

1 **Pricing Unbundled Network Elements**

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3 **Q. Should unbundled network element prices include a mark-up above direct cost**
4 **for the recovery of joint and common costs?**

5 A. In my opinion, yes. However, the magnitude of this mark-up will depend on at least
6 three different factors: the magnitude of the joint and common costs relevant to the
7 unbundled element, the manner in which the cost of the element is calculated, and the
8 appropriate legal interpretation of the 1996 Telecom Act.

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12 **Q. Earlier you indicated that the appropriate mark-up above direct cost can**
13 **depend upon the way the cost of an element is calculated. Could you explain**
14 **this point more fully?**

15 A. Yes. The extent to which a mark-up is justified depends in part on the type of
16 economic cost being estimated. In general, a mark-up above marginal cost is more
17 readily justified than a mark-up above TSLRIC. With the FCC's TELRIC concept
18 certain joint and common costs are supposed to be included in the TELRIC estimate,
19 and thus the justification for any additional mark-up is reduced.

20 In terms of the underlying economic theory, it is clear that the problem of
21 economies of scale and scope is greatest when the marginal costs of telecom services
22 are estimated, and smallest when the average cost of network elements are estimated.
23 Baumol and Sidak explain the issue in the context of marginal cost:

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[I]t is ... well known that if the firm's production process is subject to
economies of scale, then the requirement that prices be set equal to
marginal costs is a recipe for bankruptcy. Under economies of scale, the

1 revenues yielded by marginal-cost pricing will necessarily fall short of the
2 total costs of the firm's outputs. An easy way to see this proposition
3 intuitively is to recognize that substantial fixed costs are a primary source
4 of scale economies because the fixed cost per unit of output obviously
5 falls when output increases (the "spreading of overheads"). By its very
6 definition, however, fixed cost is a cost whose amount does not change
7 when output varies. Hence, a price equal to marginal cost, which is *the*
8 *addition* to total cost resulting from an output change, cannot include any
9 contribution to fixed cost. Other things being equal, marginal cost stays
10 precisely the same, whether fixed costs are large, small, or zero.
11 Consequently, prices that cover only marginal costs cannot be expected
12 to cover fixed costs as well. [William J. Baumol and J. Gregory Sidak,
13 *Toward Competition in Local Telephony*. Cambridge (MA): MIT
14 Press, 1994, p. 34.]
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16 Only if the cost function does not exhibit substantial economies of scale and
17 scope can prices can safely be set at marginal cost, without any mark-up for the
18 recovery of joint and common costs.

19 However, the argument in favor of setting prices in excess of marginal cost is
20 not necessarily applicable to incremental costs. By definition, incremental costs can fall
21 anywhere along the conceptual continuum from marginal to average cost, depending
22 upon the specific methodology used and the specific increment which has been
23 selected. As Baumol and Sidak explain:

24 Incremental cost is a generic concept... marginal cost can be
25 approximated by incremental cost when the increment in question is
26 small. But if the increment is large, marginal cost and incremental cost
27 can differ substantially, because the ranges of outputs examined in the
28 two calculations are not the same. [Id., p. 57.]
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31 In fact, to the extent the FCC's TELRIC concept is interpreted and
32 implemented in a manner which approaches the average total cost of producing each

1 network element on a stand-alone basis, no allowance for joint and common costs
2 would be necessary in order to recover the firm's long run total economic cost.

3 This distinction between TELRIC (or TSLRIC) and marginal cost can be
4 important, particularly in the context of economic efficiency. Economic theory suggests
5 that allocative efficiency is most readily achieved when prices are set equal to marginal
6 cost, assuming this can be achieved while still allowing the firm an opportunity to
7 recover its total costs. However, in an industry where economies of scale and scope
8 are pervasive, pricing at marginal cost may not allow the firm to recover its total costs,
9 and thus some mark up above marginal cost may be necessary to ensure the long run
10 viability of the firm.

11 While the FCC seems hopeful that pricing at TELRIC will encourage economic
12 efficiency, this is not necessarily the case if TELRIC and marginal cost diverge
13 significantly. As Baumol and Sidak explain, marginal cost provides an appropriate
14 pricing floor but it doesn't necessarily establish the appropriate pricing level, since it is
15 "a legitimate floor under prices, one prescribed by the competitive-market model and
16 the requirements of economic efficiency." [Id., p. 65.]

17 However, marginal cost is not the only relevant cost. For instance, Baumol and
18 Sidak conclude that TSLRIC also represents an appropriate price floor under certain
19 circumstances (the authors use the term average-incremental cost to describe the
20 TSLRIC concept):

21 ...in an industry where average-incremental [TSLRIC] declines when
22 output increases, AIC [TSLRIC] must be greater than marginal cost, and
23 AIC [TSLRIC] must be the effective price floor. [Id., p. 68.]
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1 **Q. Earlier you indicated that the appropriate mark-up above direct cost may**
2 **depend in part on the appropriate legal interpretation of the 1996 Telecom Act.**
3 **Could you explain this point more fully?**

4 A. Yes. The question of how unbundled element costs should be calculated lies at the
5 heart of the dispute that is currently pending before the federal Court of Appeals for the
6 8th Circuit. Some incumbent LECs (including Bell Atlantic) have contended that the
7 correct starting point for costing unbundled network elements is to look at their existing
8 network. AT&T and MCI, on the other hand, have argued the correct method of
9 costing is based upon an optimal, or idealized, scenario which yields the lowest feasible
10 level of cost.

11 This difference in perspectives may also explain some of the differences which
12 arise between different parties' incremental cost estimates. Even though different studies
13 may all be labeled as providing "long run" cost estimates, they don't necessarily all
14 follow the standard definition of the long run, as this term is generally used in economic
15 theory. The different parties may assume different degrees of optimization or cost
16 minimization when developing their cost estimates.

17 This issue can be most readily illustrated in the case of the utilization factor used
18 in various studies. In the long run planning horizon, the firm is able to optimize its
19 capacity to precisely match its output. However, some cost studies provided by LECs
20 include a substantial amount of extra capacity that would not be required in a true long
21 run planning horizon. The justification for this extra capacity is typically based upon the
22 firm's historical network characteristics, or current facility utilization rate, rather than on
23 any claim that a higher utilization rate is not physically or economically feasible in the
24 long run.

1 AT&T and MCI, on the other hand, generally argue that element pricing should
2 be based on the lowest feasible level of spare capacity, consistent with a pure long run
3 costing approach. Using what is sometimes known as the “scorched earth” or
4 “scorched node” approach, these parties look at the cost of constructing a network
5 built from scratch with a minimal level of spare capacity and maximum efficiency. They
6 give no consideration to the existing or historical amount of spare capacity.

7 Essentially the same issue can apply to other aspects of an economic cost
8 study, such as the mix of technologies. In a long run cost study, the optimal, lowest cost
9 technology can be selected. For this reason, studies developed by AT&T and MCI
10 tend to estimate a relatively low level of investment per line, compared with the
11 embedded cost amounts incumbent carriers have actually incurred, as recorded on their
12 books and records.

13 Returning to the legal issue, it is not clear whether regulators can (or should)
14 take this gap directly into consideration in setting unbundled element prices. Of course,
15 if a large enough mark-up is added to the economic cost, the effect will be similar to
16 setting the price equal to embedded cost, rather than economic cost. However, as I
17 mentioned earlier, the 1996 Telecom Act prohibits reference to a “rate of return or
18 other rate-based proceeding.” While this language doesn’t necessarily rule out a mark-
19 up above long run economic cost, it would be difficult or impossible to fill the entire gap
20 between economic and embedded cost without running the risk of violating this portion
21 of the 1996 Telecom Act.

22 In its Interconnection Order, the FCC attempted to prohibit any such mark-up.
23 However, on October 15, 1996 the Eighth Circuit Court of Appeals stayed the FCC’s
24 pricing rules and returned discretion in this area to the state commissions (at least
25 temporarily, pending the outcome of the appeal). The Court’s description of this issue,

1 although stated in terms of technology, also applies to utilization rates (spare capacity)
2 and other aspects of the distinction between embedded and economic costs:

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4 Many of the incumbent LECs object to the TELRIC method for two
5 reasons. First, it does not consider their "historical" or "embedded" costs
6 (costs that an incumbent incurred in the past) in calculating the cost
7 figure to be used to determine the rates. See id. SS 51.505(d)(1).
8 Second, it requires that an incumbent LEC's cost be measured as if the
9 incumbent were using the most efficient telecommunications technology
10 currently available, regardless of the technology presently employed by
11 the incumbent and to be used by the competitor. See id. SS 51.505(b)(1).
12 The incumbent LECs argue that the TELRIC method underestimates
13 their costs and results in prices that are too low. The incumbent LECs
14 maintain that these low prices would effectively require them to subsidize
15 their competitors and thereby threaten the viability of the LECs' own
16 businesses. [Order Granting Stay Pending Judicial Review, p. 11]
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18 This distinction between embedded and long run economic cost, and the
19 argument about how to ensure fair treatment of an incumbent when analyzing long run
20 economic cost has a parallel in the concept of "stranded costs" in the electric industry.
21 In the debate over the deregulation of electric utilities, the following question is
22 sometimes posed: Should currently regulated utilities who made excess investments
23 under one set of rules (i.e., regulated monopoly), be allowed to recoup those
24 embedded investments, even as new firms enter the market and prices are driven down
25 towards economic cost? The FERC's answer appears to be "yes," and as a result end
26 users will be forced to pay higher rates than if these historic costs were borne entirely
27 by the stockholders of the incumbent firms. [Notice of Proposed Rulemaking and
28 Supplemental Notice of Proposed Rulemaking FERC, Docket Numbers RM95-8-
29 000, RM94-7-001, March 29, 1996.] In contrast, in its Implementation Order, the
30 FCC's implicit answer to a similar question appears to be "no." The FCC made no
31 provision for a mark-up or other mechanism to ease the transition from the historic

1 context of embedded cost recovery to the next context of increased competition and
2 increased reliance upon economic cost calculations.

3 There are thus two distinct policy questions facing the Board: (1) Should at
4 least some recovery of historical costs be allowed when setting the price of unbundled
5 network elements? (2) If so, can this allowance be quantified in a manner which is
6 consistent with the 1996 Telecom Act's prohibition against reliance upon "rate based"
7 proceedings, while avoiding the problem of excessive recovery or double counting?

8 If unbundled network element prices are to be increased above long run
9 economic cost in an effort to help the incumbent recover its historical costs, it may not
10 be legally feasible to accomplish this mark-up through traditional embedded cost (rate
11 of return or rate base) calculations. The larger the mark-up contemplated, the more
12 effort required to avoid a potential double recovery problem. For instance, if a large
13 mark-up were applied, great care would need to be taken to ensure that the unbundled
14 element price does not exceed both the economic cost and the historical (embedded)
15 cost of the item. Similarly, if a surcharge or mark-up is added to economic cost in an
16 effort to recover stranded historical costs, care would need to be taken to prevent this
17 mark-up from continuing beyond the time these stranded costs have been fully
18 recovered or amortized. In so doing, the Board would have to avoid relying upon a
19 "rate of return" or "rate base" type proceeding. Clearly, then, achieving equity and
20 accuracy for all concerned under these circumstances could be an exceedingly difficult
21 task.
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1 **Q. It is the responsibility of the Board, and the courts, to sort out the legal aspects**
2 **of this issue. From your perspective as an economist, can you provide some**
3 **guidance concerning how this issue can appropriately be resolved?**

4 A. Yes. In my opinion, it is preferable to calculate costs on a basis consistent with standard
5 economic theory, even if the Board chooses not to set prices equal to those costs.
6 Stated differently, given a choice between overestimating economic cost in order to
7 derive a number which is more acceptable (e.g. closer to embedded cost) and
8 accurately calculating the true level of economic cost then adding a mark-up when
9 setting the price, I believe the latter procedure is preferable. I believe it is preferable to
10 rely upon standard economic theory in analyzing and interpreting the cost data. There is
11 no requirement that prices be set exactly equal to cost, nor is there any basis for
12 assuming that prices and costs will always be equal in competitive markets. To the
13 contrary, economic theory indicates that prices can fluctuate above or below any
14 particular measure of cost, depending upon demand conditions, competitive forces, and
15 other factors.

16 For that reason, and others, I believe it is appropriate to calculate the economic
17 cost of network elements using the standard definition of the long run planning horizon,
18 in which investment is optimized in order to minimize the total cost of producing a given
19 volume of output. In my view, the cost estimates should remain true to the underlying
20 economic theory, rather than being manipulated or adjusted, in an effort to match the
21 level of embedded cost, or to better fit the price level which the Board finds to be
22 appropriate.

23 In this regard, the FCC comments concerning the “long run” are of interest:

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25 683. Forward-looking cost methodologies, like TELRIC, are intended to
26 consider the costs that a carrier would incur in the future. Thus, a

1 question arises whether costs should be computed based on the least-
2 cost, most efficient network configuration and technology currently
3 available, or whether forward-looking cost should be computed based on
4 incumbent LECs' existing network infrastructures, taking into account
5 changes in depreciation and inflation. The record indicates three general
6 approaches to this issue. Under the first approach, the forward-looking
7 economic cost for interconnection and unbundled elements would be
8 based on the most efficient network architecture, sizing, technology, and
9 operating decisions that are operationally feasible and currently available
10 to the industry...

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12 684. Under the second approach, the cost of interconnection and
13 unbundled network elements would be based on existing network design
14 and technology that are currently in operation... This is essentially an
15 embedded cost methodology.

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17 685. Under the third approach, prices for interconnection and access to
18 unbundled elements would be developed from a forward-looking
19 economic cost methodology based on the most efficient technology
20 deployed in the incumbent LEC's current wire center locations.

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22 Given these three choices, the FCC selected the third option, which closely fits
23 the standard definition of the long run, although it limited wire centers to their existing
24 geographic locations. However, I do not consider this to be a significant issue. In fact,
25 there is no reason to assume the incumbent carrier would necessarily locate its wire
26 centers at significantly different locations, even if it had the flexibility to do so. While it
27 would have this flexibility in a true long run planning horizon, I don't believe it is
28 necessary to consider this complication. By eliminating this complication, the cost
29 calculations are simplified, and it is easier to align the resulting cost results with the
30 existing market structure.

31 Accordingly, in my opinion the FCC's interpretation of the "long run" is a
32 reasonable and appropriate approach, which I recommend be used by the Board in this

1 proceeding. If the resulting long run cost estimates are lower than an acceptable price,
2 the solution is to include a reasonable markup or element of additional profit in setting
3 the unbundled element rate.

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5 **Q. Has TSLRIC or a similar approach to costing and pricing been adopted in any**
6 **other jurisdictions?**

7 A. Yes. In its Implementation Order, the FCC notes that many states have employed, or
8 plan to employ, TSLRIC or LRIC to set prices for unbundled network elements.
9 [¶631]. The FCC mentioned the following states as examples of jurisdictions that have
10 taken this approach: Arizona, California, Colorado, Hawaii, Louisiana, Michigan,
11 Missouri, Ohio, Oklahoma, Texas, Washington, Wisconsin and Wyoming

12 While I am not familiar with the proceedings in all of these jurisdictions, I am
13 familiar with the Ohio proceeding where the term “LRSIC” was used to describe the
14 TSLRIC concept. The Public Utilities Commission concluded that:

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16 The price for ... unbundled network rate elements shall be set at LRSIC,
17 plus an appropriate allocation of joint costs, plus 10 percent of the sum of
18 LRSIC and allocated joint costs for the recovery of common costs.
19 [Finding and Order, Case No. 95-845-TP-COI]

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22 Similarly, the Colorado commission adopted rules for the pricing and costing of telecom
23 services which place great emphasis on TSLRIC. A copy of those rules accompanied
24 my direct testimony in Phase I of this proceeding.

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