Rethinking Depreciation

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Current regulations give the LECs little incentive to invest in infrastructure upgrades. Is there a way out?

Anyone familiar with accounting knows the concept of depreciation: If capital equipment has a finite economic life, the initial investment should be written off over time as a noncash expense—reducing reported earnings and net capital investment, but saving on income taxes and thereby increasing cashflow.

Depreciation has always played a major role in shaping the economics of the telecom industry, and that remains true today. But as carriers around the globe begin to deploy advanced network infrastructures, the history of long depreciation cycles is proving to be a major obstacle.

The Problem Isn't New

Incumbent local exchange carriers (ILECs) have traditionally depreciated capital investments over long periods of time. For example, in 1997, the total RBOC annual depreciation cost per line was $127 ($10.62 per month). Against a gross plant investment of $1,836 per line, this is a depreciation cycle of 14.4 years.

That approach to depreciation cycles made sense in the narrowband POTS environment—copper loop effectively lasts forever, and Class 5 circuit switched technology hasn't changed much in 30 years.

Moreover, long depreciation cycles fit nicely with the telcos' traditional regulated pricing environment. Rate bases are calculated minus depreciation, so rapid depreciation hurts the telcos—it drives their rate base down more quickly.

This is true of both major methods of rate regulation: Return-on-Rate-Base (RORB), in which allowed profit is set at a predetermined percentage on the rate base, and price cap rules, in which prices are set based on a combination of historical prices and a general inflation factor less a productivity index. Even though the newer price cap regulations are more "market-oriented," their productivity indices ultimately are set/adjusted based on observed rate-of-return levels, which makes depreciation an important factor here as well.

The Environment's New

Arguably, the classic long-cycle depreciation rules are becoming obsolete, as new optoelectronic and packet-switching technology improves at Moore's Law rates or faster. Here's an example of the economic reality: In late 1996–early 1997, Ciena was selling state-of-the-art dense wavelength division multiplexing (DWDM) boxes, which could multiplex 16 wavelengths; today, just 12 months later, the state-of-the art in DWDM gear is 80 colors, and it's available from multiple vendors—e.g., Lucent and Ciena.

Any telco that wants to replace the "old" DWDM boxes with the new must do a 100 percent replacement; that's a useful life of only 9 to 24 months. If you think about it, capital equipment is becoming an expensed "consumable" rather than a capital good.

Some new competitive local exchange carriers are moving to more accelerated depreciation schedules (see "What about CLECs?" p. 66), but the ILECs haven't, because accelerating the depreciation cycle at this time would have strong negative financial consequences. This is illustrated with the following back-of-the envelope calculations based on 1997 RBOC financial statements:

- **Higher Per-Line Depreciation Costs…:** If we went to a much shorter depreciation/replacement cycle with current technology assets, accrued total costs would rise substantially. For example, the RBOC $1,838 gross plant per line is made up of 43 percent cable/wire and 57 percent switching and other optoelectronics. If we moved the

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FIGURE 1 Monthly Depreciation per RBOC Line

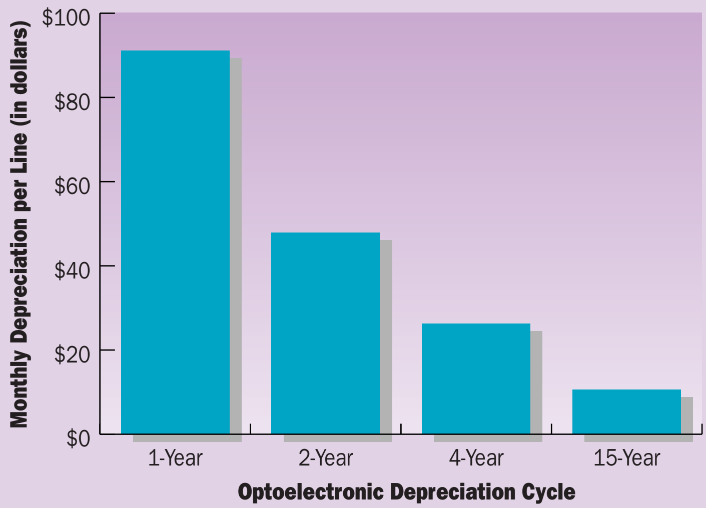


FIGURE 2 Monthly Accrued Cost per RBOC Line

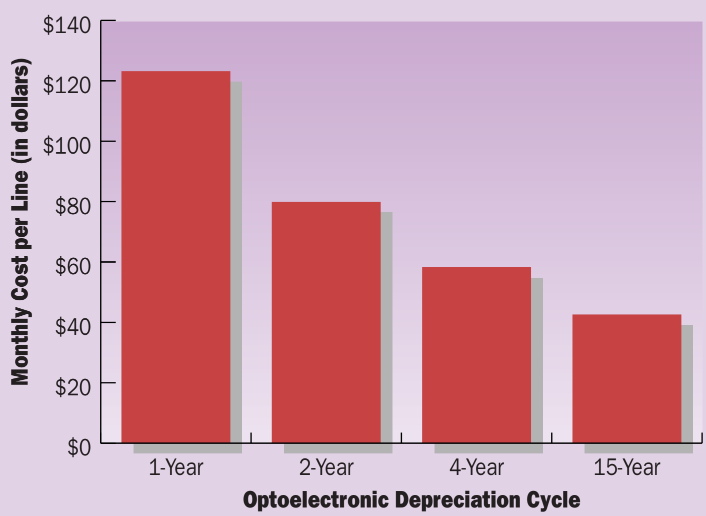
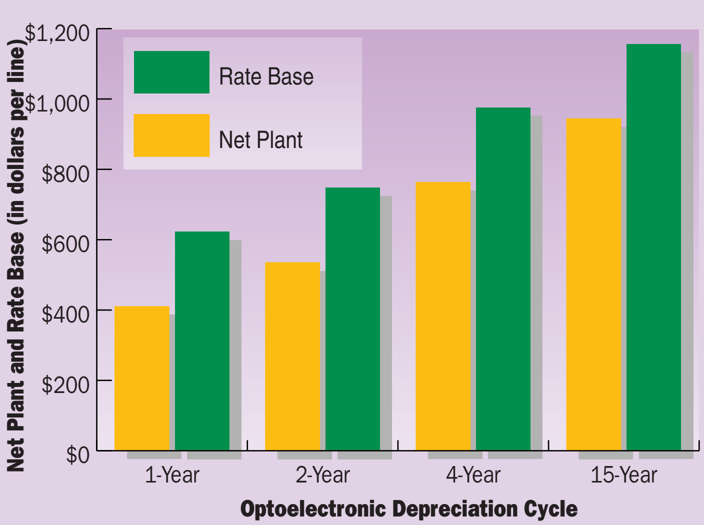


FIGURE 3 RBOC Net Plant and Rate Base



switching/optoelectronic portion to an accelerated one-, two- or four-year cycle, overall depreciation costs per line would increase from the current $10.62 per month to as much as $91.17 (see Figure 1).

...Lead to Higher Total Accrued Costs...: With these higher depreciation costs, total monthly accrued cost per line would grow from the current $42.50 to as much as $123.08 (for a one-year depreciation cycle; see Figure 2). This is a tripling in total cost; even lengthening the cycle to four years would increase costs by 37 percent. (Note that the increase in total cost comes entirely from the higher depreciation expense; other cost elements, such as service, general and administration, remain constant).

...And Lower Rate Base...: Since the rate base is calculated after depreciation, the more depreciated the plant is, the lower the rate base on which the RBOC can levy its charges. At present, RBOCs have a gross plant investment of $1,838 per line and net plant of $944 (after depreciation). Including non-plant assets, total rate base is $1,157 per line, according to FCC figures.

Our back-of-the-envelope calculations suggest that if we accelerated the depreciation rate for switching/optoelectronics, net plant would drop within five years from $944 to approximately $410–$763. Accordingly, the rate base would drop from $1,157 to $623–$976 (see Figure 3).

...Leading to a General Pricing and Profitability Dilemma: The ILECs would therefore face one or more of these three highly undesirable scenarios:

1. With higher accrued costs, the ILECs would need to raise prices substantially to offset the cost increases.
2. With lower rate bases, RORB calculations that use a percentage return on rate base would lower the ILECs' profitability.
3. The only way for the ILEC to keep profits constant despite the lower rate base would be to request a much higher RORB percentage, which regulators/the public would not accept.

Improving Productivity

In theory, these negative consequences could be offset if the new equipment were so cost-effective that the ILECs' productivity gains would outweigh the financial hit they'd take. But how much of a productivity improvement is needed to tip the scales so as to justify one-, two- and four-year replacement cycles for switching/optoelectronics? Our calculations suggest that productivity would have to improve substantially.

Figure 4 compares monthly depreciation costs per line for different combinations of productivity improvement and depreciation/replacement cycles. The results indicate that the telcos need to improve productivity by about 75 to 95 percent to offset the impact of moving to a one- to four-year replacement cycle.

However, this analysis ignores the fact that lower-cost equipment also typically has lower cash operating costs, and thus may overstate how much productivity improvement is required. In other words, we need to consider not just depreciation but also total accrued costs.

Figure 5 takes these lower operating costs into account. We assume that the ratio of plant operating costs to gross plant capital remains constant. The results indicate that lower operating costs translate into some savings: instead of 75–95 percent better, the new equipment needs to produce a 55–85 percent productivity improvement to offset the impact of a shorter replacement cycle.

One other aspect we have had to figure in is how the new technology affects cashflow. Faster replacement cycles require greater cash expenditures, thus diminishing the value of depreciation as a means of increasing cashflow.

Net-net, our calculations suggest that to break even on a cashflow basis, ILECs need about a 55-85 percent productivity improvement to offset the impact of moving to a one- to four-year replacement cycle. As seen in Figure 6, this suggests a need for annualized productivity improvements on the order of 14 to 85 percent, depending on the depreciation/replacement cycle.

That may sound like a tall order but, as Figure 7 shows, prospective Moore's Law improvements can provide the productivity gains needed to offset the depreciation penalty. After all, a doubling of productivity every 18 months translates into a 37 percent annual productivity improvement. Furthermore, Moore's Law is only a general guideline for microprocessors; within the communications segment of the industry, the news is even better: optoelectronics are improving at approximately 1.5× Moore's Law.

Given these productivity gains, a two-year replacement cycle appears justifiable. A one-year replacement cycle *does* appear to be a stretch, but less so when we consider that carriers will be shifting from circuit switching (at $350 of gross plant per line) to packet switching (at perhaps $10 gross plant per line)—a 97 percent savings.

What's Stopping Them?

So if it makes economic sense to accelerate replacement cycles in anticipation of Moore's Law–type productivity transformation, what's stopping ILECs from implementing a more rapid depreciation cycle? While technically nothing is stopping them, in reality tremendous inertia results from the existing regulatory structure—regulatory proceedings, the continued use of return-on-rate-base (RORB) regulation in some states and the price cap rules used by the FCC and other states. For example:

- Under RORB rules, moving to an accelerated depreciation schedule will result in a reduced rate base and therefore reduced allowed profits, whatever the underlying technology.

FIGURE 4 Depreciation Costs at Various Productivity Levels and Depreciation Cycles

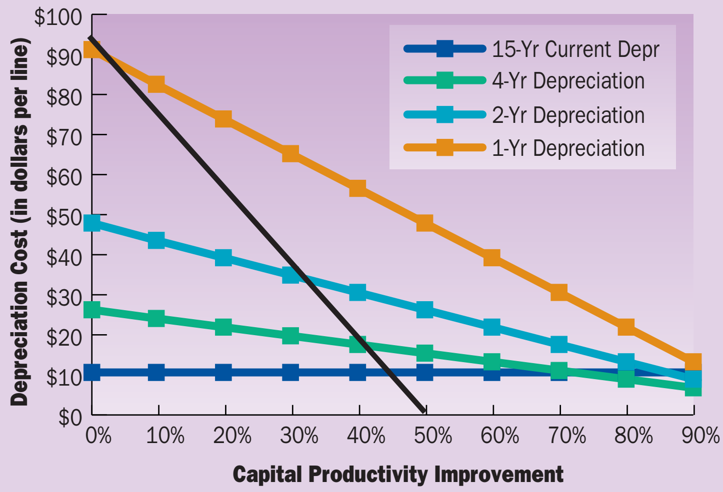


FIGURE 5 Total Accrued Costs at Various Productivity Levels and Depreciation Cycles

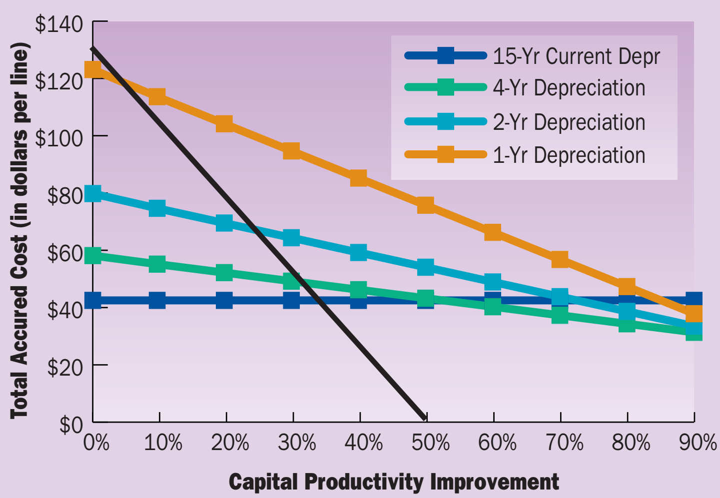
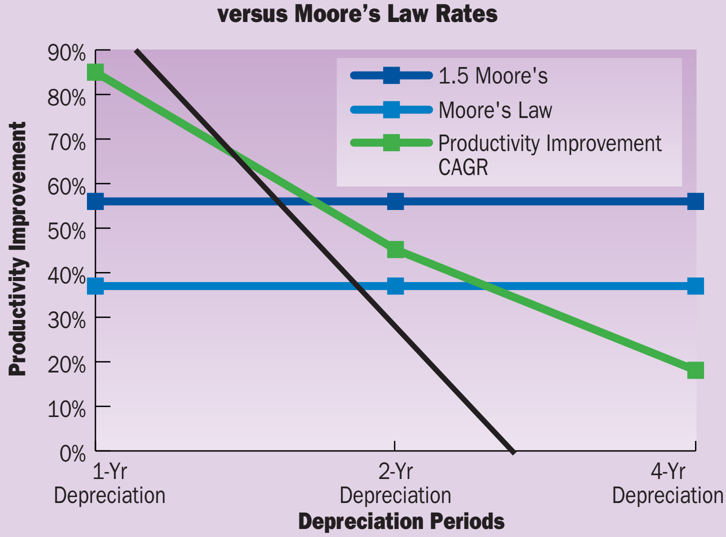


FIGURE 6 Annual Required Productivity Improvements versus Moore's Law Rates



Existing pricing regulations are fundamentally at odds with doing the right thing economically

- Likewise, some price cap rules contain an "excess profits"-sharing requirement, that is based on RORB calculations. In states where such rules are in effect, having a reduced rate base also will limit an ILEC's overall profit.
- The FCC's most ILEC-friendly price cap rule—i.e., one in which an ILEC chooses a higher productivity index in exchange for not incurring an "excess sharing" requirement—actually creating a disincentive to deploy more efficient networks: An ILEC choosing a rapid depreciation path will risk having its productivity index "recalibrated" at a much higher rate if/when its RORB rises above 20 percent or so.

In short, existing pricing regulations are fundamentally at odds with doing the right thing economically. They also result in bureaucratic "embarrassments" such as a recent FCC audit erroneously suggesting that approximately $5 billion of equipment on ILEC charts of accounts may be missing or nonexistent.

Fixing the Problem

Clearly, we need better ways to regulate prices, but since full deregulation won't happen any time soon, what should replace the old system? There is an answer—TELRIC (Total Element Long Run Incremental Cost)—but the ILECs don't want to hear about it. TELRIC was included in the FCC's August 1996 Local Competition Order, which, at the urging of the ILECs, the Eighth Circuit Court of Appeals overturned. The Order is currently before the U.S. Supreme Court, but some states have already started to use it as a guideline for their own proceedings.

The ILECs have vilified and opposed TELRIC, because it uses a "greenfield" approach—they claim TELRIC doesn't take into account the investment already made in the plant, and thus will produce an inadequate return on capital.

But there are also arguments that TELRIC's greenfield approach could work to the ILECs' benefit:

- If rates are determined by greenfield constructs rather than RORB or price cap rules, the need to maintain high rate bases goes away. Instead, ILECs would have the same incentives as CLECs to move to more rapid depreciation schedules.
- If prices are determined by greenfield constructs of what is the most efficient technology, ILECs will have strong incentives to remain state-of-the-art—i.e., to write off inefficient technology and take more rapid depreciation on new capital investments. The only way for the ILECs to be truly modern today under the existing high-cost GAAP (generally accepted accounting principles) is for them to sell below cost—and that's not going to happen.

What about CLECs?

Having taken ILECs to task for relying on long depreciation rates even as the technology cycle is accelerating, it's fair to ask: How aggressive are CLECs? Given that they aren't subject to FCC and state RORB or price cap regulation, and are typically valued by the market on a multiple-of-EBITD basis, it makes sense for CLECs to depreciate assets on a substantially more rapid cycle:

- Accelerated depreciation reduces taxes (once the CLECs become profitable) and maximizes cashflow. While this is equally true for ILECs, negative return on rate base and price cap productivity affects more than offsets this effect for the ILECs.
- Since CLECs tend to be valued on EBITD rather than on after-tax price-to-earnings multiples, lower reported earnings don't adversely affect earnings.

TABLE A1 Year-End Gross Plant/Annual Depreciation and Amortization Ratio

	1997	1996	1995
Qwest	32.4	13.1	N/A
TCG	12.1	16.6	14.4
WorldCom	7.4	14.1	6.6

Source: OneSource
Note: The gyrations reflect end-of-year timing differences—i.e., with much of Qwest's 97 capital expenditure being incurred close to year-end with limited depreciation on an annual basis.

- Since CLECs are not on an RORB or price cap regime, having less undepreciated plant has no bearing on the CLECs' ability to price.

On the other hand, if a CLEC increases depreciation rates while the ILEC continues to use long depreciation cycles, the CLEC may have higher relative accrued costs, making the CLEC seem less competitive. Thus, regulators' actions in forcing long ILEC depreciation cycles could end up affecting unregulated carriers.

So are CLECs in fact adopting accelerated depreciation cycles? As a quick check, we reviewed depreciation cycles (gross plant divided by annual depreciation) for three major CLECs: TCG, Qwest and WorldCom. The results in Table A1 are interesting, in that they suggest two different strategies:

- Qwest and TCG are depreciating their assets on a relatively slow schedule. This may make sense for Qwest, since its 1996–97 asset deployment was largely for its (long-lived) fiber deployment. TCG's investment, however, arguably had a greater proportion of optoelectronics and switches, which may have an increasingly short life cycle.
- In contrast, WorldCom generally has adopted an aggressive depreciation strategy that is roughly two times the rate of most ILECs (14.4 years).

So, there isn't "a" CLEC strategy or approach to this problem. The CLECs, having arisen from different backgrounds and management experiences and philosophies, aren't the uniform set of players they are sometimes made out to be□

Another problem the telcos have with TELRIC is how the FCC tried to implement it. In general, while TELRIC assumes the deployment of the "best-in-class" technology—i.e., the best technologies currently on the market, as opposed to technologies on the drawing board—the FCC ignored the clear need to use short depreciation cycles in the future. For example, FCC staff considered alternative TELRIC cost proxy models corresponding to average plant lives of 15, 14 and 11.9 years—all too long for use with advanced networks.

As a result, the FCCs TELRIC calculations generate very low unit costs versus historical levels and, arguably, versus true going-forward costs. To illustrate the latter, consider an ILEC attempting to build a greenfield network. If it prices network services based on long-cycle depreciation, it ends up with stranded assets when the equipment becomes obsolete—typically within about two years—and so will not obtain an adequate ROI going forward. Conversely, if it builds the network and adopts a short depreciation cycle but prices according to FCC guidelines, it will lose money because the FCC's TELRIC guidelines assume overly long depreciation cycles.

The problem for the ILECs, however, is that they're running out of choices—they're doomed if they stick with GAAP accounting, which, as noted above, results in reduced rate bases and, therefore, unacceptable downward pricing pressure. Ultimately, some middle ground needs to be found: The ILECs need to make a reasonable return on investment, and there must be incentives for them to deploy advanced networks with shorter depreciation cycles.

That middle ground may be uncovered within the FCCs recent Section 706 Notice of Inquiry (NOI) on advanced telecommunications capability (see this issue, pp. 14–16, and September 1998, pp. 44–48). Perhaps now is the time for the industry to consider new options, and below is one possible scenario:

New options may come out of the FCC's Section 706 proceedings

1. Eliminate RORB and price cap pricing regimes, which will in turn eliminate the ILEC/FCC addiction to rate-base maximization games.

2. In its place, institute TELRIC pricing for both resellers and end users, based on "best-in-class" technology.

3. In calculating TELRIC costs, employ much shorter depreciation cycles than the currently used 12–15 years for high-obsolescence equipment categories such as DWDM and packet switches. This will result in prices that facilitate adequate ROIs by efficient competitors.

4. As an alternative to calculating TELRIC prices each year, develop TELRIC rates in year 0, then apply price caps going forward. However, the productivity indices in the price cap rules create disincentives for network upgrades, and therefore need to be brought up to date. Productivity indices for services undergoing Moore's Law–based changes (e.g., 37% annually) would need to be far greater than the single-digit numbers that the FCC now mandates. This would result in significantly lower costs/prices over time for basic ILEC services using the new technologies, such as frame relay, IP, ATM and DSL.

5. To the extent that the revised short-depreciation-cycle TELRIC rates are below historical rates, regulators should permit the ILECs a limited period to recapture any stranded assets—e.g., to charge customers a surcharge until the value of the stranded assets is paid for. Since our proposed modification of TELRIC would use short depreciation periods on greenfield—read: 100 percent undepreciated—assets, it is not at all clear that TELRIC rates in year 0 would be that much lower than current GAAP rates. However, the alternative—imposing accelerated depreciation periods on existing equipment—could result in stranding those pre-existing assets, which is why some type of surcharge might be necessary.

6. The TELRIC rate in year n+1, n+2, etc. normally would be lower than TELRIC in year n, which again poses the threat of stranding assets. To deal with this, we propose adjusting permissible TELRIC rates upward in years n+1, n+2.

Essentially, this proposal takes a middle stand: It recognizes that near-term TELRIC rates need to be set relatively high in the beginning to reflect higher depreciation costs but also requires that the rates decrease substantially—by double-digit rates—over time to reflect the cost transformation occurring with telecom technology. Since it creates incentives for ILECs to deploy more efficient equipment depreciated over a shorter period, it will ultimately benefit consumers who need/want advanced telecom functionality.

Conclusion

There may be other alternatives that achieve the goal of fostering ILEC adoption of new technology on an accelerated basis. Arguably, however, the current regime (and alternative sectarian positions), by ignoring the fundamental need to move to much faster depreciation cycles, is getting in the way of upgrading the public network.

Ultimately, if the FCC cannot foster appropriate change, the free market, in the form of CLECs who do not face price regulation, may force the issue. The CLECs will build advanced networks on short depreciation cycles with continual reinvestment in best-in-class plant, and the ILECs will look decrepit if they don't adapt.

The historical strategy of long depreciation cycles based on legacy pricing regulations is becoming obsolete. It's time to dynamite the old telecom structure and come up with something that fosters new technology deployment□