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Seminario del Departamento de Economía

***“The Telecommunications Act of 1996
Four Years Later.”***

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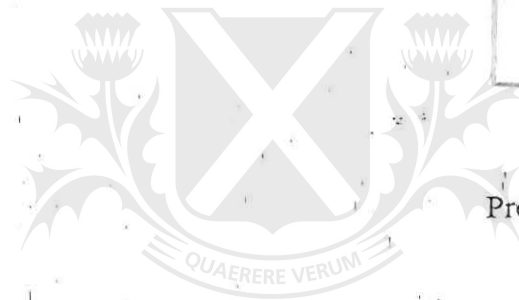
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THE TELECOMMUNICATIONS ACT OF 1996 FOUR YEARS LATER

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Introduction

Less than one century and a half has elapsed since the immortal words by Alexander Graham Bell "Come here, Watson" signaled the birth of the Telecommunications era.

By 1999, report by the U.S. Department of Commerce bears the title "The Emerging Digital Economy" that is mainly devoted to the analysis of information technology (IT) industries.

According to some authors¹, America is now a communications society in the information Age.

Shapiro and Varian (1999) define as information anything that can be digitized, from books to databases to music and they place information goods at the heart of contemporary economy.

In these circumstances it can be extremely useful to analyze the process of deregulation which took place in the U.S. telecommunications industry after the Act passed in 1996.

An information economy

Information goods -as defined by Shapiro and Varian- have supplanted industrial goods as the key drivers of world markets as industrial goods once upon a time supplanted agricultural goods in that role.

The IT complex (ranging from computers to cable TV to mobile phones) plays the role oil, steel and electricity played during the last industrial revolution. Information goods demand is the fastest growing in recent years.

"By 2006, almost half of the U.S. workforce will be employed by industries that are either mass producers or intensive users of information technology products and services."²

Let us consider some characteristics of this type of goods.

Information goods usually involve high fixed costs but very low or even practically no marginal costs. They are subject to large economies of scale and scope. Marginal cost pricing is, in most cases, unprofitable. They are usually subject to network externalities: the value of the product to one user depends on how many other users there are. The more users the more valuable a network is. Telecommunications services derive their value from connecting each user to a large number of recipients. Then, there is a 'critical mass' of users necessary to make a network worthwhile. After that, there is a positive feedback effect: as the number of users grows, more and more users find adoption of that network beneficial. And there are also the so-called lock-in effects: users of a particular network do not want to risk the benefits of joint consumption by moving to another network, even if this alternative is more efficient.

This network aspect of the industry gives an enormous market power to the incumbent provider. On the other hand, it implies the need of joint use of the network facilities by competitors. Any entrant will have little success in recruiting customers if it cannot offer them the possibility to connect to customers of the rest of the telecommunications firms.

¹ For example, see Peter K. Pusch(1996), *The innovation Age: A New Perspective on the Telecom Revolution*, Hudson Institute and Progress and Freedom Foundation.

² United States Department of Commerce (1999), 'Executive Summary,' *The Emerging Digital Economy II*, June 1999.

Hence the need to force incumbents to provide efficient interconnection arrangements for its competitors in order for the industry to operate in a competitive environment.

The Telecommunications Act of 1996

The Telecommunications Act of 1996 was signed into law in February 1996. It was the first major reform since the original 1934 Communications Act.

The main purpose of the 1996 Act was to transform the monopoly local telephone market into a free-competitive market.

One of the instruments for that purpose was the elimination of the telecommunications-cable cross ownership ban. This allowed a wave of mergers and joint ventures to take place but whose final result is still uncertain.

The other main instrument was the set of provisions concerning the development of a local competitive market, the results of which are still to be seen.

However, the telecommunications market underwent these years huge changes. But they were mainly the result of the significant technological changes which took place during these years in that industry. In this respect, technology largely outperformed legislation. The bottom line is: most of the Act did not work; most of what did work was not in the Act.

But before getting into details on what part of the legislation worked and what did not, and how the telecommunications market evolved during these recent years, let us put the Act in historical perspective, mainly on two key issues to which the Act refers: interconnection and the universal service.

The interconnection and universal service issues in historical perspective.

Interconnection and universal service are two concepts which have been closely related in the history of the U.S. telephone industry, although in different ways according to the times. The term 'universal service' was coined by Theodore Vail, the founder of the Bell System, to mean precisely what today is meant by 'interconnection.'³

In fact, in the early days of the U.S. telephone industry -from 1894 to 1924- the Bell System, on one side, and the independent companies, on the other, provided a dual service without interconnection between them.

Theodore Vail, as president of AT&T, referred to universal service as the alternative to the then prevailing dual service, meaning a single, fully interconnected system, where consumers fully benefit from network externalities. According to Mueller (1997), today's interpretation of universal service as comprehensive household penetration appeared as late as the 1970s.

In the Communications Act of 1934 there is no reference to the universal service issue. Only the preamble mentions the purpose of making "available, so far as possible, [communication by wire and radio] to all the people of the United States." This is not strange since the 1934 Act was only nominally a New Deal product. In contrast with other regulatory enactments it

³ See Milton L. Mueller, Jr., *Universal Service. Competition, Interconnection, and Monopoly in the Making of the American Telephone System.*, MIT Press and AEI Press, Washington, D.C., 1997.

did not inaugurate a new regulatory scheme. The substance of the laws the FCC, then created, was to administer was taken from the existing regulatory statutes⁴. Interconnection and universal service are the two central issues in the 1996 Telecommunications Act.

Interconnection in the 1996 Act

A central goal of the 1996 Act (hereafter, the Act) was to open local exchange markets to competition.

The AT&T breakup in 1984 through the Modification of Final Judgment (MFJ) resulted in competition in manufacturing, long distance and information services. But local telephony remained a regulated monopoly.

The key issue for open competition in the local market is interconnection. Leaving aside, for obvious economic reasons⁵, the alternative of duplicating facilities, the key issue remains the access to the so-called last mile of copper wire owned exclusively by the local monopolies.

Section 251 of the Act requires incumbent local exchange carriers (ILECs) to "interconnect directly or indirectly with the facilities and equipment of other telecommunications carriers." This interconnection should be provided at any technically feasible point, and the quality should be equal to that the ILEC provides to itself or to any subsidiary, at rates, terms and conditions that are "just, reasonable and nondiscriminatory." The main idea is to level the playing field between the incumbent company and its competitors.

In August 1996, the FCC issued a 700 page order intended to carry out the local provisions of the 1996 Act⁶. The ILECs vigorously opposed the FCC's interpretation of the Act's local competition provisions. They first sought relief from the FCC and then from the Appeals Court. One of the main arguments of the ILECs was that the FCC had no authority under the Act to promulgate rules governing pricing, since the Act assigns that responsibility to the states.

The FCC refused to stay its rules and most of the ILECs appealed the order to several different Appeals Court circuits. The appeals were consolidated before the Eighth Circuit (St. Louis) Appeals Court. The court granted a stay of the pricing rules until a full substantive proceeding before the Appeals Court was completed.

Among other things, that court held that the FCC lacked jurisdiction to promulgate its rules regarding pricing, dialing parity, exemptions for rural LECs, the proper procedure for resolving local-competition disputes, and state review of pre-1996 interconnection agreements.

The FCC appealed to the Supreme Court which ruled that the FCC has general jurisdiction to implement the 1996 Act's local-competition provisions⁷. The main argument was that

⁴ See Max D. Paglin (ed.), *A Legislative History of the Communications Act of 1934*, Oxford University Press, N.Y., 1989.

⁵ However, Mueller (1997) seems to a lonely advocate favoring access competition instead of mandatory interconnection.

⁶ Implementation of the Local Competition Provisions in the Telecommunications Act of 1996. CC Docket No. 96-98, FCC 96-325, released August 8, 1996.

⁷ See Supreme Court of the United States, *AT&T CORP. et al. v. IOWA UTILITIES BOARD et al.* Certiorari To The United States Court Of Appeals For The Eighth Circuit, No. 97-826. Argued October 13, 1998-Decided January 25, 1999.

since Congress expressly directed that the Act be inserted into the Communications Act of 1934, and since the 1934 Act already provides that the FCC "may prescribe such rules and regulations as may be necessary in the public interest to carry out the provisions of this Act," the FCC's rulemaking authority extends to implementation of §§251 and 252. Section 152(b) of the Communications Act, which provides that "nothing in this chapter shall be construed to apply or to give the Commission jurisdiction with respect to . . . intrastate communications service . . ." does not change this conclusion because the 1996 Act clearly applies to intrastate matters.

So, it was not until the beginning of 1999 that most of the legal controversies were settled. Meanwhile, most of the Act has been *letra mortis*.

The issues at stake

The Act's philosophy has been to offer a carrot to ILECs in order to prompt opening of the local market to competition. In those markets where competition is established the ILEC is allowed into long distance service. But competition has to be established *before* the ILEC is authorized to enter the long-distance market.

For this purpose, the Act establishes a 14-point checklist⁸ with which every ILEC has to comply before it may enter the long-distance market.

⁸ The checklist conditions are (all reference to sections are referred to the 1996 Act):

- 1.- Interconnection in accordance with the requirements of sections 251(c)(2) and 252(d)(1).
- 2.- Nondiscriminatory access to network elements in accordance with the requirements of sections 251(c) and 252(d)(1).
- 3.- Nondiscriminatory access to the poles, ducts, conduits, and rights of way owned or controlled by the Bell operating company at just and reasonable rates in accordance with the requirements of section 224.
- 4.- Local loop transmission from the central office to the customer's premises, unbundled from local switching or other services.
- 5.- Local transport from the trunk side of a wireline local exchange carrier switch unbundled from local switching or other services.
- 6.- Local switching unbundled from transport, local loop transmission, or other services.
- 7.- Nondiscriminatory access to:
 - a) 911 and E911 services;
 - b) directory assistance services to allow the other carrier's customers to obtain telephone numbers; and
 - c) operator call completion services.
- 8.- White pages directory listings for customers of the other carrier's telephone exchange service.
- 9.- Until the date by which telecommunications numbering administration guidelines, plan, or rules are established, nondiscriminatory access to telephone numbers for assignment to the other carrier's telephone exchange service customers. After that date, compliance with such guidelines, plan, or rules.
- 10.- Nondiscriminatory access to databases and associated signaling necessary for call routing and completion.
- 11.- Until the date by which the Commission issues regulations pursuant to section 251 to require number portability, interim telecommunications number portability through remote call forwarding, direct inward dialing trunks, or other comparable arrangements, with as little impairment of functioning, quality, reliability, and convenience as possible. After that date, full compliance with such regulations.
- 12.- Nondiscriminatory access to such services or information as are necessary to allow the requesting carrier to implement local dialing parity in accordance with the requirements of section 251(b)(3).
- 13.- Reciprocal compensation arrangements in accordance with the requirements of section 252(d)(2).
- 14.- Telecommunications services are available for resale in accordance with the requirements of sections 251(c)(4) and 252(d)(3).

By February 1997, most carriers had negotiated interconnection agreements. However, the process proved to be extremely long and difficult with continuous obstacles and appeals raised by the ILECs.

There are two novel ways of entry the Act introduced -besides through the installation of own facilities. They are: a) resale of retail services at wholesale prices; b) leasing of unbundled network elements (UNE) so that the entrant can construct hybrid networks (partly their own facilities, partly the facilities of the incumbent)..

a) The Act requires ILECs to sell at wholesale prices to entrants any retail service they offer. This raised a discussion focused on the magnitude of avoided costs this implied for the incumbent, which should be subtracted from the retail price to get the wholesale price. The FCC interpreted that the discount should equal all of the costs that the ILEC incurs in maintaining a retail, as opposed to wholesale, business. Local companies argued they had to take into consideration only the costs added or saved by taking on or giving up that particular portion of a service; for them it was something like 3%. Carriers argued it could be 40/50%, taking into consideration all the costs avoided if the ILEC were to abandon retailing entirely. In most cases, State commissions settled it at around 20%, calculated on the basis of avoided embedded costs.

b) The second way of entry introduced by the Act is through leasing of unbundled network elements (UNEs) -such as local loops, switching and/or transport- from ILECs. Thus, entrants could take advantage of the incumbent's economies of scale.

The FCC ruled that competitive LECs can buy, as UNEs, all the components of the ILEC's net, one by one, as already provided to customers, and that all the elements must remain as they were provided to customers. ILECs objected, arguing this would constitute a resale in which case wholesale prices should apply. But as unbundled elements were supposed to be sold at LRIC prices, this would mean a higher discount. ILECs argued this would render the resale provision of the statute a dead letter, because by leasing the entire network rather than purchasing and reselling service offerings, entrants could obtain the same product -finished service- at a cost-based, rather than wholesale, rate.

On top of it, the local company would not collect the access charge⁹ for the long-distance calls, which in this case would be collected by the competitive LEC handling them. The discount in such a case will amount as a whole to something like 30/40%. On the contrary, on a resale, the discount would be only 20%, as mentioned.

The Eighth Circle ruled that nothing in the law prevented entrant companies from buying as many unbundled pieces as they choose; at the same time they ruled that nothing in the law prevented incumbent companies from breaking up the already-combined network elements of the so called UNE-platform.

However, the Supreme Court reversed this last criterion. The FCC's rules governing unbundled access were declared -with only one exception- consistent with the 1996 Act. In particular, FCC's Rule 315(b), which forbids incumbents to separate already-combined network elements before leasing them to competitors, was considered a reasonable interpretation of the Act's §251(c)(3), which establishes the duty to provide access to network elements on nondiscriminatory rates, terms, and conditions and in a manner that allows requesting carriers to combine such elements. The Supreme Court pointed out that

⁹ Access charges on all originating and terminating long-distance calls were established at very high levels as a way of compensating local companies for the subsidized local calls.

this section forbids incumbents to sabotage elements that are provided in discrete pieces, but it does not say, or even remotely imply, that elements must be provided in that fashion and never in combined form, making clear that the phrase "on an unbundled basis" does not necessarily mean "physically separated," as argued by the incumbents.

Following the Supreme Court's ruling, the FCC ordered that a UNE-platform, with all its piece parts, should be made available for residential and small business service.

The Supreme Court also considered that the FCC had acted reasonably when it omitted a facilities-ownership requirement, interpreting the Act to impose no such limitation; if anything -it was alleged-, it suggests the opposite, by requiring under §251(c)(3) that incumbents provide access to "any" requesting carrier.

Finally, according to the Supreme Court -and against the ILEC's position- the "pick and choose" rule is not only a reasonable interpretation of the Act, it was considered most readily apparent.

After five long-distance entry applications of Baby Bell companies were rejected by the FCC on the basis that they had not yet opened their local networks to competition, in September 1999 Bell Atlantic, the nation's biggest local telephone company, asked for permission to sell long-distance services in New York State, and in December the application was approved. So, it was the first such case, more than three years after the Act was passed. This delay occurred although many carriers had negotiated interconnection agreements and the interconnection rates were established in cost cases by state commissions. It is clear that implementation of interconnection requires solution of new and complex technical difficulties¹⁰.

After the 1984 MFJ the newly divested Bell operating companies were required to install switches that would allow equal access to all interexchange carriers. Similarly, interconnection requires a huge effort to achieve compatibility between the incumbent company and the competitor.

In the New York case, it is clear that the goals of the Act were only partially attained. The Act introduced two novel ways of entry -as it was noted before- to ensure competition and avoid duplication of facilities: resale of retail services and leasing of UNE. In the approval of Bell Atlantic entry into the long distance market, however, the FCC acknowledged that out of a total of something like 1.100.000 lines served by competitors, only 152.000 lines were using the UNE platform and 314.000 were served through resale. Practically 60% were served using competitors' own facilities.

Past experience suggests that opening up of the local market to competition *via* interconnection requires a convergence of the interests of at least three main actors:

- 1) The local telephone company *via* its interests in offering long-distance services to its customers.
- 2) The long-distance companies and their interest in competing for the local market.
- 3) The state regulatory commission, whose pro-competitive spirit may facilitate achievement of this goal.

¹⁰ Such a delay may be used as an argument in favor of total deregulation. However, the New Zealand experience shows that in a totally deregulated market, more than three years were necessary until the main entrant and the incumbent reached an agreement over the price of interconnection, and this was reached under severe pressure put by the authorities. Even so, it is not clear that the interconnection problems have already been totally solved.

Given the legal and technical difficulties interconnection entails, absence of any of these three elements can block a competitive outcome.

These conditions may be met in states with a huge market, like New York, Texas, California, Pennsylvania or Georgia, where the local company may be interested in acquiring a share of the long-distance market and the long-distance companies are tempted to enter the local market. But it seems rather difficult to think it is going to become the general rule.

Access pricing

As we have previously remarked, competitors in telecommunications must accommodate joint use of their facilities in order for the industry to operate efficiently.

By far the most difficult regulatory problem is to make sure incumbents provide efficient interconnection arrangements for their competitors.

A basic principle of telephone pricing is that the calling party pays. In a competitive industry, access firms compete over the service prices they offer customers. But, as a customer cannot choose how a call is terminated, companies will not compete over termination charges¹¹. Hence, even in a competitive environment, an access firm is likely to have substantial market power in termination charges. High prices for completing connections is a weapon an incumbent can use against entrants.

However, if the entrant has a sufficient scale so it can avoid the facilities of the incumbent for a large fraction of its service and can impose costs on the incumbent that are comparable to the costs the latter imposes on the former for the remaining services that use the facilities of both, the incumbent has a strong incentive to negotiate efficient interconnection agreements¹².

But in the case where the entrants are firms that initially lack a significant customer base, the incumbent has no reason to negotiate a fair agreement on interconnection. Interconnection regulation will be necessary to promote competition.

Different theoretical approaches

More than a decade ago, Baumol and Willig proposed the so called "efficient component-pricing rule" ("EPCR"), also known as the "parity-pricing formula," to price a bottleneck input where such resource must be used by both the incumbent and its competitor in the supply of perfect substitute final products.¹³

Consider a vertically integrated firm that supplies a retail output and a bottleneck input necessary for producing the output (say network access). Let p be the retail price and a , the input price. Let b denote the incremental cost of access and c , the incremental cost of the

¹¹ For this reason Crandall and Waverman (1995, 265) propose to charge the recipient the price of termination. With the subscriber paying for terminal calls, no carrier could exercise market power. If recipients pay the termination costs for incoming calls, customers will choose the carrier taking termination price into consideration. However, this would imply an automatic collect call every time the phone rings. An alternative might be to enable the caller to exercise the option of charging the termination price to the recipient; for instance dialing an additional digit which will activate a recorded message asking the recipient if she agrees to pay the termination price.

¹² However, we will see this does not mean they will necessarily be in the consumers' interest.

¹³ See, for example, Willig (1979) and Baumol and Sidak (1994, ch. 7).

downstream activity. So, $b + c$ is the incremental cost of the final output. ECPR says that a should be set equal to the direct incremental cost of access plus the opportunity cost of supplying it:

$$a = p - c \quad (1)$$

Alternatively and equivalently, the ECPR price of the bottleneck input must equal the incremental cost to the firm of supplying a unit of the bottleneck input to its rivals plus the incremental opportunity cost that the firm incurs when it loses a sale of a final product to a rival:

$$a = b + [p - (b + c)] \quad (2)$$

ECPR is a *necessary* condition if inefficiency in resource allocation is to be prevented. The parity principle tells us that the price the bottleneck owner implicitly charges itself for bottleneck input is the price at which competing final-product providers should be entitled to purchase bottleneck input. Then, the firm with the lower cost for the downstream activity can afford to undercut its competitor by precisely the amount of the difference between their costs. The most efficient firm will supply the final product. On the contrary, violation of (1) or (2) would permit a less-efficient supplier for the downstream activity to underprice its more efficient competitors.

A variation of the ECPR formula is the so called "augmented ECPR." This points out to ensuring not only competitive neutrality but also preventing monopoly profits.

It has been argued that the ECPR may include monopoly profits in its opportunity cost element. As the bottleneck owner is a monopolist, its final product price may therefore be set at a level that yields monopoly profits. The augmented ECPR removes all monopoly profit from the opportunity cost component.

The regulator can ensure the absence of monopoly profits by requiring the bottleneck-proprietor firm to select any price (the "declared price") it desires for *each* of its final products requiring bottleneck inputs in its production, provided that this set of declared prices yields revenues no higher than the "stand-alone costs." For each product of the bottleneck owner, a separate bottleneck-input ECPR price would be calculated in accord with either of the ECPR formulas - (1) or (2) - on the basis of the declared price of that final product. However, the incumbent would be left free to charge final-product prices that may differ from the declared prices.

If the firm reduces the final-product price below the declared price, the ECPR price for the bottleneck input to be used in supplying it must also be reduced, with the reduction in the one matching that in the other. If the firm raises the final-product price above its declared level, the bottleneck-input price would in that case be precluded from rising above the ECPR figure corresponding to the initial declared price, so that no monopoly element can be added to the price of the bottleneck input.

So, the augmented ECPR prevents the price of the monopolist services from incorporating a supercompetitive component.

Armstrong (1997) generalizes ECPR for the case of imperfect substitution between the final product supplied by the incumbent and the final product provided by its rival. In this case, the access charge which maximizes welfare is given by

$$a = b + \sigma[p - (b + c)]$$

where σ measures the degree of substitutability between the pair of products. In particular, if the two products are perfect substitutes, $\sigma = 1$ and we obtain (2).

Laffont and Tirole (1994) analyze the case of scale economies which mean that marginal-cost pricing is not feasible. Then, theory calls for the adoption of a Ramsey price for the bottleneck input. The access price which maximizes welfare and allows to cover fixed costs has the form

$$a = b + \delta$$

where δ is a Ramsey term involving super-elasticities of demand which take account of cross-price effects as well as own-price effects. However, the Laffont-Tirole solution does not satisfy the necessary condition for productive efficiency -which ECPR does- because of the fixed-cost recovery constraint. As with Ramsey prices generally, the optimal prices are the best that can be done given the instruments available and constraints.¹⁴ If there were no fixed cost recovery problem, (1) would be optimal.

Laffont and Tirole (1996) respond to the common criticism that Ramsey pricing requires a huge amount of demand information arguing that an appropriate global price cap can induce Ramsey pricing in a decentralized manner. Under the global price cap the firm is constrained not only in the prices of final products, but in the prices of bottleneck services as well.

As Vickers (1997, 24) points out "the ECPR -in its general opportunity cost formulation, of which the margin rule is just a special case- gives the optimal access price for a given retail price when there is no fixed-cost recovery problem. Ramsey principles give optimal retail and access prices when there are fixed costs to be recovered." One way of expressing the Ramsey access price is as the ECPR plus a normal elasticity term:

As previously remarked, ECPR is a necessary but not sufficient condition for economic efficiency. The alternative ways of calculating the bottleneck service price that have been proposed look for other goals and policy objectives other than economic efficiency in the allocation of production between the bottleneck owner and its rivals.

Interconnection rates after 1996

The key criterion on interconnection rates taken into consideration by the FCC was that in a competitive market, firms do not base decisions on embedded costs but on forward-looking economic costs.

Total element long run incremental cost (TELRIC) was a new term coined by the FCC to describe its pricing methodology. According to the FCC definition¹⁵, directly attributable forward-looking costs include the incremental costs of facilities and operations that are dedicated to the element. They typically include the investments costs and expenses related to primary plant used to provide that element as well as incremental costs of shared facilities and operations.

ILECs have disputed this approach alleging that this criterion did not allow them to recover all the revenues they expected to earn before the coming of competition. Sidak and Spulber¹⁶ have endorsed this position in defense of historical costs instead of forward-

¹⁴ On the rationale behind Ramsey prices, see Appendix.

¹⁵ See FCC Order, §675.

¹⁶ See G. Sidak and D. Spulberg, *Deregulatory Takings and Breach of the Regulatory Contract*, N.Y.U. Law Review, vol. 71, 1996 and G. Sidak and D. Spulberg, *Deregulatory Takings and the Regulatory Contract: The Competitive Transformation of Network Industries in the United States*, Cambridge University Press, 1997.

looking ones, arguing that investors should be allowed to recover all their historical costs; if they are not, this will imply a breaching of the regulatory contract.

As Baumol and Merrill (1997, 1063) in response, point out, "the competitive market model requires that the firm's assets be valued for pricing purposes on the basis of the cost of replicating those assets today...that is how assets are valued in any truly competitive market." On the contrary, prices based on historical costs are a source of economic inefficiency and thus harmful for the consumers.

The cost cases in individual states followed the FCC guidelines, applying the forward-looking criterion.

Another issue widely discussed was whether costs should be computed on the basis of the least-cost, most efficient network configuration and technology currently available or on the basis of the ILECs' existing network. The FCC argued that the first of these approaches would discourage facilities-based competition by new entrants and rejected it¹⁷.

Two observations can be made about this decision:

- a) It is incompatible with the forward-looking, long-run point view. In a competitive market, the long-run, forward-looking costs which will prevail are those of the most efficient technology.
- b) All the provisions for interconnection and leasing of unbundled network elements are based on the assumption that facilities-based competition is neither desirable nor feasible. They try to ensure prices are those that would prevail in a competitive environment instead of locking in the ILECs' present inefficiencies.

The opposite view is defended by Kahn et al. (1999, 325-330): they consider that forward-looking costs should be based on the incumbent's own costs. They argue against setting the rates at the level of a hypothetical, most-efficient, new entrant, remarking that this is not the level to which competition would drive prices. But in an unregulated, competitive market, if there is an entrant whose advanced technology lets him achieve costs lower than the incumbents' ones, the price would drop down to the efficient level. In such a case, prices *do not* tend to be set on the basis of the actual costs of incumbent firms, as Kahn et al. (1999, 330) argue.

Of course, this does not stimulate the building of their own facilities by competitors, but contrary to Kahn et al's interpretation, one of the purposes of the Act is to prevent wasteful duplication of networks. That is precisely why neither the Act nor the FCC's rules contains any limitation on the right of entrants to demand unbundled elements or retail services from the incumbent.

The ILECs also strongly advocated EPCR pricing of interconnection and unbundled network elements. But the Act explicitly requires interconnection and network element charges to be based on the cost of providing the interconnection or network element plus a reasonable profit¹⁸. EPCR is based on the prices of the final product; so that unless the prices for all final services are based on cost, that approach is not pertinent in this case. In the case of local telephony, prices are claimed to substantially depart from costs. Then, use of EPCR would have been a rampant violation of the Act's requirements.

The main developments in the telecommunications industry since 1996

¹⁷ See Federal Communications Commission (1996), § 683.

¹⁸ See Telecommunications Act of 1996, Public Law No. 104-104, 110 Statutes 56, § 252 (d)(1).

While competition based on the Act's provisions has been delayed by the proceedings before the courts and the FCC, other avenues for competition opened in the telecommunications market; technological innovation rather than pricing arrangements seems to have become the major driving force favoring competition in this market.

On the one hand, the elimination of the telco/cable cross ownership ban favored mergers between telephone and cable companies. In this respect, the FCC seems to have taken the view that these mergers could favor the development of a countervailing force in the local telephone market. If the huge investments that companies like AT&T, for example, are making to develop a technology which will allow them to offer cable-based phone service are successful, the local monopoly will have been broken. This seems to be the philosophy behind the loosening of the rules which kept one company from controlling too much of the cable industry. Heavy concentration in one market -the cable market- would be the price paid for opening up another -the local telephone market.

On the other hand, digital technology has improved the quality of mobile phones, which led to a spectacular increase in their market penetration during these years. In 1984 there were only 92,000 subscribers, as compared with almost 70 million as of December 1998. This figure can be compared with the number of households with telephone service which were almost 97 million as of December 1997.

At the same time, there was a significant drop in the average monthly bill from almost 100 dollars at the end of 1987 to 40 dollars in December 1998. The Consumer Price Index for cellular telephone service, recently created by the Bureau of Labor Statistics, shows a drop of 17 per cent between the end of 1997 and July 1999.

Mobile phones initially developed as a complement to fixed ones. That is why, when the FCC launched its plan for cellular service, kept one of the two cellular services to be assigned in each area to the existing wire-line common carrier.

Even today, calls to and from mobile telephone services start and finish mostly on fixed line networks. However, given the faster rate of growth of mobile phones, one can envisage a non distant future in which voice calls between mobile phones systems could equal the number of calls between mobile telephone systems and fixed-line telephone networks¹⁹.

However, wireless telephony is still highly dependent on fixed lines. LECs and long-distance inter-exchange carriers provide the fixed lines which deliver to their customers calls that are initiated by mobile telephone customers and calls generated by fixed line telephone company customers are initially transmitted using the fixed-line infrastructure and then can be switched to mobile telephone customers.

Mobile telephony can affect the fixed network in two different ways. It can lead to an increase in traffic or it can divert traffic from the fixed facilities. Up to now the first effect has clearly been dominant. But nothing prevents the second from occurring in the future.

Mobile telephone calls are more expensive than calls using traditional fixed lines. However, if the recent downward trend in tariffs of wireless phones persists, they may become a significant competitor of traditional fixed-line telephony. This is one of the special attributes of interconnected networks: they are both complements and competitors.

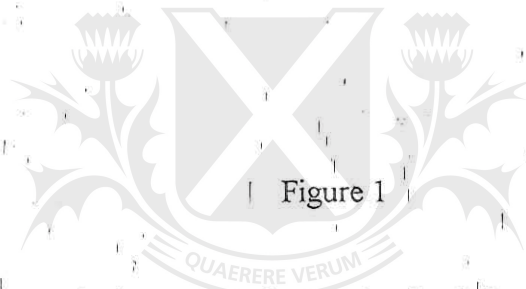
Let us analyze in more detail the possibilities of competition between mobile and fixed line telephones. For this purpose we will neglect the complementarity between both.

¹⁹ See R. Jha and S. K. Majumdar (1999).

Competition between mobile and fixed telephony

Let us assume that a mobile phone may be considered as a good of better quality than a fixed line one. As far as the first provides identical services as the latter and has the advantage of ubiquity this does not seem to be a very strong assumption²⁰. Let us also assume that each good is produced by a single firm. In this case we are facing a vertical differentiated duopoly.

Suppose there is a continuum of consumers represented by the interval $[0,1]$.²¹ Consumer $x=0$ has reservation values a for good A (mobile phone) and b for good B (fixed line phone). Consumer $x=1$ has the same reservation value b for good B and $a+\delta$ for good A, with $\delta>0$. As for consumers located between 0 and 1, they all have b as the reservation value for good B but their reservation value for good A is intermediate between a and $a+\delta$; consumer x has the reservation value $a+(x/l)\delta$ for good A, with $0\leq x\leq 1$ (see Figure 1 for an illustration).



Thus all consumers attach the same value to the fixed line phone (good B), whereas the preference for the mobile phone (good A) depends on the difference in the use different consumers can make of the superiority of mobile phone over fixed line phone.

Consumer x purchases nothing if $p_A > a+(x/l)\delta$ and $p_B > b$; otherwise she purchases a unit of A if $p_A > a+(x/l)\delta - p_A > b - p_B$ or a unit of B in the opposite case. Thus we can distinguish the three following cases:

1.- If $p_A > a+\delta$ and $p_B \leq b$, there is no demand for good A and all consumers purchase B. Fixed line telephony is the only good demanded. Firm B enjoys a monopoly as long as both conditions are simultaneously fulfilled²².

2.- If $p_A \leq a+\delta$ and $p_B \leq b$, both goods will be demanded. In order to determine each firm's market share, let us consider the supply side.

For the sake of simplicity, let us assume there are not fixed costs and that unit costs are given by c_A and c_B , for good A and B, respectively. Let us also assume that $a-c_A = b-c_B$.

²⁰ The third generation of digital phones makes it possible for mobile phone users to access the Internet. at lightning speed. As a matter of fact, in some countries -Finland is an example- the number of mobile phone connections already exceed the number of fixed line connections.

²¹ In our presentation we are following the approach by C. Henry, *Microeconomics for Public Policy. Helping the Invisible Hand*, Clarendon Press, Oxford, 1989, ch. 5, pp. 88-103.

²² Lack of production of a certain good may be modeled as the impossibility of selling it profitably at a price which at least equals the consumers' reservation price.

Moreover, Carter and Wright found a very counterintuitive result: optimal regulation requires each network to *pay* the other for each call that it receives. Given that equilibrium prices are increasing in tariffs, equilibrium prices fall as tariffs are reduced. A sufficiently large negative tariff induces each firm to price at marginal cost, which is socially optimal. A second best is "bill and keep" which means zero tariffs.²⁵ As Williams (1995) previously pointed out, bill and keep is always advisable whenever there is no serious imbalance of calls between the networks. In such a case, on average, the interconnection charge paid by either network is zero. Bill and keep has the additional advantage of having low transaction costs, eliminating the need for accounting and billing between the networks.

However, there is no reason to expect firms to agree voluntarily to bill and keep when they can use access charges as an instrument to collude over prices and act as joint monopolists. Thus mandatory bill and keep seems the way to avoid collusion over retail prices using tariffs as an instrument. Bill and keep will easily be accepted by firms when there is no serious imbalance of calls between the networks.

The universal service issue

Given the increasing development of different ways of competition within the telecommunications industry, the center of gravity of regulatory activity is being displaced to the universal service issue.

While competition may assure that urban consumers -at least in the main cities- may have the possibility of choosing the service that best matches their preferences at competitive prices, there remains a different situation for rural areas and low-income users.

The traditional way of attaining the goal of universal service has been to keep basic local exchange telephone service rates low. This was achieved thanks to cross subsidies extracted from the long distance service, which contributed to the Universal Service Fund (USF) established in 1983.

But the generalization of competition means a radical deaveraging of rates. Each individual component of a network will be priced on a stand-alone basis. Cross-subsidies are doomed to disappear.

Thus universal service requires the creation of a fund for this purpose. The Act explicitly requires any universal service support to be explicit.²⁶

Until 1996, the USF compensated telecommunications companies that provided service to both low-income communities as well as rural areas where the cost of providing service was high. But the Act extended the benefits to schools, libraries and rural health care providers.

The Act also requires the FCC and the Joint Board on Universal Service to define the set of services to be supported. For this purpose, it enumerates four criteria that a service should meet in order to be included in the definition of universal service:

- a) to be essential to education, public health, or public safety;
- c) to have been subscribed by a substantial majority of residential customers;
- d) to be deployed in public telecommunications networks by telecommunications carriers, and

²⁵ If the marginal costs of providing interconnection are significant bill and keep, is equivalent to levying negative tariffs.

²⁶ See Act, §254(c).

e) to be consistent with the public interest, convenience and necessity.

The FCC has interpreted that services to be supported should meet all four criteria, although, by exemption, there could be some services which do not.

The FCC has also interpreted that it has jurisdiction to assess contributions for the USF from both intrastate and interstate revenues.

So, the USF is currently generated through contributions from all telecommunications companies in the United States, including local and long distance phone companies, wireless and paging companies and payphone providers. The USF is administered by the Universal Service Administrative Company, a private, not for profit organization, under the direction of the FCC.

Lifeline and Link Up are two programs which are part of the Universal Service program. Link Up provides discounts on the costs of installation associated with getting telephone service. Lifeline provides discounts on the ongoing cost of telephone service, provided that states contribute their own matching funds.

In 1999, a survey undertaken to assess the progress states have made in implementing the FCC's 1997 Universal Service Order showed mixed results. While some states, like Maine and Tennessee, have taken full advantage of the program, others, including Mississippi and Oklahoma, have failed to take meaningful steps to implement the program.²⁷

Conclusions

The main purpose of the 1996 Act was to transform the monopoly local telephone market into a free-competitive market.

One of the instruments for that purpose was the elimination of the telecommunications-cable cross ownership ban.

The other main instrument was the set of provisions concerning the development of a local competitive market.

The elimination of the telco/cable cross ownership ban allowed a wave of mergers and joint ventures to take place but whose final result is still uncertain.

In August 1996, the FCC issued a 700 page order intended to carry out the local provisions of the 1996 Act. The ILECs vigorously opposed the FCC's interpretation of the Act's local competition provisions. Only at the beginning of 1999 most of the legal controversies were settled by the Supreme Court's ruling.

The Act's philosophy had been to offer a *quid pro quo* to ILECs in order to prompt opening of the local market to competition. In those markets where competition is established the ILEC is allowed into long distance service. After five long-distance entry applications of Baby Bell companies were rejected by the FCC on the basis that they had not yet opened their local networks to competition, in December 1999, Bell Atlantic, the nation's biggest local telephone company, was allowed to sell long-distance services in New York State, becoming the first such case, more than three years after the Act was passed.

In the New York case, it is clear that the goals of the Act were only partially attained. The Act introduced two novel ways of entry to ensure competition and avoid duplication of facilities: resale of retail services and leasing of UNE. In the approval of Bell Atlantic entry into the long distance market, however, the FCC acknowledged that only a small proportion

²⁷ See Center for Media Education (1999).

out of a total of something like 1,100,000 lines served by competitors were either using the UNE platform or were served through resale. Practically 60% were served using competitors' own facilities.

The key criterion on interconnection rates taken into consideration by the FCC was that in a competitive market, firms do not base decisions on embedded costs but on forward-looking economic costs.

Total element long run incremental cost (TELRIC) was a new term coined by the FCC to describe its pricing methodology. ILECs have disputed this approach alleging that this criterion did not allow them to recover all the revenues they expected to earn before the coming of competition.

However, the cost cases in individual states followed the FCC guidelines, applying the forward-looking criterion.

While competition based on the Act's rules has been delayed by the proceedings before the courts and the FCC, other avenues for competition opened in the telecommunications market; technological innovation rather than pricing arrangements seems to have become the major driving force favoring competition in this market.

On the one hand, mergers between telephone and cable companies were favored by the lax attitude taken towards them by the FCC as a way to favor the development of a countervailing force in the local telephone market.

On the other hand, digital technology has improved the quality of mobile phones, which led to a spectacular increase in their market penetration during these years.

Mobile telephone calls are still more expensive than calls using traditional fixed lines. However, if the recent downward trend in tariffs of wireless phones persists, they may become a significant competitor of traditional fixed-line telephony.

In such a case the main concern of the regulator should be how to make sure that there is effective competition and avoid collusion.

Mandatory bill and keep seems a way to avoid collusion over retail prices using tariffs as an instrument. Bill and keep will easily be accepted by firms when there is no serious imbalance of calls between the networks.

Given the increasing development of different ways of competition within the telecommunications industry, the center of gravity of regulatory activity is being displaced to the universal service issue.

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