4. GTE's Cost Models and Studies

Joint and Common Costs

Q. Let's turn to your discussion of joint and common costs. Could you begin by defining these two costing concepts?

A. Yes. Common costs are incurred when production processes yield two or more outputs. They are often common to the entire output of the firm but can be common to just some of the outputs produced by the firm. An increase in production of any one good will tend to increase the level of common costs; however, the increase will not necessarily be proportional. The costs of producing several products within a single firm may be less than the sum of the analogous costs that would be incurred if each of the products were produced separately.

A joint cost is a specific type of common cost--one incurred when production processes yield two or more outputs in fixed proportions. A classic example arises in the joint production of leather and beef. Although cattle feed is a necessary input for the production of both gloves and hamburgers, there is no economically meaningful way to separate out the feed costs that are required to produce each. If the quantity of leather and beef is reduced, there will be a savings in the amount of cattle feeding costs, but it is impossible to say how much of this change in cost results from the change in the quantity of leather and how much from the change in the quantity of beef.

Q. Would you please explain joint and common costs in greater detail?

A. Certainly. A firm that produces a single product sold in a single market incurs only direct costs. These include capital costs (cost of money, depreciation, income taxes) and all expenses exclusively attributable to a specific product or service. However,

when the firm is engaged in producing multiple products or serving multiple markets, it normally also incurs joint and/or common costs.

Joint costs are incurred when production facilities simultaneously serve two or more markets (or produce two or more products) in fixed proportions. Because proportions are fixed, it is impossible for the firm to increase or decrease the amount of output for one market without changing in the same proportion and in the same direction the output or capacity available for another market. Consequently, joint costs vary in proportion to the total available output of the joint production process, not the output of the individual joint products. Due to this interdependence between different products and markets, joint costs pose some special problems in the economic theory of pricing.

Common costs fall somewhere between direct and joint costs: they are not directly attributable to a single service, yet they vary to some degree with the quantity of production of each service. Typical examples of common costs include salaries and other costs of the firm's upper level executives, regulatory and legal expenses, and audit expenses.

It is somewhat difficult to find perfect examples of joint costs, because there are few production processes which exhibit absolute fixity of proportion. However, if the definition is relaxed somewhat, joint products and costs often occur in practice, particularly in intermediate stages of production. In the latter instances, direct costs are also incurred, in order to produce individual final products. A classic example of a joint cost would be the cost of feed used to produce the intermediate joint products beef and hides. Additional direct costs are incurred in order to produce the final products (e.g., hamburgers and leather coats). Additional amounts of cattle feed will concurrently increase the available output for both hamburger and leather coats.

In the telecommunications industry, the cost of the "subscriber loop" is a joint cost required for the provision of at least three different services: local exchange

service, intrastate long-distance service, and interstate long-distance service. Since the installation of an additional subscriber loop increases the capacity available for placing and receiving all three types of calls, the telephone company cannot increase the capacity for local calls without concurrently increasing the capacity for toll calls.

Economic theory demonstrates that there is no inherently correct method of allocating joint costs among the various joint products. In competitive markets, purchasers of each of the joint products will bear some share of the joint costs, in relative proportions that are determined by the relative strength of demand in the various markets. Thus, assuming competitive markets, purchasers of leather coats will bear a relatively large share of the joint costs of feed if the demand for leather goods is strong and the demand for meat is weak.

Q. How are joint and common costs recovered in competitive markets?

A. To the extent common costs vary with output, they are recovered in the same manner as direct costs--they directly affect the marginal cost of producing each service, and thus directly influence prices. (In competitive markets, prices tend to be most closely related to marginal cost). Joint costs, on the other hand, have no impact on marginal cost, and thus do not directly determine prices in competitive markets. In those markets, purchasers of each of the joint products bear some share of the joint costs. The relative shares are not determined by arbitrary allocations of the costs, but rather by the relative strength of demand in the various markets. Stated another way, in competitive markets, each product is priced to maximize the contribution to the joint costs, within the constraints imposed by the product's demand.

For instance, in the example of beef and hides (which are joint products) leather coat buyers will obviously not be required to shoulder 100 percent of the feed costs, and consumers of beef none of these costs. Nor will the opposite occur. Since there is a considerable demand for both products, both will pay a share of the joint costs. The

portion of the joint costs of cattle production which is recovered from consumers of leather goods will depend on the amount they are willing to pay for leather; this is limited by the availability and price of substitutes (e.g. vinyl), income constraints, and other demand-related factors. Similarly, the amount of cattle production costs which is recovered from meat consumers depends upon how much they are willing to pay for hamburgers and steak; this is constrained by the relative popularity and price of substitutes, such as chicken and pork, as well as other factors (e.g. income).

To reiterate, in competitive markets joint costs are never recovered entirely from consumers of one of the joint products, to the exclusion of the others; rather, the costs are shared by both groups of consumers, with the respective proportions depending upon the relative strength of demand. The stronger the demand for a particular joint product, the greater the share of joint costs which will be borne by that product.

A similar result is appropriate for telecommunications, with both toll and local customers contributing towards the joint costs of the loop capacity that serves both the toll and local markets. This is a fundamental difference between my pricing philosophy and that of the Company (which treats the joint loop costs as if they should be recovered entirely from local customers). In fact, because the demand for toll service is stronger than the demand for local service on a per-minute basis, (reflecting the inherently greater value of communicating over much longer distances), a competitive market result would reflect a larger contribution (per minute) from toll customers than from local customers.

Q. What was the Company's approach to common costs?

A. Some costs which are incurred within a single wire center but are common to several services or elements were included in its studies, and were spread to the specific items in question. Other, more substantial, common costs were not included directly in its

studies. These common costs, which are typically incurred at a higher, corporate, level, were analyzed separately. GTE started with 1996 uniform system of accounts data, which it considered "representative of its actual operations." The Company then removed those costs it classified as incremental costs, in order to arrive at its baseline common costs. These baseline data were adjusted "to account for reasonably anticipated and quantifiable future events." For asset-based accounts, this adjustment was made by first applying a multiplier to each account to arrive at a replacement cost. This replacement cost was then adjusted by an annual cost factor to arrive at the cost of holding the asset. For all other accounts, GTE took its 1996 USOA data and reduced each account "to reflect a commensurate reduction in GTE's process re-engineering expenses on a forward looking basis."

Q. Do you see any problems with GTE's common cost approach?

A. Yes. The Company has heavily relied upon its embedded cost data, but it isn't clear whether it has adequately identified those cost reductions which would occur in the long-run context in which an efficient carrier provided only unbundled elements. The Company was careful to make adjustments to its embedded data to reflect higher replacement costs for some items (e.g., buildings). However, it seems to have been less vigorous in its efforts to make downward adjustments to the embedded data to reflect the increased efficiencies and cost savings appropriate to a long-run study (where the firm can optimally adjust its operations for minimum cost). Also, it isn't clear whether it has adequately removed the impact of its retail operations from its common cost calculations. A firm whose sole business is renting unbundled network elements to other carriers would likely have a far lower level of marketing costs and general and administrative overhead. I am not convinced that the Company has adequately adjusted its embedded common cost data to reflect this difference.

Q. Do you have any other criticisms of GTE's common cost methodology?

A. Yes. The Company has not adequately documented its approach. For example, the Company claims to have removed from its common cost pool all costs that were included in the incremental costs of network elements, as well as all retail costs. However, GTE does not disclose the amounts that it claims to have removed from each account, nor does it provide workpapers or supporting documentation for this process. After removing these undisclosed costs, GTE then assumes that all remaining costs are reasonable to include as common costs.

Q. Let's turn to the Company's treatment of joint costs. Has the Company appropriately dealt with these costs?

A. No. Joint costs should not be included in a TSLRIC study, since they will be incurred regardless of whether or not a specific service is provided. GTE did not consistently followed this logic. With regard to services like custom calling, intraLATA toll, and switched access, GTE did appropriately exclude the joint cost of the local loop. However, it has taken the extreme opposite approach with regard to basic local exchange service, which received an allocation of 100% of the loop costs. In response to a discovery question, GTE explained this inconsistency as follows: "GTE does not allocate loop costs to services in the development of TSLRIC studies. Local basic exchange service includes the total cost of the local loop." [GTE response to OUCC Data Request No. 25ooo].

Q. Are loop costs part of the direct cost of basic local exchange service?

A. No. While these costs are necessary in order to provide basic local exchange service, they are equally necessary for the provision of toll, access, and custom calling service. In terms of economic theory, loop costs are joint or shared costs of the entire family of

services that require use of these facilities; they are not part of the direct, marginal or incremental cost of any single service within this family of services.

Disputes over the appropriate definition and treatment of these joint costs lie at the heart of the longstanding dispute concerning whether, or to what extent, basic local exchange service is "subsidized" by other services. Claims are often made that basic service is subsidized, but in most cases these claims depend entirely on a cost analysis which, like GTE's in this proceeding, inappropriately allocates 100% of the joint costs to basic service alone. As recognized in numerous proceedings, this procedure is not valid, and the resulting total for local exchange service cannot be compared meaningfully to the revenues derived from this service, nor can it be used to draw valid conclusions concerning "subsidies."

LECs have many retail revenue sources that depend upon, and are available to help recover, the joint costs of the loop, drop wire, line card, and channel connection. Hence, these joint costs cannot be meaningfully compared with the revenues associated with local exchange service alone, nor can they appropriately be included in an estimate of the total service long run incremental cost (TSLRIC) of basic local exchange service.

The facilities that are used in providing access lines also are required for--and used by--other services that the Company provides, including interstate switched access, intrastate switched access, intrastate toll, and custom calling. The poles, cable, drop wire, line card, and channel connection are required equally for the provision of these other services.

Historically, economists, regulators, and others have recognized that one of the crucial components, or intermediate products, used to provide toll, local, and other services is an access line. That access line is available jointly to serve toll and local markets. Unless congestion is present, there is no trade-off between the two purposes. In other words, when an additional access line is installed, it simultaneously increases

the intermediate output (access) available to both toll and local markets (as well as the market for other services, such as custom calling).

Even if a line is intended strictly for local calls, it can also be used to place and receive toll calls, and vice versa. In this situation, access is analogous to cattle feed in the production of beef and leather coats. Even if feed is strictly intended to increase the amount of available beef, it concurrently increases the amount of hides that are available. Of course, because an intermediate product is involved, there is no assurance that quantities of the final products will be produced in exact proportion to the quantities of inputs.

In other words, an increase in cattle feed will not necessarily increase the number of leather coats that are produced, if the hides are thrown away and never converted into coats. Similarly, the addition of another access line will not automatically increase the number of toll or local calls, nor will the volume of the final products (completed calls to various locations) increase in strict proportion to the addition of another access line. There is nothing startling, however, about this situation. In a similar way, hamburger production does not vary precisely with the number of leather coats.

The confusion can be eliminated by further disaggregation. Simply stated, completed toll calls typically involve three or more intermediate steps: use of two access lines, one or more switches, and one or more interoffice trunks. In turn, some of these components can be used only for local purposes, some only for toll, and others for both purposes. Because of congestion, switching and trunking typically involve either direct costs (when the item is dedicated to one market or the other) or common costs (when the item is shared but increased use in one market displaces use in the other market). The access line is obviously either a joint or a common cost, since it serves both markets. I believe it can be viewed most accurately as a joint cost, in the typical

situation where the line is not highly congested and use in one market does not preclude use in the other market.

More specifically, the provision of an access line yields at least two joint products: access to customers within the same locality (local access) and access to customers within other cities (toll access). Because the latter form of access is provided via toll carriers, one can think of the access line as providing access to local and toll networks. Of course, since communication is generally two-way, we also can say that two other joint products are provided as well: access to the customer installing the line for other customers within the same locality and access to that customer for toll carriers and their customers.

Sometimes it is argued that "access" (or access lines) can be viewed as a separate product, thus "solving" the joint cost problem. However, even if we were to accept this notion as valid (which I do not), it does not solve the pricing problem or change the fundamental nature of the situation. To the contrary, the product thereby defined is an intermediate product that is ultimately used in two or more markets, and the joint characteristics do not simply disappear. Similarly, if one defines the product being produced from cattle feed as "cattle," this doesn't change the fact that cattle feed is a joint cost that impacts both the beef and leather markets. Nor does it change the fact that the cost of the cattle feed (or the cost of the intermediate product called "cattle") is ultimately borne by purchasers of both beef and leather.

"Access" is provided to other lines situated within the same city, but it is simultaneously provided to toll carriers with points of presence in that city. Via their facilities, "access" is provided in both directions to millions of lines located in hundreds of other cities around the state, nation, and planet. There is no necessary reason to assume that the entire cost of a particular access line should be borne entirely by the customer that is directly connected to that line, since "access" functions in both

directions, and it provides valuable benefits to both the local market and within the long distance market.

There is no economic reason to assume the entire cost of the access line should be recovered through the price of local service, from the particular customer who requests installation of the line. Rather, it is appropriate to recover the cost from all of the beneficiaries of that line--including the other local customers in that city and the toll carriers that are interconnected to the new line, whether directly or indirectly.

Q. Have other jurisdictions followed this approach with regard to analyzing and recovering the joint cost of access lines?

A. Yes. For example, on April 11, 1996, the Washington Utilities and Transportation Commission issued an order rejecting proposed tariff changes by U.S. West. [Commission Decision and Order Rejecting Tariff Revisions, Docket No. UT-950200.] In analyzing various cost studies submitted in that proceeding, the Commission found as follows:

> [T]he cost of the local loop is not appropriately included in the incremental cost of local exchange service. The local loop facilities are required for nearly every service provided by the Company to a customer. Neither local service nor in-state long distance service nor interstate long distance nor vertical features can reach a customer without the local loop. Should USWC cease to provide any one of these services, its need for a local loop to provide the remaining services would remain. The cost of the local loop, therefore, is not incremental to any one service. It is a shared cost that should be recovered in the rates, but no one service is responsible for that recovery. USWC's presentation that the local loop is appropriately and necessarily an element of the cost of local exchange service, made through the testimony of witness Farrow, is not credible in light of the purposes of a long run incremental cost study and is inconsistent with accepted economic theory regarding such studies. [Order, p. 78]

Similarly, in the Colorado rules attached as Appendix C, the Colorado Commission discusses access loops, and states as follows:

> The access loop is not a separate service but rather is an input necessary for the provision of many telecommunications services. As such, costs associated with the access loop will not appear in the total service long run incremental cost of any single service requiring the access loop but will appear as part of the total service long run incremental cost of the entire group of services requiring the loop. Consequently, price must be set so that the sum of the revenues from all services requiring the access loop covers not only the sum of the total service long run incremental costs for the individual services but also the shared cost of the loop. Finally, regarding the computation of stand alone costs, since each service in this group requires the access loop, the entire cost of the loop will appear in the stand alone cost for each of these services. [Rule 4(2)(iii)].

Q. What conclusions have you reached concerning the treatment of joint and common costs in this proceeding?

A. I recommend that the Commission insist upon a better documented, more persuasive showing concerning the amount of common costs which can reasonably be attributed to the various unbundled network elements, consistent with a true long run economic costing approach. However, rather than exclude any recovery for common costs, I recommend that using 10% markup, or allowance. This is a conservative percentage figure, which will avoid any over recovery of common costs. If the Company is convinced that its actual level of long run common costs is higher than this, it can be given another opportunity to make its case more persuasively than it has in this proceeding.

With regard to joint costs, this issue does not significantly impact the cost calculations for unbundled network elements, since relatively few costs are joint across multiple elements. However, the Commission should not be misled by the TSLRIC studies submitted by the Company in this proceeding. The Company asserts that its current basic local exchange rates are not adequate to recover the cost of the local loop. However, this assertion is both irrelevant and misleading. No one service can be expected to recover the entirety of the joint costs incurred in providing multiple

services. The key question which is relevant to this proceeding is whether a carrier is able to recover its loop costs (e.g. the unbundled loop rates which will be paid by competing carriers) from the total revenue stream generated by that loop. In answering this question, it is critically important to look at the entire array of revenues generated by the loop, including switched access, intrastate toll, interstate toll, custom calling, and basic local exchange. If there are specific markets (e.g. rural communities) where the total amount of retail revenue generated by a typical loop is not sufficient to recover the cost of that loop, there is reason to be concerned, since competitors will be discouraged from entering those particular markets. Assuming such a problem exists in a specific market, there are several potential solutions. Most notably, a "universal service fund" or other regulatory mechanism may be needed, to help cover the high costs of serving these particular markets.