UNIVERSAL SERVICE: A CRITIQUE

1. INTRODUCTION/OVERVIEW

Competitive forces, technology and the convergence of traditional industries: telephony, broadcast media, publishing and computers are transforming the world's economies. The long anticipated global information infrastructure is here, although its structure is still evolving.

The convergence of the previously distinct industries has created new problems and issues for policy-makers and analysts. The regulatory structure in each industry has been distinct with different methods of social control, goals and objectives.

The traditional telephone monopolies are disappearing, although their market power is not diminishing as quickly. New regulatory tools of incentive regulation and competitive entry are replacing the traditional rate-base, rate-of-return regulation and rate structure setting methodologies.

Many issues arise because of this transition: Are the competing regulatory structures at odds with one another? What market structure will emerge? What market structure is desired? However, one myth remains which impedes the development of an effective competitive transition -- the universal service obligations.

This paper will focus on the "universal service obligation,"[1] but, the reader is reminded, this is only a partial analysis of the total telecommunications structure.

Section 2 addresses the traditional role of "universal service obligation" in telephony. We argue that universal service as practiced was developed by the telephone industry as an anti-competitive tool, but accepted by policy-makers. This myth of universal service continues to plague the industry and leads to poor and inappropriate policy.[2]

Related to the universal service issue is the pricing of intermediate services -- a thorny, but extremely important, issue. Although the correct interconnection price structure has not been resolved, the universal service requirement distort the determination of the correct interconnection prices. (See the Chapter on Interconnection in this volume for more details on this pricing issue.)

We conclude with a set of policy and research recommendations in Section 3.

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[1] Universal service is the social obligation imposed on the telecommunications industry to ensure that residential exchange rates are low and that rural telephone rates will not be higher than urban. In the United States it is the "principle" that exchange service will be subsidized in order, it is alleged, to increase telephone penetration. A similar concept is applied to the National Information Infrastructure (NII) See footnote 3.

[2] For example, see the United States Telecommunications Act of 1996.

2. UNIVERSAL SERVICE

This section critiques the universal service obligation, the related cross-subsidy arguments and its implications for competitive entry. We illustrate the arguments with the telephone industry; however, the arguments apply equally to the NII.[3]

The major distortion in the United States telephone industry developed around what has come to be known as "Universal Service" or the subsidization of subscribers' access to the network.[4,5] (Other countries practice similar cross-subsidization, including Spain.) The regulatory community and the telephone industry have both promoted universal service. Currently, the telephone industry is suggesting another inappropriate quick fix. They would like all of its competitors to pay the subsidy.[6]

We argue universal service is inefficient as a means of obtaining its intended goal for the following reasons:

- it is not directed to the marginal subscribers,
- it is not directed to the needy subscribers,
- it may not be desired, nor necessary
- the pricing practice does not obtain the desired goal, and
- the means of raising the funds to support the subsidy may be counter productive.

Moreover, the subsidies flow to the companies, not to the end-users.

As currently practiced, the cross-subsidies:

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[3] A similar concept is applied to the NII as noted in the following quotation from the Telecommunications Act of 1996. "...extend the 'universal service' concept to ensure that information resources are available to all at affordable prices. Because information means empowerment -- and employment -- the government has a duty to ensure that all Americans have access to the resources and job creation potential of the Information Age."

[4] One study estimates this subsidy at 20 billion dollars (Economics and Technology , Inc. and Hatfield Associates, Inc.).

[5] We use the terms: access, exchange access and subscriber access interchangeably to indicate the connection from the subscribers premise to the telephone company's switch. It offers the ability to make and receive telephone service.

[6] The fact that the industry has difficulty quantifying the subsidy does not bear on the recommendation.

- provide no market test of the efficiency of the incumbent,
- inhibit effective competition and,
- are anti-competitive in practice.

The paper argues that cross-subsidies are not appropriate, particularly as currently practiced. If subsidies are desired, they should be targeted to the end-users and funded directly through government both for democratic and competitive reasons.

The argument is never in terms of the individuals who need the funds but rather that the universal service funds should be raised and distributed by the telecommunications companies. Since this litany has been invoked, it has had scant theoretical or empirical support, but yet it has remained with the policy makers despite the pleadings of economists and reflective policy makers, as witnessed by the most recent telecommunications legislation from the United States.

While the author does not expect to convince the Luddites, I come at these issues with the assumptions that these subsidies are undesirable, inefficient in execution and, indeed, more recent evidence indicates that the recipients may not desire the service.

We demonstrate with a simple models how universal service is inefficient and introduces anti-competitive practices which inhibit efficient competitive entry into markets.

Each of the above points will be addressed briefly here since they have been addressed sufficiently elsewhere.[7]

2.1. Inefficient subsidy

A moment's reflection shows how ludicrous the universal service obligations subsidy is. The subsidy supports all of the subscribers -- the infra-marginal as well as the marginal subscribers. The poor are "helped" but so are the rich, and all of those in between. It is well known in the economic community that this type of distortion is inefficient. Benefits could be increased by its elimination. Moreover, if it is desirable to subsidize a segment of the population because it is needy or this segment would not subscribe to the network without the subsidy, subsidizing the cost of all of the subscribers is an inefficient method by which to accomplish this.

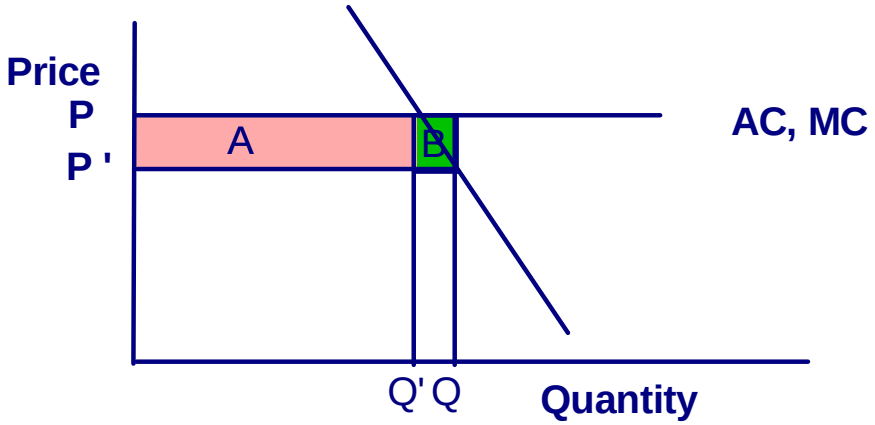
The argument is simple. Inframarginal subscribers do not need a subsidy to remain on the service. Only the marginal subscribers have to be subsidized to remain on the system at prices that cover the incremental cost of access. It is more efficient because

[7] See Alleman, *et al.*, Stone, Schankerman and Fenton; Mueller and Schement; Johnson and Willig and the references cited therein.

less of a subsidy is required. If, for example, at the full cost of subscriber access, ten percent of today's subscribers would no longer subscribe, these customers could be given a direct subsidy for one-tenth of the cost of the current subsidy to all subscribers.

Figure 1

Service Subsidy



In the above diagram, the current subsidy required is the sum of the two shaded areas (A + B) to support the service subsidy required to add the incremental subscribers (Q - Q'). The same increment could be added by subsidizing only these marginal subscribers by directly giving the dark shaded area (B) to the incremental subscribers (Q - Q').[8]

The preferred method to address the problem is by targeting a subsidy directly to the individuals who need them, not the service nor the companies that supply the service.[9] With service subsidies, the wrong price signals are given. People purchase service who do not value the service at the cost the society must incur to provide the service. Since the subsidies must come from some source, some segments of the market will be over-priced. This is precisely the case in the telephone industry (and the proposal for providing universal service to the NII).

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[8] Other methods could be used to bring marginal subscribers onto the network, for example clever non-linear prices or "means-test" tariffs. See Johnson for a discussion of alternative methods of handling "life-line services" and their availability in the United States.

[9] Universal service is the acknowledged goal of the subsidy; however, as pointed out two decades ago, and repeatedly since then, the incidence of the subsidy has not been addressed by regulators. (See Section 2.2, below) Apparently, the situation has not changed. See Stone, Schankerman and Fenton. They pointed out that targeted subsidies are to be preferred, if subsidies are supported at all, to the service subsidies currently applied in the industry. A point elaborated on by Willig. Also see Johnson.

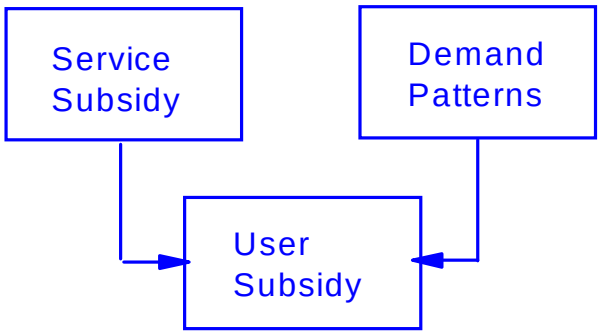
The exchange telephone industry has not had the proper cost and price signals to promote the correct incentives for efficiency.

2.2. Incidence of the subsidy not addressed

Only the marginal subscriber needs to be subsidized to join the network, subsidizing all subscribers through a service subsidy is unnecessary for all of the inframarginal subscribers. Thus for example, where the policy prescription is to ensure that the ten percent of the people who are "poor" in a country have access to telecommunications, it would be sufficient to only subsidize this group to join the system, but at one-tenth (1/10) the cost. (See Figure 1) This has been referred to as targeted subsidies as opposed to service subsidies. The point is that the incidence of the subsidy -- the final burden -- must be considered. How do the service subsidy and demand patterns interact?

Figure 2

Incidence of Subsidy



2.3. Subsidies miss the target

Rural does not necessarily define poor. In my state of Colorado the rural area contains some of the most affluent regions in the state, if not the country. One has only to mention Aspen and Vail to drive home this point. These communities receive preferential rates and the serving companies receive the money from the telephone industry's "Universal Service Fund". One would think that Gerald Ford, Barbra Streisand and John Denver could afford unsubsidized phone service![10]

2.4. Subsidies may not be desired for access

The poor may not want telephone service. Recent survey evidence indicates that low income groups may not wish to have a telephone (Mueller and Schement). Bill collectors, ex-spouses, tele-marketers, and lack of control over the telephone bill have led low income consumers not to desire phones.

But the linkage of universal service with the plight of the under-class allows the carrier to justify higher margins in other areas of its markets. The irrational price structure is

[10] Vail is in Eagle County, which has a real estate assessment greater than the combined GNP of Bolivia and Nicaragua (*Sunday Daily Camera*).

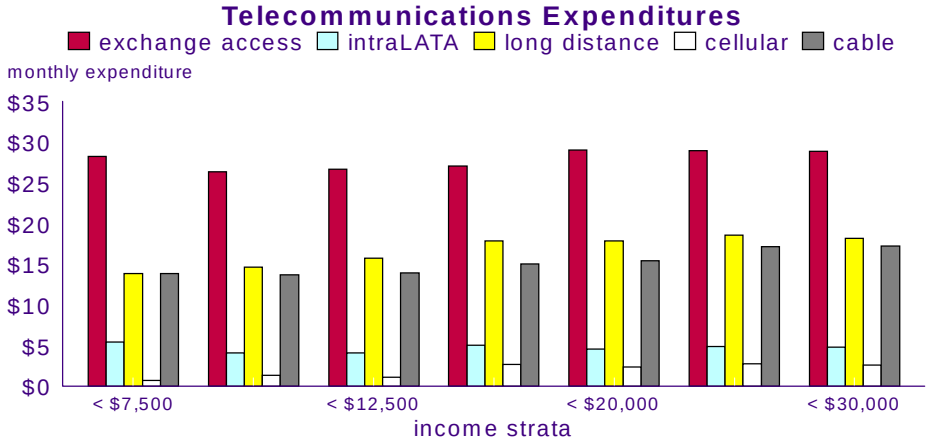
then used to justify barriers to entry to keep the "cream skimmers" from distorting the "carefully" crafted cross-subsidies erected by the carriers with the concurrence of the regulator (See Section 2.8). Thus, no market test should be allowed, so the argument goes. Very convenient!

2.5. Low income customers use long distance services

Long distance service is used to support exchange access. The presumption is that low income customers do not use long distance service, but this simply is not the case. A variety of studies, the most recent of which includes expenditures on cable services, and other telecommunication services shows that low income users[11] spend approximately the same amount or more on long distance and cable services as they do on exchange service (See Figure 3).

Figure 3

Expenditures by Income Strata



Source: PNR & Associates, Bill Harvesting, 1994

If we examine all of the discretionary spending by the low income subscribers in the United States (See Figure 4), the spending is more that the what is spent on exchange access.

Recall it is these discretionary services that are, in part, to generate the profits to support the universal service obligations. But it is the poor who are helping the rich with its below cost exchange access!

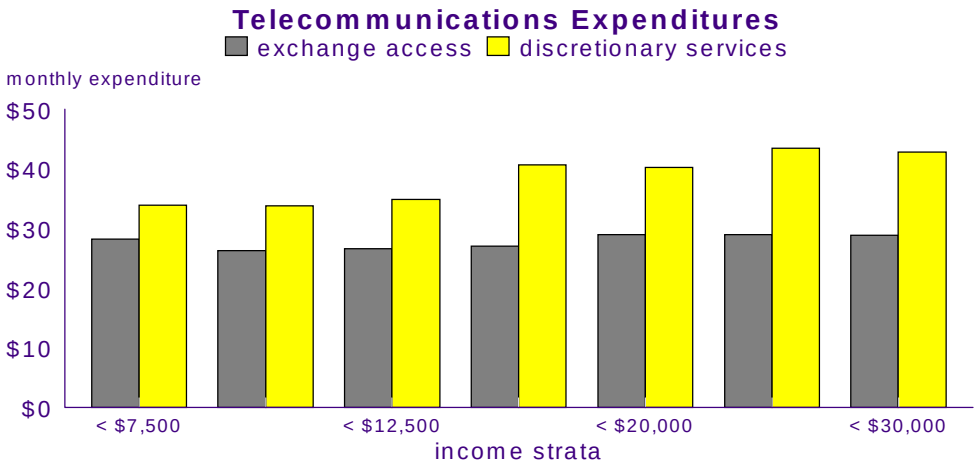
[11] In the United States the first three set of income classes, below US$ 12,500, would be classified as poor for a family of four.

2.6. Goal not accomplished

In the United States, at least two empirical analysis indicate a significant negative cross-elasticity between the long distance and subscriber access.[12] That is the higher the price of toll service, the less exchange access service will be demanded. When one considers that the only reason one would subscribe to the telephone system is to make a receive call, this makes sense. Access is a derived demand -- derived from the demand for usage -- local, toll and international; as these prices increase, there will be less demand for exchange access.

Figure 4

Expenditures by Income Strata



Source: PNR & Associates, Bill Harvesting, 1994

Thus the universal service policy is at cross-purposes. It attempts to induce more subscribers on to the network by raising the price of toll services, which discourages users from joining the network.

2.7. Targeted Subsides Preferred

If governments believe that some segments of the population should be on the network but would not subscribe because they do not value the service sufficiently -- that they would not join without support, then it is the government's legislative bodies that should decide the necessity of the subsidies and fund them. This has the advantage of making the subsidy visible and democratizes the approval process.

2.8. Anti-competitive

Finally, since the subsidy is directed to the companies, not the end-users, it creates an anti-competitive environment. This is illustrated in Figure 5. The service subsidy precludes a more efficient firm from entering the market. The new entrant must have a

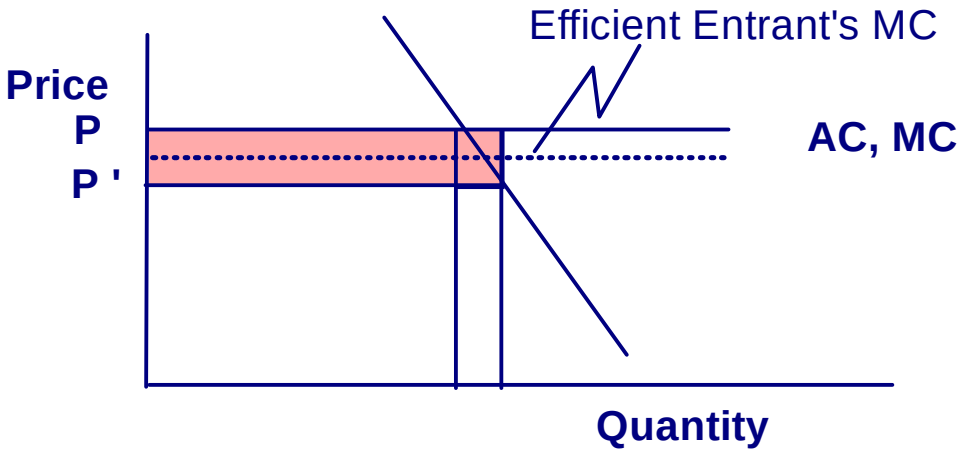
[12] See Tardiff and Kahn and the references cited therein.

cost which is significantly less than the incumbent to overcome the price handicap allowed by the society. The potential entrant has a lower marginal cost, but because the incumbent has a subsidy indicated by the shaded area which allows it to keep the price below not only its cost, but the cost of the potential entrant, the entrant is kept out of the market.

If, as recommended above, the subsidy is used only to support only a lower price for the marginal subscriber, any allocative distortion will be much reduced.

Figure 5

Service Subsidy Anti-competitive



We have seen these arguments invoked in the United States, Spain, the European Union and elsewhere, but without considering the points made above. Now, the same fallacious arguments are being applied to the Global and National Information Infrastructure (GII and NII, respectively).

2.9. Interconnection/Intermediate-good Pricing

Interconnect pricing represents the price of the intermediate services needed by a new entrant to provide its service. The price is also known as the access price and would be the price charged by one service provider, usually the incumbent, for connection to its network in order for a new entrant to complete the service for its end-user customers. For example, in the United States, it would represent the price that the long distance carriers must pay the exchange carriers to complete a call on the public switched network. Another example would be the connection of a mobile provider to the public switched network.

The pricing becomes more difficult when the company charging the interconnection price also competes with the company which it charges. The company charging for interconnection has an obvious incentive to over-charge the competing company -- not only to enhance its own revenue, but to make the competing company's cost, and hence it price higher.

Since the universal service obligation is included in the "opportunity cost" in determining the "proper" interconnection price, this will create a large distortion in the price interconnection. Stated differently, no matter how erroneous the interconnection price is methodologically, it is further distorted by the size of the subsidy that must be included. Elimination of this in the calculation of the interconnection price will reduce substantially any inefficiencies due to the incorrect interconnection price, *certeris paribus*.

While the pricing of interconnection is critical, it cannot be covered in this paper. The reader should be aware that it is a serious policy issue which feeds back to the universal service obligation.[13]

3. CONCLUSION AND RECOMMENDATIONS

The major distortion in the telephone industry is universal service or the subsidization of subscribers' access to the network.

We have shown that universal service is inefficient as a means of obtaining its intended goal. Because it is not directed to the marginal subscribers it is costly to support; because it is not targeted directed to the needy subscribers, it misses its goal. The raising of the funds through cross-subsidies from other services are counter productive -- higher prices for the services providing the subsidies reduce the demand for exchange access from the group which it is intended to aid!

Since the end-users do not receive the subsidies directly, but they flow to the companies, the subsidies inhibit effective competition because of artificially low prices for subscribers access, and, thus, it provides no market test of the efficiency of the provider. This can lead to inefficient entry in the high-priced markets and preclude efficient, low-cost entry in the markets being subsidized. This is incompatible with competitive policy.

Currently, universal service funds are raised and distributed by the telecommunications companies without regard for the individuals who are in need with all its anti-competitive consequences. Despite little theoretical or empirical support, the universal service obligation remains an erroneous belief with many policy makers. If a democratic process determines that subsidies are desirable, these should be targeted to the end-users and funded directly through government.

While, the myth of universal service promoted the telephone industry is without economic foundations, nevertheless, universal service arguments continue to plague the telecommunications industry to the detriment of business, the public and potential competitors. The issue should be re-examined in light of the criticisms above.

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[13] See the proceedings of two recent conferences, Access and Interconnection and InterOperability Workshops, April and October 1995, respectively, in New Zealand (forthcoming), especially Armstrong and Vickers and Armstrong, Doyle and Vickers.

References

Alleman, James H., *The Pricing of Local Telephone Service*, OT Special Publication, 1976.

Alleman, James H. (ed.), Edward Beavais, Larry Cole, Neil Stolleman, *A Telecommunication Pricing Primer*, 1991.

Armstrong, Mark, Simon Cowan and John Vickers, *Regulatory Reform: Economic Analysis and British Experience*, The MIT Press Cambridge & London, 1994.

Armstrong, Mark and John Vickers, "The Access Pricing Problem," Access and Interconnection Workshop, April 1995, New Zealand (forthcoming).

Armstrong, Mark, Chris Doyle and John Vickers, "The Access Pricing Problem: An Synthesis," InterOperability Workshop, October 1995, New Zealand, to appear in *The Journal of Industrial Economics*, (forthcoming).

Brock, Gerald W., *Toward a Competitive Telecommunications Industry*, LEA Telecommunications Series, Mahwah, New Jersey, 1995.

Brown, Stephen J. and David S. Sibley, *The Theory of Public Utility Pricing*, Cambridge University Press, Cambridge, New York and Melbourne, 1986.

Graham, Stephen, James Cornford and Simon Marvin. "The socio-economic benefits of a universal telephone network: A demand-side view of universal service," *Telecommunications Policy*, vol. 20, no. 1, January/February 1996. pp. 3 - 10.

Economics and Technology , Inc. and Hatfield Associates, Inc., "The Enduring Local Bottleneck: Monopoly Power and the Local Exchange Carriers", 1994.

Leland Johnson, *Telephone Assistance Programs for Low-Income Households: A Preliminary Assessment,* Technical Report R-3603-NSF/MF, The Rand Corporation, February, 1988.

Mitchell, Bridger M. & Ingo Vogelsang, *Telecommunications Pricing: Theory and Practice*, Cambridge University Press, Cambridge, England, 1991.

Mueller, Milton, and Reina Schement " Six Myths of Telephone Penetration: Universal Service from the Bottom Up, Rutgers University School of Communication, Information and Library Studies, 1995.

Nuttall, Robin and John Vickers, *Competition Policy for Regulated Utility Industry in Britain*, Applied Economics Discussion Papers, Institute of Economics and Statistics, Oxford No. 178, February, 1996.

Tardiff, Timothy J. and Alfred Kahn, “Universal Service with Full Competition,” International Telecommunications Society: Eleventh Biennial Conference Seville, Spain, 16 - 19 June 1996 (mimeo).

Stone, Robert F., Mark A. Schankerman and Chester G. Fenton, *Selective Competition in the Telephone Industry: An Independent Responses to the FCC Docket 20003*, T+E, Cambridge.

Sunday Daily Camera, (New York Times News Service), September 17, 1995, p. 12A.

Willig, Robert, "Consumer Equity and Local Measured Service," in J. A. Baude, *et al.*, *Perspectives on Local Measured Service*, Ablex, New Jersey, 1979.