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Nancy H. Sims
Director – Regulatory Relations

September 24, 1998

Mrs. Blanca S. Bayo
Director, Division of Records and Reporting
Florida Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee, Florida 32399

980000A

Subject: Comments Regarding Study 2 (Fair and Reasonable Rates)
Reference Docket No. 980733-TL

Dear Mrs. Bayo:

As required by the Florida Legislature, the Florida Public Service Commission (FPSC) is to report on four aspects of residential basic local telecommunications service with respect to "the fair and reasonable Florida residential basic local telecommunications service rate." The areas to be considered include: 1) affordability, 2) value of service, 3) comparable residential basic local telecommunications rates in other states, and 4) the cost of providing residential basic local telecommunications service in Florida

In preparation for the FPSC workshops, attached are comments prepared by Daonne Caldwell, Dr. William Taylor, and Dr. Robert Harris to discuss each of these areas. I would note that the testimony of Dr. Randall Billingsley and Mr. David Cunningham, pertaining to cost of capital and depreciation, respectively, is also attached. Due to the voluminous nature of the attachments to Mr. Cunningham's and Mr Billingsley's testimony, they have not been attached. Both gentlemen submitted testimony on their topics as part of the Universal Service Docket 980696-TP, thus, the attachments are on file with the FPSC in this Docket. In addition, on behalf of BellSouth, GTE and Sprint, Don Perry has prepared comments regarding the value of service and affordability. Mr. Perry's comments will be transmitted separately by GTE.

Since each of these subjects are interrelated, each participant is not dedicated to one subject. However, each topic is addressed. Ms. Caldwell's comments are being filed in this proceeding on behalf of BellSouth. Ms. Caldwell will address the methodology and process used by BellSouth to develop the costs included in BellSouth's contribution analyses. Since costs are an integral part of the contribution analyses, Ms. Caldwell will also comment on the process used to calculate the contribution for each of the services contained in the FPSC Staff's data request. BellSouth's results for these categories of services are attached to Ms. Caldwell's comments.

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Harris — DOCUMENT NUMBER-DATE 10617 SEP 24 98 FPSC-RECORDS/REPORTING

Taylor — DOCUMENT NUMBER-DATE 10616 SEP 24 98 FPSC-RECORDS/REPORTING

Caldwell — DOCUMENT NUMBER-DATE 10615 SEP 24 98 FPSC-RECORDS/REPORTING

Attached's — DOCUMENT NUMBER-DATE 10614 SEP 24 98 FPSC-RECORDS/REPORTING

Dr. William Taylor's comments are filed on behalf of BellSouth and Sprint. Dr. Taylor will respond to the value of service issue. In addition, Dr. Taylor will explain the relationship between cost and price and outline the appropriate costs to be used for pricing decisions. Comments filed by Dr. Robert Harris on behalf of BellSouth, GTE, and Sprint will complement Dr. Taylor's presentation with actual results from a BellSouth marketing perspective in addressing the affordability and value of service issues. Dr. Harris will also compare BellSouth's residential rates with those of other states, both within the BellSouth region and on a national basis.

If you have any questions or need any additional information, please call me.

Sincerely,

Nancy H. Sims

Nancy H. Sims

cc: W. D'Haeseleer
All parties of record
R. G. Beatty
William J. Ellenberg II

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COSTING AND PRICING PRINCIPLES FOR DETERMINING FAIR AND REASONABLE RATES UNDER COMPETITION

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September 24, 1998

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Consulting Economists

Costing and Pricing Principles for Determining Fair and Reasonable Rates Under Competition

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September 24, 1998

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COSTING AND PRICING PRINCIPLES FOR DETERMINING FAIR AND REASONABLE RATES UNDER COMPETITION

EXECUTIVE SUMMARY

Public policy on telecommunications throughout the United States is presently being re-examined and reshaped as regulators and legislators attempt to set rules and implement the provisions of the Telecommunications Act of 1996 ("Telco Act"). With its sharp emphasis on competition and reliance on market forces to effect outcomes that were once sought through regulation, the Telco Act has placed a significant onus on economic principles to guide the future course of telecommunications. Those principles pertain generally to costing and pricing, arguably the two most critical components of the Telco Act's provisions, and the very foundation for successful entry by competitors into the hitherto closed local exchange markets.

In the State of Florida, Chapter 364 of the Florida Statute requires the Florida Public Service Commission ("FPSC") to study and report to the Legislature, by February 15, 1999, a "fair and reasonable rate" for residential basic local telecommunications service ("RBLTS") in the state. In response, the FPSC has opened Special Project No. 980000A-SP and Docket No. 980733-TL to conduct workshops and a proceeding. This paper provides significant input on two specific issues identified in the Statute and FPSC's Work Plan for Fair and Reasonable Rates (Section 2): (i) cost of providing RBLTS in Florida, including a proportionate share of "joint and common costs" and (ii) value of service considerations in pricing telephone services. Both of these issues go to the heart of economic costing and pricing principles. Accordingly, this paper presents a detailed discussion of those principles and offers suggestions for determining prices that are economically efficient and fair. While the reasonableness of such prices must, in addition, be judged with reference to affordability of service and comparable prices in other states (subjects covered elsewhere in this proceeding), the principles described in this paper are expected to contribute the essential economic framework for determining a fair and reasonable rate for RBLTS in Florida.

This paper begins by developing a useful taxonomy of cost concepts that specifically distinguishes between past (embedded) costs and prospective (incremental or economic) costs, and demonstrates how the two have very different roles. In particular, the paper shows why only economic cost is the proper basis for pricing, while embedded cost is a subject for cost recovery. Two important price limits are introduced: the price *floor*—the familiar total service long run incremental cost ("TSLRIC")—and the price *ceiling*—the less familiar stand-alone cost ("SAC"). The paper first shows that while, in theory, these price limits define the range of prices that would be considered fair (subsidy-free) and reasonable, it is almost impossible to reliably estimate the SAC for individual services in a multi-service environment. Fortunately, the paper demonstrates, the SAC is *not* needed to determine whether all service prices are subsidy-free: it suffices only that all such prices be at or above their respective TSLRICs. Based on these preliminaries, the paper states efficient pricing principles that would permit prices to recover the full economic costs of services (i.e., TSLRIC plus efficient contribution to shared and common costs) as long as they remain within the range of fair and reasonable prices.

The paper then examines the applicability of those simple pricing principles to real-world incumbent local exchange companies ("ILECs"). First, it explains why fixed costs that are large relative to operational variable costs give rise to economies of *scale*, and resources that may be shared in producing different services give rise to economies of *scope*. In the presence of such economies, pricing to recover only TSLRIC would prevent the ILEC from recovering its (shared and common) fixed costs and, therefore, compromise its financial viability in the long run. Illustrations of scale and scope economies are provided to demonstrate that point. Recognizing the special significance of scale and scope economies to multi-service ILECs, the paper states two modified efficient pricing principles that would be better suited to market competition in the real world and to the customers that are served by that market.

Chapter 4 of the paper introduces three special issues of direct concern to the FPSC in its present proceeding: (i) the role of embedded costs, if any, in telephone service pricing, (ii) whether the local loop is a shared facility that makes it a source of joint (or shared) cost, and (iii) the role of value of service in telephone service pricing. This chapter is intended to be readable on a stand-alone basis, although the previous two chapters provide a useful preamble to the issues discussed here.

This chapter provides several reasons for not regarding embedded cost as the proper basis for pricing. It demonstrates that embedded cost is arbitrary and fails to produce prices that reflect cost causation—*the* fundamental precept for efficient pricing. It explains why embedded cost may not reflect efficient production in prospectively competitive markets and, hence, why embedded cost-based prices may not be sustainable under competition. In addition, embedded cost may inadvertently permit hidden cross-subsidies among prices of different services. Finally, this chapter shows why any tying of embedded cost-based prices to an ILEC's historical earnings record has no relevance to the pricing of RBLTS in a future competitive environment.

Next, this chapter demonstrates why the same fundamental principle of cost causation also argues against treating a facility that is shared in use as automatically being shared in cost. One such facility, the local loop, may be shared for delivering different services but that does *not* automatically imply that its cost must also be shared among those different services. The local loop is the most significant component of RBLTS, but it is still an output rather than an input. That is because the local loop provides subscriber access to the network, a service that may be demanded in its own right—and independently of any other service—by the customer. Consequently, this chapter argues that from an economic perspective (i) the cost of the loop should be considered as *wholly* a part of the cost of RBLTS, and should not be allocated among other services provided by the ILEC, and (ii) the price of any other service (intraLATA toll, vertical features, etc.) should *not* include any part of the cost of the local loop. While recovery of shared and common costs in service prices may be a sound idea, the allocation of the loop cost is most definitely not.

Finally, Chapter 4 demonstrates why arbitrary allocation formulas for recovering shared and common costs should be rejected in favor of methods that rely on both market demand and supply information. The inverse elasticity rule is shown to result in economically efficient prices and contribution levels. Other value of service pricing rules (such as two-part tariffs) are shown to provide a viable alternative to inverse elasticity pricing when data and fairness concerns preclude the use of the latter rule. Furthermore, the *economic* view of value of service pricing (which is based on the *customer's* valuation of service) is distinguished from the *public policy* view (which is based on the *policymaker's* valuation of service). In particular, the paper explains why only the economic view of value of service pricing should be adopted, with exceptions made only for specific customer groups (e.g., low-income) for whom targeted subsidies are deemed to be in the public interest.

COSTING AND PRICING PRINCIPLES FOR DETERMINING FAIR AND REASONABLE RATES UNDER COMPETITION

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Chapter 1

INTRODUCTION

Public policy on telecommunications throughout the United States is presently being re-examined and reshaped as regulators and legislators attempt to set rules and implement the provisions of the Telecommunications Act of 1996 ("Telco Act"). With its sharp emphasis on competition and reliance on market forces to effect outcomes that were once sought through regulation, the Telco Act has placed a significant onus on economic principles to guide the future course of telecommunications. Those principles pertain generally to costing and pricing, arguably the two most critical components of the Telco Act's provisions, and the very foundation for successful entry by competitors into the hitherto closed local exchange markets.

In the State of Florida, Chapter 364 of the Florida Statute requires the Florida Public Service Commission ("FPSC") to study and report to the Legislature, by February 15, 1999, a "fair and reasonable rate" for residential basic local telecommunications service ("RBLTS") in the state. In response, the FPSC has opened Special Project No. 980000A-SP and Docket No. 980733-TL to conduct workshops and a proceeding. This paper provides significant input on two specific issues identified in the Statute and FPSC's Work Plan for Fair and Reasonable Rates (Section 2): (i) cost of providing RBLTS in Florida, including a proportionate share of "joint and common costs" and (ii) value of service considerations in pricing telephone services. Both of these issues go to the heart of economic costing and pricing principles. Accordingly, this paper presents a detailed discussion of those principles and offers suggestions for determining prices that are economically efficient and fair. While the reasonableness of such prices must, in addition, be judged with reference to affordability of service and comparable prices in other states (subjects covered elsewhere in this proceeding), the principles described in this paper are expected to contribute the essential economic framework for determining a fair and reasonable rate for RBLTS in Florida.

This paper is organized as follows. Chapter 2 explores, at length, various cost concepts relevant to regulatory economics, and provides a helpful taxonomy for sorting out the role of cost in pricing and cost recovery. Chapter 3 recognizes the likelihood that competition among real world telecommunications firms will not follow the familiar, if simplistic, contours of textbook perfect competition, and presents costing and pricing principles more appropriate for the manner in which competition will materialize in the real world. Chapter 4 examines three specific issues that have important implications for pricing and efficient competition. These issues, which are of particular concern to regulators, are: (i) the role of embedded costs in pricing telephone services, given the incumbent local exchange company's ("ILEC's") overall cost recovery objective, (ii) whether the local loop is a source of joint or common cost, or is a service in its own right, and (iii) how value of service can help to determine contribution levels in efficient prices. The discussion of these issues in Chapter 4 is intended to be self-contained. While the issues themselves are linked to the concepts discussed in Chapters 2 and 3, the discussion in Chapter 4 may be read on a stand-alone basis.

Chapter 2

COST CONCEPTS FOR REGULATORY ECONOMICS

I. COST CONCEPTS AND RELATIONSHIPS: A USEFUL TAXONOMY

Before proceeding with an in-depth analysis of efficient pricing principles, it is useful to review the different cost concepts that are commonly encountered in regulatory economics. Even though "cost" is widely understood as the monetary value of resources used for a particular activity, this chapter will distinguish among the different ways in which cost is recorded and the different purposes they serve. Thus, it is first important to develop a taxonomy for cost concepts in regulatory economics.

A. Definitions

Different cost concepts help to answer different questions about the economic activity of a firm. In this context, a useful point of departure is the distinction between embedded cost and economic cost.

The *embedded cost* of an activity is a record of expenditures that a firm *actually* attributes to the pursuit of that activity within a given accounting period. That cost reflects, among others, the firm's depreciation expense for plant and equipment and its actual costs of operation and maintenance. For regulated firms, embedded costs are calculated by applying regulatory—not economic—depreciation rates to existing investments. Embedded costs reflect a firm's past performance and cost experience, including costs that are *sunk* (i.e., the costs of irreversible investments). By their nature, embedded costs have no predictive value for future costs or for the prospects of entry by competitors. In addition, as will be showed later, those costs have no direct relevance for future pricing or production decisions.

The *economic cost* of an activity is the actual forward-looking cost of accomplishing that activity in the most efficient possible way. In contrast to embedded costs, forward-looking costs are those associated with present and future uses of the firm's (or society's) resources. Only economic costs are relevant for making present and future production and investment decisions, for placing resources in alternative uses, and for setting prices for the services to be provided presently or in the future. Forward-looking economic costs, in effect, reflect the costs that a potential competitor might face as it contemplates entry into the market served by the incumbent firm. Examples of forward-looking costs are reversible fixed costs (i.e., fixed costs that can be avoided by ceasing production of one or more services) and incremental cost.

Fixed costs in economics are forward-looking costs that do not vary as the volume provided of a service changes. In contrast, *variable costs* are those forward-looking costs that vary with the volume of service. For a telecommunications firm, the cost of its switching functions varies with the level of demand served and is, hence, a variable cost. There are several varieties of both fixed and variable costs.

Fixed costs can be of at least three types for a firm that produces multiple services: *service-specific*, *shared*, and *common*.

- *Service-specific fixed costs* are those associated with the supply of *a particular service*. By definition, such costs are independent of the volume of service. A firm supplying *any* level of that service would incur those fixed costs, but would avoid those costs altogether by simply ceasing production of the service. Software to provide equal access from Stored Program Control switches is an example of a service-specific fixed cost attributable to the provision of carrier access service.

- *Shared fixed costs* are those associated with the supply by a firm of *a group of services* comprising more than one, but less than all, of its services.[1] "Fixed" in this context means that those costs vary with neither the level of any individual service in the group nor the decision to produce or cease producing any service or subset of services within the group. For example, the cost of some software right-to-use fees is a shared fixed cost of switched services.

- *Common fixed costs* are not associated with a specific service or groups of services. Instead, those fixed costs are shared by *all* services produced by the firm. The president's desk is a classic example of a fixed cost that is common to all services.

There are two types of variable costs, although one is really a limiting case of the other. *Incremental* cost and *marginal* cost refer to the cost incurred by the firm to produce the next

[1] A special case of shared cost is *joint cost* which is the cost that is shared by a group of services or products that are produced in *fixed proportions* to each other.

increment of output. Both are forward-looking and require knowledge of volume-sensitive cost changes related to the additional increment of output. *Incremental cost* is the additional cost of supplying an increment of output and *marginal cost* refers to the additional cost of supplying a single, *infinitesimally small* increment of output. Thus, marginal cost is really a limiting case of incremental cost, where the increment in question is the smallest possible unit of output.

Total service incremental cost is a special case of incremental cost, where the increment of output in question is the total volume of a service. That is, total service incremental cost for a *new* service measures the increase in costs causally associated with the supply of the new service at the full volume of its likely demand, other things being constant. For an *existing* service, total service incremental cost measures the decrease in costs associated with discontinuing supply of the service in its entirety, other things being constant. Total service incremental cost differs from ordinary incremental cost in two respects:

- The per-unit total service incremental cost measures an average incremental cost over the entire range of output of the service. If incremental cost varies with output (possibly due to economies of scale), average incremental cost *over the entire range* of output will differ from the incremental cost measured *at* the current level of output.

- Total service incremental cost includes service-specific fixed costs, i.e., costs that do not vary with the level of output but would be saved if the firm discontinued production of the service. That is, total service incremental cost has a part that varies with the volume of service and a part that does not so vary.

A further nuance in these definitions arises from the distinction drawn by economic theory between the "short run" and the "long run." Short run incremental cost is the additional cost of supplying an increment of service using the current *fixed* capital plant. Long-run incremental cost ("LRIC") is measured over a sufficiently long period that allows the firm to adjust (i.e., *vary*) all of its factors of production for supplying an additional unit of service at minimum cost.[2] Long-run incremental cost for which the increment of demand is the *entire* service is called *total service long-run incremental cost* ("TSLRIC"). As in common parlance,

[2] Analogously, the long run *marginal* cost ("LRMC") is simply the LRIC when the increment in output is infinitesimally small. If the smallest measurable increment of output is the next unit of a service, then LRIC and LRMC are equivalent.

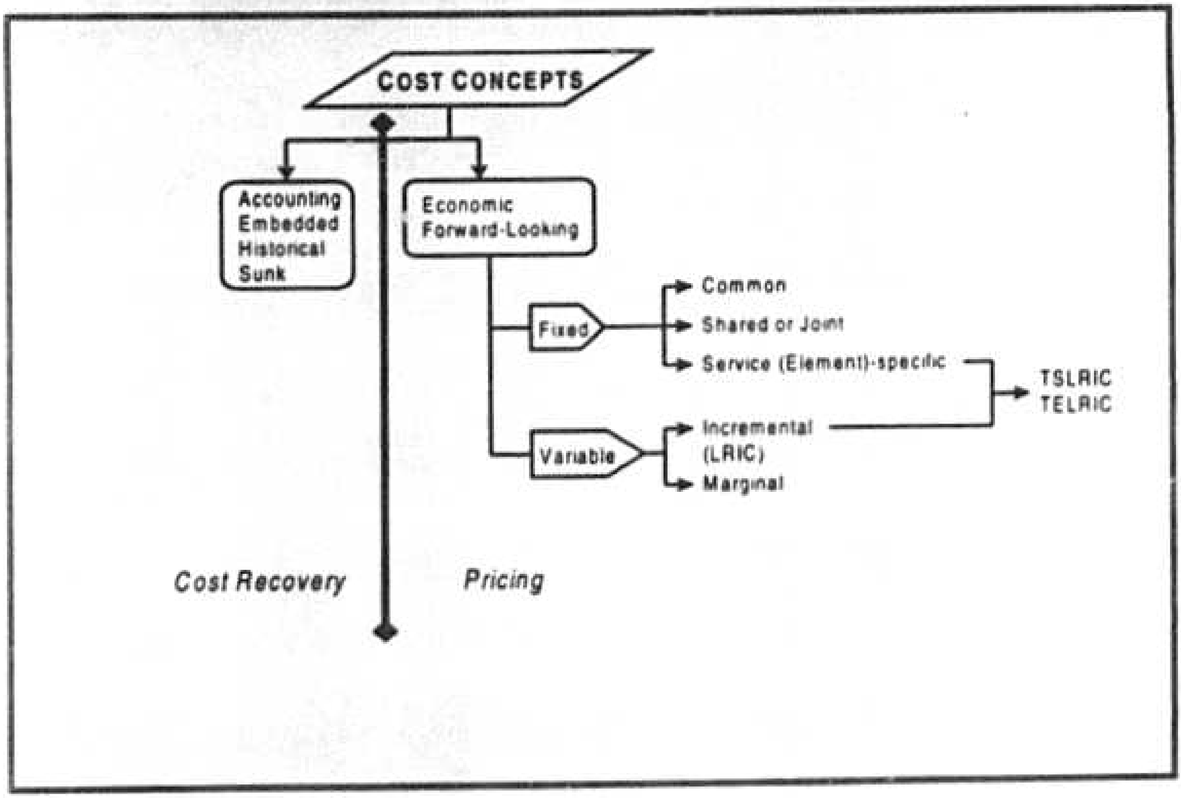
any reference to LRIC and TSLRIC in this paper should be taken to mean incremental costs expressed on an *average* or *per unit* of service basis.

While both fixed and incremental costs may be associated with the supply of a service, neither is, *by itself*, a complete measure of the economic cost of that service. Instead, the economic cost of a service in its entirety is the sum of its TSLRIC and some assignable portion of the firm's shared and common fixed costs.[3] TSLRIC is, therefore, only the *directly* attributable part of a service's total economic cost.

B. Relationships Among Cost Concepts

Figure 1 is a schematic representation of various cost concepts.

Figure 1: Cost Concepts in Regulatory Economics



[3] The FCC Interconnection Order (CC Docket No. 96-98, *First Report and Order*, August 8, 1996), ¶672-675 and §51.505, adopts precisely this definition of economic costs in the context of unbundled network elements.

Figure 1 provides a perspective for some of the cost concepts that are now familiar terms in regulatory parlance. However, their respective roles, and the connections among them, are not always clear. Broadly speaking, there are two categories of cost, one relevant to the relatively more limited task of *pricing* services and the other to the broader task of *cost recovery* at the level of the firm. Figure 1 provides a schematic separation of these two tasks and of the cost concepts which are associated with each. One cost concept that does not appear in Figure 1 is stand-alone cost ("SAC"). The SAC is defined as the total forward-looking cost (inclusive of both fixed and variable costs) of producing a service on a stand-alone basis (i.e., separately from any other production activity). As will be explained later, there are some circumstances in which the SAC coincides with TSLRIC, and others in which they differ. Accordingly, the SAC is omitted from Figure 1 to avoid burdening the schematic with this distinction.

II. PRICING VS. COST RECOVERY

Figure 1 also distinguishes between the *roles* of the two categories of cost. Measures like historical, embedded, accounting, or sunk cost record the costs that a firm or ILEC *has already incurred* on activities that it has completed or pursued. Those cost measures are relevant to the question of overall *cost recovery*, i.e., the target amount of funds that the ILEC must earn in revenues in order to stay financially solvent. Those measures, however, are only indirectly related to the task of setting a price per unit of service.

In contrast, a measure like economic (or forward-looking) cost records the cost that the ILEC *will incur prospectively* as it pursues a particular activity. This is a measure of the value (to society) of the resources that will be used when employing efficient and forward-looking technology and practices currently available to the ILEC. Economic cost is directly relevant to the task of *pricing*: the underlying principle is that the price that is set must at least recover the prospective cost that will be incurred.

For making public policy to foster competition, it is vitally important to understand the twin, but distinct, objectives of pricing and cost recovery and the roles played by the cost concepts in Figure 1.

A. Pricing

Pricing refers to the task of setting either a single price for a (specific increment of) service, or of determining a range within which the price should fall. Wherever pricing flexibility is called for, it is typical to prescribe the rules by which a range of fair, efficient, and reasonable prices may be determined. This means determining both the minimum acceptable price (the *price floor*) and the maximum acceptable price (the *price ceiling*). Both of these limits, however, are set on the basis of forward-looking or economic costs. That is because when pricing a specific increment of service (anywhere between the next discrete unit of service to the entire quantity of that service), the prime consideration is the value of the resources that would be used to produce that increment of service. That value should depend only on the conditions under which the increment of service will be produced, namely, the mix of technologies that will be used, the prices that will be paid for input resources, and the future economic depreciation rates and cost of capital that will apply. The incremental cost of the planned increment of service is thus the foundation for the price to be set for that increment: the price must at least recover that incremental cost. That is the basis for LRIC to be the price floor for a service.[4]

Where a *range* of reasonable or subsidy-free prices is desired, it is customary to also define a price ceiling. Typically, the SAC is used for that purpose because, with free entry into the industry, no supplier could charge a price higher than the SAC without inducing entry. By definition, the SAC represents the minimum value of resources that would be spent in order to produce a planned increment of service under conditions of stand-alone production. Again, by definition, if a regulated firm that just earned its cost of capital charged more than its SAC for a service, that service would be providing a subsidy to one or more of the firm's other services. In *practice*, however, it is extremely difficult—even impossible—to reliably estimate the SACs of different services provided by a multi-service firm. Fortunately, the range of reasonable and

[4] The selection of LRIC (or LRMC) as the price floor makes sense because the planned increment of service for which a price is sought need not be the entire quantity of the service. However, it has become increasingly common regulatory practice to select the (average) TSLRIC as the price floor in place of LRIC. The two differ in that TSLRIC includes service-specific fixed costs while LRIC does not; hence, in most circumstances, TSLRIC results in a higher price floor. As explained below, the primary role of TSLRIC is to test for cross-subsidy among the services produced by the same firm.

subsidy-free prices can still be determined using TSLRIC-specific information alone (i.e., without any reference to the SAC). These issues are best understood in the context of single- vs. multiple-service firms discussed later.

B. Cost Recovery

In contrast to pricing, which pertains narrowly to setting a price for a planned (future) increment of service, cost recovery reflects a firm's objective to stay viable, i.e., to at least break even in the long run. The firm need not break even in every time period as long as over the long haul its total costs do not stay persistently ahead of its total revenues. Failure to break even in the long run would make the firm vulnerable to exiting the business. Because of this long run perspective, the firm must be concerned with recovering *all* of the costs it has incurred, not just the additional cost it will incur when producing planned increments of a service or services. From the perspective of these planned increments, all costs that have gone before are historical, embedded, or sunk, and are, hence, irrelevant to the narrow pricing decisions discussed above. From the perspective of the firm's long run performance, however, *all* costs at *all* times remain relevant. Therefore, it must find a way to eventually recover all costs, even those that may be considered embedded or sunk from the standpoint of future production.

Cost recovery, in a sense, represents the next step up from pricing. The only way the firm can recover all of its costs is by appropriately assigning them to prices of selected (if not all) services in some (if not all) future time periods. Ideally, in a competitive world the firm would rely on, or be constrained by, market forces (relative strength of demand for its different services, prices already in effect, technological and demand trends, etc.) to determine which of its services should be priced to recover all outstanding past costs, and in which time periods.[5]

[5] This discussion of the recovery of historical costs does not purport to describe the incentives or behavior of firms in competitive markets, for which forward-looking economic costs are relevant. Such firms price services to earn as much profit as possible from each service, regardless of the embedded costs the firm has incurred in the past.

C. Efficient Pricing Principles

In economics, the ideal of *efficient* pricing is frequently held up as a desirable social goal, whether in competitive markets or in regulated industries. Only efficient pricing can ensure that consumers pay the true economic value of the products (and the underlying input resources) that they purchase, and that society's scarce resources find their best possible uses. The following are two key principles pertaining to efficient pricing:

> ***Economically efficient pricing***: The economically efficient price of any increment of service must *exactly* recover the full economic cost that will be incurred to provide that increment of service.
>
> ***Efficient pricing under competition***: In a perfectly competitive market, the price of any increment of service will be driven to the full economic cost of that increment of service and will, therefore, be economically efficient.

There is widespread agreement among economists regarding the plain statement of these two principles. In practice, however, there is often a failure to understand (i) that competition that occurs in many real-world markets is not, and cannot be, "perfect" in the textbook sense, and (ii) in such markets, while the economically efficient price must equal the full economic cost of the underlying service, no measure of pure incremental cost like marginal cost, LRIC, or TSLRIC is sufficient as a measure of the relevant *full* economic cost. These are important considerations and are explored in detail next.

Chapter 3

REAL WORLD MARKETS AND THE PROPER USE OF COST CONCEPTS

I. THE NATURE OF REAL WORLD MARKETS

Markets in the real world rarely fit the stereotypes discussed in most texts on economic principles. The model of perfect competition that often forms the basis for economic prescriptions ' regulatory proceedings in the telecommunications industry is only an ideal. In reality, there will be many important differences between that ideal and the circumstances of the typical ILEC, even in the most competitive conditions imaginable. The following table contrasts the conditions that apply to textbook perfect competition and to a real world ILEC.

Table 1: Contrast Between Hypothetical Perfectly Competitive Firm and Real World ILEC

Perfectly Competitive Firm	Real World ILEC
Single service	Multiple services
Homogeneous (i.e., undifferentiated) service provided by all competitors.	Service differentiated by competitor (branding, different pricing plans, packaging, customer service plans, etc.).
Large number of competitors. Each competitor has negligible market share and no control over price.	Fewer competitors, subject to different degrees of regulation and market forces. Market shares may not be negligible.
No economies of scale or scope.	Economies of scale and scope prevalent. High fixed costs, often high sunk costs.
No regulation, no franchise obligations.	Varying degrees or terms of regulation. Franchise obligations (universal service, carrier of last resort, below-cost pricing of local service) common.
No restrictions on capital. Depreciation determined purely by technological and economic conditions (including risk).	Depreciation rates and cost of capital below economic levels (subject to regulatory approval) and may not reflect prospective market risks.
Homogeneous and perfectly informed customers.	Customer base with widely varying demand and usage characteristics.

Table 1 is useful because it helps to focus questions regarding regulation and competition in the right place—away from the hypothetical and idealized world of perfect competition and toward the actual circumstances of the local exchange market.

II. SINGLE VS. MULTIPLE SERVICE FIRMS

The fact that, unlike the hypothetical firm under perfect competition, a real world ILEC is a provider of multiple services is of enormous significance. When a firm provides only one service, concepts like TSLRIC are irrelevant. Indeed, as stated before, there is no distinction then between SAC and TSLRIC; *all* costs, whether fixed or variable, would be part of the total cost of providing that single service. In a single-service world, there are no shared or common costs and no distinction between direct (or attributable) cost and indirect (or unattributable) cost. Put differently, the total cost of the firm is *entirely* attributable to the single service. Any profit or loss realized by such a firm is simply the difference between the revenue earned by the service and the cost at which it is provided.

A. TSLRIC and SAC are Generally Different for a Multi-Service Firm

Strictly speaking, TSLRIC is a meaningful cost concept only when a firm provides multiple services. Specifically, TSLRIC is the additional cost incurred by the firm when adding a new service to its *existing* lineup of services, *while holding the quantities of all those other services constant.*[6] This definition is based on the idea of *cost causation*, namely, that only the cost that would be caused by adding a new service (or saved by dropping the service) should be characterized as TSLRIC in a multi-service world. Clearly, a service's TSLRIC would differ from (specifically, be lower than) its SAC if that service used resources that were shared with (or were common to) other services provided by the firm. Because there are no shared or common costs in a single-service world, TSLRIC and SAC cannot differ. This leads to the following important distinction between single-service and multiple-service environments.

> ***Composition of Total Cost***: For a single-service firm, total cost is simply the SAC of the service. For a multiple-service firm, total cost is the aggregation of

[6] This qualifier should be part of a complete definition of TSLRIC.

the TSLRICs of the individual services, the costs shared by various combinations of services, and the costs that are common to all services.

It is worthwhile reflecting on this difference in the composition of cost from a *practical* standpoint. A single-service firm's total cost can be unambiguously measured and, by definition, identified with the SAC of the single service it provides. In other words, estimating the SAC for a single-service firm is reasonably straightforward. However, a multi-service firm's total cost is far easier to build up from its incremental and shared or common costs than in terms of the SAC for each of its services. Consider an ILEC that provides only four services: local, intraLATA toll, call waiting, and voice messaging service. Determining that ILEC's total cost only requires knowledge of the TSLRIC of each service, the costs shared by each pair or trio of services, and the costs common to all four. However, determining the SAC of *each* service is nowhere as straightforward. By definition, the SAC of call waiting service is the total cost of providing that service on a stand-alone basis, i.e., if the ILEC were *not* to also provide local, intraLATA toll, and voice messaging services. This is not a simple matter of somehow "backing out" the cost of call waiting service from the ILEC's total cost by subtracting from that total cost all of the costs (incremental and shared) identified with the other three services. Even if such an exercise were mathematically possible, it could still be wrong. That is because the network that may be created to provide call waiting on a stand-alone basis may be quite different from the network that is needed to efficiently provide all four services including call waiting. Differences in network design and engineering between stand-alone production and multi-service production make it impossible to deduce the SAC from costs associated with multi-service production alone. In reality, therefore, the SAC is a toothless concept as far as cross-subsidy tests and subsidy-free pricing in a multi-service environment are concerned. However, in what follows, the SAC *is* used as a *theoretical* device to illustrate issues that are of concern to this proceeding, namely, the reasonableness of prices in a multi-service firm and why economies of scope cause efficient prices to be marked up above TSLRIC.

B. Range of Reasonable Prices is Defined by TSLRIC and SAC

Theoretically, an important implication of the difference between the TSLRIC and SAC in a multi-service world is that it defines a range of reasonableness for the *price* of a service. This can be stated as the following principle.

> ***Reasonableness of Prices in a Multi-Service Firm***. For a multi-service firm, the reasonable and subsidy-free price of any service it produces is one that lies somewhere in the range between the TSLRIC (price floor) and the SAC (price ceiling) of that service.[7]

The range between the TSLRIC and the SAC will only exist if the added service has shared and common costs. Otherwise, if the service can be added to the lineup purely discretely (i.e., without any shared or common costs), TSLRIC and SAC will coincide and there will be no difference between a price ceiling and a price floor. The TSLRIC is often regarded as a price floor because it represents the minimum cost per unit—averaged over all units of the service—that the service must recover in order that it not be subsidized by some other service. Similarly, the SAC represents the upper bound on the cost the firm would experience to add the service. Any effort to recover more than that cost would, in principle, offer the opportunity to that firm to subsidize some other service. In theory, therefore, any price in between the TSLRIC and the SAC would be reasonable and subsidy-free. This also means that any mark-up in the price above TSLRIC (more on this later) should not be so high as to violate the upper bound on price placed by the SAC.

Given these simple guides to determining reasonable prices, the real difficulty—as remarked earlier—is to estimate SAC accurately in a multi-service environment. The complexity of such a task is greatest for a service that has a high degree of shared and common costs. For a real-world ILEC (which shares several resources to provide different services), that task may be impossible to carry out. To deduce the SAC in these circumstances, one may either look for examples where that service is provided on a stand-alone basis by some other firm, or estimate as accurately as possible the extent of costs presently shared that would be part of that service's SAC were it to be provided on a stand-alone basis. In the world of multi-service ILECs, there may be no examples of the former, and no practical or feasible way to do the latter. In particular, because the hypothetical world in which costs have to be calculated (a network engineered *only* to provide call waiting and no other service) would be so different

[7] G.R. Faulhaber, "Cross-Subsidization: Pricing in Public Enterprises," *American Economic Review*, 65(5), 1975, pp. 966-977. Note that this principle defines the price of a *service*. Individual units of service can be sold efficiently at a price below the TSLRIC of the service—but above the LRIC of those units—provided the incremental revenue from the service *as a whole* covers its incremental cost.

from the real world (that of the multi-service ILEC), the exercise needed to calculate the SAC may have academic—but no real—value.

Fortunately, the SAC is not needed to determine the reasonableness of prices of a multi-service firm. The reasonableness or subsidy-free price requirement stated above is actually equivalent to the requirement that, *for a firm whose total costs must equal total revenues*, the price of every service it provides must be no lower than the TSLRIC of that service.[8] The reasoning behind this can be illustrated by the following simple *hypothetical* example.

Suppose an ILEC provides two services: local and toll. By definition, the total cost of the ILEC is the sum of the SAC of, say, local and the TSLRIC of toll.[9] Suppose also that the ILEC prices its services so that its revenues from both match its total cost, i.e., it breaks even. If the ILEC priced its toll service to *at least* recover the TSLRIC of that service then, to break even, it could only price local service to *at most* recover the SAC of that service. Further, if toll service recovered *more* than its TSLRIC, then local service would recover *less* than its SAC. That means, in general, that as all services recover at least their respective TSLRICs, there is no scope for an ILEC that breaks even to recover any more than the SAC of *any* service, regardless of what that unknown SAC may be. In addition, prices of all services would lie in the range between their respective TSLRICs and unknown SACs and, hence, automatically be subsidy-free. This alternative approach to testing for cross-subsidy does away with any need to estimate the SAC of every service.

III. Economies of Scale and Scope

A. Definitions and Examples

A firm with high fixed costs can often benefit from increased production. Provided that its variable or operational costs are low relative to its fixed costs and/or are not steeply

[8] See W.J. Baumol, *Superfairness*, Cambridge, MA: MIT Press, 1986, esp. pp. 122-124 for a proof.

[9] This example merely assumes that the ILEC provided local service first and then added toll service. However, ignoring issues of technical feasibility, the example would still work if that sequence were reversed. That is, the actual chronology of that ILEC's provision of service does not matter.

increasing as volume grows, the firm's *average* cost of production[10] may actually decline with volume growth. This effect—called *economies of scale*—may be seen from the following example. Suppose, a single-service firm provides the service at 3¢ per unit and has fixed costs of $50. If the firm provides 100 units, its total cost is $50+($0.03×100) = $53, and its average cost is $53÷100 = 53¢ per unit. If volume now grows to 200 units, the firm's total cost will grow to $50+($0.03×200) = $56, but its average cost will *decline* to $56÷200 = 28¢ per unit. This decline of average cost as volume grows, or economies of scale, occurs because averaging brings down the fixed cost per unit *faster* than the variable costs per unit can rise (in this example, variable cost per unit stays constant).

A multi-service firm with high fixed costs can also often benefit from expanding the scope of its production and sharing fixed resources. When some of the fixed resources needed to produce one service can, *at no extra cost*, be shared to produce another service, it is more economical to produce the two services together and pay only once for the shared resources than to produce the services separately on a stand-alone basis. This effect—called *economies of scope*—may be seen from the following hypothetical example.[11]

Suppose there are two services *A* and *B*. If *A* and *B* are produced by separate firms on a stand-alone basis, assume the relevant costs are as follows:

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[10] The term "average cost" is used loosely here. It can pertain to true average cost for a single-service firm or to average incremental cost for a multi-service firm.

[11] Even though the SAC figures prominently in this hypothetical example, it is only used to illustrate how economies of scope arise. The point of the preceding discussion is not that SAC cannot exist in a multi-service world, only that it is impossible to determine it reliably for practical use.

Service A		Service B	
Stand-alone fixed cost	$500	Stand-alone fixed cost	$1000
Variable cost	$100	Variable cost	$300
Stand-alone total cost	$600	Stand-alone total cost	$1300

Combined industry total cost = $1900 = ($600+$1300)

But if *A* and *B* are produced together by the same firm *at their stand-alone levels*, assume the relevant costs are:

Shared fixed cost = $400

Service A		Service B	
Service-specific fixed cost	$100	Service-specific fixed cost	$600
Variable cost	$100	Variable cost	$300
Service-specific incremental cost	$200	Service-specific incremental cost	$900

Total cost = $1500 = ($400+$200+$900)

Note that, at $1500, the total cost (the aggregation of shared cost and the service-specific incremental costs) is $400 less than the combined industry total cost from stand-alone production. This is a manifestation of economies of scope because of the $400 in shared costs. Also, note that these $400 of shared costs reduce service *A*'s fixed cost from $500 under stand-alone production to $100 under sharing, and similarly reduces service *B*'s fixed cost from $1000 to $600. When those costs are not shared (as in stand-alone production), the $400 is included in the stand-alone fixed costs of *both A* and *B*.

B. Significance of Scale and Scope Economies for Pricing

The practical significance of shared costs and economies of scope (and scale) is that a firm (such as an ILEC) with significant fixed costs can actually experience lower service costs per unit by sharing resources and becoming a provider of multiple services. Hence, even carriers that start out by providing only one service may, because of resource sharing and scope economies, diversify into providing multiple services. Customers also benefit because economies of scope translate into lower prices than under stand-alone production. That happens because, under resource sharing, the firm employs the shareable resources only once rather than each time a service is provided under stand-alone conditions. In turn, that means that the cost of those resources will need to be recovered only once, thus lowering the total cost of providing all services (in the example above, that total cost falls from $1900 under stand-alone production to $1500 under multi-service production).

Consider the incremental costs of the two services in the example above. Under stand-alone production, service *A*'s SAC (also equal to its TSLRIC, by definition) is $600 and service *B*'s is $1300. Reasonable and subsidy-free pricing should recover at least $600 for *A* and $1300 for *B*. Under multi-service production, however, *A*'s TSLRIC (though not its SAC) falls to $200, while that for *B* falls to $900. Since the volumes in service for both *A* and *B* are the same under both stand-alone and multi-service production, prices for both services under the latter can be lower. However, it is important to note that the firm can break even (recover all its costs) only if it recovers the full $1500 (including $400 of shared costs), and not just the $1100 of combined service-specific incremental costs. This feature has important ramifications.

Under stand-alone production, if the two services were priced *exactly* at their respective SACs (or TSLRICs) per unit, the industry would recover all of the $1900 of total costs. Under multi-service production, however, if prices were set *exactly* at the respective service-specific TSLRICs per unit, the firm would recover only $1100 in incremental costs, but not the $400 in shared costs. In other words, driving the service prices down to the level of the respective TSLRICs per unit would leave the firm unable to break even and vulnerable to going out of business. Textbook discussions of perfect competition that ignore economies of scale and scope, and conditions of multi-service production and resource sharing generally, talk routinely of competition driving prices to incremental costs. In reality, however, if multi-service ILECs that experience economies of scope and scale—no matter how hard they compete—were required to price down *to* their incremental costs, they would eventually go out of business. That is why, even under competitive conditions, multi-service firms will generally need to mark their prices above TSLRICs in order to pay for their shared and common costs in order to simply break even, let alone make economic profits. Regulators have begun to recognize this fact in designing pricing rules for competition.[12]

IV. Textbook Pricing Prescriptions Reconsidered

The simple lesson of the preceding discussion is this: even under strong market competition, certain industries cannot merely follow the simplistic pricing rules espoused by textbook models of perfect competition without risking the viability of even the most efficient firms. In the real world markets that ILECs operate in, multi-service production, economies of scale and scope, slow depreciation, etc., are all reasons why competitive cost recovery by those ILECs will not be well served by rules that set prices at service-specific incremental costs. Therefore, when pricing the services of ILECs, the following pricing principles should, in my opinion, replace the textbook pricing principles.[13]

> ***Pricing Principle 1***: In a competitive market, the efficient price of a service provided by a multi-service ILEC *need not be equal* to its TSLRIC. Instead, the efficient price must be equal to the *full* economic cost of the service which exceeds the TSLRIC.

Contrary to the often-cited textbook principle that the only efficient price under competition is one equal to the underlying incremental or marginal cost, *Pricing Principle 1* recognizes the multi-faceted nature of an ILEC and uses the full economic cost as the basis for the efficient price. Economic costs can more meaningfully be defined for ILECs by thinking beyond mere incremental costs like TSLRIC. *Full* economic costs should include those incremental costs and, as well, appropriate shares of other legitimate items of recoverable forward-looking cost, namely, shared and common costs.[14] A corollary to this principle is the following:

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[12] For example, FCC Interconnection Order, ¶672, and the discussion that ensues.

[13] William J. Baumol and J. Gregory Sidak have articulated essentially the same pricing principles for ILECs that experience scale and scope economies. See their book, *Toward Competition in Local Telephony*, Cambridge, MA: The MIT Press and Washington, DC: American Enterprise Institute, 1994 (especially pp. 27-35 and Chs. 5-6).

[14] See fn. 3, *supra*.

> ***Pricing Principle 2***: The TSLRIC shall, at all times, remain the price floor for the multi-service ILEC's services in the sense that incremental revenue from each service must cover the TSLRIC of that service. A price that is equal to the full economic cost, however, will necessarily be efficient *even if* that price is above the price floor, i.e., above the underlying TSLRIC.

This corollary specifies the efficient price in competitive real world markets in which firms have the characteristics of present-day ILECs. Therefore, a price that is above its price floor is not automatically inefficient (as would be the case under textbook pricing principles).

Chapter 4

DETERMINATION OF FAIR AND REASONABLE RATES: SPECIFIC ISSUES

I. INTRODUCTION

The costing and pricing principles proposed in this paper have general applicability in real world markets with developing competition. However, the nature of telecommunications itself in the U.S. introduces three additional questions that have an important bearing on how those principles should be applied to pricing telephone services:

- What role should embedded costs have in determining the fair and reasonable price for an ILEC's services, in particular, for RBLTS?
- What is the nature of the cost of the local loop, and how should that cost be recognized in the pricing of RBLTS?
- How should an ILEC use information about the value of its RBLTS to its customers for pricing that service?

II. ROLE OF EMBEDDED COSTS IN TELEPHONE SERVICE PRICING

A. The Broad Questions

Public utilities and telecommunications firms have had a long history of using embedded costs to price their services. That tradition is changing in favor of basing prices on incremental costs and, as a result, two questions are being asked:

- Why should incremental costs replace embedded costs as the basis for pricing telephone services?
- What should be the role of embedded costs, if any, in an environment in which prices are based on incremental costs?

By definition, embedded costs are a firm's historical costs, i.e., the costs actually recorded on its books of account during a particular period of time. Being historical in nature, they serve as a record of how the firm's operations were in the past, not how they would be in the future. This has several important implications for pricing which can be best understood by first examining the role of pricing.

B. Cost as a Foundation for Price

Pricing is an instrument for rationing the use of society's scarce resources in meeting society's consumption needs. Prices are a record of the valuation that individuals or markets place upon goods and services that provide utility to their consumers. However, prices cannot only reflect individual valuations of those goods and services; in effectively functioning markets, they must also signal the manner in which productive resources are used. Specifically, the price a consumer pays for a unit of service must reflect the cost to society of using scarce resources to produce and provide that service. If that were not the case, resource use would be mismatched with consumption needs and, hence, not efficient. For example, consumption would be too low (i.e., less than socially optimal) if a service price were set too high relative to the cost of producing the service. On the other hand, there would be too much (i.e., higher than socially optimal) consumption if the price were below the cost of producing the service. While the balance between price and cost has clear implications for efficiency and social welfare, the question remains: what measure of cost is relevant here?

The answer to that question rests on the manner in which a service is provided. When a consumer expresses a need for a particular service and offers to pay a price for it, the supplier of that service must expend productive resources in order to meet the need. A purchase or sale transaction between the buyer and the seller would only occur if the price (offered by the buyer) were at least compensatory, i.e., recovered fully the resource costs (incurred by the seller). Viewed another way, if the buyer did *not* express a need for the service (and back it up with a price offer), the seller would *not* commit productive resources to its supply and would, therefore, *avoid* expending valuable productive resources. Clearly, the only price the seller would find acceptable would be one that would make it worthwhile to use resources in order to provide the service. Hence, the price resulting from a successful transaction here would necessarily be *caused* by the cost to provide the service. This principle of *cost causation*—alluded to earlier in Chapter 3—is *the* fundamental precept of pricing: a price must reflect a cost and, in particular, the (demand) activity that gives rise to it. It does not matter what subsequent use the service may be put to or, if its use is shared, what distribution of benefits it may create past the original point of sale.

Only this cost causation basis for pricing can generate prices that are economically efficient and result in buying and selling transactions that maximize social welfare. Hence, given the obvious normative appeal of that pricing principle, it follows that the underlying measure of cost should be the cost that is caused by a given activity. The only such measure of cost is incremental cost. By definition, incremental cost measures the additional cost associated with providing the next increment of a service. It is, by its nature, forward-looking because meeting the demand for *new* units of a service requires the expenditure of *new* productive resources. In other words, any new activity that results in a sale or purchase transaction generates a new cost that is unconnected with any costs realized in the past on previous transactions. Therefore, prospective or incremental--not embedded—cost alone can lead to prices based on cost causation and support consumption levels that are socially optimal and economically efficient.[15]

An additional property in favor of making incremental cost the foundation for pricing is that such a cost also reflects the technically most efficient way to provide a service. Under competition, the firm or seller that has the lowest incremental cost has the opportunity to charge the lowest price and, therefore, conclude a sale. When incremental cost is minimized, scarce productive resources are used in the most economical and efficient way, and social welfare is maximized. The example of the successful least-cost firm then drives other competing firms to become more efficient themselves. Therefore, competitive markets exert their own discipline on the level of incremental costs and ensure that cost-caused prices are the lowest possible.

[15] The issue here is only whether pricing should *start* with incremental cost. That does not necessarily mean that economically efficient prices should always be *equal* to their corresponding incremental costs. Instead, according to the pricing principles in Chapter 3, an economically efficient price must at least recover the forward-looking ***economic*** cost (i.e., the sum of incremental cost and an appropriate contribution to shared and common costs). The economic cost price level is obviously higher than the incremental cost price level, and the difference is only relevant for multi-service firms that experience economies of scale and/or scope.

C. Embedded Cost is *Not* the Proper Foundation for Price

If forward-looking incremental cost is the proper economic foundation for pricing, then what role, if any, should embedded cost have? First, it is clear that embedded cost cannot conform to the cost causation principle of pricing. The price charged for the next unit of service depends only on the cost incurred to provide it, not on past costs. Therefore, embedded cost cannot—except by accident—ensure economically efficient pricing that makes the best possible use of valuable productive resources and maximizes social welfare.

Second, prices based on past, embedded cost are unsustainable in competitive markets. Competition rewards the most productive and efficient firms and penalizes those that are not so. Competitive pressures in the market ensure that firms that achieve the *lowest* economic costs are the most likely to succeed and endure. If past mistakes, inefficiencies, or other factors cause a firm's current embedded cost per unit of service to exceed its per-unit economic cost, charging a higher price in order to fully recover all costs can leave the firm at a competitive disadvantage. If, in the process, the firm cannot simultaneously compete on its embedded cost *and* fully recover its costs, it will be forced to default and exit the market.[16]

Third, prices based on embedded cost may inadvertently permit hidden cross-subsidies among service prices. When prices are not cost-causative, they inevitably reflect some form of averaging or allocation across different services of shared and common costs or costs unrelated to the services being priced. That is, the link between a service's price and its underlying cost is broken by such a complex formulaic approach to pricing. In these circumstances, one service's price may end up being set below its true (but unknown) TSLRIC, while that of another may be above. As explained in Chapter 3, cross-subsidies among services cannot exist when all service prices equal or exceed their respective TSLRICs. The cost allocation approach to pricing when embedded cost is the cost basis can easily violate this rule and, in the process, create undesirable cross-subsidies.

[16]A price based on incremental cost but required to contribute to the recovery of shared and common costs may still be lower than a price based on embedded cost. That is because both the incremental cost and the shared and common costs are supposed to be *forward-looking* costs, while embedded cost may contain inefficiencies or other additives that forward-looking costs do not.

Nowhere is this cross-subsidy effect of embedded cost-based pricing better demonstrated than in what some observers believe to be a tie-in between the pricing of RBLTS and the ILEC's historical earnings. In the U.S., there has been a long tradition of pricing RBLTS on a "residual basis," i.e., backing out the price of RBLTS by subtracting from the ILEC's overall revenue requirements (total costs) the revenues expected from all other services. As a result, RBLTS prices have frequently been set below economic cost levels, albeit justified by the value judgment that such prices were in the public interest. Because of residual pricing (rather than pricing based on economic cost), some observers now fear that were RBLTS prices to be raised to economic cost levels and made subsidy-free (as part of an overall rate rebalancing in the face of competition), ILEC earnings would increase as well. This fear, however, is misplaced for two reasons.

First, *past* ILEC earnings have no clear relevance for the pricing of services in the future. Where ILECs operated in a regulated, single-provider environment before, in the future, ILEC pricing would be driven much more by forces of competition in the marketplace than by historical earnings. This means that an ILEC's future pricing would be a function of future costs and market demand, rather than embedded or past costs and actions. In other words, the residual pricing of RBLTS (sustained by embedded cost allocations) would not be sustainable under competition. Only prices based on economic cost would enable ILECs to earn normal profits (a competitively determined return on capital).

Second, an RBLTS rate anchored to embedded cost and determined residually could conceivably be detrimental to both ILECs *and* prospective new entrants and, in the process, to the promise of competition itself. The following possibilities explain why that may be so.

- New entrants will most likely make entry decisions based on the prospective (i.e., incremental) costs to serve rather than on the ILEC's embedded costs. Therefore, as technological progress lowers the cost of providing service in the future to levels below the embedded cost that the ILEC incurred in the past, the service price would—in a competitive market environment—move downward as well. While new entrants could take advantage of that price movement, an ILEC precluded from cost-causative and cost-based pricing would be seriously handicapped in its efforts to compete.

- On the other hand, if an RBLTS rate (that is determined residually and supported by embedded cost allocations) remains persistently below the true incremental cost of that service, prospective competitors would have little incentive to enter the market. That is

> because the prospective entrant would have to recover at least that incremental cost in order to make entry worthwhile. An artificial RBLTS rate not supported by true incremental cost could not serve as a signal for profitable entry and would seriously limit the prospects for meaningful competition.

In either event, consumers would be denied the full benefits of true competition among incumbents and new entrants.

In sum, embedded cost should *not* be the starting basis or foundation for pricing. Prices linked to embedded cost violate cost-causation, and are inefficient and unsustainable under competition. When an ILEC is at liberty to allow competitive forces and its legitimate costs to shape its service prices, it should *not* be constrained by public policy to a formulaic approach to setting prices based on embedded cost. Under competition, market forces determine prices—individual firms do not *set* them—and only firms that have the economically proper cost basis to charge such prices and fully recover their costs survive and succeed.

III. Is the Loop a Source of Joint (or Shared) Cost?

A. Views of the Local Loop and Implications for Cost

FPSC's Work Plan for Fair and Reasonable Rates (Section 2) calls for the FPSC to recommend a "fair and reasonable" rate (for Florida's RBLTS) that includes a "proportionate share of joint and common costs." This approach to pricing RBLTS is not only consistent with the efficient pricing principles advocated in this paper, it is also a radical break from past practice. However, while the *principle* espoused in the Work Plan may be beyond reproach, the *practice* of apportioning shared and common costs remains controversial.

Contrary to accepted economic theory, some observers contend that the local loop—the cable facility that links a customer premises to an ILEC's switch—is a *shared* facility because it is the means for delivering not just RBLTS but also toll service, vertical services, and other services.[17] Therefore, according to advocates of this position, it is necessary to allocate the cost

[17] Economists generally disagree with this view of the local loop as a shared facility. See,e.g., Rebuttal Testimony of John W. Mayo (on behalf of AT&T), *In re: Investigation into NTS Cost Recovery, Phase I*, FPSC Docket No. 860984-TP, June 1, 1987; John T. Wenders, *The Economics of Telecommunications: Theory and Policy*, Cambridge, MA: Ballinger, 1987; Alfred E. Kahn, "Pricing of Telecommunications Services: A Comment," (continued...)

of the loop to all of its different *uses*. This position, therefore, views the cost of the local loop as being joint to (or, more accurately, shared by) all the services that can physically be delivered over the loop. The implications of such a position are huge and controversial.

The local loop is, by far, the most significant cost item within the local network. Indeed, when viewed as a fully integral part of RBLTS, the cost of the local loop accounts for an overwhelming proportion of the cost of that service. However, when the loop is viewed as a shared facility and its cost is divided up and allocated to other services besides RBLTS, its importance as a cost driver of RBLTS is reduced considerably. Indeed, an allocation procedure that reduces the loop cost portion of the overall cost of RBLTS may have the effect of pulling that cost *below* the price charged for that service. In other words, an RBLTS rate that may appear to be subsidized when the full unallocated cost of the loop is included in the service cost may actually appear subsidy-free when only an allocated *portion* of the loop cost is included in that service cost. This possibility is significant because it goes to the heart of an ongoing controversy over whether RBLTS is generally subsidized across the country.

Given the FPSC's objective of recommending a fair and reasonable rate for RBLTS in Florida, it is particularly important to examine these contrasting views of the local loop. It is natural to ask whether or not the loop is a shared facility. However, the more important public policy question is whether the full amount of the loop's cost, or only a "proportionate share" of it, should be assigned to RBLTS.

B. Critique of the "Loop as a Shared or Common Cost" Position

Like the FPSC's Work Plan, the Telco Act also establishes rules "... to ensure that services included in the definition of universal service bear no more than a reasonable share of the joint and common costs of *facilities* used to provide those services."[18] While this refers to

(...continued)

Review of Industrial Organization, 8, 1993, pp. 39-41; William E. Taylor, "Efficient Pricing of Telecommunications Services: The State of the Debate," *Review of Industrial Organization*, 8, 1993, pp. 21-37; and Lester D. Taylor, "Pricing of Telecommunications Services: Comment on Gabel and Kennet," *Review of Industrial Organization*, 8, 1993, pp. 15-19.

[18] Telco Act, § 254(K). Emphasis added.

unspecified facilities, it certainly does not specifically require that the loop cost be treated as shared or common. One can think of the headquarters building of an ILEC—where most managerial, administrative, financial, and legal functions are performed—as a shared facility that fits the Telco Act's description. That others may choose to view the loop as a shared cost neither follows from what the Telco Act states nor is necessarily accurate from the standpoint of economic theory.

1. The Fallacy that Shared Use Implies Shared Cost

As remarked above, some observers believe that sharing in *use* qualifies the loop to be a source of shared or common cost. This belief conflicts with the fundamental principle of cost causation. Cost causation provides the answer to the question why the resources used in providing the loop have been expended. The answer is simple: the costs associated with the loop are caused by *a customer gaining access to the network*. That is true whether that access is gained as part of a standard bundled offering like RBLTS or, in the new environment, by purchasing an unbundled loop. Once the loop is provisioned, the cost has been incurred. The way in which it is *used* (if at all) does not change that cost.

This is a subtle, but important, point. A customer that purchases (or leases) the loop essentially acquires the *right* to access the network and receive services of his or her choosing. Actual usage of the loop does not matter for cost causation. The loop has been provisioned—and a cost incurred—regardless of whether the customer uses the loop at all, accesses only one service, or accesses multiple services. The cost of that loop should be recoverable regardless of actual use. The contrary position—that the loop's cost should depend on how it is used—is based on a fallacy. To see why that is so, it is reasonable to ask whether the cost of the loop should be recovered differently from different customers, depending on how many services including none at all) they access with it. Alternatively, as Steve Parsons has asked,[19] shouldn't the cost of constructing a highway be considered a shared or joint cost to butchered meats, milk, stereo equipment, and dry cleaning if distributors of these products use that highway to receive

[19] S.G. Parsons, "Seven Years After Kahn and Shew: Lingering Myths on Costs and Pricing Telephone Service," *Yale Journal on Regulation*, 11, 1994, pp. 149-170.

them? Similarly, would a car be considered a shared cost of motels since access to motels is facilitated by the car? The fallacy of identifying shared cost with shared use can be eliminated by thinking of the loop facility as a provider of access to the network—a service in its own right and, therefore, a facility with its own unique cost and price. This requires that the loop be thought of as an "output" rather tha s an "input."[20]

It is instructive to further explore the idea that access to the network (the loop) is a service in its own right. A customer may take just the access service (in order to *receive* calls) but avoid originating toll or other types of calls over the telephone network. That is, while access service logically precedes consumption of any other service, taking the access service does not *require* that some other service also be taken. Customers do not purchase access and other services in fixed proportions (e.g., one access line with 100 minutes of toll and twenty uses of Call Forwarding); hence, the cost among them cannot be joint. Once a customer acquires network access or a loop, other services can only be made available to that customer at *additional* cost. For example, provision of toll service to a customer would cause the network to incur a cost that is separate from that for the loop. Therefore, the loop or access service cannot be a joint or shared cost.

Economists have offered several other arguments against regarding the loop as a shared or common cost. Some of these are as follows.[21]

- Charges for access alone are common in many competitive markets (e.g., clubs, credit cards, on-line computer services, long distance telephone service, etc.).
- The cost of a service should not be confused with the *benefits* that service provides. Loop costs belong to subscriber access regardless of whether the loop provides value to other services or customers.

[20] Professor John Mayo, testifying on behalf of AT&T, has endorsed this view of the loop. For example, in recent testimony, he disagreed with the notion of recouping the loop cost through an allocation mechanism, stating instead: "It is well known in the economic analysis of the telecommunications industry that there is a well-defined demand for, and supply of, access to the telecommunications network. The costs of providing that access can, and should be borne by the consumers that cause these costs to be incurred." (Rebuttal Testimony of John W. Mayo, on Behalf of AT&T, Maryland Public Service Commission Case No. 8715, March 14, 1996, p. 9). Also see the references in fn 17, *supra*.

[21] See, e.g., Alfred E. Kahn and William B. Shew, "Current Issues in Telecommunications Pricing," *Yale Journal on Regulation*, 4, 1987, pp. 191-256, and Parsons, *op cit.*

- Loop costs cannot be considered shared between local and other services (e.g., internet and optional services) because those services may be provided by different firms. A cost cannot be shared by (and be recovered jointly from) independent companies. Rather, costs are specific to firms or decision-makers.

2. It is Economically Efficient to Charge for the Loop as a Separate Subscriber Access Service

The cost causation principle provides useful guidance on the economically efficient method of pricing the loop. Consider the following two questions that were asked, and answered, by Alfred Kahn and William Shew over a decade ago.

> ... First, does subscriber access have a separate identifiable incremental cost associated causally with providing it? The answer is, unquestionably, yes. Connecting a customer to the network uses scarce resources, even if he or she never uses the connection. The customer who subscribes to two access lines imposes a greater cost than a customer who subscribes to one, even if they make the same number of calls at the same times and places.
>
> Second, does charging for access serve a purpose? The answer is that it serves the very important purpose of economic efficiency if buyers are confronted, in each of their purchase decisions, with prices that reflect the respective incremental costs to society of their taking more or less of each available good and service or, to put it another way, what costs society would save if they took less of each.
>
> ... Using the price of telephone calls to recover access costs that do in fact not vary as more or fewer calls are made therefore induces wasteful choices by customers. It encourages them to order underpriced access lines that they value less than the incremental costs to society of providing the lines, and it discourages them from making overpriced calls whose value to them would have exceeded the incremental cost to society. The same result would follow if an electric utility were to supply its customers with all the appliances they wanted at no charge and recovered the costs in the price of electricity—wasteful overpurchasing of appliances and underconsumption of electricity.[22]

Only a price reflecting the full economic cost of the loop will ensure the socially optimal level of use of that facility. If the loop is part of a bundled exchange service offering

[22] Kahn and Shew, *op cit.*, p. 201. Footnote in text omitted.

like RBLTS, then the full economic cost of the loop should be a part of the cost of that bundled service.

3. It is Fallacious to Conduct Subsidy Test for RBLTS When Loop Cost is Allocated

RBLTS is a bundling of the loop (subscriber access service), dial tone, and other services. Therefore, if the price of RBLTS is below the cost of the loop itself, it must also be below the cost of the overall service. In that event, with a price below TSLRIC, RBLTS will be receiving a subsidy.[23] That conclusion can appear to change, however, if enough of the loop cost is incorrectly allocated away to services other than RBLTS, so as to cause the remaining cost to fall below the price of the service. Such allocations can also mislead policy makers into believing that RBLTS is being priced in an economically efficient manner when, in fact, it is not. As Kahn and Shew pointed out, any deviation from economically efficient pricing will cause overconsumption of the subsidized service (RBLTS) and underconsumption of the overpriced service (toll or other services that provide contribution toward RBLTS). That is why a lot rides on using the proper cost principles to correctly identify the cost of both the loop and the bundled RBLTS.

C. The Bottom Line on the "Loop as a Joint Cost" Issue

Correctly viewed, joint costs are incurred when production facilities simultaneously serve two or more markets (or produce two or more products) in *fixed* proportions. From that standpoint, beef and hides are joint products to cattle breeders. Every cow that is slaughtered for beef also yields—irrespective of whether it can be sold—a certain quantity of hides. This form of jointness is simply not true of telephone services. Customers do not purchase subscriber access (the loop), other exchange access services, long distance services, and other services in fixed proportions.

[23] Recall that the range of subsidy-free prices is defined by the TSLRIC (lower limit) and the stand-alone cost (upper limit). A service whose price exceeds the stand-alone cost may be *providing* a subsidy, and a service whose price is below TSLRIC may be *receiving* a subsidy. However, if *all* services provided by a firm are priced at or above their respective TSLRICs, then there can be no cross-subsidy among those services as long as the firm at least breaks even.

The purchase of the loop represents the right or opportunity to access the telephone network, pure and simple. Therefore, regardless of (i) how the loop is sold (bundled into RBLTS or by itself), (ii) what uses it is put to, or (iii) what benefits it provides, cost causation requires that all costs directly attributable to the loop *not* be allocated to services or network components other than the loop. The loop, or subscriber access, should be viewed as an output, a service that is demanded in its own right by customers. Under no circumstances should its cost be allocated away, whether for pricing loops or for testing whether RBLTS is subsidized. Any distortion of the economically efficient price of a loop, or of RBLTS, will cause consumption to be less than optimal, resources to be wasted, and social welfare to suffer. In a competitive world, the wrong price will also send the wrong signals, encouraging entry by less efficient competitors if the price of the loop or RBLTS is set below its economically efficient level.

Implications of this analysis for the FPSC's objective of recommending a "fair and reasonable" rate for RBLTS are clear.

- The local loop is *not* a shared facility and, hence, its cost should not be allocated among services besides RBLTS.
- The fair and reasonable rate for RBLTS ought to include the full cost of the local loop as well as a proportionate share of the cost of facilities that are truly shared by or are common to an ILEC's services.
- The price of any other service (toll, vertical features, etc.) should *not* include any part of the cost of the local loop.

Suppose, however, that even after this explanation, some recalcitrant observer is still inclined to (improperly) treat the non-traffic sensitive cost of the loop as a shared cost of services that use the loop. It *still* does not follow that any of that shared cost should be recovered on a usage basis from any of the services to which this putatively shared cost has been allocated. There is general agreement that neither the first minute nor any additional minute of usage causes additional loop costs to be incurred. Thus, economic efficiency and the principle of cost causation would require that the *recovery* of any loop costs assigned to a usage service be done on a flat-rated basis (i.e., a basis independent of the amount of usage). Otherwise, high-use customers would be asked to pay more than the non-traffic sensitive loop costs their subscription entails and low-use customers would be asked to pay less. Such an arrangement would not be sustainable when markets are opened to competition. High-volume customers would switch to a competitor offering a lower usage price and a higher flat-rate subscriber access price, and carriers would be unable to serve low-volume customers profitably without charging a higher flat-rate price. Cost causation aside, it would still be inefficient to recover any of those supposedly shared costs from usage services because marking up the price of usage services above incremental cost to recover shared fixed costs would reduce demand for those services by a much greater proportion than marking up the price of subscriber access. On pure efficiency grounds, whatever fixed costs are shared between usage and RBLTS should be recovered predominantly from RBLTS.

IV. Value of Service and Telephone Service Pricing

A. Cost Recovery by Multi-Service Firms

As explained in previous chapters, a multi-service firm that experiences economies of scale and/or scope (i.e., a firm that has high fixed costs relative to operational variable costs and some or all of those fixed costs are shared by different services) cannot fully recover all of its costs if it prices its services *exactly* at their respective TSLRICs. This feature of multi-service production will remain true no matter how efficiently the firm in question functions and how intensely all firms in the market compete. The efficient pricing principle that would enable complete recovery of the multiple-service ILEC's legitimate total costs is to allow the ILEC to mark up its prices above their respective TSLRICs. If the markups are done right, the contribution so generated from each service price would enable full recovery of the ILEC's shared and common costs.

The need for efficient contribution from service prices of multi-service ILECs is being increasingly recognized by regulatory agencies and legislative bodies. The Telco Act, the FCC, and state commissions now permit the inclusion of such contribution in service prices. While there may remain additional questions about just how much contribution is needed, or how much contribution each service should provide, the fundamental *need* for that contribution is now generally accepted. This section explains how economic theory may be used to determine economic efficiency, the real-world ILEC's prices *can* be "set" so as to minimize the cumulative loss of economic efficiency. Such an outcome (necessarily a feature of real-world markets where competition is not "perfect") is known as *second-best optimality* and expresses the best that society can expect to achieve under the circumstances.[24]

C. Methods of Second-Best Optimal Pricing

1. Value of Service Pricing Leads to Economically Efficient Prices

Prices charged by real-world ILECs necessarily include contribution. In theory, if the distortion to allocative economic efficiency that results from including contribution in prices could be minimized, then those prices would also be economically efficient. In practice, however, a great deal of care must be exercised when determining economically efficient prices and contribution levels. Past history of pricing by regulated public utilities shows why such care is essential. From time to time, various *allocation* schemes—relying on a single (and, usually, overly simple) formula—have been used to determine the level of contribution in price. One such scheme known as *fully distributed pricing* ("FDC") was widely used by public utilities but now, with the advent of incremental cost-based pricing, has been all but abandoned, including by the FPSC. The two main defects of the FDC method are that it leads to:

- prices that are inherently arbitrary (and possibly unfair) with no guarantee that any loss of allocative economic efficiency would be minimized, and
- prices that ignore valuable market (in particular, demand) information and, therefore, cannot truly represent market forces.

A wide cross-section of economists believes that a form of pricing called *value of service pricing* (or some variant of it) has the ability to deliver prices that are second-best

[24] Of course, except under regulation, competitive firms do not "set" prices; rather, to one degree or another, they "accept" prices that are determined by the interaction of demand and supply in the market. However, for pedagogic purposes, economically efficient price *setting* for regulated firms and economically efficient price *determination* in competitive markets may be thought of as being the same thing since both lead to second-best optimal prices that include contribution.

optimal, subsidy-free and fair, and reflect market forces.[25] In economics, value of service pricing refers to the use of market demand information for determining efficient prices.[26]

Value of service pricing determines the appropriate level of contribution on a service-by-service basis, not by the application of a fixed common allocator. That leads to differences in the contribution by service in both level and percentage terms. In its most elementary form, the percentage contribution (i.e., the percent by which price is marked up above TSLRIC) of a service is set in inverse proportion to the own-price elasticity of demand for that service.[27] More sophisticated versions of this rule take account of cross-price elasticities of demand among the various services as well.[28] Because own-price (and cross-price) elasticities can vary by service, the contribution markups implied by this rule can vary by service as well. Furthermore, because of the inverse-elasticity rule, services that have the lowest own-price elasticities would incorporate the largest percentage markups, while those with the highest such elasticities would be marked up the least (on a percentage basis).

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[25] Value of service pricing is most familiar under the labels "Ramsey pricing" (after Frank Ramsey who first proposed the method in 1927) and "inverse elasticity pricing" (for reasons that will become clear). Support for value of service pricing may be found in Stephen J. Brown and David S. Sibley, *The Theory of Public Utility Pricing*, New York: Cambridge University Press, 1986; William J. Baumol and J. Gregory Sidak, *Toward Competition in Local Telephony*, Cambridge, MA: The MIT Press and Washington, DC: American Enterprise Institute, 1994, p. 56; Sanford V. Berg and John Tschirhart, *Natural Monopoly Regulation: Principles and Practice*, New York: Cambridge University Press, 1988, pp. 93-97; and Bridger M. Mitchell and Ingo Vogelsang, *Telecommunications Pricing: Theory and Practice*, New York: Cambridge University Press, 1991, Ch. 8.

[26] As explained below, this contrasts with how the term value of service pricing is used in regulatory parlance.

[27] Own-price elasticity of demand is a measure of how sensitive the demand for a service is to its price. It is measured as the percent change in the quantity demanded for each percent change in the price. Thus, an own-price elasticity of -3 indicates that if price were to rise (fall) by 10 percent, demand would fall (rise) by 30 percent. The negative sign of this elasticity signifies that demand moves in the opposite direction of price. An analogous concept is the *cross*-price elasticity of demand which measures the sensitivity of demand for one service when the price of *another* service changes. Thus, if the cross-price elasticity between two services *A* and *B* is a positive number then the two services are *substitutes* (because as the price of, say, *A* rises, the demand for *B*—now the *relatively* cheaper service—rises as well as consumers substitute *B* for *A*). Conversely, if the cross-elasticity is a negative number, then *A* and *B* are *complements* (because as the price of one falls (rises), demand for *both* is stimulated (depressed)). A *zero* cross-price elasticity signifies that *A* and *B* are *independent* in demand.

[28] Berg and Tschirhart, *op cit.*, Ch. 3. More generally, the pricing rule ensures the same percentage distortion in demand for each service which minimizes the total reduction in economic welfare. At these efficient prices, the vector of demands for services will be proportional to the demands forthcoming at prices equal to incremental cost for each service.

It is easy to see how value of service pricing overcomes the two main problems with any allocation-based method. First, there is nothing arbitrary about the manner in which the markups are determined. Those markups do not depend on cost or supply-side conditions alone (in particular, on attributable costs that can vary *without* any change in the underlying output, or outputs that can change *without* generating any change in attributable costs). Instead, the markup depends solely on *demand* conditions, the all-important market force that allocation methods ignore. In other words, once the supply side of the market has determined the price floors (TSLRICs), the demand side of the market fills in the appropriate contribution information. Ultimately, the final price is the result of both demand and supply forces.

Besides reflecting demand-side forces, there is a deeper reason for using the inverse own-price elasticity rule to determine the percentage markups. When the price of a service is set above incremental cost, some demand for the service is almost inevitably suppressed. That is because those individuals whose valuation of the service is less than the going price, but is somewhere in the range between the TSLRIC and the going price, will forego consumption of the service. Because it costs society only the TSLRIC to provide the service, social welfare is maximized by enabling all individuals with valuations of the service at the level of the TSLRIC and higher to consume the service. A price higher than TSLRIC suppresses some of this consumption and, hence, causes some sacrifice of social welfare.[29] While it is true that a price higher than TSLRIC will suppress some consumption and sacrifice social welfare to some degree, the degree of that sacrifice varies with the own-price elasticity of demand. By construction, the lower (higher) is that elasticity, the greater (smaller) is the consumer's tolerance of a price change. That is, when a price rises, a consumer reacts more strongly (by reducing consumption) when the elasticity is high than when it is low.[30] In other words, for low-elasticity services, consumer reaction to prices marked up above TSLRIC is likely to be

[29] This can be illustrated with a simple hypothetical example. Suppose the TSLRIC of RBLTS is $20 per month but its price is set at $30 per month. All individuals who value that service at $30 or higher per month will subscribe to RBLTS, but those who value it between $20 and $30 per month will not. Because, it costs society only $20 per month to provide RBLTS, all consumption foregone by individuals who value the service in the $20-$30 range represents the extent to which social welfare is sacrificed by the deviation of price from TSLRIC.

[30] In the limit, if the own-price elasticity is zero, no amount of price change can alter consumption one way or the other.

less pronounced and, hence, the loss of allocative efficiency and social welfare from such a price is likely to be smaller. The opposite would be true for higher-elasticity services. Therefore, by marking up low-elasticity services *relatively* more than high-elasticity services, the necessary contribution (that enables the ILEC to cover all its costs) can be generated, while also minimizing the loss of efficiency and social welfare that any marking up of price entails.

In sum, value of service pricing attempts to simulate forces of both market demand and supply in discovering socially optimal (albeit, second-best) levels of contribution, on a service-by-service basis. It avoids the quick-fix but entirely arbitrary approach advocated by simplistic allocation methods. In theory, it generates only as much contribution in total as is needed to recover all non-incremental costs. In contrast, arbitrary allocation methods provide no such assurance. Ultimately, value of service pricing provides an economically rational method of protecting the legitimate financial concerns of ILECs that experience scale and/or scope economies, while adhering as closely as possible to the yardstick of economic efficiency and social welfare maximization.

2. Can the Market Itself Simulate Value of Service Pricing?

Two "limitations" of value of service pricing are frequently cited in the academic and regulatory arenas. First, for this pricing method to work as envisioned, significant information about the *market* price elasticities of the various services is needed. That is easier said than done because (i) data of the requisite quantity and quality may not be available or easily accessible and (ii) significant structural change (e.g., transition between alternative regulatory regimes or between regulation and open competition) may make it impossible to estimate price elasticities reliably. Second, by calling for the steepest contribution to be in the prices for the lowest-elasticity services, this pricing method creates an appearance of unfairness.[11] The FCC has used this argument to reject value of service pricing for unbundled network elements:

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[11] Unfairness supposedly arises at two levels. First, low elasticity signifies consumer dependence on a service (or, the absence of options). Thus, the highest contribution is assessed to the most "captive" of consumers. Second, since RBLTS has historically had the lowest elasticity among telephone services, substantial contribution in the price of RBLTS may frustrate the public policy goal of universal service (which, so far, has been promoted by consciously subsidizing RBLTS).

> On the other hand, certain allocation methods would not be reasonable. For example, we conclude that an allocation methodology that relies exclusively on allocating common costs in inverse proportion to the sensitivity of demand for various network elements and services may not be used. We conclude that such an allocation could unreasonably limit the extent of entry into local exchange markets by allocating more costs to, and thus raising the prices of, the most critical bottleneck inputs, the demand for which tends to be relatively inelastic.[32]

That is, in this view, economic *efficiency* is not a sufficiently strong consideration to overcome concerns about fairness and equity.[33]

Despite those alleged limitations, value of service pricing provides an important paradigm that can be the basis for more imaginative—and acceptable—forms of pricing that serve the same ultimate purpose: to enable multi-service ILECs to recover all their costs in the presence of scale and/or scope economies and in the absence of any subsidy. More importantly, the market itself can produce value-of-service prices without the need for intervention or second-guessing by regulators or other agents with limited information. That can happen by allowing market forces themselves to determine sustainable levels of contribution in the different services. To accomplish this, an extension of value of service pricing called *nonlinear* or *multi-part tariff pricing* can be practiced.[34]

The simplest form of nonlinear pricing is two-part pricing. Under this scheme, consumers are offered a choice among different pricing plans for a service, each plan offering a different combination of access (to the service) and usage. For example, in its simplest form, there may be two such plans for a service: the first charges an access fee but offers unlimited usage at zero charge, while the other has a relatively lower access fee but offers usage for a per-unit usage charge. The idea is that even though price elasticity information may not be reliably known, consumer valuations of the service are "revealed" by the manner in which they choose

[32] FCC Interconnection Order, ¶ 696. (Footnote omitted)

[33] However, it should be noted that the FCC's negative view of value of service pricing applied to the pricing of inputs or wholesale services (unbundled network elements) rather than to that of outputs or retail services, and expressed concern about possible barriers to competitive entry by rival firms rather than about the welfare of end-users.

[34] For extensive discussions of this topic, see Robert B. Wilson, *Nonlinear Pricing*, New York: Oxford University Press, 1993, Mitchell and Vogelsang, *op cit.*, Ch. 5, or Brown and Sibley, *op cit.*, Chs. 3-7.

among different two-part tariff plans. Thus, if enough such plans (which vary by price and access-usage combinations) are offered, the demand information necessary for optimal pricing would become available to a sufficient degree from the choices consumers actually make. Two- or multi-part tariffs may be designed to appeal to very diverse consumers in ways that a single, uniform price never can. For the example given above, the high access fee/unlimited usage plan may appeal more to the high-volume consumer while the low access fee/metered usage plan may appeal to the low-volume consumer. A single price, on the other hand, may prove too high for at least some segment of consumers and exclude them from the market. Thus, not only does two-part pricing provide a way for the market itself to reveal critical demand information, it also improves social welfare by broadening the appeal of a service to a wider class of consumers and encouraging greater market participation.

Nonlinear pricing of this type reduces the need to depend on formulaic approaches to determining optimal contribution levels in service prices. It also reduces the need for assembling and processing elusive market demand information, and lowers concerns about the inherent unfairness of prices based on inverse elasticity rules. Multi-part pricing (a form of social welfare-enhancing price discrimination) can be easily experimented with until firms discover for themselves the combinations of prices and access-usage offerings that maximize their revenues and the opportunity to recover all costs. Increasingly, markets with (i) competition or deregulation and (ii) firms with economies of scale and/or scope (e.g., airlines, electric power, etc.) are resorting to nonlinear pricing practices. The opportunity clearly exists in telecommunications where optional two-part tariffs for local exchange service can be—and have been—designed.[35] That is a hopeful sign because such practices enable firms to recover their costs while reducing the burden on those firms (and, where applicable, their regulators) to determine fair and efficient prices based on market information that is incomplete at best.

[35] Indeed, in some states, subscribers to flat-rated residential local exchange service also have the opportunity to choose from several different optional "measured service" pricing plans with different access-usage combinations. Elsewhere in telecommunications, two-part pricing is already standard practice for internet, wireless, and long distance telephone companies.

3. Economic and Public Policy Views of Value of Service Pricing Differ

As remarked earlier, the *economic* view of value of service pricing is quite different from value of service pricing viewed from a *social* or *public policy* standpoint. In traditional regulatory parlance, value of service pricing has meant that prices are set for different groups of customers on the basis of a public policy judgment regarding the value (to those customers) of the service in question. That judgment is paternalistic because it reflects the *policymaker's*, not the *customer's*, preferences and valuations of the service. The economic view of value of service pricing, on the other hand, is based entirely on customer preferences and valuations.

This difference can be best understood in terms of the price outcomes themselves. The public policy view of value of service pricing—anchored by the overall social objective of providing universal service—seeks to provide RBLTS to low-income and rural customers at subsidized prices, even if it means (i) having to set high prices to customers in densely populated urban areas or to business customers in order to create the subsidy flows necessary and (ii) disregarding differences in the cost to serve those different customer groups. The underlying public policy value judgment is that the value of RBLTS is greatest for indigent or rural customers—other things being equal—and that subsidizing those customers in order to ensure their participation is in the public interest. In contrast, the economic view of public service pricing makes no such value judgments. Rather, prices vary in direct response to the (i) willingness and ability to pay of the customers themselves and (ii) differences in the (incremental) cost to serve. Public policy itself does not provide a steering mechanism for prices. Thus, if customers in urban areas pay different prices for RBLTS than their rural counterparts, it is because of those differences in customer valuation (i.e., price elasticities of demand) and the cost to serve. This form of value of service pricing does *not* establish a mechanism by which one group of customers subsidizes another purely because of a public interest determination made by policymakers.

Regardless of this difference, there may still be valid public interest grounds for subsidizing RBLTS to specific groups of customers, e.g., low-income consumers who may be unable to afford service except at very low rates. If public policy justifies providing service to those customers at prices below TSLRIC (i.e., at subsidized prices), then the appropriate action is to provide *targeted* subsidies to only those customers, and to set prices to all other customers in accordance with the economic form of value of service pricing. Moreover, those targeted subsidies should then supported by a separate and explicit fund, rather than by the ILEC's other customers. In the final analysis, exceptions for targeted subsidies notwithstanding, only the economic view of value of service pricing should be adopted for pricing RBLTS to different customer groups.