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Extending Telecommunications beyond the Market

Toward universal service in competitive environments

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Competitive markets go a long way toward making telecommunications services available throughout the population. But governments often seek to extend access to services beyond what the private sector will provide on its own. Cost-effective measures to achieve widespread access focus on removing obstacles that prevent the market from working well, letting users decide what they need and can afford, and using market mechanisms to allocate responsibility for extending service beyond the market and to quantify and allocate any necessary funding. As they adopt such measures, governments must make some decisions: Which services to extend? To what population groups? At what cost? Who should provide the additional service? Who should pay? The answers vary widely among countries and over time. This Note outlines options and best practices, emphasizing those relevant to emerging economies.

Sector reforms in recent years have rapidly extended the reach of telecommunications, but in many countries part of the population remains excluded. In Chile, for example, telephone connections more than quadrupled to 2.2 million lines in the eight years following privatization of the state telecommunications monopolies in 1987, the average wait for new connections dropped from seven years to a few weeks, and after the last regulatory barriers to entry and competition were dismantled in 1994 prices declined and have remained low by international standards. The share of households with a telephone increased from 14 percent to about 53 percent in 1996 and is estimated to exceed 80 percent today. Yet many of the remaining households, perhaps as many as 500,000, will be unable to afford a telephone connection in the foreseeable future. And in 1996 about 10 percent of the population—1.5 million people—lived in localities that lacked even a public telephone.

Which services to extend?

Government actions to extend telecommunications services beyond what commercial operating companies are prepared to do on their own vary widely. In Finland, with a well-functioning, competitive market and more phones than people, intervention is limited to income support to qualified households to help pay for such basic needs as food, electricity, television licenses—and telephones. In Ireland the Department of Social Welfare provides free telephone rental for qualified elderly and disabled people living alone.

In other countries the government defines a “universal service” objective—a minimum set of services of specified quality that must be available to all users regardless of where they live and at a price affordable to all. If the market fails to meet the universal service objective on its own or there is reason to believe that it will, the



government intervenes through regulation or funding. In addition to universal service, the authorities sometimes identify other services that must be provided to any customer requesting them but are priced on a fully commercial basis. In France, for example, such services are integrated services digital network (ISDN), leased lines, packet-switched data, enhanced telephony services, and telex.

Defining the universal service objective usually involves a market test as well as economic and ultimately political assessments of the relative importance of the services to society as a whole, generally based on these criteria:

- The value of the service has been demonstrated through the market, with the service having been taken up on commercial terms by a substantial part of the population to which it is available.
- People deprived of the service are deemed to suffer serious economic or social disadvantage.
- The cost, if any, of extending the service beyond the market and the distribution of this burden across the population are acceptable.

Universal service objectives vary with the level of network development. Most developing countries seek to achieve universal access through communal facilities within reach of everyone. Burkina Faso, near the low end of the range of network development with only 0.3 telephone line per 100 inhabitants, aims at having pay phones within 20 kilometers of most people. Countries with more extensive networks aim at a telephone in every home, and more. In Colombia, with about 14 lines per 100, basic telephone service is being extended to low-income urban households through cross-subsidies from businesses and higher-income households.

In the United Kingdom, with 55 lines per 100 and telephones in 94 percent of households, the universal service objective comprises fixed telephone connections countrywide at a uniform price, able to carry voice, low-speed data, and fax; an optional limited service at a low price; and free access to emergency services. In the

United States, which has about 65 lines per 100 and the same residential penetration as the United Kingdom, universal service also includes touch-tone signaling; access to long-distance, operator, and directory assistance services; and optional limits on long-distance calls for low-income customers.

Making some level of service affordable to the population at large lies at the heart of universal service. Affordability can be assessed by the share of potential users who take up the service when it becomes available. In the United Kingdom an optional telephone service introduced in 1997 for low-income users was priced so that about a third of households wanting a telephone but unable to pay for it would subscribe in the first eighteen months. Alternatively, a government might simply decide which groups deserve help. In the United States the state regulatory commissions decide which customers qualify for the Link-up and Lifeline programs (subsidies for initial telephone connection and monthly rental), regardless of whether the funding is state or federal, based on state-specific conditions or enrollment in federal social assistance programs.

Universal service objectives are likely to change as market boundaries are pushed outward. Larger and more modern networks make it easier and less costly to extend service to outlying areas. Services become more affordable as new technologies reduce costs and incomes grow. New entrepreneurs develop local business niches in once unprofitable markets. New services (mobile telephones, electronic mail) are taken up through the market and become necessities.

These changing conditions require frequent review of universal service objectives. The current definition of universal service in the United Kingdom, covering 1997–2001, is subject to a review initiated by the regulator, the Office of Telecommunications (Ofel), in mid-1999. In France the regulator must report to parliament at least every four years, starting no later than 2001,

including any proposed changes in the scope of universal service. The European Union in 1999 initiated a general review of telecommunications rules and guidelines, including those for universal service. In the United States the Federal Communications Commission will review the definition of universal service by January 2001.

To what population groups?

Universal service support programs mainly seek to extend service to uneconomic areas and customers. Another category receiving increasing attention (but not discussed here) consists of customers with disabilities, especially those who have severely impaired hearing (needing text rather than voice communications), are wheelchair bound (unable to reach regular public telephones), or are accident prone (unable to reach a telephone to summon help, such as the elderly).

How to serve uneconomic areas

Service is often thought to be commercially nonviable in some parts of a country, usually because of limited revenue potential (as a result of low incomes, or few customers among which to spread fixed costs) compounded by high cost (because of low population density, distance from the main network, or difficult terrain).

But people everywhere are willing to spend part of their income on telecommunications services. Across a wide range of developing and industrial countries telecommunications services typically account for 1 to 3 percent of GDP, and the worldwide average is 2.2 percent. This share is not much smaller in rural areas, even in poor countries. In 1996 villages in Botswana generated telephone revenues equivalent to about 1.3 percent of GDP, compared with 1.6 percent countrywide. And villages in Peru spend a larger share of GDP (1.5 percent) for telephone services than the country as a whole (1.2 percent).

The challenge is to enable operators to tailor their service offerings and technical choices so as to

effectively tap this revenue potential. A viable rural business strategy, for example, might consist of connecting high-revenue small businesses and institutional customers such as health clinics and schools, providing public access through pay phones, and adding only a few residential lines. Revenue could be increased by franchising telephone shops to individuals or small businesses, adding mobile pay phones, and combining voice mail (or paging) and pay phones to provide virtual telephone service. Privately owned telephone shops in Indonesia and Senegal effectively market telephone, fax, and other retail services, typically generating four to ten times the national average revenue per telephone line (ITU 1998). In Brazil and India rural pay phones can be profitable in localities with as few as 200 people (Kayani and Dymond 1997).

Open entry. Removing restrictions on entry is likely to accelerate service expansion in areas thought to be uneconomic. New entrants may be better placed than incumbents to provide service cost-effectively. This is especially so in developing countries, where incumbents have large backlogs even in highly profitable market segments. New entrepreneurs tend to bring in additional capital and management resources, and they are often smaller and nimbler than incumbents, faster to adopt new, lower-cost technologies, more focused on customer needs and marketing, better attuned to local conditions and business opportunities, and better able to assess and deal with local risks.

In Bangladesh villages, among the poorest in the world, women entrepreneurs provide pay phone service at a profit, using mobile cellular phones, and are expected to reach 60 percent of the rural population (Lawson and Meyenn 2000). Agricultural cooperatives built rural telephone facilities in parts of Brazil in the 1970s, and local cooperatives provide telephone service in Bolivia and Finland.

In South Africa a telecenters program focuses on demand-driven initiatives, launched and managed by local entrepreneurs or community

organizations with a vested interest in success and self-financed except for a limited subsidy, if needed, to help defray initial investment and training costs. Telecenters piloted since 1997 are communal facilities, typically with one or more telephone lines, fax machines, computers, printers, and other communications and information processing equipment—and attendants to train and assist users. An expanded program prepared in 1999 envisions a wider range of facilities, from simple telephone shops to multi-purpose community telecenters and information and communications technology cooperatives. The higher-level telecenters could support business activities, government health and education programs, electronic commerce, and community initiatives.

Cost-reflective pricing. To encourage expansion into uneconomic areas, retail prices for services must reflect cost differences across the country. In several industrial countries, however, the universal service provider is required to charge geographically averaged prices. In Australia Telstra provides standard telephone service in rural, remote, and aboriginal communities at the same price as in the rest of the country, where costs are lower. Although a carryover from monopoly days, geographically averaged pricing is still possible in a competitive environment, and it extends throughout the country the low prices resulting from competition in contested areas. Nonetheless, it runs counter to the principle of cost-based pricing and reduces economic efficiency. As competition becomes keen, geographically averaged pricing will lead to loss of market share by the universal service provider in contested low-cost areas or require a complex system for operators to share the net cost of (or responsibility for) providing service in high-cost areas.

In developing countries, less burdened by users' acquired rights and operators' vested interests, it is best to avoid geographic price averaging. Service at a higher than average price is preferable to no service at all. In Brazil in the early 1980s, about 400,000 farmers and

rural cooperatives were prepared to pay the full cost of obtaining telephone service. But since the state telecommunications companies could charge them no more than it did customers in cities, the farmers remained without service for years.

Cost-reflective interconnection charges. Also essential to support service expansion to uneconomic areas are interconnection arrangements that reflect the fact that calls to and from high-cost areas cost more than those between low-cost areas. High-cost areas would retain a larger than average share of charges for outgoing calls, whether paid for by the caller or by third parties. And they would receive a larger than average payment for completing calls generated elsewhere. Calls from economic to uneconomic areas often outnumber those in the opposite direction, partly as a result of income differences. Villagers receive profitable calls made by relatives who have migrated to the cities. Migrants from El Salvador and Mexico to the United States make many more calls home than they receive. Failure to properly pay for the termination of these incoming calls undermines the chances for otherwise uneconomic areas to become viable.

Better spectrum management. Improved management of the radio spectrum facilitates technological innovation, leading to lower costs. Oftel estimated that replacing wireline with wireless systems would reduce BT's costs in low-density areas of Scotland by about half. Multiaccess radio offers cost-effective alternatives to conventional radio and cable for serving low-density areas. Cellular and personal communications systems built to provide mobile service in cities and along roads can be used to extend fixed service to adjoining rural areas at marginal cost. Very-small-aperture satellite terminals (VSAT), developed mainly for business use, can provide a mix of pay phone and direct line connections in villages. Low-earth-orbit satellite (LEOS) systems being built to serve mobile markets worldwide may eventually sell capacity at marginal cost in other markets.

How to serve uneconomic customers

Even in economic areas not all connected customers are profitable. Local call charges and monthly subscriptions often remain well below cost (another carryover from monopoly times), resulting in operating losses that increase with each new customer. Rebalancing tariffs would make local service to most customers commercially viable. As overpriced long-distance call charges become less costly, service in small and remote localities, where customers mainly make long-distance calls, would become more affordable. Universal service support measures can then target the relatively few customers who remain uneconomic.

Rebalancing tariffs may make service less affordable to some groups, however. Fixed and local call charges, both likely to rise, account for much of the bill for low-income households. In many developing countries with large unmet demand and mainly middle- and high-income residential customers, tariff rebalancing is unlikely to make much difference in service penetration. The impact is also limited in mature economies. In the United States the decline in long-distance call charges more than offset increases in fixed and local call charges even for the most vulnerable groups, and rebalancing has not reduced the share of connected households (Wolak 1996; Cronin and others 1997). But in some transition economies many customers could not afford service on commercial terms. Preliminary calculations in Bulgaria and Latvia, for example, suggest that rebalancing might cause as many as a third of customers to drop their service unless they receive some support.

Even without rebalancing, not everyone in economic areas can afford service. Potential customers may be deterred by high up-front charges (initial connection, deposit), inability to pay standard recurrent charges (monthly or quarterly payment for the connection), concern about building up large bills, and fear of incurring debt. For the same reasons, customers facing temporary financial problems may leave the network.

And connected customers having difficulty paying their bills face disconnection.

Offering alternatives to standard service can do much to help low-income customers become or remain connected. When options are differentiated by service quality and price, customers—not the telephone company or government officials—decide which option suits them best. Many options can be built by repackaging components of the standard service. Effective programs include:

- Low up-front charges.
- Low fixed recurrent charges.
- Ways for the customer to control expenses.
- Ability to make small, frequent, regular payments.

In the United Kingdom BT began giving all residential customers with small bills a discount of up to 61 percent on the quarterly line rental in the early 1980s. But this light-user scheme targeted customers who used their telephone infrequently, not those unable to afford one. Nor did the scheme help customers manage expenses, debt, or uncertainty about the size of bills—all major determinants of affordability. In 1997, at the request of Oftel, BT improved its package, offering an optional lifeline service at a very low price, prepaid calling, and soft disconnection (box 1). (The regulator will allow BT to discontinue the light-user scheme, which loses money on 30 percent of customers, once most of those using it have migrated to lifeline and other new services.) But two years later less than a tenth of the targeted 300,000 customers had taken up the lifeline option. The unavailability of prepaid calling at the start seriously limited flexibility, while rapid development of competing prepaid mobile services offered an expeditious (though more costly) alternative.

Prepaid cellular service reaches, on a commercial basis, many low-income customers who are unwilling to commit to fixed monthly charges, are not creditworthy for normal (postpaid) service, want more control over call spending, or make few calls. Customers buy or lease a cellular

BOX 1 MAKING TELEPHONE SERVICE MORE AFFORDABLE: SERVICE OPTIONS INTRODUCED IN THE UNITED KINGDOM IN 1997

Lifeline service. As a first step up the ladder for customers wanting to join (or stay in) the network, BT introduced a limited telephone service at a very low price. This option provides a telephone connection, unlimited incoming calls, and outgoing calls to emergency services (as well as to the company's customer and repair services). Thus the customer can be reached by family, friends, and social workers and can summon police, ambulance, and fire services, but cannot make outgoing calls. The initial costs are minimal—a low one-time connection charge (about US\$17), no deposit, and a fixed quarterly charge (about US\$10) payable in advance.

Limited paid calls. As a next step up the ladder toward standard service and prices, BT committed to introducing a service enabling customers to predetermine the amount they spend on telephone calls as a way to control their spending and avoid debt. Customers pay in advance for a limited number of calls, can find out at

any time how much they have spent, and revert to the service that bars outgoing calls when they reach the limit. About two years later, prepaid phone cards and preauthorized collect calls, already offered with standard service, would become available to lifeline customers.

Soft disconnection. As an alternative to disconnection for nonpayment, BT offers a service that bars outgoing calls, at a lower price than standard service and accompanied by an agreed repayment plan. Options include payment of the outstanding and future bills by direct monthly bank account transfers, an agreed limit on call spending, free inquiries to keep track of call spending, and a bar on international or premium rate outgoing calls. Limited call spending is also available to new customers for standard service for the first twelve months, in lieu of a deposit. Ofel's target was to reduce net disconnections by 50 percent in each of the first two years of the service.

handset and pay in advance for a block of airtime, which can be extended by subsequent payments. Vodacom customers in South Africa can continue to receive calls (paid for by the caller) for six months after using up their prepaid calls. LMT, a Latvian cellular operator, introduced a service option with low monthly rental aimed at elderly users who make few calls but receive many from their families. For the operators, prepaid service adds many new customers, substantially increases traffic, and eliminates billing costs and collection risk. Baja Celular, a Mexican company, saw its customer base increase by 180 percent and its traffic by 80 percent in the sixteen months after it introduced low-cost prepaid service in 1996.

At what cost?

Even after impediments to effective working of the market are removed, the objectives of universal service may not be fully attainable on commercial terms alone. Some areas are too costly for any operator to serve. Pay phones in remote villages may lose money. Some price averaging may be unavoidable for political reasons and because it is impractical to charge each customer a different price. Losses from tariff imbalances may continue while tariffs are being rebalanced. Schemes to make service more affordable may be unprof-

itable. How much would it cost to close these gaps between universal service objectives and what the market delivers?

Universal service has a net cost to an operator if not providing the service would result in better financial performance. This cost is best revealed through the market decisions of operators. Without market signals, the net cost can be roughly calculated, to provide a basis for reviewing whether the proposed universal service objectives are reasonable and whether operators providing universal service should be compensated. One method uses the concept of long-run avoidable cost, which equals the long-run future costs that the operator would avoid by not providing the service, less the revenues forgone by not providing the service (Analysys 1995; ART 1998; ART decision 98-907, November 13, 1999). This method, in various adaptations, has been used extensively in Australia, France, the United Kingdom, and other countries and is reflected in European Union guidelines. Other methods, such as using fully distributed costs, are common in the United States and elsewhere.

The net cost of universal service is generally small relative to sector turnover. Among countries with major differences in universal service

objectives and costing methods, the net cost is at most a small percentage of turnover (table 1). This benchmark can be used to gauge new universal service proposals. It also puts to rest the old claim that universal service is inordinately costly and cannot be sustained in a competitive environment or without large payments to the incumbent. Net cost is likely to decline with the efficiency gains and better alignment of prices with costs that result from competition, market growth, and technological innovation.

Price distortions can account for a large part of the net cost of universal service. For France Télécom, 42 percent of the estimated net cost in 1999 was due to tariff imbalance, and 32 percent to geographic price averaging (table 2). With tariffs fully rebalanced by the end of 1999, the cost of universal service relative to turnover should decline by almost half in 2000.

The high costs of universal service in the United States partly reflect the difficulty of separating out these costs from a complex maze of cross-subsidies and interconnection charges. (Other reasons include the country's large size and its long-standing commitment to rural service.) In 1998 support for federal programs for high-cost areas and low-income customers, including state-level contributions, reached about US\$8.7 billion, or 5 percent of telecommunications turnover. Actual subsidies may be higher, as mismatches between costs and prices that developed during the monopoly era have not been fully corrected despite adoption of competitively neutral mechanisms to fund universal service (Mueller 1997).¹

Net cost calculation has important limitations. It depends on good information, often available only from the incumbent, which has a vested interest in the results, or not at all, especially in developing countries. Results vary considerably with the choice of method and accounting rules. Using fully allocated costs, Telstra calculated its annual net cost of universal service in the late 1980s at about A\$800 million, while a government study using an early version of the long-run avoidable cost method put it at A\$240 million.

TABLE 1 NET COST OF UNIVERSAL SERVICE OBLIGATIONS IN SELECTED COUNTRIES

Country	Percentage of total sector revenue
Argentina	0.6–1.0
Australia	2.0
Chile	0.2
Colombia	4.3
France	3.0
Norway	2.0–2.4
Peru	1.0
Sweden	0.8–1.2
Switzerland	1.7–2.2
United Kingdom	0.2–0.3
United States	5.0

Note: The data are estimates or projections covering various years from 1995 to 2004.

Source: Author's compilations.

TABLE 2 NET COST OF UNIVERSAL SERVICE IN THE TRANSITION TO COMPETITION FOR FRANCE TELECOM, 1999

Source of cost	Millions of French francs
Broad geographic access	
Losses from geographic price averaging	1,550
Net cost of countrywide pay phones	189
Subtotal	1,739
Affordability	
Losses from tariff imbalances	2,027
Cost of social programs ^a	1,105
Subtotal	3,132
Telephone directory and information services	0
Total	4,871

a. Special programs for low-income, disabled, and other target groups.

Source: Estimates by Autorité de régulation des télécommunications (ART), decision 98-907, November 13, 1998.

Even with a single method, cost calculations vary widely. In the mid-1990s BT estimated the annual net cost at about £400 million, initial calculations using the long-run avoidable cost method yielded £90 to £160 million, and Oftel's 1995–96 estimate using a more advanced version of that method gave £45 to £65 million. In some countries (including the United Kingdom) net cost is

further reduced by an estimate of indirect benefits to the operator from providing universal service.² Such estimates are unreliable, dependent on arbitrary assumptions, and hard to untangle from the effects of being the dominant operator.

Who should provide the service?

Under monopoly supply, universal service obligations were imposed on the sole operator. Because prices were set so as to make the operator profitable overall, any losses from providing service to uneconomic places or customers were recouped internally. In Mexico the monopoly operator, Telmex, was required, as a condition of the license it was granted at the time of its privatization, to install pay phones in about 20,000 rural localities between 1990 and 1994, thereby extending service to all communities with more than 500 inhabitants. But some 100,000 localities with fewer than 100 people remained without service.

In the transition from monopoly to competition, the incumbent is sometimes required to continue providing universal service, primarily because no other extensive networks are in place. BT, France Télécom, and Telstra, the former monopoly operators in the United Kingdom, France, and Australia, are also the designated universal service providers. Competitors may also offer the services, but they are not required to do so and they may offer them at different qualities and prices.

In a competitive environment, however, high margins are quickly competed away and the potential for mandatory coverage of uneconomic areas or customers declines. When regulators conclude that compensation is due for losses incurred in meeting universal service objectives, one solution is to calculate the losses and establish a mechanism for compensating the designated universal service provider, as has been done in France.

The responsibility for universal service provision, and any associated funding, are increasingly being allocated through the market.

Besides promoting efficiency, competition for the market reveals the true net cost of providing universal service, including the indirect benefits perceived by the operators, offering a simple and robust alternative to calculating the net cost. It also calls attention to forgotten places—as incumbents defend their territory and challengers seek footholds on new ground.

In countries moving to competition, incumbents can be given the option of renouncing universal service obligations, which would then be put out to tender. The incumbent would be allowed to bid and might win, but the compensation would be determined through the market. Competition can also be used to determine which operators will meet new universal service objectives most cost-effectively. In Chile a rural telecommunications development fund periodically invites bids for nonexclusive licenses to install and operate village pay phones, awarding the licenses to the bidders requiring the lowest one-time subsidies (Wellenius 1997). Competitive tendering also holds promise for the provision of lifeline or other schemes to increase affordability.

In a variant of competitive tendering, “pay or play,” the incumbent retains its universal service obligation, but other operators can assume parts of this obligation in exchange for corresponding reductions in their contribution to universal service funding. In Australia participating operators can contribute a share of revenues, less the calculated net avoidable cost of universal service provided, which may result in a net credit or debit from the universal service reserve. Pay or play is also allowed under European Union rules and the French telecommunications law and has been proposed in the United Kingdom.

Other ways of using the market to allocate universal service responsibility and funding have been proposed. One is a system of “virtual vouchers” for eligible customers to use in buying services from any competing provider, which would then credit these amounts against its share of the cost of an industrywide universal service obligation (Noam 1994). Another is

a system of tradable universal service obligations to extend service to uneconomic areas, akin to approaches used in the United States and elsewhere to limit air pollution (Peha 1999).

Allocating universal service responsibility through the market is a recent idea and experience is limited. And it is not without risk. There may be only one bidder—as there were for about half the village pay phone projects tendered in 1995 in the first round of bidding in Chile—or there may be collusion among few bidders. Information asymmetry favors the incumbent, which knows best the business potential of areas it already serves. And there is the winner's curse: new entrants bidding for too little funding (or too high prices for the licenses) and then being unable to deliver. This occurred in the United States following the 1998 auction of personal communications system (PCS) licenses reserved for small and minority investors, and in India after the 1997 auction of licenses for second fixed local telephone operators across the country.

Who should pay?

If the net cost of universal service is only a small percentage of telecommunications turnover, special measures to fund the service may be unnecessary. Operators might extend service this little beyond the market to reap the indirect benefits of being a universal service provider or as the cost of good corporate citizenship. Of the fifteen countries of the European Union, only France uses a specific funding mechanism.

Still, funding may be required in some cases. Where gaps in universal service provision remain despite removal of obstacles to the market, modest funding might entice existing or new operators to reduce these gaps. That was the case in Chile, where private operators invested US\$20 in new rural telecommunications facilities for every US\$1 of one-time government subsidy. Where maintaining the incumbent's universal service obligation would place it at a significant disadvantage relative to its emerging competitors, funding could be made available for the elements of universal

service that are not mandatory for all operators. This can be done using several financing mechanisms. Administering any of these mechanisms should cost no more than a tiny fraction of the funds involved, typically less than 1 percent.

Universal service fund

A universal service fund collects funds from different sources and pays the universal service operators the eligible net costs of the service. The fund can be administered by a specially created agency or company. In the United States federal support for high-cost areas and low-income customers is channeled through the federal universal service fund administered by the Universal Service Administrative Company (USAC), a private not-for-profit subsidiary of the National Exchange Carrier Association. USAC implements fund rules, notifies companies of their obligations to the fund, collects their contributions, invests the funds, and makes payments to eligible service providers. It also provides guidance to the constituents of the universal service programs on how to obtain financial support from the fund.

A universal service fund can also be administered by an existing financial institution. In France the universal service fund is simply a dedicated account with Caisse des dépôts et consignations. The regulatory authority determines annually the contributions of each operator to the fund and the payments the fund must make to the universal service provider. In Australia the universal service reserve is administered by the treasury.

Under a variation called a "virtual fund," the regulator informs the universal service providers what proportion of their net costs each operator should pay based on revenue information provided by all the operators. The universal service providers calculate their net costs, apply the proportions determined by the regulator for the other operators, and bill and collect from them directly. The regulator specifies which costing methodology to use, which operators must contribute, and what the basis for those contributions is. It also ensures transparency, monitors

compliance, and resolves disputes. Oftel has been preparing a blueprint for a virtual fund for use if it should find, in the 1999 review or later, that BT needs to be compensated for its universal service obligation.

Add-ons to interconnection charges

An alternative is for the incumbent universal service provider to charge interconnecting operators a share of its net cost of universal service in addition to the interconnection charges. This was the main mechanism used in the United States before it was replaced by universal service funds at the federal level and in many states. The arrangement is simple and inexpensive, using administrative procedures already in place or that must be established anyway as new operators enter the market. But it has major disadvantages. The operator collects subsidies to cover its universal service costs, so it has no incentive to reduce these costs. The lack of a market mechanism to determine the cost of universal service makes any subsidies look like arbitrary contributions to the incumbent's profits. And new entrants have no incentive to compete in high-cost areas if the system pays subsidies only to the incumbent.

During the initial years of transition to competition, France has combined a universal service fund and add-ons to interconnection charges. A charge levied on companies interconnecting with France Télécom finances the net cost to that company arising from geographic price averaging and imbalanced tariffs. The universal service fund covers the net cost of countrywide pay phones, universal directory and directory assistance, and special programs to make service more affordable or accessible to low-income, disabled, and other target groups. Once France Télécom has gradually reduced and rebalanced tariffs, but not later than the end of 2000, compensation for losses from tariff imbalances will end, losses from geographic price averaging will be met from the universal service fund, and the interconnection add-on will be discontinued.

Sources of funds

Because universal service is intended to benefit society at large, for reasons of both equity and economic efficiency the natural choice for financing is the public sector budget, as in the case of the Chilean rural telecommunications fund. But that puts universal service in direct competition with other demands on the budget and subjects it to the uncertainties of annual appropriations, increasing the riskiness of long-term telecommunications investments.

The more common choice, therefore, is to finance universal service funds through mandatory contributions by telecommunications operators. Since the telecommunications sector is generally profitable, it can bear the burden of social obligations, and sector players are generally willing to contribute reasonable amounts if the costs are allocated fairly. To spread the burden among as many customers as possible, eventually approximating the effect of a broad-based tax, in principle all operators (that is, all customers) should pay. In the United States the high-cost and low-income federal support programs are funded by mandatory contributions from all U.S. companies providing interstate telecommunications services, and most state programs are funded by contributions from all operating companies billing customers in the state.

From the viewpoint of network externalities, operators of services not part of the universal service objectives (mobile, leased lines) could be excluded from paying into the fund. And when the universal service provider is the incumbent, pro-competitive policies might dictate exempting new entrants until they attain a certain market share. In France mobile operators are exempted from some components of the universal service contribution.

Contributions to universal service financing are usually assessed in proportion to gross revenues, adjusted to avoid double counting (for example, to exclude interconnection revenues from other contributing operators). Revenue information is

easy to collect and audit, and this method results in customers paying markups that are proportional to their bills, much like a progressive tax. In the United States contributions to the federal programs are assessed in proportion to the companies' end-user revenues from interstate and international services (about 1.5 percent in 1998). Contributions at the state level vary by state. Vermont, for example, levies a charge of 1.06 percent on all telecommunications bills to Vermont customers. Arizona charges local telephone companies an annual fee of US\$0.01211 per line, cellular and other wireless companies US\$0.1211 per interconnecting trunk, and intra-state long-distance operators 0.1391 percent of revenues. Alternatively, contributions could be assessed on the basis of traffic (call numbers or minutes), as in France.

Conclusion

Relying primarily on the market to achieve universal service objectives speeds the transformation of today's still distorted telecommunications markets into tomorrow's freely functioning markets. It also minimizes the demands on regulators, especially important in countries with limited regulatory capabilities (Smith and Wellenius 1999).

For broader development reasons, however, governments often seek to extend access to services beyond what commercial operating companies will provide on their own. Ensuring that people have access to some level of telecommunications services is considered essential to enable them to participate fully in a modern society and to obtain vital public services.

As more advanced services become critical for national competitiveness (for example, mobile and Internet service), however, an important question arises: Should universal service policy go beyond intervening at the tail end of the market to also lead development of these new markets? The issue is not whether advanced services and new technologies are good for development, nor whether they should be promoted.

Instead, it is whether they should be mandated and offered at subsidized prices as part of universal service support programs. The answer dictates who will decide on matters well beyond telecommunications, and who will pay.

Some governments have chosen to accelerate deployment of broadband technologies ahead of market take-up. This, it is argued, will speed access to information for educational and leisure purposes, make interactive services and electronic commerce more attractive, and enable the delivery of new services such as video on demand. In the United States, following the Telecommunications Act of 1996, the Federal Communications Commission established two new federal programs that support advanced telecommunications and information services in schools, libraries, and rural health centers. Funding comes from mandatory contributions to the federal universal service fund by all telecommunications companies (local and long-distance carriers, resellers, cellular, paging, other wireless, and any other companies that interconnect with the switched network, but not Internet, on-line service, and cable companies). In 1998 these contributions amounted to 0.7 percent of telecommunications turnover, on top of the already high 5 percent contributed at federal and state levels for the high-cost and low-income telephone programs.

Australia, Canada, and the European Union, among others, have decided that for the time being, leading the market is not within the scope of universal service. Selecting particular services or technologies for preferential support, it is argued, would interfere with market choices among a widening range of options, risk making wrong choices, and add barriers to innovation and competitive entry. Requiring telephone users—including low- and middle-income families—to subsidize early adopters of new technology, who tend to be among the better off, would be inequitable.

Policymakers argue that since the benefits of the new technologies are expected to be

widespread and would materialize through government health, education, information society, and other programs, the options should be assessed from the perspective of these programs, not telecommunications. Moreover, the cost should be shouldered by the population at large through general taxation, not by telecommunications users. And resource allocation should be subject to the discipline of national budgets, not telecommunications regulation.

Canada has in recent years allocated large amounts of public funds to market leadership programs to ensure that schools, health clinics, and rural communities have access to the Internet. These programs are led by the industry and human resource ministries, not the telecommunications regulator. Canada's policy-makers even refer to "universal access" to the Internet in their information society programs, although Internet and enhanced services are not part of the mandate or funding for universal telecommunications services.

The vigorous debate under way in industrial and developing countries alike attests to the complexity of the issue. Perhaps some of the answers will come through the market. In at least some countries, for example, Internet use is close to meeting the market test for universal service. Moreover, a persuasive case can be made that changes in the economics of universal service supply and demand, driven by the global growth of electronic commerce, could accelerate extension of new services to all through the market more effectively than regulatory intervention could. Precedents can be found in television broadcasting, publishing, mobile telephony, and Internet service (Townsend 1999). Perhaps the marriage of commerce and telecommunications will be more effective at making universal service a reality than telecommunications service monopolies, obligations, and cross-subsidies ever were in the past.

Notes

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material published by these reviewers, the agencies mentioned in the text, and other sources.

¹ AT&T has argued that of the US\$20 billion in annual payments from long-distance to local operating companies, about half would suffice to cover interconnection costs and finance an efficiently run universal service program.

² Indirect benefits include life-cycle effects (uneconomic customers today may later become economic and stay with the same operator), ubiquity (the universal service operator may be better known than competitors to potential new customers), and brand enhancement (marketing and advertising value).

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