

Forces, Trends and Glitches in the World of Communications

**John C. LeGates
and
John F. McLaughlin**

**Some things for decision makers
to watch in the communications
and information businesses**

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Forces, Trends and Glitches in the World of Communications

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Executive Summary

Some things for decision makers to watch in the communications and information businesses:

- **Density and concentration.** Is there a need for uniformity in telephone markets? States' regulatory needs differ.
- **The baby-boom bust.** In answer to a borderline crisis in entry-level employment, automation is increasing the productivity of service jobs or automating them out of existence.
- **Computer as network -- network as computer.** These solutions often link with the telephone network in complex ways, from use of communications to relocation of the smarts.
- **The demographics of political power.** Telephone companies are failing to rally support for continuing monopolies and subsidies. The voting blocs who assembled and preserved the rural subsidy apparatus are gone, replaced by an urban majority allied with the strongest competitors wanting to get out of regulation.
- **Work.** With information workers comprising as much as 40% to 55% of the work force in industrialized countries, information regulators find themselves refereeing the struggle among suppliers rather than protecting the users.
- **Technology and other resources.** Information use is exploding not only because it's getting cheaper and faster, but also because it's substituting for other resources as they get more expensive.
- **The dynamics of information supply.** Smaller, faster, cheaper, and better technologies provide opportunities for new products or applications, new markets, or chances to penetrate an existing market with a new strategy -- resulting in planning difficulties and increasing "bypass."
- **The dynamics of information purchase.** The evolution of information products and services from scarcity to abundance raises questions about the role of government oversight. Assumptions are changing about needs for redundant communications, about what's a necessity and what's a luxury, and about what's "basic" and what's enhanced.

Foreword

This paper grew out of two speaking engagements which were close together in both time and subject. One was a presentation at the California Public Utilities Commission en banc hearings on September 24-25, 1987, entitled "Alternatives to Cost-of-Service Regulation for Local Exchange Carriers." The other was a presentation at the National Association of Regulatory Utility Commissioners Telecommunications Committee meeting a week later. These opportunities provided the focus and color of the paper.

Both before and since the presentations, the ideas presented here have seemed to strike a responsive chord with audiences of many kinds, not limited to public bodies considering alternatives to rate-of-return regulation. Some have been interests affected by public regulatory regimes; others have been parties who see themselves caught up in the same large forces and trends.

This is not a "report" in the Program's usual sense of exploring both sides of a divisive issue. It is instead a compilation of some underlying phenomena common to many issues. It tries to uncover and describe these phenomena rather than impose order on them. We offer it on the hope that it may help those who must sort out the trends from the glitches to make a decision.

Much of what is presented here lies in that irritating category of the blindingly obvious. But the most obvious knowledge can be the most likely to fade into unstated assumption, and be thereby forgotten or unarticulated when the time comes to use it.

I. Density and Concentration

A lot is being said these days about the need for uniformity in telephone markets. This may mean, among other things, national uniformity of service offerings beyond dial tone, uniformity of tariffs, uniformity of interconnect standards, or uniformity of revenue-sharing structures.

Mostly this is being said by those who stand to benefit by uniformity, such as the operators of national corporate networks, or those who wish to offer nationally available services. There is another voice among technologists, for whom uniformity combines cost control with the elegance of an optimal engineering solution.

It is of course hard to find an argument in favor of lack of uniformity per se.

However we don't have uniformity now. Admittedly dial tone looks the same everywhere, but its price doesn't. Other sources vary wildly. Hence the burden of proof is on those who want it changed. They must show that uniformity has benefits that outweigh both the inertia of history and some strong reasons for doing things differently in different places. These reasons, it turns out, are considerable.

To start with, states are not all the same. Figure 1 shows the contiguous 48 states with shadings for population density. The lightest areas have fewer than 50 persons per square mile. These look like variations on US West. The diagonal lines show states with between 50 and 100. They look like variations on Southwestern Bell and BellSouth.

When divestiture happened on 1/1/84, the debate began on how to protect universal telephone service. There was concern that the "high cost areas" would have to price basic service above the ability to pay, or that new capabilities would never get there.

It was widely argued that providers of service in less-dense territories would have less need for technological gee-whizzery, due to less sophisticated markets. This was fortunate, as they would also need more dollars per capita to deliver service, and the cost of the gee-whizzery could be avoided. Density was presumed to define the boonies of the telephone business.

first crack in the obvious was the appearance of US West as an opponent of the pools to subsidize service in high-cost areas. Why?

Figure 2 displays another low cost service area pools measure by which states differ -- concentration. Unshaded are the seven states with less than 50% in "urban" areas. Cross-hatched states have between 50% and 60%.

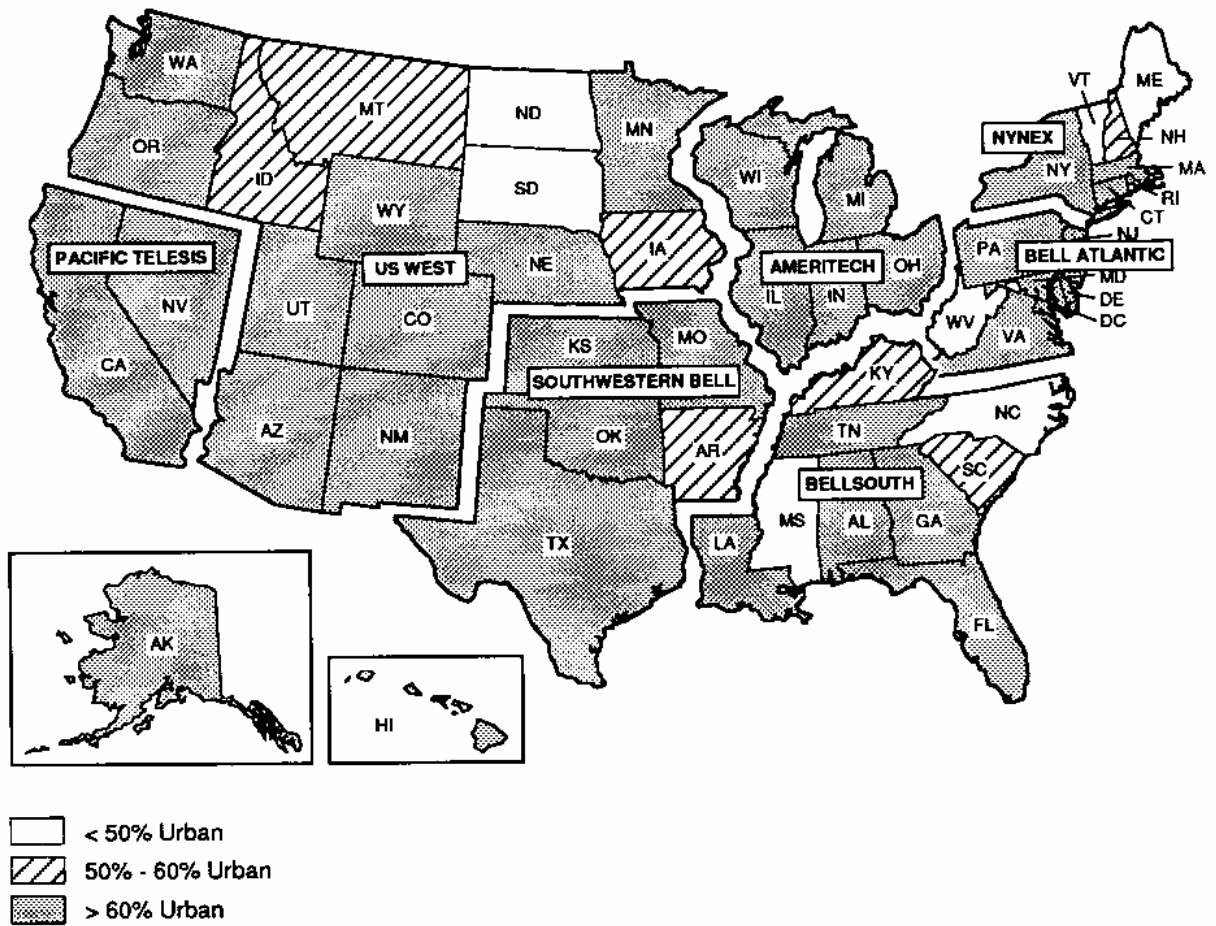
The maps tend to err on the side of looking more rural than the reality. Much "rural" population lives in the outlying suburbs of large cities, and commutes.

Two of US West's 14 states are "rural" vs. two of BellSouth's nine and two of NYNEX's six. Southwestern Bell has none. Neither of the two states with less than 40% urban -- Vermont with 34% and West Virginia with 36% -- is in US West territory.

On the other hand, some of the least dense states are highly concentrated: New Mexico 72% urban; Colorado 81%; Arizona 84%; Utah 84%. Those figures are right up there with the obvious candidates: New York 85%; Pennsylvania 69%; Michigan 71%. In Colorado over 80% of the traffic comes from a band 15 miles by 35 miles. Some boonies!

Although concentration is a useful measure, density isn't meaningless. From a Boston perspective, for example, Colorado and Connecticut look rather alike. They both begin with "Co", they are both in the southwest, and they are comparably concentrated (Ct 79%, Co 81%). But Connecticut, which is small and dense (638 persons/sq. mi.), still makes different demands on the telco and the regulator than larger and sparser (30 persons/sq. mi.) Colorado, especially for the dispersed part of the population.

This takes some of the surprise out of Vermont's becoming the pioneer in inventing "social contract" regulatory proposals and West Virginia's becoming the first to adopt one. As of this writing, things are in the middle of happening on the state regulatory scene, and the outcomes haven't taken shape. The point, however, is that different states have different needs. Within a state, those needs may look different to the telephone companies than to the regulators (as ever).



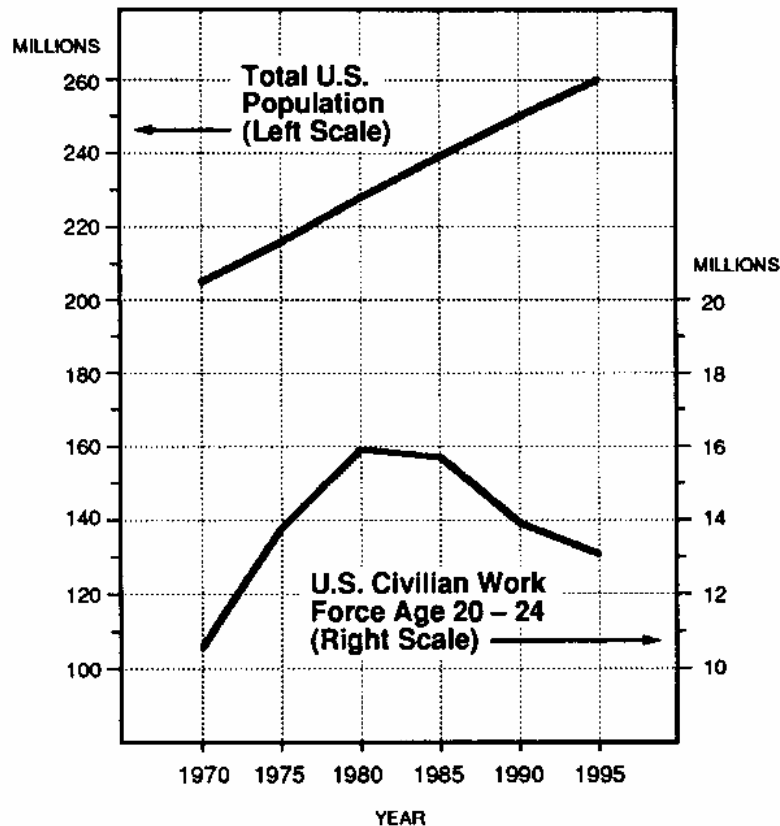
Source: *Statistical Abstract of the U.S.*, 1985, Table 12, pp.12-13.

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Figure 2
Population Concentration of the States

II. The Baby Boom Bust

Figure 3 shows a population trend which we call "the baby boom bust". The top line (increases in U.S. population), overlaid by the economic climate, has been a pretty good indicator of the total demand for goods and services. But at the same time that the demand for goods and services is growing, the entry-level work force is shrinking, as the lower curve suggests. Since 1980 it has dropped about 6% while the population grew 8%.



Source: *Statistical Abstract of the U.S.*, 1985, Tables 2 and 4, pp. 8 and 15;
Table 639, p. 376.

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Figure 3

The Baby Boom Bust

In the booming northeast, there is a borderline crisis in the delivery of services. Positions for bank clerks, department store sales clerks, supermarket checkout people, and secretaries, for example, are almost unfillable. Major corporations are cultivating high schools.

If you can't find people, however, you can find machines. One response has been to increase the productivity of these jobs by automation, or better yet to automate them out of existence.

Consider checkout lines. In the food business, any larger store now has the items marked with codes, and the checkout person merely runs them over a bar-code reader. The cash register notes the charge and does the total. Far fewer people are required and they don't have to know addition. The bottleneck is now the baggers.

In banks the teller has been supplemented, and sometimes replaced, with the automated teller machine (ATM).

In our own office we produce more with three secretaries now than we did three years ago with six. How? We have word processors and a computerized mailing list. We're working on the filing system.

To date industry has had to respond to an 8% rise in population and a 6% drop in the 20-24 year old cohort. By 1995 it will be a 16% rise and a 17% drop. The pressures will get much more intense.

Other age demographics probably pose their own opportunities and threats to the information world. For example the elderly, a growing cohort, are mostly able to care for themselves at home most of the time. The very expensive glitch is that they are also more prone to need emergency care. This glitch is taken care of by nursing homes with attendants -- another entry-level job. There are experiments with home care augmented with electronic monitoring devices and quick response medical help.

From the early days, by the way, lower-level jobs have been the first to get computerized. Accounting, billing, bookkeeping, order entry, inventory, check-in and check-out were among the first successes. They are also among the ones where improving automation has continued to improve productivity. Figure 4 describes the different roles that information plays at different corporate ranks.

Job	Population	Function	Sources	Reliability
CEO ↑ CLERK	SMALL ↑ LARGE	INTEGRATION ↑ COLLECTION DISTRIBUTION	MANY ↑ FEW	LOW ↑ HIGH

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Figure 4

Information Serves the Corporate Hierarchy

III. The Computer as Network -- The Network as Computer

A closer look shows that the automation of lower-level jobs often links with the telephone network in complex ways.

Before an ATM hands you your cash, it first checks your account to see that you have the balance. That means communication with a central database. Let's assume that the database is in a large office somewhere on the bank's property.

If the ATM is in the same building, then the connection is probably made over wires in the wall. The telephone network never sees the transaction.

If the ATM is elsewhere in a large city, the connection may be made over a citywide corporate data network. The lines could be owned by the bank, or they could be leased as "private lines" from the local telco. They could be leased from a non-telco communications provider. They could be part of a condominium circuit -- owned by the bank but operated by an independent provider.

If the ATM is in a small suburb or remote shopping center, the connection is probably made over a line provided by the local telco or telcos.

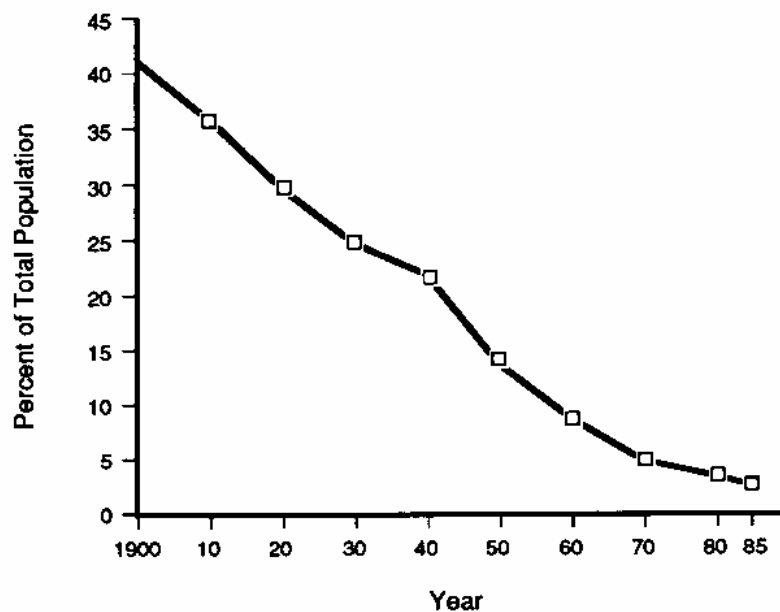
A large bank or manufacturer spends enough money to justify paying someone to manage communications and computer budgets. The bank, behaving like a rational purchaser, will constantly re-evaluate its strategy on these things. If one communications provider comes in the door next year with a better deal, he'll get a hearing, maybe a sale. The bank's decision may involve a change of mode: from telco to condominium; from hard wire to microwave; from buy to build. In the city, there are more options and more likelihood of a change.

To make matters worse for those who like to plan ahead, there may also be a relocation of the smarts. This year it may be cheaper to have the ATM act as a typewriter and have the computer at the database do the processing. Next year it may be the reverse, with big consequences for the transmission requirement. Cheaper may not be the issue. The bank may wish to adjust which department has control, or to

make use of excess processing capacity or wires that went in for another purpose. The moral: Many ways to do things in a changing environment makes for big-time instability.

IV. The Demographics of Political Power

The flight from the farm has been a relentless feature of American migration throughout this century (Figure 5). Even now a significant drop in the numbers of those still farming is being forecast. This can't make a big difference to the national scene, however, since they're already less than 3% of the work force.



Sources: 1900-1970: *Historical Statistics of the U.S.*, 1977, Table K 1-16, p. 457.
1975-1985: *Statistical Abstract of the U.S.*, 1985, Table 105, p. 631.

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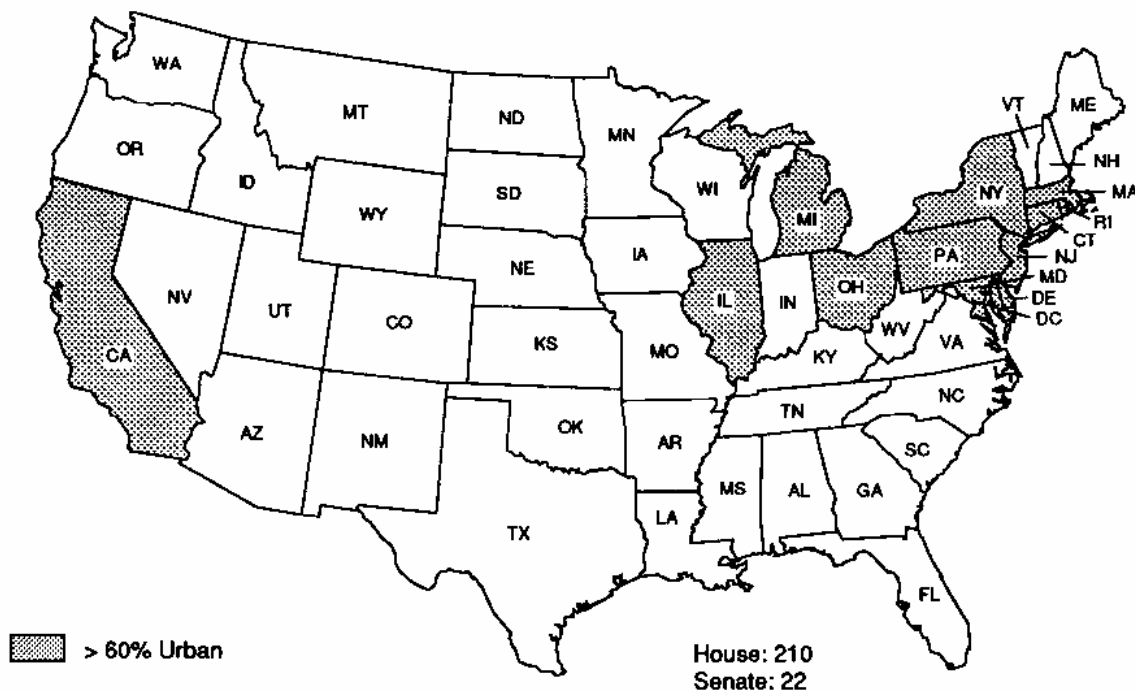
Figure 5

U.S. Farm Population

The notion that a significant percentage drop in the farm population isn't news is itself a new notion. While it's been true for between 10 years and a century, depending on your perspective, old perceptions and political institutions lag behind current events and die hard.

Our economy is loaded with institutions that subsidize rural people in general and farmers in particular, needless to say at the expense of somebody else. It's amazing how much tax credit, free help, and low-cost loans you can get for a big garden in Massachusetts -- a state whose agricultural viability died with the opening of the Erie Canal and the Hoosac Tunnel.

When you look at who was traditionally where, this is not hard to explain. States that were 60% or more "urban" in 1930 controlled only 22 seats in the Senate, and 210 in the House (Figure 6). Earlier it was more so. However, by 1980 they had 72 in the Senate and 381 in the House (Figure 7). This shift is mirrored within most states.



Source: *Statistical Abstract of the U.S.*, 1985, Table 405, p. 242.

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Figure 6

States with 60% or More Urban in 1930

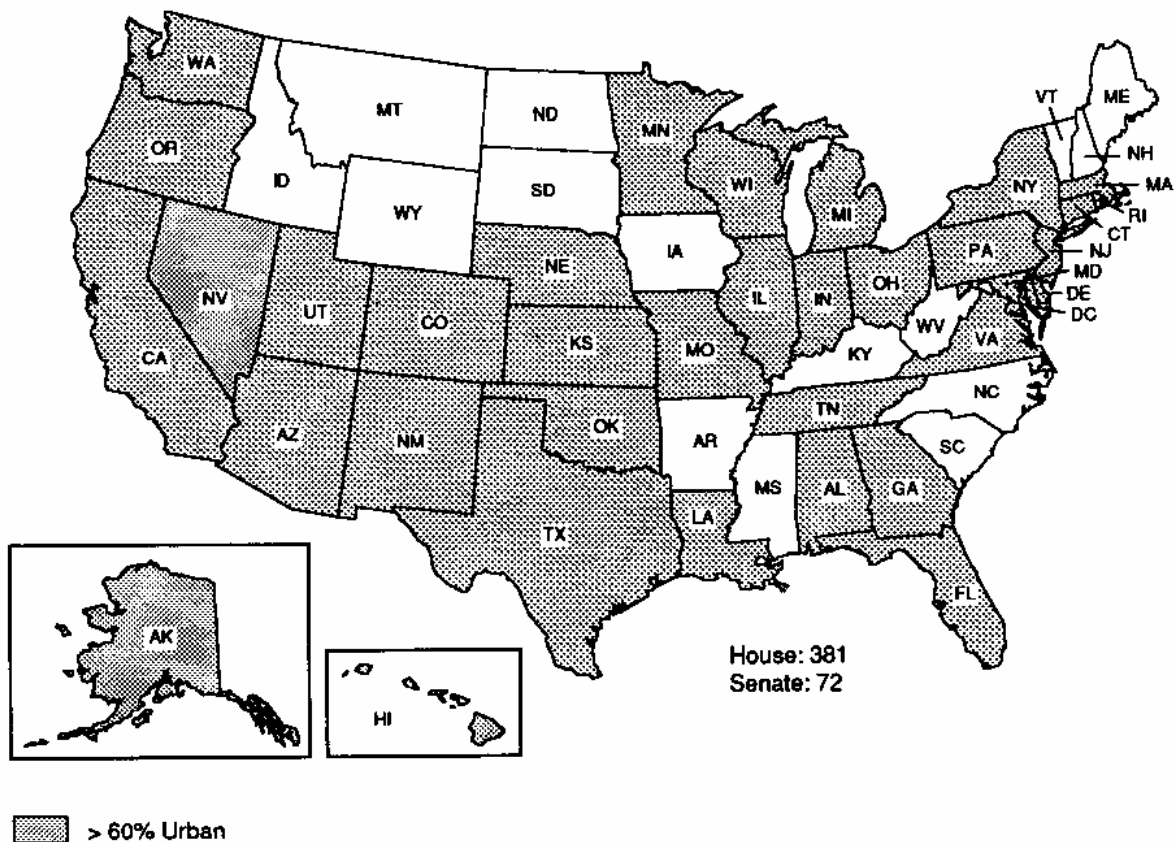
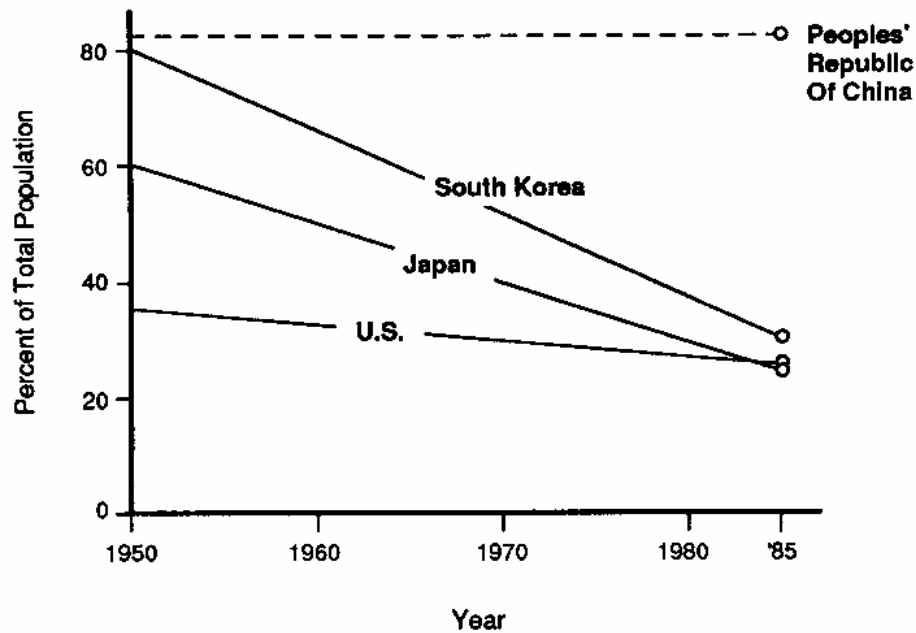


Figure 7

States with 60% or More Urban in 1980

Simply put, the voting blocs who assembled and preserved all that subsidy apparatus are gone. In their place are a majority who don't wish to be left out of a competitive market, and who may be willing to disassemble monopolies, rules that trade efficiency for broad coverage, price averaging, and the like. They make a good coalition partner for the strongest competitors wanting to get out of regulation. Populism is by no means dead in rhetoric, and gerrymandering still keeps old blocs disproportionately strong -- but rural populism can't get the votes any more.

The same urbanizing trend is common to the developed and developing countries (Figure 8), so that a worldwide political culture helps reenforce those who push for changes.



Sources: U.S.: *Statistical Abstract of the U.S.*, 1985, Table 24, pp. 20-21.
PRC, S. Korea, Japan: World Bank Report quoted in *The Wall Street Journal*, Jan. 13, 1986, p. 27.

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Figure 8

World Rural Populations

The political watershed, in which voting blocs began to catch up with reality, was *Baker vs. Carr* (U.S. Supreme Court, 1962) commonly called "one man one vote". The House of Representatives and the state legislatures began to be redistricted, and the power went where the people were. Even so it took a decade before significant institutions began to shake (Figure 9)..

-
- Postal Reorganization - 1970
 - Airline Deregulation - 1978
 - Trucking Deregulation - 1979
 - Railroad Line Abandonments (1970s - 1980s)
-

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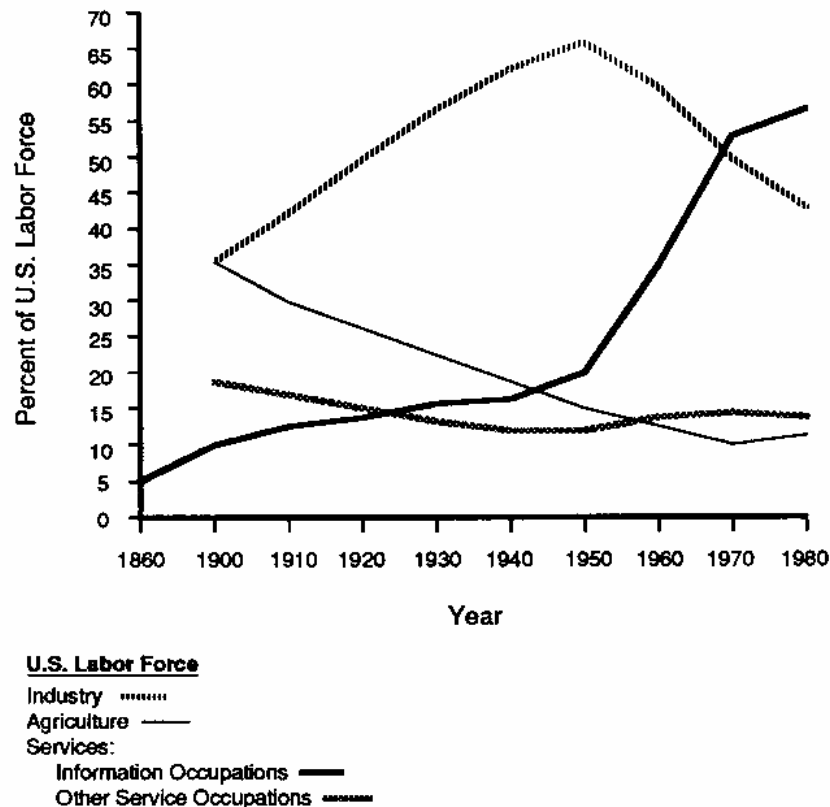
Figure 9

Events following Baker vs. Carr (U.S. Supreme Court, 1962)

The last several U.S. presidents, regardless of party, have used rhetoric that favored a reduction in government involvement, the promotion of competition, and the lessening of regulation (at least as a goal). These play well with constituents who see themselves as living at the center of things, worthy of competition, and not needing to be propped up. The failure of some telephone companies to rally support for continuing monopolies and subsidies (when they tried) should be no surprise.

V. Jobs and Regulators

If people are fleeing the farms, where are they going? The usual response -- "to the factories" -- is no longer true. Since the late 1940s they've also been fleeing the factories. What's growing is the information work force (Figure 10).



Source: Edwin B. Parker and Marc Porat. *Social Implications of Computer Telecommunications Systems*. Center for Interdisciplinary Research, Stanford University. February 1975.

Figure 10

Employment by Industry Sector

In all the industrialized countries somewhere between 40% and 55% of the work force is now reckoned as being information workers. That does admittedly depend on what you decide to count. To get the higher figure you count all telco employees, even if they're driving a truck.

You also count trucking company employees if they're answering a telephone.

The numbers are very sloppy. But they're big enough to hint at a big and fundamental change. It's the kind that takes public awareness and political institutions a long time to absorb.

One implication is that information regulators (which means mostly telco regulators) are no longer principally adjudicating between telcos and their users. Instead they referee the struggle among competitors, and try to balance interests between users and shareholders.

Most (38) state regulatory bodies were founded between 1907 and 1917, when information workers were less than 15% of the population. Large among the issues that caused their creation was monopoly and utility abuse of the population. By and large that's what their charters require them to prevent.

Although considerable rhetoric remains about how regulatory alternatives are about the welfare of the public, the public itself does not speak up today. We shall look later into why not.

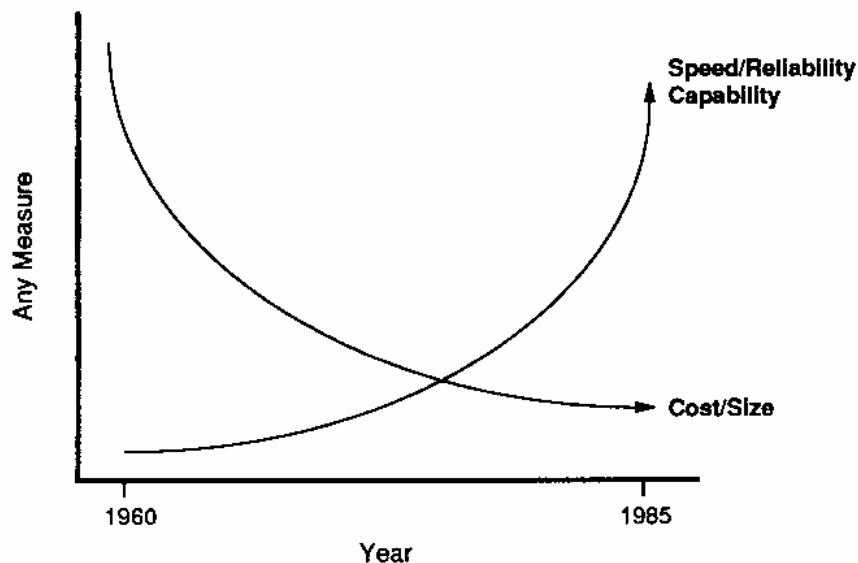
Instead, in the recent en banc hearings held by the California PUC on telephone regulation, 18 of the 22 parties who submitted advance comments were competitors. In federal proceedings, the skewing is even more pronounced.

In other words, the fundamental *raison d'être* of the state PUCs has evolved out from under them, the mission is no longer the same, and the demands that come over the transom are not obviously related to the charter.

VI. Technology and Other Resources

It is difficult to open a magazine these days without seeing another analysis of how technology is improving with lightning speed. It is next to impossible to open a newspaper without reading about some manifestation of it.

Here it is again in a general phrasing (Figure 11). By any measure, cost and size of information technologies are coming down; speed, reliability, and capability are going up. Measures include instructions per second or dollar (nowadays it's millions of instructions), bits per square inch, bits per pound, bits transferred per second, miles between repeaters, mean time to failure, and asking price per kilobyte. Whatever you pick, it's improving fast. Typically these measures improve by an order of magnitude (factor of 10) every three to five years. The growth is a compound curve and has been going on for 40 years with no end in sight.



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Figure 11

The Information Technology Explosion

That means underlying technology is handing us capability faster than we can assimilate it. Much faster. It's an engine of change on the scale of the industrial revolution.

To further compound matters, unrelated trends are acting as multipliers. One is the change already mentioned in the entry-level age cohort. Another is that other economic fundamentals are getting less efficient.

The fundamental building blocks of the universe are materials (without which there is nothing), energy (without which nothing moves), and information (without which there is only chaos). The fundamental building blocks of economic activity are labor and capital. Resource costs are the labor and capital components of materials, energy, and information -- a two-by-three matrix.

	Materials	Energy	Information
Labor	up	up	up
Capital	up	up	down

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Figure 12

Resource Cost Trends

That makes six fundamental resource costs, as displayed in Figure 12. Over the years (with occasional downturns), five of them have been going up. The other one -- the capital cost of information -- has been plummeting.

It is common business practice to keep track of resource costs and to substitute where necessary. You don't put in machines so quickly where labor is cheap. Information use is exploding not only because it's getting cheaper and faster, but also because it's substituting for other resources as they get more expensive.

We've already discussed the checkout counters, secretaries, and ATMs (information for labor), but substitution is pervading the economy. There are computer-routed trucks, taxis, and buses which substitute information for drivers, vehicles, and fuel. And facsimile and data transmission substitute electronic transfer for post offices. Finding it is a matter of noticing it. It's everywhere.

VII. The Dynamics of Information Supply

Big revolutions in economic structure can happen in little decisions, albeit sometimes quickly and in large numbers. The macro trends we've described so far are the result of some micro decision-making trends.

To the supplier, such decisions can look like opportunities for exploiting the improvements in technology. Specifically, the technology is improved over its predecessor by being smaller, faster, cheaper, or better (SFCB). Opportunities exist for creating new products or applications, for opening new markets, or for penetrating an existing market with a new strategy (PAMS).

A quick visualization is provided by Figure 13. Many changes are "caused" by new market entries that respond to these opportunities. The chart can also be used to suggest where changes might occur next. In fact it has been used by suppliers hunting for new opportunities. The four entries are only examples.

- Computing and transmission power finally became small enough to be used in the field to aim guns, or even carried aboard rockets as homing devices. The "smart" stinger missile is said to be a major reason for Russia's withdrawal from Afghanistan.

- Weather forecasting requires the processing of simultaneous equations with real-time input of enormous amounts of data. It couldn't be done in advance of the weather happening until processing speeded up enough.

- The pocket calculator first appeared for high-end, expensive, portable computing done by professionals. As the price dropped, it created market after market, eventually killing off much hand calculation for high school students.

- SONY captured the American market for television sets from domestic manufacturers by offering a more expensive product. But it was a better product. It was also virtually service free, allowing SONY to bypass the traditional distribution channels.

Areas of Opportunity	Technology Improvements			
	Smaller	Faster	Cheaper	Better
Products	Smart Weapons			
Applications		Weather		
Markets			Calculators	
Strategies				Japanese

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Figure 13

Technology Improvements Create Business Opportunities

Desktop publishing is now growing in two domains: as a smaller product in the household (top left corner) and a better, cheaper strategy for former users of small commercial printers (bottom right corner).

The "SFCB/PAMS" process is happening in all markets, niches, and levels of supply simultaneously. That means, among other things, that offerings substituting for or competing with each other are pouring forth. Many of these will fail, but even so they fragment and diversify the market.

Two examples relate to forecasts for transmission demand.

One forecast anticipated a growth in use for encryption. It assumed that anyone cares about security, but that's another story. Until recently, acceptable encryption was done by machinery the size of a filing cabinet that used tons of transmission capacity. Capacity was expected to drop in price and increase in quality -- a faster, cheaper, better application -- and make encryption feasible for large-scale use. AT&T, MCI, and US Sprint have current capital budgets to upgrade their networks totalling about \$4 billion a year. As the bandwidth is being

brought on line, simultaneous technology (STU-3) has appeared which does the encryption with a shoebox-sized machine requiring the bandwidth of an ordinary voice line -- a smaller, better product.

Another forecast was based on the assumption that households would demand video entertainment. This would justify the fiber connection into the home -- a faster, cheaper application. Meanwhile VHS videocassette recorders have penetrated half the households, and cassettes are available in drugstores and supermarkets for between \$1.00 and \$2.00 a rental -- a cheaper product and market. Planners in one telephone company have produced a brown paper bag with the words "caution, this bag contains unlimited bandwidth."

As the cost of data transmission comes down, usage is going up. The ability to compress is bringing bandwidth requirements down. Is this net growth or shrinkage for an industry in which usage is exploding and unit costs are plummeting?

One consequence of SFCB/PAMS is the increasing difficulty of planning. Forecasts can be blindsided by competition coming from unexpected directions. Entire industry segments and industries get destabilized or even wiped out. Flexibility and quick response become more important virtues than before.

Another consequence is that so-called "bypass" is more subtle than is often presumed. Public debate tends to treat bypass as alternative circuits. Alternatives can go well beyond just circuits, as in the examples above. The Postal Service avoided bypass in the form of electronic mail (remember those predictions?) by introducing the pre-sort discount. The possible loss of traffic outside the network can happen in many ways, and deserves imaginative watching. It is also extremely difficult to predict and quantify.

Both the corporate planning process and the public regulatory process proceed at paces that no longer fit the world they are trying to handle. External events can overtake their outcomes before they come out. There is a message in this for both telephone companies and regulators. Telephone companies have traditionally dealt in 20-year capital plans and 40-year depreciation cycles. For planning, the companies require a change of culture and procedures. For depreciation

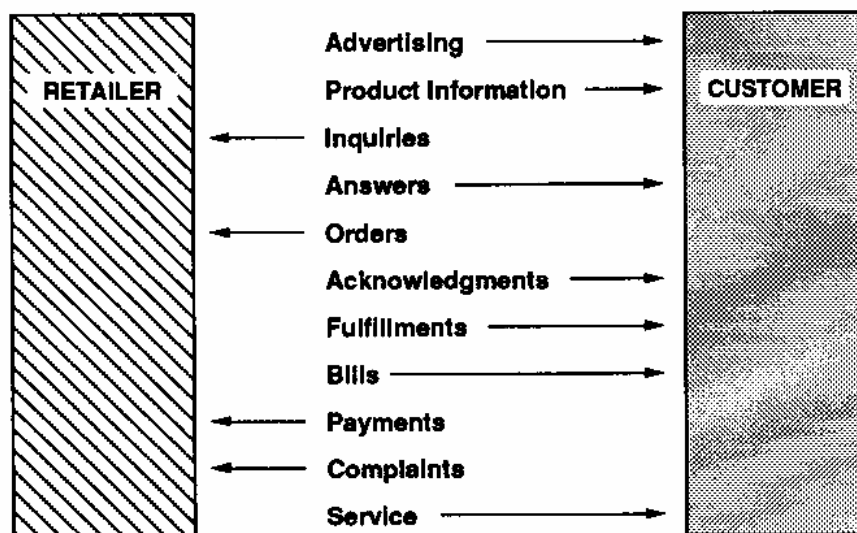
schedules, both the companies and the regulators need to rethink historical practice.

These phenomena also speak to the "relocation of the smarts" decisions mentioned above. One of the reasons for this relocation is that the capability, the price, the quality, or the source changes for some or all of the system in use. When that happens, the user rethinks his configuration.

VIII. The Dynamics of Information Purchase

The changing array of information products and services looks to business customers like opportunities to meet their needs in a smaller, faster, cheaper, or better way, or to rethink their own products, markets, applications, or strategies.

Figure 14, as an example, lists the flows of information between the retailer and the customer. Some of these flows are admittedly goods, but are usually accompanied by information. Figure 15 looks at some of the ways the retailer might reexamine his flow techniques.



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Figure 14

Sample Industry Information Flow

Substance	Traditional Channels	New Channels
Advertising	Newspapers/TV	Catalogs/800 numbers
Product Information		
Inquiries		
Answers		
Orders		
Acknowledgments		
Fulfillments		
Bills		
Payments		
Complaints		
Service		

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Figure 15

New and Old Information Channels

Many of the boxes in this matrix are unstable, and some have changed radically in recent memory.

Consider advertising. Catalog shopping has grown dramatically. This is a "low-tech" hard-copy medium responding to the demographics of working women and two-job parents. It is at least partly made possible by high-tech processes, such as computerized mailing lists, 800 numbers, and instant credit card verification. There is much discussion but little certainty as to whether dollars have been displaced from "traditional" media such as television. Television in its day seemed to grow at the expense of radio and newspapers. It is worth noting that catalog advertising preceded all of these, but in a less sophisticated form.

Now, the payment that goes with many catalog purchases is done when the customer gives his credit card number over a toll-free line

while placing the order. The account is immediately debited over another telephone line. All new.

The details are endless and are the subject of other Program publications. The point here is that the business purchaser of information uses a multifaceted array of changing information products and services. The user can change his purchases as new options become available. The implications for the user's own products and his internal structure can sometimes be profound.

We use information differently in the home than we do in the office.

Most analyses come up with variations of the same four uses: data gathering, opinion formation/decision making, social connection, and escape. Figure 16 suggests that the media we use for these purposes are changing.

Example	Category			
	Data Gathering	Opinion Formation/ Decision Making	Social Connection	Escape
	Stock Prices, Sports Scores	News, Advertising	Telephone, broadcast	Books, Films
Media Stability	very unstable	mildly unstable	?	unstable

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Figure 16

Stability of Personal Information Consumption

Many people who used to go to the movies now bring the movie home as a videocassette, and invite the neighbors over. In 1986, videocassette rentals passed box office receipts. The most rapidly growing advertising media are catalogs and direct mail -- an adaptation to the changing demographics of work and family. Telephone services

now offer sports scores. These changes represent the household version of the instability in the work place.

IX. From Scarcity to Abundance

Suppliers of information may have astronomical headaches, but the user has a smile on his face.

He has been confronted with more choices (enough to cause a headache sometimes), dropping prices, and disappearing scarcities. In such an environment, expectations should rise, and they have been.

Worldwide instantaneous video coverage of news is now the norm; anything else looks primitive. The America's Cup races were not only broadcast live from Australia, but from the boats. Thirty years ago, a long-distance phone call was a rarity -- even deaths were announced by telegram. Now telco ads promote routine calls to friends in Europe and Asia. Law partners search databases instead of sending associates to search books. Indeed it can be malpractice not to use the databases.

Improving experiences lead to rising expectations -- even assumptions. Some of these can have practical consequences for the telephone industry and its regulators.

In February 1987, British Telecom's unions staged a strike. To inflict maximum pain, they cut off service to the City of London -- Britain's financial district. However the financiers were ready for them. They had installed connections to BT's competitor, Mercury Communications Ltd. The strike ended in 11 days on terms favorable to management. Corporate communications budgets run approximately 1% of expenses for the average large company (up to 3% for some communications-intensive businesses). Redundant communications has now become an affordable kind of insurance policy. The old regulatory goal of avoiding plant duplication may no longer serve either supplier or user.

Forty years ago many households had one radio, which was the size of a desk and sat in the main room. Now many households couldn't even cite how many radios sit unused inside desks and closets. Television sets were once one-to-a-family. Now some have one for each child plus a portable.

The same is beginning to happen for telephone lines. The telephone book for the western Boston suburbs lists several families with a line for the parents, another for the children, and a third for

the answering machine. When it was scarce it was a necessity or luxury. Now it's halfway to being a commodity.

And a growing number of these lines have call-waiting, call-forwarding, automatic dialing, or some other feature beyond simple dial-tone service. At the moment we consider the dial tone "basic" and the features "enhanced" -- technical terms which reflect common perception. If present trends continue, the notion of "basic" could expand. Other capabilities will seem routine, and more in line with what the user sees elsewhere. Automatic dialing, for example, is now routine on telephone equipment.

X. And What It All Means for Government Oversight

The America telephone industry has traditionally been subject to rate base/rate-of-return regulation (ROR). In other words it earns up to an authorized percentage on its rate base, and nothing else.

In an era of declining capital costs, this mode of regulation eventually becomes detached from its underlying premises. The capital base is dropping relative to other costs, and provides a less meaningful proxy for the whole operation. The market value of the company will shrink as it serves its customers better -- a seemingly perverse incentive structure. Services that couldn't pay their way and needed subsidy help (read universal service) became available and affordable.

In fact, universal service as an issue looks passé. It's been achieved, and the threat of astronomical costs that will unachieve it is past. It no longer makes for an underlying rationale for government intervention -- at least in the U.S. and at least for voice. However, there are already advocates for redefining the concept of universal service to include more than voice.*

American government is held to be a reactive mechanism whose reason to act is to prevent harm. Users of telephones and information generally are not a group experiencing harm. Every year things get better for them.

Figure 17 compares the cost of residential telephone service with the price of fuel oil and with the consumer price index. The direction of the adjusted price of telephones versus oil is worth noting, and so is the magnitude.

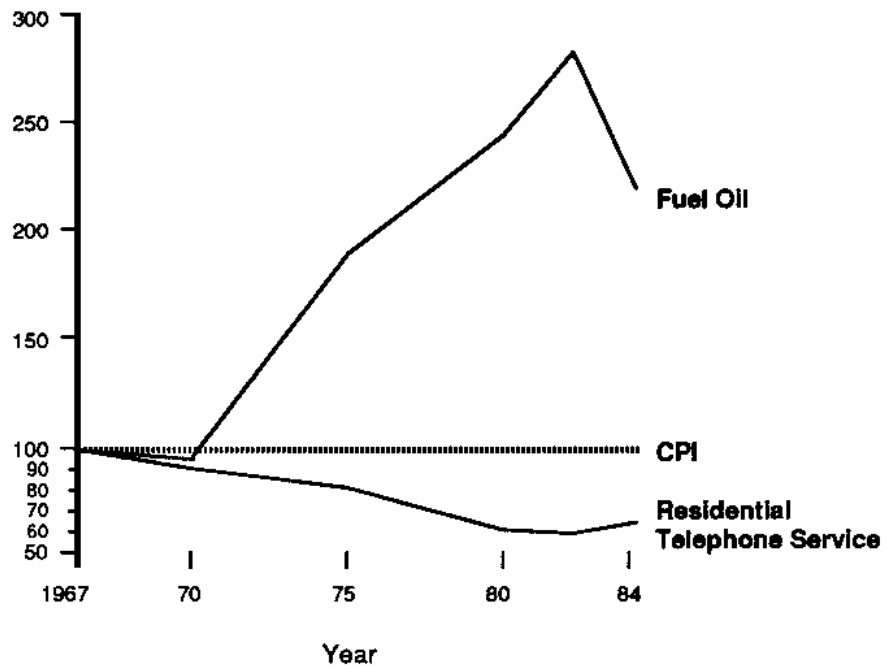
(For what it's worth, the upturn between 1980 and 1984 looks more like a glitch than a trend. It was largely caused by two items: an increase in the allowed rate-of-return due to rising inflation; and a shortening of depreciation schedules.)

Basic residential service averages around \$14/month, and has been

* There remains considerable noise about the unserved population. But it is a very small population, and neither a major power bloc nor an engine of growth for the industry. The rhetoric, however, lives on.

declining in most years. During the '70s many people in the chilly north found their monthly heating bill jumping from \$200 to \$1000.

Most households devote minimal time to pressuring their government. These figures show where that time will be spent. They also explain why three consecutive chairmen of the House Subcommittee on Telecommunications have been unable to find a grass roots movement. Telephone matters are a voter nonissue.



Source: *Statistical Abstract of the U.S.*, 1987, Table 787, p. 469, and Table 803, p. 482.

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Figure 17

Consumer Prices

Oddly enough, that may provide an incentive for regulators at the state level to stay in the business. They don't have many victories to present to the state house. With this one they can go back to the voters and say "we didn't make you happy about the nuclear power plant, but you've done well on telephones this year."

These observations do not prescribe a "correct" answer to the question of what governments should do. They do, however, explain why there is so much current interest in rethinking the fundamentals. They also suggest that this thinking is timely.

