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.

The term "common costs" is used by economists to describe costs that are incurred in production of multiple products or services, and which are not directly attributable to a single 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. The term "shared" costs is sometimes used to describe joint and common costs without distinguishing between these two terms. Joint costs are a particular type of common costs–those 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.

Joint production functions (and joint costs) have traditionally been defined by economists based upon "fixed proportions." However, this can lead to confusion, since it is difficult to find

1   perfect examples of joint costs. There are few production processes which exhibit absolute fixity

2   of proportion, except, perhaps, at intermediate stages of production. In the Handbook of Industrial

3   Organization, a standard reference work edited by Schmalensee and Willig, in an article entitled

4   "Technological Determinants of Firm and Industry Structure," Dr. John C. Panzar explains joint

5   costs in a cogent, and more intuitive, manner. He explains that joint costs arise when there are

6   production factors that "once acquired for use in producing one good... are costlessly available for

7   use in the production of others." Handbook at 17. This alternative definition clearly fits the familiar

8   example of the joint production of beef and hides. Once the decision is made to produce more beef,

9   the cattle feed used in fulfilling this process will costlessly also produce hides. Similarly, once the

10   decision is made to install one more loop in order to produce any one output, such as local service,

11   it is "costlessly available for the production of others," such as call waiting service.

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

13   A.   To the extent common costs vary with output of individual services, they are

14   recovered in the same manner as direct costs--they directly affect the marginal cost of producing each

15   service, and thus directly influence prices. (In competitive markets, prices tend to be most closely

16   related to marginal cost). To the extent common costs do not vary with output of individual services

17   (as is the case with joint costs), they have no impact on marginal cost, and thus do not directly

18   determine prices in competitive markets. Nevertheless, purchasers of each of the joint products bear

19   some share of the joint and common costs. The relative shares are not determined by arbitrary

20   allocations of the costs, but rather by the relative strength of demand in the various markets. Stated

21   another way, in competitive markets, each product is priced to maximize the contribution to the joint

1   and common costs, within the constraints imposed by the product's demand.

2   For instance, in the example of beef and hides (which are joint products) leather coat buyers

3   will obviously not be required to shoulder 100 percent of the feed costs, and consumers of beef none

4   of these costs. Nor will the opposite occur. Since there is a considerable demand for both products,

5   both will pay a share of the joint costs. The portion of the joint costs of cattle production which is

6   recovered from consumers of leather goods will depend on the amount they are willing to pay for

7   leather; this is limited by the availability and price of substitutes (e.g. vinyl), income constraints, and

8   other demand-related factors. Similarly, the amount of cattle production costs which is recovered

9   from meat consumers depends upon how much they are willing to pay for hamburgers and steak; this

10   is constrained by the relative popularity and price of substitutes, such as chicken and pork, as well

11   as other factors (e.g. income).

12   To reiterate, in competitive markets joint costs are never recovered entirely from consumers

13   of one of the joint products, to the exclusion of the others; rather, the costs are shared by both groups

14   of consumers, with the respective proportions depending upon the relative strength of demand. The

15   stronger the demand for a particular joint product, the greater the share of joint costs which will be

16   borne by that product.

17   Q.   You mentioned earlier that it isn't appropriate to expect revenues from just one

18   service to recover all of the shared costs. Would you please elaborate on this point, particularly as

19   it relates to loop and port costs?

20   A.   As the FCC and many state commissions have affirmed, loop and port costs are joint

21   or shared costs necessary for the provision of toll, access, and custom calling service, as well as local

1   exchange service. Even if a line is intended strictly for local calls, it can also be used to place and

2   receive toll calls, and vice versa. Local loops are thus analogous to cattle feed in the production of

3   beef and hides. Even if the feed is strictly intended to increase the amount of beef, it concurrently

4   increases the amount of hides which are available. The economic literature clearly establishes that

5   the cost of cattle feed won't be borne entirely by purchasers of steak and hamburger; some of the

6   feed costs will inevitably be recovered from purchasers of leather coats and gloves.

7   In general, the more different products involved in the common production process, the more

8   widely one would expect the costs to be spread. Thus, for example, revenues from the sale of steak,

9   ribs, hamburger, beef fat, and leather will all be involved in recovering cattle feeding costs.

10   The provision of a loop and port yields at least two joint products: access to customers within

11   the same locality (local access) and access to customers within other cities (toll access). Since the

12   latter form of access is provided via toll carriers, one can think of the loop and port as providing

13   access to local and toll networks. Of course, since communication is generally two-way, we can also

14   say that at least two other joint products are provided, as well: access to the customer installing the

15   line by other customers within the same locality, and access to that customer by toll carriers and their

16   customers. However, this does not end the list of services involving the loop and port. A LEC has

17   many revenue sources which directly benefit from, and have generally helped recover, these shared

18   costs, including custom calling and Caller ID and voice mail.

19   Generally, when a customer is connected to the public switched network, that customer is

20   provided with access to the other lines situated within the same city, but access to that customer is

21   simultaneously provided to the toll carriers with points of presence in that city; and via their

1   facilities, access to that customer is provided to millions of lines located in hundreds of other cities

2   around the state and country.

3   Notwithstanding strong advocacy efforts by both local exchange and interexchange carriers,

4   most state regulatory commission have been reluctant to recover the entire cost of loops and ports

5   as part of the price of local service. A share of these costs has historically been recovered from

6   numerous other services, including switched access services provided to toll carriers, as well as the

7   custom calling and other ancillary services related to the line.

8   This broad approach to cost sharing has long been used in Missouri, as well as in many other

9   states. Not only is it consistent with the historic pattern in many telecommunications markets, it is

10   also consistent with the normal practice in unregulated markets. Just as cattle feed costs are

11   recovered through the price of steak and coats, loop and port costs have historically been recovered

12   through the price of toll, local, and many other services.

13   Q.   Placing of 100% of loop costs on local service has sometimes been defended on a

14   "cost-causative basis." Would you discuss this argument?

15   A.   Yes. It is sometimes argued that the cost of the access line is effectively "caused" by

16   the act of subscribing to local exchange service, and that all other services that may be provided over

17   the line are made available costlessly and are thus economically irrelevant. That is, because the line

18   is provided by the phone company on a bundled basis, in conjunction with local exchange service,

19   it is argued that the full cost of that line should be attributed to the local exchange category.

20   This is an overly simplistic view of causation, one that can lead to misleading conclusions.

21   In fact, if we want to really examine causation, the cost of a local loop as physical plant is incurred

1   when someone--perhaps an aspiring subscriber in years past, perhaps a real estate developer or home

2   builder, perhaps a phone company executive--makes a decision to install loop plant along a particular

3   route. Some of this plant is dedicated to a particular neighborhood, or house, and other plant serves

4   a broader geographic area. The decisions that lead to the act of installing these facilities can be seen

5   as the proximate cause of the cost. Subsequently, if consumers don't decide to purchase telephone

6   service, the plant will often sit idle; if they do decide to purchase service, it will be utilized. The

7   actual loop cost incurred by the phone company may not vary much either way. The investment in

8   loop plant accumulates carrying charges until a further decision is made to activate the circuit and

9   supply the dial tone that enables the line to become an active part of the public switched network.

10   At that time a billing cycle is initiated, and the cost of the loop begins to be recovered.

11   In general, however, "cause and effect" reasoning does not have any impact on the manner

12   in which joint costs are recovered in competitive markets. To the contrary, all of the joint products

13   contribute to the joint costs, regardless of which one "caused" the joint costs to be incurred.

14   Consider, for example, cotton and cotton seed. Cotton seed is a mere byproduct of the production

15   of cotton, and people buying cottonseed oil arguably don't "cause" cotton to be grown. Instead, one

16   can plausibly argue that consumers of cotton cloth "cause" the various costs of growing raw cotton

17   to be incurred. Yet, this causal relationship is irrelevant to recovery of the joint costs incurred by

18   cotton farmers. Consumers of both cottonseed oil and cotton clothing contribute to the cost of

19   growing and harvesting cotton. The mere fact that the planting of cotton is "caused" by demand for

20   cotton cloth does not result in all of the joint costs being recovered from the clothing market, and

21   none from the ancillary products like cottonseed oil. Customers in both markets share the joint costs,

1   in proportions that are determined by the relative strength of demand for cotton cloth and cottonseed

2   oil.

3   Attempting to assign costs on the basis of "causal relationships" is even less logical in the

4   context of telecommunications services. Undoubtedly, many consumers want to obtain and use an

5   entire array of telecom services, including local, toll and custom calling. Any attempt to trace "cost

6   causation" and to assign the loop and port costs to individual services on the basis of consumer

7   motivation is bound to be meaningless, since these costs are often "caused" by the desire to use the

8   full array of services, and the chain of causality cannot be uniquely traced to any single service

9   within this array. If the access line were bundled with toll service, and local service were priced as

10   an optional add-on, many consumers would still acquire an access line, to ensure that they can place

11   and receive toll calls. Under these circumstances, it might appear that the access line is a direct cost

12   of toll, and thus one could plausibly argue that the entire cost should be attributed to the toll

13   category. However, this type of reasoning is not economically valid, regardless of which service is

14   bundled with the access line, and regardless of which service provides the dominant or primary

15   motivation for acquiring the line. So long as numerous different services require the use of the line,

16   economic theory suggests that all of these different services will contribute towards the cost of the

17   line.

18   Q.   Given the problems with shared costs, is it even possible to compare costs with

19   revenues in a meaningful manner?

20   A.   Yes it is. While shared costs can be confusing, they do not pose an intractable

21   problem. There are at least three ways in which revenues and costs can appropriately be matched in

1   a context where shared costs loom large:

2   <u>First</u>, a pure incremental cost approach can be used: the direct cost of a particular service (or

3   group of services) is compared to the revenues from that service or group. Costs that are shared with

4   other services are excluded from the analysis. A calculation is then performed to determine the

5   magnitude of the contribution generated by that service (or family of services). This contribution

6   is available to help cover the joint costs, as well as any common costs which were excluded from the

7   analysis. The resulting contribution can be evaluated, to see how large it is on an absolute basis, or

8   relative to the analogous contribution provided by other services. In other words, the magnitude of

9   the contribution from each service (in absolute or percentage terms) can be evaluated, to judge its

10   profitability, but one would not expect any single service, or limited group of services, to recover

11   the entire amount of shared costs.

12   <u>Second</u>, an allocated share of the shared costs can be added to the direct costs of the service

13   (or group of services) in question, to arrive at a reasonable cost amount for comparison with the

14   revenues from the service (or family of services) in question. This method differs from the first

15   approach because it includes an allocated share of shared costs in the analysis.

16   <u>Third</u>, all of the shared costs can be included in the analysis. This is the approach followed

17   in a Stand Alone cost study. Needless to say, one would not normally expect the revenues from a

18   single service to be sufficient to recover all of the shared costs. However, it can be useful to see the

19   degree of cost recovery–what portion of the cost needs to be recovered from other services at current

20   rate levels. Another approach is to focus on a larger group of services, thereby minimizing or

21   avoiding the joint and common cost problem. For instance, the analyst could look at the entire family

1 of services that benefit from the loop and port. By expanding the analysis to include revenues

2 associated with this entire family of services, it becomes legitimate to include all of the loop and port

3 costs, since these are matched with all of the associated revenue streams.

4   Q.   Would you please elaborate on the second method, particularly with regard to the

5 allocation of loop and port costs?

6   A.   Certainly. There is no universally accepted method for allocating these costs, and the

7 differences in method can result in very significant differences in the cost study results. One of the

8 difficulties with the second method is that the results are highly dependent upon the particular

9 allocation approach that is selected, and there is no consensus concerning the "right" way to allocate

10 loop and port costs. A category which is shown to have a very low return in one study can show a

11 very high return in another study, depending upon the allocation approach that is used.

12   Perhaps the simplest and most stable approach is for the Commission to select one or more

13 uniform percentage allocation factors. This is the approach currently used by the FCC in allocating

14 loop costs between the federal and state jurisdiction–the interstate share is a uniform 25%, regardless

15 of the specific circumstances applying to a particular carrier. Other options include revenue-based

16 methods and usage-based methods. Revenue-based allocations assign shares of joint costs based

17 upon the services' percentages of total revenues. For example, if basic local service accounts for 35

18 percent of total revenues, it might be allocated 35% percent of loop costs. Usage-based allocations

19 assign shares of joint costs by relative minutes of use, perhaps weighted in some way to distinguish

20 toll from local and/or peak from off-peak, etc.

21

1   Q.   Have other jurisdictions addressed this allocation issue?

2   A.   Yes. For instance, the Indiana Utility Regulatory Commission addressed this issue

3 in a generic universal service proceeding. [Cause No. 40785]. As part of that proceeding, the Indiana

4 Commission was concerned with the proper interpretation of paragraph 254(k) of the 1996 Federal

5 Act, which provides in part:

6   The Commission, with respect to interstate services, and the States, with
7   respect to intrastate services, shall establish any necessary cost allocation
8   rules, accounting safeguards, and guidelines to ensure that services included
9   in the definition of universal service bear no more than a reasonable share of
10   the joint and common costs of facilities used to provide those services.
11

12   In its discussion of joint and common costs, the Indiana Commission rejected the principle

13 of "cost causation", stating that

14   It seems reasonable that if two or more services require the presence of a
15   particular facility in order to for each of the services to function, then this
16   particular facility would be common or joint to each of the services. Even if
17   it were true that one of the services may have initially caused the cost, it does
18   not alter the fact that each of the services requires the availability and use of
19   that facility and therefore each service benefits from the existence of the
20   facility. [Id., October 28, 1998 Order, p. 36].
21

22   The Indiana Commission further held that loop costs are properly included in the definition

23 of joint and common costs. [Id., p. 39].

24   Q.   Did the Indiana Commission consider a uniform percentage allocation approach?

25   A.   Yes, it did. The Indiana Commission noted that under the federal Part 36 separations

26 procedures, 25 percent of loop costs are allocated to the interstate jurisdiction. [Id., p. 38]. With

27 regard to allocation of the remaining 75 percent, the Indiana Commission began by identifying three

1 groups of intrastate services: those included in the definition of universal service, those not included

2 in the definition of universal service, and those not subject to its jurisdiction. [Id., p. 42]. The

3 Indiana Commission discussed using fixed allocators and moving allocators, and concluded that if

4 a fixed allocator were used, an appropriate approach would be to allocate one third of the intrastate

5 joint and common costs to each group of services. [Id., p. 44]. This approach would result in the

6 allocation of 25% of total joint and common costs to the services included in the definition of

7 universal service, 25% to switched access, toll and other services subject to intrastate regulation,

8 25% to services within the FCC jurisdiction, and 25% to unregulated services. Another approach

9 it considered would have allocated 37.5% of total joint and common costs to the services included

10 in the definition of universal service, 18.75% to other services subject to intrastate regulation, 25%

11 to services within the FCC jurisdiction, and 18.75% to unregulated services.

12   Thus, the Indiana Commission considered use of a uniform percentage allocation factor for

13 basic universal service ranging from 25% to 37.5%. However, it was reluctant to settle upon a

14 uniform fixed percentage, since it recognized that "if the services in a particular category were to be

15 dramatically reduced at some future time, such a fixed allocator might not continue to be a fair and

16 reasonable method of allocating common and joint costs" [Id.]. Accordingly, the Indiana

17 Commission indicated a preference for a moving allocator, which could vary over time, as

18 circumstances changed. It discussed the possibility of using several different moving allocators,

19 including revenues, minutes of use, number of users, and investment, but it found flaws with each

20 of these approaches, and thus decided to let the parties present evidence on an appropriate moving

21 allocator in a later phase of the Indiana proceeding. [Id., p. 47].

1   Q.   What are the pros and cons related to revenue-based allocation methods?

2   A.   One advantage is that revenues are a common denominator which applies to every

3   service. In contrast, a usage-based approach cannot readily be applied to custom calling, Caller ID

4   and similar services which generate revenues, but do not have associated minutes of use. Also,

5   revenues tend to reflect the status quo regarding the manner in which shared costs are currently being

6   recovered (services generating large revenues tend to contribute more to the shared costs than

7   services generating low revenues).

8   One disadvantage is that revenues are essentially a function of pricing, and pricing may

9   change, depending upon the outcome of the cost analysis, and the resulting pricing decisions. The

10   allocations reflect existing prices. To the extent prices change, the allocations will also change, and

11   thus a problem of circular reasoning may arise. (Prices are increased, which increases the revenue-

12   based allocation of costs, which creates the appearance that prices must increase even further.) Given

13   this potential problem with circularity, I prefer to use a uniform flat percentage approach, although

14   some consideration of revenue relationships may be useful in establishing the uniform percentage

15   factors.

16   Q.   What are the major usage-based allocation methods?

17   A.   The two most familiar are use of a Subscriber Line Usage (SLU) factor and use of a

18   Subscriber Plant Factor (SPF). Both SLU and SPF reflect differences in usage; however, there is a

19   very significant difference in the two allocation approaches, which will substantially influence the

20   resulting costs for the toll and local categories.

21

1   Q.   What is the difference between SLU and SPF?

2   A.   SPF has long been used to allocate non-traffic sensitive costs (including the costs of

3   the loop and port) for jurisdictional and cost recovery purposes. SPF is mathematically derived from

4   SLU, which are simply traffic factors that reflect the relative minutes of use for the various services.

5   For instance, an intrastate toll SLU factor would be calculated by dividing the intrastate toll minutes

6   of use (originating and terminating) by total minutes of use (interstate toll, intrastate toll and local

7   exchange) for the service area in question.   The SPF is more complex because it introduces

8   weighting into the computations, the effect of which is to put greater emphasis on toll usage than on

9   local usage.

10   The weighting is designed to reflect certain demand factors, such as distance, and the

11   deterrent effect of attaching a price tag to toll minutes. Specifically, the SPF formula is: $SPF = (.85$

12    $SLU) + (2 \, SLU * CSR)$. For the interstate SPF, the Composite Station Ratio (CSR) is calculated as

13   the nationwide average interstate 3-minute toll charge applicable to the average length of haul for

14   interstate calls in the study area, divided by the nationwide average 3-minute toll charge applicable

15   to the average length of haul for all toll traffic for the total industry. This component of the formula

16   gives more weight to the toll usage ratio in areas where the price of toll calls is higher than the

17   average. In the interstate environment where SPF and SLU were originally developed, the effect of

18   this formula is to reflect differences in the average length of haul, and the associated differences in

19   toll prices. The philosophy is straightforward: the higher value and price tag associated with the call,

20   the greater the appropriate allocation of cost.

21   If one assumes that the CSR is equal to 1 (toll calls in the study area have a price that is equal

1 to the overall average), the SPF for toll will be 2.85 times SLU. Similarly, if one assumes that the

2 calls in question have a zero price, and thus the CSR is equal to zero, then SPF will be equal to .85

3 SLU.

4 　　　　While the formula is somewhat complex, the intention is clear: a greater portion of the costs

5 should be allocated to a category in which the usage has a higher value per minute of use, and a

6 greater portion of costs should be allocated to a category in which usage volumes have been

7 suppressed due to high prices. When comparing toll and local, it is readily apparent that the average

8 toll minute has a higher value than the average local minute (due to the differences in distance). It

9 is also apparent that toll traffic volumes are reduced due to the fact that most toll service is not flat

10 rated. SPF partially neutralizes the deterrent effect of a toll rate structure which imposes a charge

11 for individual calls, unlike local service, which is typically flat rated.

12 　　　　In contrast, SLU ignores these fundamental differences in the characteristics of toll and local

13 usage. Bear in mind that the costs which are being allocated are not traffic sensitive. Thus, there is

14 no particular reason why the costs should be allocated in strict proportion to usage. While usage is

15 obviously relevant, there are other factors which are also relevant, such as the relative value of a

16 minute of toll usage in comparison with a minute of local usage. In fact, the SPF approach is

17 superior in this context, because it reflects differences in value, differences in benefit, and

18 differences in the strength of demand for local and toll service. These differences are not adequately

19 reflected by raw usage statistics, but they should be considered in an appropriate allocation process.

20 When allocating joint and common costs it is appropriate to simulate to some degree the pattern in

21 competitive markets, where the recovery of shared costs reflects differences in demand

1   characteristics. This is accomplished much more effectively by SPF than by SLU.

2   Q.   What are the pros and cons related to usage-based allocation methods?

3   A.   Usage-based methods potentially avoid the circular reasoning problem, and they are

4 based upon readily available statistics. However, there is no single measure of "usage" which

5 appropriately encompasses all of the many services supporting the access line. The use of custom

6 calling service, for instance, cannot easily be measured in minutes of use. If someone has their

7 phone programmed to forward calls to another number all day, should use of this service be

8 measured for the entire time it is engaged? Or, just during the few seconds while a call is received

9 and forwarded to the other number? Surely, the first alternative overstates the usage and benefits

10 associated with Call Forwarding, while the latter measure understates the benefits. Thus, usage

11 based allocation factors cannot readily deal with the myriad of different services that recover shared

12 costs.