, 35,278 (1994) (estimates range from tens of billion of dollars to $200 billion); American Bar Association, ANNUAL REPORT, Section of Public Utility Communications and Transportation Law 188 (estimate of $300 billion). See generally Doane, Michael J. and Williams, Michael A. (1995), *Competitive Entry into Regulated Monopoly Services and the Resulting Problem of Stranded Costs*, HUME PAPERS ON PUBLIC POLICY, Volume 3. No. 3, pp. 32-53; Baumol, William, Joskow, Paul and Kahn, Alfred. (1994), *The Challenge for Federal and State Regulators: Transition from Regulation to Efficient Competition in Electric Power*, Appendix A of the Comments of the Edison Electric Institute in Response to FERC, Notice of Proposed Rulemaking on Recovery of Stranded Costs by Public Utilities and Transmitting Utilities, Docket No. RM94-7-000; and Baumol, William, and Sidak, J. Gregory (1995) *Stranded Costs*, HARVARD JOURNAL OF LAW AND PUBLIC POLICY, Volume 18, No. 3, pp. 835-849.

by regulators for allowing recovering of stranded costs. In the electric industry, as a result of new customer access to alternative generation sources, incumbent utilities have not been able to recover sunk costs of investments in nuclear power plants and other investments made specifically to provide service to suppliers or customers who now have competitive options.

Although few cases have reached ultimate disposition the current rationale for stranded cost recovery offered by regulators have centered on dispute resolution and fairness, rather than on making certain that the defined level of stranded costs can ultimately be recovered. That is, there has been no systemic argument for any level of allowed recovery in the decisions. In natural gas, as a result of regulatory agencies allowing customers to purchase gas directly from producers, incumbent pipelines have not been able to recover the full costs of the long-term gas contracts integral to their previous utility service. Recovery here has been defined as the difference between (1) revenues that would have recovered the incumbent's actual (embedded) costs and (2) market determined revenues remaining to the incumbent after the previous utility service has been eliminated. What is not clear in the ongoing proceedings in gas and electric regulation is whether full stranded costs are going to be collected in specific transition charges. J. Philips Jordon and Joel De Jesus take the position that regulators have "finessed the issue of stranded cost recovery" by accepting the principle of stranded costs but then determining the percentage that will be recovered to vary from case to case on "equitable and practical grounds."[2] The position taken here is that there is a correct method for determining the level of stranded costs, and that a charge or tax for a limited period should be levied to collect the full amount. To do so would be to establish consistency from case to case not found in past and current decisions in the electric and gas industries.

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[2] Jordon, Philips J. and De Jesus, Joel, *Stranded Costs on Old Shores*, LEGAL TIMES, Volume XIX, No. 40 Reprint, p. 3.

TABLE ONE
DEFINITION OF TRANSITION COST ADOPTED BY STATE AND FEDERAL REGULATORY AGENCIES

Agency	Source	Summary
California	CPUC, Decision 95-063 (12/20/95) as modified by D.96-01-009 (1/10/96)	"For a particular utility, its transition costs are the net above-market costs associated with its assets, both economic and uneconomic." [p. 114] Three primary sources of transition costs are: (1) uneconomic utility generating assets (nuclear and other non-nuclear); (2) existing power purchase obligations (QF contracts and wholesale contracts); and (3) regulatory obligations. [p.125]
Maine	MPUC, Draft Plan – Docket No. 95-462 (7/19/96)	"Certain costs and obligations incurred by utilities to fulfill their legal obligation to provide electricity service are potentially unrecoverable, or stranded, when Maine's electric generation markets are opened to retain competition. these costs and obligations fall into two general categories: (1) above market fixed costs associated with utility-owned generation plants; and (2) above market costs associated with generation-related contracts, most notably purchased power contracts with QFs." [p.31]
New York	NYPSC, Opinion No. 96-12 (5/20/96) – Case 94-E-0952, et al.	"Strandable costs are those costs incurred by utilities that may become unrecoverable during the transition from regulation to a competitive market for electricity." [p. 46]
Texas	Texas PUC Web Page "Texas PUC Staff Releases Stranded Electric Investment Draft"	". . . the calculation of costs that electric utilities incurred under regulation that might not be recovered if competition were introduced to Texas. To estimate these 'stranded costs. . . .' " [p. 1, par. 1]
FERC	FERC Order No. 636 (4/8/92)	". . . stranded costs, are costs now incurred by pipelines in connection with their bundled sales services that cannot be directly allocated to customers of the unbundled services." [p. 198]
FERC	FERC Order No. 636-A (8/3/92)	"Costs that are now incurred in connection with bundled sales service that cannot be directly assigned to customers of unbundled services, called 'stranded costs.' " [p. 336]
FERC	FERC Order No. 888 (4/24/96)	". . . if customers leave their utilities generation systems without paying a share of these [legitimate, prudent and verifiable stranded] costs, the costs will become stranded unless they can be recovered from other customers." [p. 457]

TABLE TWO
STATE AND FEDERAL AGENCIES REASONS FOR
TRANSITION COST RECOVERY

Agency	Source	Summary
California	CPUC, Decision 95-12-063 (12/20/95) as modified by D.96-01-009 (1/10/96)	"To ensure the continued financial integrity of the utilities, and give them an opportunity to be vital market participants in the restructured market following the transition, we will allow them to recover completely costs associated with contracts for power and prior regulatory commitments, called regulatory assets." [p. 111]
California	"CPUC Approves PG&E Interim Competitive Transition Charge" *CPUC News* (11/26/96)	"Current electric rates, in part, reimburse utilities for their costs of building power plants and buying electricity from other utilities and IPPs to serve their customers. ... To ensure utilities recover these costs during the transition to a competitive electric industry, all utility customers on and after 12/20/95 . . . will pay a competitive transition charge (CTC) until 2002." [p. 1,][2]
California	"CPUC Approves Electric Utility Cost Recovery Plans ..." *CPUC News* (12/9/96)	". . . the CPUC today approved PG&E, SCE, and SDG&E plans to recover costs that become uneconomic in a competitive market. . . . The Commission approved these expenses as being reasonable and they are being recovered in current rates.
Maine	MPUC, Draft Plan- Docket No. 95-462 (7/19/96)	"Electric utilities should have a reasonable opportunity to recover legitimate and verifiable costs incurred or associated with obligations incurred prior to March 1995 which may be stranded as a result of industry restructuring." [p.33]
Mass.	MDPU, D.P.U. 96-100	"In D.P.U. 95-30, at 29-31, the Department stated that electric companies should have a reasonable opportunity to recover net, non-mitigable stranded costs." [p.50]
New York	NYPSC, Opinion No. 96-12 (5/20/96)- Case 94-E-0952 et al.	"The recommended decision found that, while a generic decision can address certain aspects of the strandable cost issue, the calculation, the amount to be recovered from ratepayers, and the timing of recovery should be left to individual rate cases or utility specific proceedings that should begin in 1996." [p.46]
FERC	FERC Order No. 636 (4/8/92)	Stranded costs . . . should be treated like all other prudently incurred costs, and the pipeline should file to recover such costs in a general rate filing under NGA Section 4." [p.198]
FERC	FERC Order No. 636-A (8/3/92)	"The Commission recognized in Order No. 636 that pipelines may incur certain transition costs as a direct result of implementing the requirements of that order. . . . stranded cost . . . [should] be included for recovery in a general rate case under section 4 of the NGA." [p.336]
FERC	FERC Order No. 888 (4/24/96)	". . . we continue to believe that utilities entered into contracts to make wholesale requirement s sales under an entirely different regulatory regime should have an opportunity to recover stranded costs that occur as a result of customer leaving the utilities' generation systems through Commission-jurisdiction open access tariffs or FPA section 211 orders in on order to reach other power suppliers." [p.465]

The Telecommunications Act of 1996 has the potential to create stranded costs as new carriers enter local exchange markets, based on responses to a number of real and artificial incentives. That is, entry could occur because the new carrier has an opportunity to charge unregulated prices or has lower costs because various incumbent burdens, such as supplier-of-last-resort obligations, have been placed only on existing carriers.[3] Either inducement, when taken, leaves the incumbent with a smaller market for its services, either because of less demand or lower prices. Cost recovery is reduced by the loss in present value of future expected earnings accruing to the incumbent, given its loss of revenues in the marketplace after entry. Reductions also take place when the regulated prices at which entrants can take wholesale services and unbundled network elements from the incumbent are not sufficient to make up for lost contributions in current retail rates. That is, stranded costs are caused not only by the loss of markets to new sources of supply but also by implicit subsidies to those new source in the prices charged for shared network elements.

The Economic Framework for Determining Stranded Costs

In equilibrium, the regulatory process holds the total revenues of the franchised utility down to a level equal to operating and capital costs generated from service offerings. Revenues are generated by prices approved by the regulator. The basic agreement on this process is that the incumbent carrier undertakes an obligation to serve customers in its franchise region, on conditions set by the regulator, in exchange for the opportunity to recover and earn a fair return on prudent investments.[4] That follows from the regulated company being certified to provide exclusive service in a given area with the justification that a

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[3] Incumbent burdens are costs borne by incumbent firms that are not borne by new entrants. Incumbent burdens can be thought of as the converse of entry barriers. See MacAvoy, Paul W., Spulber, Daniel F., and Stangle, Bruce E. (1989), *Is Competitive Entry Free?: Bypass and Partial Competition in Natural Gas Markets*, YALE JOURNAL ON REGULATION.

[4] This characterization of general polices and practices of regulatory commissions has been documented in textbooks on regulation, judicial decisions, and articles in scholarly economic and legal journals. See, for example, MacAvoy, Paul W. (1979), THE REGULATED INDUSTRIES AND THE ECONOMY, New York, NY: W.W. Norton & Company; Philips, C. (1993), THE REGULATION OF PUBLIC UTILITIES, Arlington, VA: Public Utilities Reports, Inc. Chapter Nine; Kahn, Alfred (1970), THE ECONOMICS OF REGULATION: PRINCIPLES AND INSTITUTIONS, New York, NY: John Wiley; Spulber, Daniel F. (1989), REGULATION AND MARKETS, Cambridge, MA: MIT Press; Goldberg, Victor, P. (1976), *Regulation and Administered Contracts*, BELL JOURNAL OF ECONOMICS, vol. 7, pp. 426-448; and Laffont, Jean-Jacques and Tirole, Jean (1993), A THEORY OF INCENTIVES IN PROCUREMENT AND REGULATION, pp. 53-127.

single source of supply can provide service at a lower total cost than could two or more suppliers. In acquiring exclusive rights, the regulated company gives up its discretion as to whom to serve and at what prices. Instead, regulatory agencies require franchised carriers to provide services they would otherwise not undertake, e.g., to provide rural services at the same prices as urban services when costs of rural services are higher. In return there is agreement that the franchised carrier has the *opportunity* to recover and earn a competitive return on its investments, including those made to carry out the obligation to serve.[5] For this condition to hold – service for all comers in exchange for the opportunity to earn the market return – the incumbent carrier has to be allowed the opportunity to earn revenues in excess of its operating costs by an amount that equals depreciation expense plus the competitive return on the remaining book value of its investment. The firm's "revenue requirement" can be expressed as:

$$[1] \qquad R_t = c_t + d_t + r_t B_t / (1 - t_t)$$

where:

R_t = revenue in period t;
c_t = operating costs in period t;
d_t = depreciation expense in period t;
r_t = allowed rate of return in year t;
B_t = ratebase (undepreciated capital investment) in period t; and
t_t = tax rate in period t.

Defining the regulated firm's earnings in period t ("V_t"), as revenues minus operating costs (after taxes), we have

$$[2] \qquad V_t = [(r_t B_t /(1 - t_t))(1 - t_t) + d_t + c_t] - c_t$$
$$= rB_t + d_t.$$

By setting the allowed rate of return on capital "r" equal to the firm's opportunity cost of capital "i," the regulator determines an equilibrium in which the present

[5] In many jurisdictions, a utility may not have an exclusive franchise. However, this does not imply an absence on entry controls that permit cost recovery.

value of future expected earnings in each time period is equal to the ratebase in that period.[6] In other words,

$$[3] \qquad PV_t = \sum_{\tau=t}^{T} \frac{rB_\tau + d_\tau}{(1+r)^{\tau-t+1}} = B_t, \quad t = 1, 2, \ldots, T.$$

where $B_{t+1} = B_t - d_t$. Stated simply, under equilibrium in regulation the incumbent utility is compensated for its asset purchases as long as a competitive rate of return is allowed on the book value of these assets.[7]

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[6] Greenwald, Bruce (1984), *Rate Base Selection and The Structure of Regulation*, RAND JOURNAL OF ECONOMICS, vol. 15, pp. 85-95.

[7] The proof is as follows.

Define $PV_t = \sum_{\tau=t}^{T} \frac{rB_\tau + d_\tau}{(1+r)^{\tau-t+1}}$, where $B_{t+1} = B_t - d_t$.

Theorem: For $t = 1, 2, \ldots, T$ it is true that $PV_t = B_t$.

Proof: by induction. The theorem is true trivially for period T. Take as the induction hypothesis that $PV_{t+1} = B_{t+1}$. Then

$$PV_t = \frac{rB_t + d_t}{1+r} + \frac{1}{1+r}\left\{\frac{rB_{t+1} + d_{t+1}}{1+r} + \frac{rB_{t+2} + d_{t+2}}{(1+r)^2} + \ldots\right\}$$

$$= \frac{rB_t + d_t}{1+r} + \frac{1}{1+r} PV_{t+1}$$

$$= \frac{rB_t + d_t}{1+r} + \frac{B_{t+1}}{1+r}$$

from the induction hypothesis. Using $B_{t+1} = B_t - d_t$ we obtain:

$$PV_t = \frac{rB_t + d_t + B_t - d_t}{1+r} = B_t.$$

Note that this result holds for any depreciation schedule $d_1, d_2, \ldots$. See Schmalensee, Richard (1989), *An Expository Note on Depreciation and Profitability Under Rate of Return Regulation*, JOURNAL OF REGULATORY ECONOMICS, vol. 1, pp. 293-298, and Greenwald, Bruce (1984), *Rate Base Selection and The Structure of Regulation*, RAND JOURNAL OF ECONOMICS, vol. 15, pp. 85-95.

As a matter of course, the utility is seldom in exact equilibrium. Its realized rate of return differs from the allowed rate of return as a result of changes in cost and demand, as well as other exogenous events. The regulatory process does not promise to make up every difference. But the regulated firm that has the *opportunity* of earning its competitive return on capital, and can forecast the expected result (i.e., the most likely result under a range of possible outcomes), will make the level of investment sufficient to supply service at regulated (full cost) prices. Resources will be used efficiently in the long run, given that expected market conditions are in fact realized.

The Concept of Stranded Cost

The introduction of competition reduces incumbent firm earnings as market share and prices are reduced. In that process the opportunity for cost recovery is eliminated because the discounted present value of future earnings falls below the remaining value of the ratebase. This is not a random exogenous event of the kind discussed above that contributes to variance of earnings from expected levels, but rather is endogenous to the mixed system of regulation and competitive entry with permanent below-cost levels of revenues. These reductions in the incumbent firm's earnings result in stranded costs equal to $[B_0 - PV(V^C)]$, where B_0 is the ratebase at the introduction of competition and $PV(V^C)$ is the present value of earnings after competitive entry.

Given that the level of stranded cost is prospective, and that the incumbent firm is seeking its remaining unrecovered cost, a process has to be developed that generates a payment to that firm of $[B_0 - PV(V^C)]$. That is, the transition cost payment necessary to maintain the service/revenues equilibrium of regulation equals (1) the present value of the incumbent firm's ratebase with the monopoly intact *minus* (2) the incumbent firm's expected earnings after entry. Beginning with the firm's ratebase, at the start of competition, the lost earnings under competition can be thought of as the "write down" of the ratebase necessary for the firm to earn its cost of capital on a going-forward basis with the new competitive conditions.[8]

The Act will reduce the earnings of incumbent local exchange carriers by opening local phone markets to competition. In addition, implementation of the Act requires that regulators set terms and conditions under which any incumbent local exchange carrier must provide access to its network elements and provide at

[8] Assume that the introduction of competition reduces the incumbent's earnings to less than $r_tB_t + d_t$ in year t, to a level that results in present value earnings of $PV(V^C)$. The defined level of transition costs in year t equals $B_t - PV(V^C)$.

wholesale its existing retail services.[9] These regulated rates may eliminate the possibility of profit from providing such services and generate stranded cost for incumbent local companies.

Since the inception of local phone service, state and federal governments have regulated retail rate structures so as to maintain low basic exchange rates. There are many acknowledged reasons for doing so – to ensure universal service, increase the size of the network, for local political benefit, etc. – but over time, the result has been that a greater percentage of the cost of basic system infrastructure has been recovered in charges for services other than basic local exchange. Long-distance companies have paid access charges (set by state and federal regulators) that have substantially exceeded the cost of providing access and were passed on to customers in full in the prices for long-distance calls. When new "enhanced" services (e.g., call waiting and call forwarding) were developed, they too were priced well above costs in order to provide additional funding to maintain local service prices to residential customers at fixed levels. Business customers located in urban areas where costs of providing service to a subscriber were less, also contributed by paying uniform rates, which in their case were substantially in excess of their costs. Local toll call rates also became a source of subsidy funds as they were set to exceed costs by a wide margin.

A defining characteristic of this method of cross-subsidy of local service has been its implicit nature. Rather than financing the provision of below-cost local services to residential customers by specific taxes on all subscribers, state and federal regulators have allowed high price-cost margins to be put in place on services to less-preferred classes of customers. There are as a result numerous hidden subsidies in the rate structure. This has been possible only because regulation prevented potential entrants from selectively targeting customers who paid higher prices that provided the source of the subsidy funds. The Act, however, reverses this process, since new entrants are allowed to go into any and all service markets in local exchanges and they will have a strong economic incentive to target high-margin customers. When an incumbent carrier loses its high-margin customers, and it cannot maintain low rates to preferred classes of customers, the implicit subsidy is no longer implicit. Indeed no subsidy system is in operation and if rates to those being subsidized remain at previous levels then, for service to continue, revenue flows to investors are reduced. Costs are stranded.

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[9] The unbundled parts of the local network are referred to as loops (i.e., the copper wires that connect customers to switches located in a phone company's "central offices"); switches that route calls between parties; the lines that transport calls between central offices; and other parts of the network necessary to provide local phone services.

It is one of the complexities of regulatory policy that selective entry has led regulatory agencies and incumbent carriers to focus on depreciation rates. Prior to competitive entry, any depreciation schedule yields a ratebase at each instant equal to the present discounted value of the firm's future earnings just so long as prices can be adjusted so that the allowed rate of return equals the cost of capital. The choice of depreciation schedule does not matter. An extended depreciation schedule (e.g., one based on long useful physical lives of assets) could be utilized because the value of the assets could always be recovered. In contrast, after the Act, the onset of competition reduces the firm's future earnings making it impossible to recover such depreciation. This results in "asset impairment" equal to the reduction expected future earnings from those assets. This reduction in the value of the ratebase necessary for the firm to just earn its depreciation and cost of capital equals the "write off" in assets, and is just equal to our defined level of stranded costs.

III. ESTIMATING STRANDED COSTS

We apply this conceptual framework to estimate the level of stranded costs for a representative local exchange telephone company in 1997. For this company, called "Telephone," our approach is based on analysis of cash flows consistent with the definition of stranded costs as equal to $[B_0 - PV(V^C)]$.[10]

The first step in our analysis is to estimate the company's present value of future earnings given the regulatory environment that existed prior to the Act. We estimate revenues based on existing rates and number of switched access lines, and estimates of long-run incremental costs for four service classes consisting of basic local exchange, vertical services, local toll, and switched access. For each service category, we subtract long-run incremental costs from revenues to find the earnings that are the contributions to the recovery of capital investment costs in the ratebase. These earnings are calculated for 1997 and held constant for all future years. To estimate the length of time required to recover the firm's current investments, we divide net book investment by the current depreciation charge. For "Telephone," net book investment equals $971 million and the period in which its allowed depreciation would recover its embedded historical costs equals

[10] "Telephone" is an actual local exchange company in a major state. The data presented in this section are derived from (1) Telephone's ARMIS report filings to the Federal Communications Commission, (2) filings before Telephone's state public utility commission, and (3) Telecom Act arbitration proceedings involving Telephone and competing local exchange carriers. No attempt is made here to withhold the identity of this company. Rather, it remains anonymous, with all actual statistics, in order to focus attention on the estimation process while excluding numerous controversial matters of cost or revenue definition in regulatory proceedings in that state.

approximately eight years at the firm's weighted average cost of capital (9.73 percent).

The second step is to calculate Telephone's present value expected earnings taking into account the effects of competitive entry and the pricing provisions for resale services and unbundled network elements. Telephone's expected earnings are reduced as a result of the Act as follows: (1) it will lose market share to rival local exchange carriers; (2) prices will be reduced by this entry; and (3) prices established in state regulatory agency proceedings for unbundled network elements and resale services will not generate the earnings generated by current retail rates.

The reduction in market shares is the most important of these factors. Estimates of Telephone's market shares given the presence of alternative exchange carriers are derived from forecasts made by market analysts and industry participants. The forecasts converge on a finding that competing local exchange carriers will capture at least thirty percent of local exchange markets within five years. For example, AT&T's CEO, Robert Allen, stated that AT&T alone will capture 33 percent of the local exchange market within a few years.[11] Similarly, AT&T Pacific States President, Mr. Antieri, has said that AT&T will capture 30 percent of Pacific Bell's local exchange market within five years.[12] These estimates are exceeded by a recent survey performed by the Yankee Group which found that "AT&T could capture from 40 to 54 percent of the combined local/long distance markets in each [Regional Bell Operating Company] territory, with MCI and Sprint capturing about 4 to 5 percent each."[13] Morgan Stanley estimates that competing local exchange carriers will capture 25 percent of residential customers and 35 percent of business customers within a ten-year forecast period.[14] As noted by Morgan Stanley, these market share loss assumptions are conservative when compared to the results of a Morgan Stanley consumer survey which shows that competing local exchange carriers will capture 65 percent of the residential market and 56 percent of the business market.[15] Finally, the Chairman and CEO of MCI announced "There's nobody in the world who doesn't believe that MCI, with its marketing and sales strength, can't pick

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[11] J.P. Morgan (July 16, 1996), TELECOMMUNICATIONS REVIEW, p. 36.

[12] *Telecommunications Act of '96: New Players, New Rules, New Ball Game* (April 19, 1996), SAN FRANCISCO BUSINESS TIMES.

[13] The Yankee Group (December 1995), *IXCs versus RBOCs: The Battle of the Century*, p. 3.

[14] Morgan Stanley (September 20, 1995), *Telecommunications Services: The Regional Bell Operating Companies - Let the Games Begin.*

[15] Id.

off 15 percent of any market. We could pick off that much of the shoe market, and we don't even make shoes."[16] Taken together, these estimates justify our assumption that Telephone will lose 15 percent initially, and 40 percent of its market share over five years.

The new carriers will have three alternative entry strategies available, namely to undertake complete facilities-based bypass; to lease unbundled network elements from incumbent carriers; or to buy resale services from incumbent carriers. Predictably, they will select the most profitable of these alternatives. Therefore, we have to examine the discounts off retail rates offered by these three entry paths for serving both residential and business customers to determine which will be most profitable and therefore which will be offered. The discounts obtained by carriers utilizing resale services are 13 percent and 16 percent for residential and business customers, respectively. Alternatively, the discounts obtained from repackaging unbundled network elements are -4.1 percent and 43.7 percent for residential and business customers, respectively.[17] Based on these discounts, we assume the entering carriers will provide service to residential customers by purchasing resale services from Telephone, and that they will provide service to business customers by leasing Telephone's unbundled network elements. We assume conservatively that no entry will be accomplished by facilities-based bypass.

It is only reasonable to expect that when a customer selects the entrant to provide its local service, she also selects that carrier for local toll service. Thus, if the entrant resells basic service or leases unbundled network elements to provide basic service, it also bypasses Telephone's retail local toll service. In this circumstance, Telephone collects more toll access revenues, while losing the contribution from its retail toll services. With respect to interLATA access revenues, Telephone accrues such revenues if entrants utilize resale services, but loses these revenues if entrants lease unbundled network elements or utilize their own facilities.

In Table Three, we present an estimate of stranded costs for Telephone that results solely from loss of market share (i.e., we assume no price reductions subsequent to entry). In this scenario, the present value of Telephone's future earnings after entry falls to $898 million, generating after-tax stranded costs of $73 million, or 8 percent of the current ratebase. (Applying a marginal tax rate of 37 percent, before-tax stranded costs equal $115 million.) In calculating the

[16] *The Washington Post*, March 28, 1994.

[17] The discount obtained from repackaging unbundled network elements for residential service is negative because the unbundled loop rate is based on the average cost of a loop while retail rates for residential service are below-costs.

present value, the assumed discount rate equals the firm's weighted average cost of capital (9.73 percent). This is the appropriate discount rate given the assumption that regulation is fair so the firm's realized rate of return equals its allowed rate of return.[18] (See equation 3.) Note that the market share losses shown in Table Three are not cumulative, e.g., the total market share loss in 1998 is 15 percent, not 30 percent (i.e., 15 percent from 1997 and 15 percent from 1996).

TABLE THREE
ESTIMATES OF STRANDED COSTS FOR TELEPHONE
SCENARIO ONE

Value of Ratebase Prior to Entry	$971 million
less	
Present Value of Future Earnings After Entry	$898 million
equals	
Present Value of Stranded Costs (after taxes)	$73 million
Present Value of Stranded Costs (before taxes)	$115 million

Assumptions:

- Weighted average cost of capital equals 9.73 percent.
- Discounting period is 7.7 years.
- Entry scenario:
  - Resale services for residential customers.
  - Leasing unbundled network elements for business customers.
- Loss of share equals: 15 percent in 1997; 15 percent in 1998; 25 percent in 1999; 30 percent in 2000; 35 percent in 2001; 40 percent in 2002 and thereafter.
- No price reductions.
- Marginal tax rate is 37 percent.

[18] We use the same discount rate in the two present value calculations (i.e., under regulation and under competition). Increased risk in a competitive market may require a higher rate of discount.

Scenario Two is identical to the first with the exception that both Telephone and entering local exchange carriers offer price reductions. We assume that such price reductions would apply to services for which (1) the incumbent carrier's prices exceed its incremental costs and (2) entrants utilize unbundled network elements or facilities-based bypass. If entrants utilize resale services, we conservatively assume that, even if the incumbent carrier's prices exceed its incremental costs, there would be no price reductions because entrants must incur retailing costs that may approximate the wholesale discount. Excluding the possibility of discounts for resale services has the effect, all else equal, of reducing the incumbent carrier's stranded costs.

With these two criteria for determining which services will have price reductions, we find that price reductions will occur for (1) residential local toll, (2) business local exchange, (3) business local toll, and (4) business vertical services. In addition, we assume that price reductions do not cause prices to fall below incremental costs. This has the effect of preventing carriers from being forced by assumed price reductions to offer subsidized, below-cost services.

Finally, we assume that price reductions implemented by alternative local exchange carriers are matched by Telephone. This implies that carriers' market shares are unaffected by price reductions under the assumption that cross elasticities of demand between services offered by different carriers are equal. In other words, if there were two carriers with given market shares prior to a price reduction, they have the same market shares after both carriers reduce prices by the same amount. This result follows from the maintained assumption that the change in the quantity demanded of one carrier's service with respect to a change in the price of another carrier's service is the same for all carriers.

The levels of the assumed price reductions are based on predictions that utilize survey research and standard oligopoly models. Based on survey research, The Yankee Group reports that "over 19 percent of [survey] respondents said they would be likely to switch [local service providers] for the same price. However, over 67 percent said they would switch for service costing 10 to 15 percent less."[19] Using these survey data, we calculate the implied own- and cross-price elasticities facing an incumbent and a competitive local exchange carrier.[20] (We maintain the assumed market demand elasticity of -0.2.)

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[19] The Yankee Group (December 1995), *IXCs versus RBOCs: The Battle of the Century*, pp. i-ii.

[20] The own- and cross-price elasticities are calculated as follows. The first survey result in the Yankee Group report states if the incumbent (firm 1) and entrant (firm 2) charge the same price, the firm demand curves equal:

$$Q_1 = 80.9 = \alpha_1 - \beta P_1 + \delta P_1$$

. Next, using standard oligopoly theory, we determine the equilibrium price reductions implied by the firm demand elasticities. We considered two basic oligopoly models, Cournot and differentiated products Bertrand.[21] The two models yield similar results; we report the results for the differentiated products Bertrand model because it follows directly from Yankee Group survey research. (The Cournot model depends on the market elasticity of demand, but does not explicitly take into account firm own- and cross-price elasticities.) In the differentiated products Bertrand model, firms choose prices to maximize profits, and we determine the percentage reductions in prices for specific services given the pre-entry prices and TSLRICs. This is done by maximizing the firms' profit functions which equal (1) price minus TSLRIC multiplied by (2) the quantity demanded (which depends on the own- and cross-price elasticities).[22]

$$Q_2 = 19.1 = \alpha_2 - \beta P_2 + \delta P_1.$$

The own-price slope parameter in the firm demand curves is denoted β; the cross-price slope parameter is denoted δ; and the intercept terms are denoted α_1 and α_2. (Recall that P_1 equals P_2 in the first survey result.)

The second survey result states that if the entrant lowers its rate by fifteen percent, the firm demand curves become:

$$Q_1 = 32.2 = \alpha_1 - \beta P_1 + 0.85\delta P_2$$

$$Q_2 = 67.8 = \alpha_2 - 0.85\beta P_2 + \delta P_1.$$

(The entrant's price is multiplied by 0.85 to capture the fact that its price has been reduced by 15 percent.)

Given these four equations, we can solve for the four unknowns ($\alpha_1, \alpha_2, \beta$, and δ) in order to calculate the own- and cross-price elasticities. For example, the own-price elasticity for the incumbent equals -4.1 and its cross-price elasticity equals 4.0.

[21] *See, e.g.*, Tirole, Jean (1988), *The Theory of Industrial Organization*, Cambridge, MA: MIT Press; Carlton, Dennis and Perloff, Jeffrey (1994), *Modern Industrial Organization*, New York, NY: Harper Collins; and Shy, Oz (1995), *Industrial Organization: Theory and Applications*, Cambridge, MA: MIT Press.

[22] Given the two firm demand curves, we solve for the equilibrium post-entry prices by maximizing the firms' profit functions:

$$\max_{P_1} (P_1 - C_1) \cdot Q_1(P_1, P_2)$$

By determining the post-entry prices that maximize the incumbent's and entrant's profits, we find that the following percentage price reductions would occur in equilibrium. The price reductions are the same in every year because the product differentiation model depends on the own- and cross-price firm demand elasticities but not on market concentration, e.g., the Herfindahl-Hirschman Index.

TABLE FOUR
EQUILIBRIUM PRICE REDUCTIONS
GIVEN PRICE COMPETITION FOR DIFFERENTIATED SERVICES
(PERCENTAGE)

Basic		Toll		Vertical	
Residential	Business	Residential	Business	Residential	Business
0	1.4	58.1	63.9	0	68.2

The residential basic service price reduction equals zero because that service's retail price falls below its TSLRIC, and the residential vertical service price reduction equals zero because we conservatively assume that entrants utilizing resale services would not reduce retail prices.[23]

Applying the price reductions shown in Table Four yields an estimate of pre-tax stranded costs equal to $151 million, or 16 percent of the ratebase.[24] Thus, the likely price reductions increase after-tax stranded costs by $78 million (i.e., $151 million in Scenario Two minus $73 million in Scenario One).

$$\max_{P_2} (P_2 - C_2) \cdot Q_2 (P_1, P_2).$$

Substituting for Q_1 and Q_2, the first order conditions equal:

$$2\beta P_1 - \delta P_2 = \beta C_1 - \alpha_1$$

$$2\beta P_2 - \delta P_1 = \beta C_2 - \alpha_2.$$

Solving these first order conditions for P_1 and P_2 yields the equilibrium price reductions shown in Table Four.

[23] This is conservative because, all else equal, retail price reductions increase stranded costs.

[24] We also investigated the plausibility of the assumed price reductions shown in Table Four by using a standard differentiated products model. The assumed price reductions imply given values for firm specific demand elasticities and cross-price elasticities that appear reasonable.

TABLE FIVE
ESTIMATES OF STRANDED COSTS
FOR TELEPHONE
SCENARIO TWO

Value of Ratebase Prior to Entry	$971 million
less	
Present Value of Future Earnings After Entry	$820 million
equals	
Present Value of Stranded Costs (after taxes)	$151 million
Present Value of Stranded Costs (before taxes)	$239 million

Assumptions:

- Weighted Average Cost of Capital equals 9.73 percent.
- Discounting period is 7.7 years.
- Entry scenario:
  - Resale services for residential customers
  - Leasing unbundled network elements business customers.
- Loss of share equals: 15 percent in 1997; 15 percent in 1998; 25 percent in 1999; 30 percent in 2000; 35 percent in 2001; 40 percent in 2002 and thereafter.
- Percent price reductions are those reported in Table Four.
- Marginal tax rate is 37 percent

IV. PROPOSED TRANSITION COST RECOVERY MECHANISMS

Ideally, any proposed mechanism for recovery of stranded costs should meet certain criteria for the efficiency of the results, subject to requirements for "fairness" or equity. The mechanism also should not disadvantage any carrier relative to another in competitiveness in the market.

The most efficient mechanism is that reducing consumption the least. Given that mechanism, for "fairness" it should not result in higher rates than those

that would have been obtained without the Act – that is, the Act should not leave any consumers worse off. The second criterion for a "competitively neutral" recovery mechanism is met by a set of choices that does not distort consumer choice of carrier.

The threshold political requirement, superseding efficiency and equity, is that the recovery mechanism not become a permanent tax. All recovery mechanisms that collect compensation for stranded costs if actually put into effect must involve only "transition" payment. When stranded costs are fully recovered, the mechanism vanishes.

There are two alternative funding mechanisms to recover transition costs that at least partially conform to these criteria. The first would levy a charge on the consumer's bill (a consumer line charge) each month. The second would levy that line charge on competitive entrants. These mechanisms need not be mutually exclusive. Indeed, we will show that combining them has the desirable properties of preventing rate increases and preserving competitive neutrality. With respect to competitive neutrality, a customer charge does not affect which local exchange carrier customers select. While the CLEC charge targets certain providers, it ensures that entrants are at least as efficient as the incumbent carrier.

The Mechanics of a Two-Part Recovery Mechanism

We advocate a two-part mechanism that would operate as follows. Each period's stranded costs would be estimated by the process described above, i.e., equal to the change in the incumbent firm's earnings resulting only from implementation of the Telecommunications Act. Revenues and costs for that year would be calculated using the methodology described. Then the reductions in earnings resulting from price reductions would be recovered in consumer line charges. While reductions in earnings resulting from market share losses would be recovered in a line charge on entrants.

More formally, the two-part recovery mechanism would operate as follows. Assuming no increase in consumption from price reductions (for illustrative purposes only), the first part is a monthly charge on all bills that generates revenues equal to the reduction in earnings calculated as $(P_{rt} - P_{et})Q_t$ where P_{rt} equals the retail price but for the Act in period t, P_{et} equals the retail price resulting from entry in period t, and Q_t equals total demand. The second part is the reduction in earnings resulting from market share loss $(P_{e,t} - IC)(Q_t - Q_{et})$, where IC is incremental cost and Q_{et} equals the incumbent firm's sales after entry in period t.

Based on the market conditions in Scenario Two for Telephone, Table Six presents estimates of these two annual charges. They have been estimated on a

pre-tax basis since income taxes would be paid on receipts of these funds. In 1997, for example, the change in pre-tax earnings is $38 million which is comprised of $29 million in foregone earnings resulting from price reductions and $9 million in foregone earnings resulting from market share loss. The resulting line charges on the monthly bills of residential and business customers are $1.26 and $8.26, respectively; the line charges to alternative carriers for their residential and business lines are $2.49 and $16.34 per month, respectively.

The present value of these annual transition costs is also shown in Table Six. On a present value basis, the change in pre-tax earnings is $239 million, of which $155 million would be funded through consumer charges and $84 million would be funded through line charges on alternative local exchange carriers. Since the consumer line charges are assessed only in the case of price reductions, they would not increase rates above the levels that would be in place but for the Act.

It is important to note that payments are made based on charges set annually. Each year there would be estimates made of the incumbent carrier's expected earnings without the Act and of its realized earnings. The difference would equal the amount to be covered by the two line charges. We refer to this mechanism as a "pay-as-you-go" system.

Alternatively these transition cost payments could be implemented based on "up-front" charges on all subscribers. The up-front payment would equal the immediate write-down of the incumbent firm's ratebase due to the reduction in present value expected earnings resulting from competitive entry. In practice, the write-down could be subject to an eventual "true-up" or accuracy adjustment, so that realized earnings-flows equaled those used in calculating the write-down, thus ensuring consumers do not over-compensate the firm for its transition costs.

The two sets of charges are conceptually equal in present value, differing only with respect to the period over which they are levied. The "up-front" approach takes the present value of stranded costs and recovers these costs either in a one-time payment or in a series of annual payments that yield the same present value. This approach requires that accurate projections be made of entrant carrier market shares and of prices for the period over which the ratebase will be depreciated The "pay-as-you-go" system has no such reliance on long-term forecasts since stranded costs are calculated each year as market conditions unfold.

TABLE SIX
COMPETITIVE TRANSITION CHARGE UNDER A TWO-PART RECOVERY MECHANISM

Year	Change in Pre-Tax Earnings ($ millions)			Two-Part Competitive Transition Charge			
				Consumer Line Charge[1] ($/line/month)		CLEC Line Charge[2] ($/line/month)	
	Total	From Price Reductions	From Market Share Loss	Residential	Business	Residential	Business
1997	38	29	9	1.26	8.26	2.49	16.34
1998	38	29	9	1.26	8.26	2.49	16.34
1999	44	29	15	1.26	8.26	2.49	16.34
2000	47	29	17	1.26	8.26	2.49	16.34
2001	50	29	20	1.26	8.26	2.49	16.34
2002	53	29	23	1.26	8.26	2.49	16.34
2003	53	29	23	1.26	8.26	2.49	16.34
2004	37	21	17	0.89	5.86	1.77	11.60
Total Present Value	239	155	84				

Notes:

[1] Recovers transition cost associated with price reductions.

[2] Recovers transition cost associated with market share loss.

The obvious advantage of a pay-as-you-go system is that it reduces reliance on forecasts of competitive market behavior over long time periods. However, depending on its implementation, one might anticipate that the pay-as-you-go approach could reduce incentives for the incumbent to compete vigorously or even operate efficiently: losses in market share and prices are made up in the monthly stranded cost payment, so "why compete." The answer is that incentives are preserved in fact by the charge on all customers to make up price losses. This is because the firm's compensation for market share loss is based on the per-unit contribution it achieves on its actual sales [$P_{e,t}$ - IC], so that any contribution earned on actual sales increases the contribution earned on lost sales. But disincentives can exist from having loss of sales [Q_t - $Q_{e,t}$] made up by the monthly charge on subscribers to services provided by the entrant.

The response is that "pay-as-you-go" cannot operate without imposing transaction costs. The system takes time – earnings stranded in year t are subject to reimbursement of transition costs in the following year (i.e., year t + 1). To examine incentive effects we denote the firm's discount rate (cost of capital) by r, and note that if profits are one dollar in period t, the firm's transition cost reimbursement is reduced to $1/(1 + r)$ dollars the next period. For example, if r equals ten percent, then a $1.00 increase in profit in year t would translate into a reduction in transition cost reimbursement of $0.90 in period $t + 1$. Thus, any activity that would reduce profit in period t with full transition cost recovery would still reduce the value of the firm. Therefore, the incentive to undertake profitable activities is preserved because the system only provides lagged transition cost reimbursement.

There are similar incentive issues with the up-front payment approach due to its "true-up" provision. For simplicity, suppose that the true-up is held five years after the transition cost recovery mechanism is implemented. In year three, for example, the incumbent might not have an incentive to hold market share contemplating that this would result only in an increase in the true-up payment to consumers and alternative local exchange carriers in year five. Such incentives are reduced by the true-up mechanism applying only after the payments are made. If the firm does better than forecast in a given period, it would not have to refund any difference until the true-up takes place later leaving it better of in present value terms. Neither would it get full compensation if it did worse than had been forecast so that waste would reduce the value of the firm. Either way, the firm is given the incentive to compete effectively.

The Relationship Between Line Charges for Stranded Cost Recovery and a Universal Service Fund

Policy recommendations in many states for a Universal Service Fund necessarily affect the magnitude of stranded cost recovery using these mechanisms. Most proposals for a Universal Service Fund have two requirements: (1) subsidies *implicit* in current rates should be made explicit and quantified and (2) they should be replaced by an *explicit*, competitively neutral funding mechanism. All carriers providing service to customers at below-cost rates would be eligible to draw from the fund supported by payments under this mechanism by carriers selling non-subsidized services. Since the funding mechanism would be competitively neutral, consumers' choices regarding competing local exchange carriers would not be influenced.

Since the USF increases the incumbent firm's future cash flows, relevant to cost recovery it reduces transition costs on a dollar-for-dollar basis. This is apparent in the following formula which describes the relationship between the transition costs and the USF:

Transition costs = (sales revenues – total costs) + USF

That is, transition costs represent the deficit in the firm's total costs after it recovers revenues from the USF fund and from sales to retail and wholesale customers.

We can illustrate the extent to which recovery of stranded costs depends on the USF mechanism by considering how those costs would change with a USF for Telephone in Scenario Two. The USF mechanism we consider operates as follows. Telephone's retail rates (including access charges) are rebalanced, with the exception of basic residential service, using an equal percentage mark-up rule. The equal percentage mark-up is obtained by dividing the firm's forward-looking common costs by the sum of the forward-looking incremental costs attributable to individual services.[25] Since the USF mechanism preserves the existing retail rate

[25] This proposal has been advocated by GTE Corporation in state USF proceedings. While the proposal does not take into account explicitly information on demand elasticities, the approach maintains the existing rate for the most inelastic service (basic residential service) and lower rates for more elastic services, e.g., vertical services. Thus, the proposal enhances economic efficiency in relation to the status quo. The analysis could be modified to include other forms of rate rebalancing that take demand elasticities into account, e.g., Ramsey pricing principles. *See* Ramsey, Frank P. (1927), *A Contribution to the Theory of Taxation*, ECONOMIC JOURNAL, vol. 37, pp. 47-61 and Baumol, William and Bradford, David (1970), *Optimal Departures From Marginal Cost Pricing*, AMERICAN ECONOMIC REVIEW, pp. 265-283.

for basic residential service, the USF equals (1) the rate for basic residential service that would be obtained if an equal percentage mark-up were applied to that service's long-run incremental cost *minus* (2) the existing basic residential rate, *multiplied* by (3) the number of basic residential lines. All carriers providing basic residential service would be eligible to draw from the USF.

The rebalancing and establishment of the USF reduces the contributions contained in all other rates. Thus, when entry occurs, Telephone's stranded costs are lower than they would be in the absence of a USF. Table Seven illustrates the effects of adopting a USF that rebalances rates by examining how the establishment of a USF would effect the estimates of stranded costs in Scenario Two. Recall that in Scenario Two universal service is provided through implicit subsidies in retail rates rather than an explicit fund, and Telephone incurs market share losses and competitive price reductions. In Table Seven we refer to this situation as Scenario Two, Case One.

In Case Two, a USF is established that rebalances rates using an equal percentage mark-up of 60 percent. We further assume that resale and UNE rates are those established in arbitration proceedings. In this case, stranded costs equal $112 million, thus the introduction of the USF reduces stranded costs by $127 million (i.e., $239 million minus $112 million). Stranded costs are mitigated because the rate rebalancing reduces the contributions contained in basic business, toll, and vertical services. As a result, market share losses generate lower stranded costs, all else constant.

We also estimate the extent to which the adoption of a USF, combined with a rationale, cost-based pricing structure for wholesale services would further reduce stranded costs. In this example, the resale rate equals the retail rate less Telephone's avoided costs of providing retail service, and the rate for the package of network elements used to replicate retail service equals the long-run incremental costs of the network elements plus the share of common costs allocated to retail service. Under this wholesale pricing structure, Telephone's contributions to common costs are maintained when it sells retail services to rivals at resale rates. Telephone's contributions are also preserved when it sells unbundled network elements because that rate also equals the retail rate less Telephone's avoided costs. The restructured prices for unbundled network elements also reduce the extent to which entrants can undercut Telephone's retail rate because the gap between Telephone's retail rate and price of unbundled elements is less. Therefore, contribution losses resulting from retail price reductions are also lower in this case. As shown in Table Seven, stranded costs in this scenario (Case Three) fall to $43 million, thus the establishment of a rational pricing structure for wholesale services mitigates stranded costs by an additional $69 million (i.e., $112 million minus $43 million).

TABLE SEVEN
ESTIMATES OF STRANDED COSTS
FOR TELEPHONE WITH A UNIVERSAL FUND MECHANISM
($ MILLIONS)

	Present Value Stranded Costs Before Taxes
	Scenario Two[1/2]
Case One • No USF • Resale and UNE Rates Established in Arbitration	239
Case Two • With Telephone's Proposed USF • Resale and UNE Rates Established in Arbitration	112
Case Three • With Telephone's Proposed USF • With Telephone's Proposed Resale and UNE Rates	43

Notes:
1/ Scenario Two, Case One has market share losses and reductions in existing retail rates following entry (see Table Five).
Scenario Two, Case Two has market share losses and reductions in rebalanced rates (same percentage reductions as in Case One).
Scenario Two, Case Three has market share losses and reduction in rebalanced rates for local toll only (same percentage reduction as in Case One).

These examples illustrate that the adoption of a USF mechanism in combination with a restructured pricing system for resale services and unbundled network elements can substantially mitigate stranded costs. Stranded costs are limited to those losses that would result from facilities-based bypass and competitive price reductions. They would not include recovery of subsidies required to maintain below-cost basic residential service.

V. CONCLUSION

The Telecommunications Act of 1996 introduces entrants into local exchange markets characterized by rates that bear no relationship to costs for specific classes of services. Entrants can target selected customer groups that are the source of implicit subsidies used to fund other classes of service, with the result that incumbent carriers will experience reduced earnings streams that will strand – leave unrecoverable – prudently incurred historical investments. Using plausible assumptions on future market conditions, in our case study of Telephone, a typical state local exchange provider, pre-tax stranded costs range from $115 million to $239 million, which imply percentage reductions in the range of 8 to 16 percent of the value of its current assets.

To reach equilibrium in asset and service flows, regulation has to ensure that the incumbent carrier is not denied the opportunity to earn a competitive return on the actual costs of its assets. To recover any stranded costs a transition charge must be implemented. The two-part transition charge mechanism advocated here is competitively neutral and ensures that rates to consumers will not be higher than those that would have prevailed but for the Act. The proposed transition charge mechanism can be implemented on an annual basis to minimize the need to rely on market forecasts, and to induce incumbent firms to compete vigorously and operate efficiently.

The competitive transition charge is less when put in place in conjunction with any Universal Service Fund program that restructures rates to plot them in line with direct costs. Implementing both of these mechanisms would move local exchange markets away from the legacy of monopoly regulation and enable consumers to gain the benefits of competitive local exchange markets.