Funding the Public Telecommunications Infrastructure

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I. INTRODUCTION

The evidence is quite clear that the current system for funding the maintenance and modernization of the telecommunications infrastructure and assuring society-wide availability of sophisticated and reliable service is breaking down. New technologies combined with newly-unleashed competitive forces are dismantling from within the implicit social compact reflected in the massive within-industry transfers that made modern and universally available telecommunications services possible. While we have not yet reached the point of crisis, that date is fast approaching. If the impending crisis is to be avoided, new funding mechanisms consistent with current economic and social realities—including the near certainty that the political system will continue to view prices and subsidies for telecommunications services as vehicles for implementing financial transfers among user groups.

In assessing any mechanism for funding the telecommunications infrastructure, it is helpful to begin with a clear statement of just what the infrastructure is and what policy objectives it is to serve and a list of properties that are desirable in a funding mechanism. The statement of goals serves two purposes. It helps us determine how much funding will be needed relative to what is currently provided. It also makes more obvious inconsistencies among goals and tradeoffs that will have to be faced. A list of properties that are desirable in a funding mechanism helps us see problems inherent in the current system more clearly and helps to clarify the extent to which various alternative funding mechanisms may or may not improve upon the current system, as well as how they stack up relative to each other.

The next section provides a definition of infrastructure, from a social, rather than engineering or physical, perspective. It also identifies and examines policy objectives that the telecommunications infrastructure might reasonably be expected to serve as technology advances in the future. Desirable properties for infrastructure funding mechanisms are considered in Section III. The current system of support mechanisms is then discussed in Section IV. This is followed by a presentation of our Value-Added Service Surcharge (VASS) proposal in Section V. Section VI discusses implementation

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and administration issues and Section VII discusses funding mechanisms that might complement a VASS support system by providing additional flexibility at the level of individual local telephone companies and specific geographic areas (e.g., rural or remote areas). The analysis and our conclusions are summarized in Section VIII.

II. INFRASTRUCTURE AND POLICY OBJECTIVES

Historically, the social policy goal of universal service has been served through a system of massive intra-industry transfers of funds, with the primary flows being from business and toll service users to basic residential subscribers and from urban to rural exchanges. Predivestiture these transfers were accomplished largely within the corporate umbrella of AT&T. Since then they have been maintained by a complex gerrymandered set of rules governing transfers among carriers. This system, rooted more in political compromise than economic logic, was sustainable when there was a single monopoly network. However, competition is the natural enemy of cross-subsidy and the emergence and continuing growth of competitive suppliers makes it doubtful that the current mechanisms for managing these transfers can be maintained much longer.

The growth of competitive suppliers means that, for policy purposes, the working definition of the telecommunications infrastructure, which in the past has largely reflected concerns with mnopoly providers of common carrier services, must be expanded to incorporate the facilities and functionalities of the new and increasingly diverse players in an industry that is rapidly and inexorably becoming competitive. Most components of the traditional public telephone network either are, or soon will be, competitively supplied. For example, terminal equipment, toll services, and business services are all available from increasingly sophisticated competitive providers and competition in residential services appears imminent.

The definition of infrastructure should further be refined to distinguish between what might be called the "core network" and "on/off ramps." For the most part, the core network is the interoffice portion of the infrastructure. By and large, new and advanced services reflect and depend on the increasingly sophisticated hardware and software components of the core network. Access lines are the on/off ramps to the core network and the two meet at points of interconnection, which traditionally have been end office switches. However, as fiber and other broadband media continue to make inroads into neighborhoods and business districts, and as existing residential broadband media such as cable television begin to offer switched services, the loci of the points of interconnection will shift as well. For the most part policy concerns with network functionality are issues relating to the competency of the core network, while access concerns relate to the provisioning of residential on/off ramps.[1]

The task of listing goals and objectives that should be served by the telecommunications infrastructure is complicated by the fact that different people and groups look for different things in a telecommunications infrastructure. Nevertheless, there are a number of high level goals on which there is broad agreement. These serve as a useful starting point for focusing our analysis of the current funding systems and the alternative we are proposing. At a minimum, the infrastructure should serve the following set of policy goals. However, as will become clear in the discussion to follow, there is considerable room for disagreement over what level of public commitment they imply.

[1]In rural areas the provisioning of business on/off ramps and core network components might also be issues.

- Universal service—Basic telecommunications services should be both universally available and (nearly) universally subscribed to. Universal service is a long-standing goal of U.S. telecommunications policy and is supported by both equity and efficiency arguments. Universal service serves equity objectives because without the availability of at last a certain minimum level of telecommunications services, effective participation in modern society is not possible. It might also be argued that policies that promote universal service serve efficiency objectives as well, because while the value of the network to all of its users increases as the level of societal participation increases, individual decisions to participate reflect personal benefits only.
- Participatory fairness—We long ago passed the point at which access to telecommunications services became absolutely necessary to effective participation in the economy and in society more generally. As more advanced services become widely-used, the level of generally available services necessary to effective participation will advance as well. Of course, the quality of service that should be universally supplied is an issue over which there is likely to be considerable disagreement and will have to be resolved through the political process.
- Contributions to economic productivity—Ongoing advances in basic communication technologies are making possible new services that have the potential to improve productivity in other sectors of the economy as well as offer direct value to consumers. Further economic welfare gains are anticipated from the use of the telecommunications infrastructure to facilitate the delivery of new and current public services. It is important that the infrastructure incorporate these technologies as it evolves and make generally available the services they make possible. Strong network externalities in telecommunications services imply that investment driven by market incentives alone is unlikely to push technology and infrastructure capabilities ahead as rapidly as is socially desirable.
- Reliability—It is important that public network services, however sophisticated, be reliably provided.
- More efficient and participatory government—A widely accessible, advanced public network infrastructure could be used to make more direct connections between the electorate and their government possible, as distance would not so much affect the ease and convenience of participating in government affairs. We are already witnessing the primitive beginnings of the process in the use of computer bulletin boards by the Clinton administration.
- Provision of new public services and electronic entitlements—Advancing technological capabilities are almost certain to make possible the electronic provision of new public services that currently are beyond our capabilities. Possibilities include public bulletin boards and database access, public services directories, medical advisory services, various types of stand-a-lone library and educational services, as well as advanced technologies for classroom instruction. Along with these capabilities we are likely to see the emergence of a political demand that they be made available as public-supported resources analogous to public parks and libraries.

III. DESIRABLE PROPERTIES OF A FUNDING MECHANISM

While the properties of an infrastructure funding mechanism cannot be divorced entirely from the objectives the infrastructure is to serve, it is still useful to list properties of a desirable funding mechanism. We begin with the following list.

- Contributory and distributive fairness—The current system has a large number of internal transfers, both among industry segments and between groups of consumers. Political viability requires that recipients of the transfers be truly deserving and that the levies required to maintain these transfers be fairly distributed. A funding system will eventually cease to be supported politically if there is a widespread belief that some are unfairly profiting at the expense of others or that some are unfairly able to avoid contributory obligations that then fall more heavily on others.
- Political sustainability—Any new infrastructure funding mechanism must represent a politically stable coalition of interests. While not sufficient by themselves, contributory and distributive fairness are both necessary to political sustainability.
- Promotion of economic efficiency—Both static and dynamic efficiency concerns must be addressed. To promote static efficiency—the efficiency with which current services are provided—it is important that the infrastructure funding mechanism not create purely financial incentives to engage in activities that function solely to avoid participating in intrasystem transfers. To serve the goal of dynamic efficiency, it is critical that the funding mechanism not discourage investments in, and experiments with, new technologies and services. Equally important is that funds be deployed to compensate for deficiencies in the market process in the promotion of new technologies and services.

IV. THE CURRENT SYSTEM

Viewed from the national level, the current infrastructure has been financed and continues to be serviced largely from the revenues of the U.S. telecommunicatons industry.[2] Viewed from the levels of its various parts, however, we see that this apparent self-sufficiency at the national level masks a complex set of intra-industry transfers sustained through the force of regulation and law. Focusing on within-industry transfers, we see that there are three primary types of support mechanisms: (a) Funds transferred from toll services to local services, both at the federal and state levels.[3] (b) Transfers from low cost local exchanges to high cost local exchanges, which are primarily transfers from more densely populated urban exchanges to less densely populated rural exchanges, and (c) differential allocation of local service costs through rates charged different customer classes. Higher local service rates for business and not residential customers is an obvious example. Less obvious is rate averaging in which high cost customers and low cost customers are charged a common rate. Also included in this category are social support services such as lifeline programs that provide service to low income customers at below marginal cost rates, 911 emergency services, and services for the hearing impaired, the costs of which are commonly covered through charges on local phone bills.

In combination, these mechanisms for reallocating resources within the industry have worked tolerably well to ensure universal service up to now. Given the record of stagnant or declining investment in the public network, however, it is hard to argue that the funding system has worked well to promote investment in advanced network capabilities. While there may be considerable debate on this point in the academic

[2]REA funds, which have been important to the modernization of rural service, are an exception.

[3]This represents the lion's share of the intraindustry flow of transfer payments at risk due to competitive supply of toll services. This flow has been estimated at by Monson and Rohlfs at approximately $20 billion annually. See Monson, C.S. and Rohlfs, J. H., (1993, July 16). The $20 billion impact of local competition in telecommunications, *Strategic Policy Research*.

literature, the need for more infrastructure investment and more widely available advanced services is increasingly in the popular political agenda, as evidenced by the many network infrastructure initiatives pending in the states and at the federal level. In any case, it is clear that the current system is beginning to crumble under the pressure of the competitive forces that have been unleashed by technological advance and open entry regulatory policies.

For example, the growth of competitive access providers (CAPS) has made it possible for large toll customers to directly connect to toll service providers to avoid paying the usage-based contributions to within system transfers that traditionally have been collected through the fees charged by local exchange carriers (LECs) for access services. As long as only LECs and their access customers have to make mandatory contributions to maintaining Universal Service obligations, true competition on the merits in access services and its attendant efficiencies is not achievable. Furthermore, it is becoming increasingly clear that the inequities inherent in the current system of access charges is undermining the sense of political legitimacy that sustains at least this component of the system of intra-industry transfers.

Similarly, as genuine local exchange competition develops, regulated LECs in the larger metropolitan areas will find it increasingly difficult to maintain their contributions to high cost areas, or, in the longer run, to support the (free) default capacity relied on for system back-up by competitive network providers. Finally, in both large and small markets the locally averaged rates and pricing of social services below cost put in place through the political/regulatory process are likely to become increasingly unsustainable as alternative service providers pick off the customers with the largest price-cost differentials. This is already happening in the case of business and toll access services and is likely to become an issue in residential local services as well in the not too distant future. Two-way cable television networks and new wireless Personal Communication Networks (PCNs), both of which are relatively inexpensive to provide, are on the horizon. In both large and small exchanges this type of competition will make it increasingly difficult for incumbent LECs to continue to provide public services such as Lifeline and emergency services below cost. In smaller markets it threatens the viability of local exchange carriers left to serve only a dwindling number of high cost customers. Clearly this system of internal transfers is not sustainable given current trends. But a return to the constraints and rigidities that held this system together in the past is neither conceivable nor desirable.

As an important component of an alternative funding mechanism, we are proposing Value-Added Service Surcharges (VASS) to either augment or totally replace funds generated through the current set of levies that transfer funds from toll services to local services and from low cost exchanges to high cost exchanges. As a public policy tool, the VASS mechanism could serve to augment current transfer mechanisms if policy makers wish to speed up infrastructure development and investment or it could eventually replace the current mechanisms entirely. The VASS is a sustainable, equitable, and relatively efficient mechanism for funding intra-industry transfers, even in the face of widespread competitive entry. The VASS proposal is described in the next section.

It is important to note that while VASS differs from the current system in many respects, it does not break with the U.S. tradition of relying on intra-industry transfers funded by levies on services. Thus it differs from the Japanese approach which draws on general tax revenues to fund contributions to the support of certain services and customer classes. While support from general revenues has attractive efficiency properties, a shift to this type of system in the U.S. is not within the realm of political feasibility in the foreseeable future.

To the extent that social distributional and infrastructure objectives currently met

through local rate averaging cannot be satisfied with VASS generated disbursements, we recommend that state and/or local authorities pursue one or both of the following approaches for adjusting local rates: (a) Efficient Component Pricing (ECP) principles applied to LEC bottleneck monopoly services, as recently articulated by Baumol and Sidak,[4] and (b) Make contributions to local rate averaging or infrastructure/service objectives specific to certain classes of customers, regardless of who serves them. ECP and customer class-specific obligations are described in Section VII.

V. VASS

Simply described, VASS is a set of surcharges calculated as a fixed percentage of gross revenues that potentially could be collected from all businesses selling value-added telecommunications services, where value-added services are the services of all service providers interconnecting with the public switched network *with the exception of local loop services provided to residences by state certified common carriers with provider of last resort obligations.*[5] As the benefited service, the local residential loop or primary access line is exempted from VASS surcharges. The size of the fixed percentage VASS charge would be adjusted annually to reflect anticipated needs for the coming year and projected revenues for the contributing services. Judged by the criteria set out above for evaluating funding mechanisms, VASS has a number of important advantages over the current system of fixed charges per minute of use (MOU) on toll services, the most important being greater economic efficiency and contributory fairness.

A. Efficiency advantages

To see the nature of the efficiency advantages of a value-added surcharge over fixed MOU levies, consider the effects of a value-added surcharge and a fixed per unit levy, both collected on the same good. Both the fixed per unit levy and the value-added surcharge would affect economic decisions by altering marginal revenue-output relationships as perceived by sellers. The effect in both cases is to raise price and reduce sales and consumer surplus. However, it is straightforward to show that a value-added surcharge or tax (VAT) has a smaller effect on marginal revenue and price than a revenue-equivalent fixed per unit tax. For a seller, a fixed per unit levy is equivalent to a downward shift in its demand and marginal revenue schedules by the full amount of the tax. By contrast, a fixed percentage value-added surcharge shifts a seller's demand and marginal revenue schedules downward by equal percentages. As long as demand curves are downward sloping, marginal revenue must be less than price, so that a value-added tax reduces marginal revenue by less than the amount of the surcharge extracted from the sales price. Because a value-added surcharge reduces a seller's marginal revenue by less than a revenue-equivalent fixed per unit levy, less output is sacrificed and more surplus remains in the hands of consumers.[6] Put another way, for equivalent reductions in consumer surplus due to induced price increases, a value-added surcharge generates more revenue than a fixed per unit levy.

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[4]Baumol, W. J., and Sidak, G. J., (1993). *Toward competition in local telephony*, Cambridge: MIT Press.

[5]The non benefited services of LECs would be included in the value-added services category. Also, a number of definitional issues regarding residential loop services must still be resolved. For example, what level of functionality should be associated with basic service? And should second and additional access lines for a single residence be subject to the VASS?

[6]For a more extensive version of this analysis, see Stiglitz, J. E., (1986). *The economics of the public sector* (p. 361). New York: W. W. Norton & Company.

As an effective tax on output, a VASS is potentially much less distorting of economic activity than the current system which taxes productive inputs (e.g., toll and carrier access services). This is perhaps the most important efficiency advantage of a system of ad valorem surcharges relative to the current system of fixed per unit levies; it eliminates the incentive to inefficiently bypass LEC access facilities to avoid the MOU charges levied on LEC access services. With the same value-added surcharge applied to LEC and CAP access services, competitive advantage will be determined by economic efficiency-based cost advantages alone.

B. Contributory fairness

The political legitimacy of the current system as an equitable mechanism for funding telecommunications infrastructure investments is being seriously eroded by the fact that, increasingly, telecommunications winners are separated from telecommunications losers by their ability to avoid the contributions that all are supposed to be making to infrastructure support. Furthermore, it is the largest users who are best able to exploit the flaws of the current system, which makes it appear doubly inequitable.

The main problem with the current system is that, for the most part, the largest users who appear most able to carry the load of transfer payments have been the most successful at avoiding them by purchasing access services from CAPs. As technology and competition expand the class of customers able to bypass LEC access facilities, the burdens of supporting universal service goals will be born increasingly on the shoulders of small users. Continuation of this trend will make the current system simply unsustainable in the long run. If VASS is applied to all services, or to end services universally used, bypass will no longer function as a mechanism for avoiding universal service contributions.

In addition, the current system of targeting an inelastic service like toll as a primary source of transfer funds can be very regressive, especially for certain customer classes like the rural and poor, both of which spend proportionally much more of their disposable income on toll service than most other demographic groups. Broadening the base of contributing services to include non-essential value-added services can make the system more progressive.

The efficiency advantages of VASS as a mechanism for raising revenue for infrastructure investments and the support of basic services will also contribute toward meeting national goals for economic growth. The contributory equity advantages of VASS also make it attractive in terms of meeting the public policy objectives that the telecommunications infrastructure should be serving. Since a more efficient collection mechanism reduces the opportunity cost of funds raised, the funding for more advanced infrastructure services, including the most basic level of service universally available, can and should be provided.

Finally, to the extent that VASS revenues are used to finance infrastructure improvements necessary for advanced services, excluding residential loop services from VASS levies ensures that the telecommunications users benefiting most are the ones who pay. This goes to the heart of a major industry controversy. As the public network is upgraded to provide more and more advanced services, some subscribers either do not want or can not afford them. Excluding basic residential loop services from VASS levies ensures that consumers who feel that they are harmed by increasing costs because they do not see any direct consumption benefits in enhanced services do not have to help pay for them.

The extent to which the theoretical advantages of VASS described above are realized

in practice will depend on how it is implemented. Here we briefly discuss three alternative approaches to implementation: (a) Selective targeting to one or a few final (as opposed to intermediate) telecommunications services, (b) general application to all but the benefited class(es) of service with each service provider subtracting payments to other VASS target services purchased as inputs before determining its own obligations, and (c) general application to all but benefited services with no deductions for payments for VASS targeted telecommunications inputs.

The selective targeting alternative is similar to Ameritech's recent proposal that transfer payments currently funded through levies on its switched carrier access services provided to toll carriers instead be recovered by"bulk billing" the same carriers in proportion to their shares of interstate toll revenues.[7] Ameritech's bulk billing proposal is a logical first step toward a full VASS system as proposed herein. Ameritech's plan is equivalent to a value-added surcharge on toll services alone.

Since the size of a VASS-funded revenue pool would be determined by policy needs, as is the pool of funds collected under the current system, switching from the current system of per minute access charges to a bulk billing arrangement results in little change in the total bill to carriers. Nevertheless, both the short- and long- term economic welfare gains could be substantial. As we have explained elsewhere,[8] toll service is an attractive target for a VASS because it is applied to a final service rather than an input and, because toll demand is inelastic, the effect of the surcharge on price will have little effect on total surplus. In addition, because it would apply to all toll services regardless of service type, it would have little if any effect on the relative prices of toll service providers. A VASS on toll services would also allow the relative prices of different services to reflect relative costs in the same proportions as would be generated by an untaxed competitive market. In the past, the per minute charges on switched carrier access services severely distorted relative prices resulting in uneconomic substitution toward so-called dedicated access arrangements. What's more, dedicated access arrangements, used in lieu of switched arrangements to avoid paying the policy levies on LEC access services, are generally less efficient and more expensive to provision.

While a VASS on toll services would be a good way to initiate the program, it is desirable that, overtime, the VASS be extended to cover other service providers that interconnect to, and thereby benefit from, the Public Switched Telephone Network. Obvious candidates to bring under the umbrella of VASS would be cellular telephone network operators and electronic information service providers (e.g., Prodigy and CompuServe). Broadening the base of services which contribute to the total subsidy amount would proportionately reduce the burden on toll services providers and their customers and allow the relative prices of toll and other services to more faithfully reflect relative costs.

From a theoretical perspective, a generally applied VASS would be most efficient if the VASS contributions of each service provider were calculated after payments for other telecommunication services were subtracted out. Otherwise, some of the efficiency advantages of a VASS over fixed per unit charges would be sacrificed due to the effect of taxes on taxes on the prices of final services and the possibility that service providers might merge with telecommuncations input suppliers to avoid the double taxation. However, no practical method of taxation is perfect. The advantage of a

[7]See the FCC filings in Ameritech. (1993, March 1). *Petition for declaratory ruling and related waivers to establish a new regulatory model for the Ameritech region.* Location: Publisher name. More specifically, see Wildman, S. and Egan, B. L. (1993, April 6). *Promoting local telephone competition through access charge reform*. Location: Ameritech.

[8]id. Wildman and Egan.

general VASS in which telecommunications input purchases are subtracted out over a generally applied VASS in which they are not is less clear because the procedures and bureaucracy required to manage the necessary system of accounts could well be cumbersome, expensive, and generate second order inefficiencies of its own. Further study is required to determine which of these three approaches offers the greatest total benefits.

VI. IMPLEMENTING AND ADMINISTERING VASS

A VASS mechanism would be significantly easier to operate than the current system with its tedious and relatively expensive per minute measurement and billing process. Another source of efficiency for the VASS mechanism is its relatively low administration, enforcement, and monitoring costs. Other consumption-based levies on end-user services might well be as efficient as a VASS, but charging carriers and not end users will greatly reduce the number of entities that have to be dealt with and reduce the direct costs of administration. Furthermore, a VASS applied to business revenues is like a broad based retail sales tax and the economic efficiency is similar. By placing the VASS on revenues, which are generally publicly reported to meet the requirements of regulators and tax and securities laws, monitoring, enforcement, and auditing costs are reduced.[9]

Both Federal and State regulators should participate in implementing VASS nationwide. The FCC should take the lead initially by reforming the current interstate toll to local transfer mechanism based on toll usage charges applied to interexchange carriers' switched traffic. The model for the initial reform program should be Ameritech's "bulk billing" proposal filed on March 1, 1993 at the FCC.

Federal guidelines and basic principles describing the VASS mechanism could then be drafted and state participation in similar programs encouraged. The differing financial and information requirements likely to exist at the state level and the varying economic development goals of individual state governments require that local and state authorities be responsible for implementing VASS in their jurisdictions, hopefully consistent with broad guidelines established by the FCC. The model for such federal-state cooperation has been established previously in various FCC initiatives, including the "Link-up America" lifeline assistance program. This program was set up by the FCC and implemented in different ways by individual states in accordance with federal guidelines.

VASS would be implemented through a regulatory process distinct from the normal federal and state government budget processes. It would be couched in terms of a telecommunications service tariff rate (but in percentage terms) for interconnection to the PSTN and, while beginning with toll service providers, VASS could eventually be applied to the revenues of *all carriers interconnecting with the local PSTN*, local or toll, including resellers, enhanced service providers, cellular and other wireless services, data networks, and other "value-added" network operators.

Revenues for the services subject to VASS would have to be reported by the carriers selling them. The records of LECs providing interconnection to the PSTN could be used to identify carriers with contributory responsibilities and help with the verification of their reported revenues. Annual independent audits of the billing mechanism, reve-

[9]Even in the case of a VASS based on market shares measured in physical units (e.g., subscriber access lines of installed network capacity), as long as the data required to administer the system is standardized and periodically reported it should be relatively easy to audit. In practice, the unit measured would have to be one which all affected carriers would be required to report.

nue collections, and funds distributed would be performed and reported to the regulatory authorities overseeing and monitoring the VASS program. VASS monies could be disbursed by an industry revenue pool administration authority (e.g., NECA), and funds would be distributed to carriers based on the needs identified in setting the overall VASS sum to be collected.

In the beginning VASS funds might be targeted to the regulated LECs currently receiving the toll to local transfer to cover a portion of their residential access line costs. But, over time, the class of qualified recipients might be broadened to include any facilities-based carrier providing basic local exchange telephone service subject to the same obligations and oversight as incumbent LECs, providing requisite cost of service thresholds are satisfied.

The most difficult part of administering the VASS will be ensuring that the funds disbursed are used to expand and modernize the regulated LEC PSTN infrastructure. On the other hand, as with most potential complaints concerning implementation of the VASS mechanism, these problems already exist with the current intra-industry transfer mechanisms. While the specific application of VASS funds is probably best left to the recipient carriers, as has been the case with funds allocated in the past, regulatory oversight will be necessary to assure that funds are, in fact, invested in the local network for residential access and not otherwise used to gain competitive advantage in unregulated markets.

VII. SUPPLEMENTAL SOURCES OF INFRASTRUCTURE FUNDING: EFFICIENT COMPONENTS PRICING AND SERVICE AND CUSTOMER SPECIFIC CONTRIBUTIONS

A potential disadvantage of a VASS-type mechanism for infrastructure financing is that, if administered at the state or federal level, it may not be sufficiently responsive to variation in telecommunications policy goals among local communities. For example, a community served by a rural LEC may want to reduce residential rates charged to farm families by more than would be possible with VASS-funded disbursements alone. One solution would be to build the necessary contributions into charges for the residual monopoly services (e.g., certain switching services) of regulated LECs. Baumol and Sidak show that it is possible to grant competitors access to LEC natural monopoly facilities and still maintain the contributions embedded in charges for services provided with LEC facilities that still have natural monopoly status.[10] Competition and continuance of the contribution are both possible if competitive providers are allowed to bid for the use of LEC monopoly facilities with the stipulation that bid prices cover the sum of the cost of the monopoly element and its contribution to infrastructure maintenance or public services. Baumol and Sidak's plan goes under the name of Efficient Components Pricing, or ECP.

In the long run, the residual monopoly elements of the current system are almost certain to erode and disappear as new technologies erode LEC cost advantages. However, there is no reason in principle why obligations cannot be tied to specific classes of customers and/or services in such a way that firms competing for these customers would do so contingent on assuming their contributory obligations.[11]

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[10]Baumol and Sidak, op. cit.

[11]For additional discussion of customer-specific obligations and problems that arise with various proposals for targeting transfer payments to specific customer classes, see Panzar, J. C. and Wildman, S. S. (1993, September).*Competition in the local exchange: appropriate policies to maintain universal service in rural areas*, Evanston, IL: Northwestern University.

VIII. SUMMARY AND CONCLUSIONS

The current system of access charges used to fund the intra-industry transfers supporting universal service goals is crumbling rapidly. The largest toll customers have been able to avoid the universal service contributions implicit in these charges by turning to CAPs, whos services may be profitable even when their underlying costs exceed those of the incumbent LECs with whom they compete. These inefficiencies and inequities are eroding the economic rationale and the political legitimacy of the current system. As an alternative we have proposed VASS, a system of levies collected as a fixed and common percent of revenues for selected non basic services. Compared with the current system, VASS would have the efficiency advantages of: (1) Leaving the relative prices of contributing services virtually the same as relative costs would dictate in competitive markets not subject to such levies, (b) minimizing deadweight surplus losses due to surcharge-induced price increases, and (c) placing the primary burden for funding infrastructure enhancements on those benefiting the most.

While a VASS might initially be levied only on the toll services targeted by the current system of access charges, over time, it would be beneficial to expand the range of contributing services to minimize distortions of the relative prices of contributing and non-contributing services. Theoretically, the most efficient form of a VASS would allow carriers to deduct any VASS levies built into prices they pay for telecommunications services they purchase as inputs. Whether the benefits of this approach outweigh the costs of a more cumbersome collection and oversight apparatus is open to question.

Ideally, VASS would be implemented through a coordinated and complementary set of state and federal policies. To provide greater flexibility for meeting varying local needs and goals, VASS might be supplemented with efficient components pricing and/or customer specific levies.

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