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Universal Telecommunications Service in India

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Abstract

Nearly every country in the world, including India, has policies intended to promote universal access to telecommunications services, despite the absence of evidence of a market failure in the industry. Universal service policies typically involve cross-subsidies among types of telecom consumers and among telecom providers. India’s New Telecom Policy of 1999 set goals of providing telephone and Internet access in all villages by 2002. This plan was not successful, so in 2003 DoT established a program to subsidize some telecommunications services in Indian villages. Taxes on all providers, raised mostly from private entrants, are transferred to the state-owned incumbent, BSNL, to cover part of the costs of its local network. Additional funds are distributed via auction to the firm requesting the smallest subsidy to provide service in a given area. The auction design discourages competition, so that the initial subsidies went primarily to the incumbent, BSNL. To be effective, policies intended to bring telecommunications services to people who otherwise would not have access should focus on encouraging competition, which has proven worldwide to be the most effective mechanism for encouraging investment and reducing prices.

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Introduction

Telecommunications reform in India began in the 1980s, but struggled for more than a decade to find reforms that would substantially improve industry performance. Beginning in the new millennium, technological change and new government policies encouraged competition, primarily from mobile telephony, and performance improved dramatically (Figure 1). Not surprisingly, telecommunications access has increased far more quickly for wealthy and urban consumers than for poor and rural consumers. To address this gap, India has adopted so-called “universal service” policies, especially targeting rural villages. These policies primarily rely on subsidizing the incumbent state-owned carrier, despite its unimpressive historical performance.

An innovative part of India’s universal service policy is an auction in which providers bid the subsidy they seek for building village public telephones (VPTs). Typically the only bidder and hence the recipient of the subsidy is Bharat Sanchar Nigam Limited (BSNL), the incumbent state-owned carrier for nearly all of India. The auction process is designed to favor BSNL, and so is not an effective mechanism for either minimizing the state subsidy or identifying the most efficient provider. Meanwhile, the taxes that finance the access subsidy are highly distortionary. Moreover, private mobile operators are expanding service rapidly, which calls into question the presumption that a subsidy scheme targeted at VPTs is cost-effective.

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The funds for implementing the universal service policy come from two sources. One is a tax on the revenues of all telecommunications carriers. The other is “access deficit charges” on subscribers of systems owned by private carriers. These fees are paid directly to BSNL. In theory, these fees reimburse the incumbent for its (mostly unmet) obligation to provide service in places where revenues cannot cover costs. In reality, the incumbent does not disaggregate its costs in any way that makes it possible to determine whether revenues exceed costs in any particular geographic area or other market segment.

This paper evaluates India’s universal service policies. The next section provides a brief introduction to Indian telecommunications. The following sections analyze universal service explicitly. The final section concludes.

A Brief History of Indian Telecommunications Reform

Since 2000, the telecommunications sector in India has improved dramatically. In 1982-85, before structural reform began, the annual growth rate of telephone penetration was about seven percent. In 1986, telecommunications services were separated from postal services and divided into three parts. Local service in Delhi and Mumbai was given to a corporatized state-owned enterprise, Mahanagar Telephone Nigam Limited (MTNL), and the rest of local service plus domestic long-distance service was given to BSNL, which remained a part of the Department of Telecommunications. Minority interests in MTNL subsequently have been sold to private corporations, and today the government owns 56 percent. BSNL eventually was corporatized on October 1, 2000, and may be partially privatized in the next few years. Finally, Videsh Sanchar Nigam (VSNL) was created as a government-owned corporation to operate

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1 This section is based on Noll and Wallsten (2005).
2 For a thorough and fascinating analysis of the history of Indian telecommunications, see Desai (2004).
international telephone service. This reorganization increased the growth in telephone lines to slightly less than ten percent per year.

The next major reform began in 1991 with the commitment to allow the private sector to provide some services, including both fixed and mobile wireless telephony. Procedures for granting private licenses were developed and implemented over several years, so that private operators only began to enter at the end of 1995. During this period, the SOEs continued to be monopolies but expected entry in the future. Performance improved, with the number of lines in service more than doubling in five years.

Between 1996 and 2001, private wireless carriers offering both fixed and mobile service entered the industry, and the SOEs faced competition for the first time. Wireless services grew slowly during this period. By 2001, fixed wireless accounted for only three percent of lines, and mobile telephony accounted for about ten percent, while the SOEs roughly tripled their number of lines in service and thus accounted for about 80 percent of the growth in penetration.

From 2001 to mid-2005, total telephone lines grew from about 30 million to 104 million, tripling again in only four years. An important change from the 1990s is that wireless telephony accounted for nearly all of this growth, and most of the growth in wireless telephony was accounted for by private carriers. Between March 2002 and June 2005, the number of fixed lines grew from 38.4 to 46.9 million, a gain of 8.5 million, while the number of mobile lines grew from 6.4 to 57.4 million, or by over 50 million (TRAI 2004). Moreover, as of June 2005, the SOEs served 40.75 million fixed-service lines, compared to 37.85 million in March of 2002 – an increase of less than three million. Most of this increase occurred early in the period. Fixed line penetration by the SOEs has been essentially constant since late 2003. Meanwhile, private fixed wireless carriers provided 0.6 million lines in March 2002 and 6.1 million lines in June 2005, an
increase of 5.5 million.\(^3\) In mobile wireless, the SOEs, which were allowed to enter only at the beginning of the recent reform period, grew from 0.2 million to 12.0 million subscribers between March 2002 and June 2005, whereas the private carriers increased their penetration from 6.2 to 45.4 million. Thus, an important part of the recent success of Indian telecommunications is the growth of wireless services provided by private companies. As of mid 2005, private companies provided 51.5 million lines, or nearly half of the total, compared to 15 percent to all lines in March 2002. In June 2005, wireless telephony accounted for 63.5 million telephones, or 61 percent of telephone penetration, compared to 16 percent in March 2002.

**Universal Service – Theory and Practice**

“Universal service” refers to the idea that an infrastructure public utility, such as electricity, transportation, water or telephony, should be available to everyone. Universal service policies are typically rationalized in three ways (Cremer, *et al.* 1998; Cremer, *et al.* 1998). First, externalities related to the consumption of infrastructure services might make it economically efficient to subsidize prices for those who cannot afford the service at cost. Positive externalities imply that the total benefits from providing service to an individual exceed the benefits to an individual subscriber. If the private marginal cost of service exceeds the private marginal benefit by less than the amount of the external benefit, then some individuals will not subscribe even though the social benefit of serving them exceeds their cost of service.

Second, some services might be ‘merit goods’—goods and services that society believes everyone should have, regardless of whether they are willing to pay for them. A policy decision that certain goods and services ought to be subsidized may come from a belief that everyone

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\(^3\) Penetration data are from the TRAI website at http://www.trai.gov.in/pr11jul05.htm. These data differ somewhat from estimates by the Cellular Operators Association of India http://coai.in/archives_statistics_2005_q2.htm.
should achieve a certain minimum standard of living or a concern that individuals are unable to accurately assess the private benefits of consuming these services.\(^4\) If society is more concerned about consumption of merit goods than the overall welfare of poor people, subsidies for these goods might be preferable to direct monetary transfers because people may choose to spend cash transfers on something other than the service society wants to encourage.

Finally, political factors or regional development goals may induce government to transfer resources to rural or low-income constituents. In countries with large rural populations, like India, politicians may face a political incentive to ensure that their rural constituents have access to the same services as do urbanites.

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**Rationale for Universal Service in Telecom**

Universal access to some types of infrastructure is easier to justify than to others. Water and sewerage, for example, involve large health externalities, and bringing these services to everyone can yield large social benefits. But it is not at all obvious why universality is legally mandated in some sectors but not others. Nearly every country in the world has laws mandating some type of universal access to telecommunications services, but the economic rationale behind these laws is weak.

The typical economics argument defending policies regarding universal service in telecommunications is that service is underprovided because of network externalities. Network externalities in telecommunications mean that the benefits a new consumer accrues from connecting (the private benefits) are less than the total benefits to society, because when an additional person connects to the network all other subscribers benefit by being able to

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\(^4\) For example, it is sometimes argued that people might not fully appreciate the benefits of consuming clean water if they are unaware of the costs associated with consuming polluted water or unable to fully assess the risks associated with doing so (Shirley and Ménard 2002).
communicate with the new subscriber. Therefore, individuals may not face a strong enough incentive to subscribe, thus requiring subsidies to induce socially optimal subscription. This argument is incomplete and therefore misleading.⁵ Even if the benefits to the new subscriber are less than the total benefits, the private benefit may still exceed the cost for nearly all subscribers, in which case a general subsidy of service is mostly wasted. Second, because services become more valuable when more people are connected, the firm providing access captures some of the benefits from network externalities. Consequently, although network externalities are external to the individual, they are not necessarily external to firms providing the service, potentially removing the need for subsidies. In other words, network externalities by themselves do not necessarily imply telecommunications under-subscription and a need for subsidies. Third, all subscribers receive an external benefit from subscriptions by others, implying that each person should subsidize the service of the other. Consequently, on average the subsidy a subscriber receives to take service ought to be roughly equal to the amount of subsidy that subscriber should be willing to pay to induce others to subscribe.

In developing countries, the case for subsidizing access service by the incumbent wire-line carrier is further undermined because the incumbent wire-line monopoly, whether privatized or state-owned, generally has not offered service in poor urban areas. Indeed, in the era of state-owned enterprises, telecom providers had little incentive to invest in any telecommunications services, as witnessed by the appallingly long waiting period to obtain connections and the poor quality of service following installation. As a result, telephone penetration and use were low, even considering developing countries’ low incomes, and service to poor and rural areas was horrible (see Figure 2).

⁵ See Cremer (1998) for a more complete discussion of this issue.
Economics research provides convincing empirical evidence that the case for extensive cross-subsidization in telecommunications is weak (e.g., Clarke and Wallsten 2002; e.g., Crandall and Waverman 2000; Rosston and Wimmer 2000). Among their conclusions are the following:

(1) Cross-subsidization systems are inefficient because the amount transferred among services and households is much greater than the net subsidy to low-income consumers;
(2) the cross-subsidy system has little effect on the penetration of telephone service because it taxes usage services, which have relatively high price-elasticities of demand, in order to subsidize access, which has a very low price-elasticity of demand;
(3) low-income households, if given the choice, would generally prefer cash to a subsidy for telephone service; and
(4) in developing countries, almost no low-income households subscribe to access service while many make calls from pay telephones or call centers, so that taxing usage to subsidize access transfers income from the poor to the middle class.

That the alleged market failures in telecommunications do not provide a convincing rationale for universal service policies should not come as a surprise considering the origins of universal service in telecommunications. Universal service policy in telecommunications does not have its roots in the desire to ensure telephone access to all people. Instead, early in the 20th Century universal service policy arose from the desire by the Bell Telephone Company, which constructed the first telephone network in many nations throughout the world, to stifle competition. “Universal service” did not mean that everyone should have a telephone. Instead, it meant that everyone who had telephone service should be allowed to have only a Bell telephone (Mueller 1997). Universal service was to be achieved through price discrimination
within a single monopoly provider; competition would undermine this process by attracting entrants who would “cream-skim” customers who were charged the highest prices. In other words, universal telephone service was a rationale for granting and preserving monopoly, not for ensuring service to everyone. In developing nations, this rationale continued after private carriers were nationalized in the middle of the 20th Century (Noll 2000). As a result, universal service policy in telecommunications tended to benefit monopolists, not consumers.

While there may be little reason to believe that there is a market failure with regards to telecommunications, the fact remains that nearly every country in the world, including India, has universal service policies for telecommunications. Regardless of the merits of the rationale for these policies, governments face substantial political pressure from favored user groups to consider the complex pattern of price-discrimination in telephone rates (Estache et al. 2001). These policies generally are based on the goal that all residents of a country should have access to telecommunications services at affordable prices, though definitions of “access,” “telecommunications services,” and “affordable” are debated across and within countries.

To achieve this goal, pricing policies seek to subsidize basic local access service (and increasingly data services as well) for customers in high-cost (typically rural) areas and for urban residential customers. In some cases, subsidies are targeted at residential customers with low incomes, but most of the subsidy arises through price discrimination between business and residential customers and across geographic areas without regard to a customer’s ability to pay. Deficits in providing local access service typically have been paid primarily from taxes on other services, notably local usage, long-distance, international calls and, more recently, mobile telephone service.
India has been no exception to any of these trends. Telephone service stagnated under state ownership. Despite DoT’s (later BSNL’s) mandate to provide service in rural areas, relatively few villages had even a public telephone, let alone were offered private telephone access during the era of state-owned monopoly. In 1995 approximately 185,000 villages out of more than 600,000 had a public telephone (Jain and Das 2001), and in 1998 only 2.6 percent of rural households had telephone service (Figure 3). And, as Das and Srinivasan (1999) note, that number exaggerates the true state of telecommunications in rural areas because village surveys “revealed that more than 60 percent of … VPTs [village public telephones] were faulty. Of the remaining, a high percentage were disconnected due to non-payment of dues, so that in effect, very few are in actual use.” Clearly, prior to recent reforms the incumbent did a poor job of providing service to rural areas.

The network externality inherent in telecommunications at first seems to imply a subsidy for access; however, on average each person creates an externality that approximately equals the external benefit that each user receives from other subscribers, so for a given subscriber the optimal outgoing and incoming subsidies roughly cancel. Only people who have a low willingness to pay for service are likely to create an externality that is substantially larger than the externality that they enjoy from others, in which case optimal pricing requires that their service be subsidized. If the willingness to pay for subscription externalities enjoyed from others is positively related to income, the network effect theoretically could support targeted subsidies to induce low-income users to subscribe. Thus, if a “universal service” policy is desirable, it should be targeted at people who otherwise would not subscribe because their incomes are low.

Most nations subsidize rural telephony, although in developing countries rural telephone penetration is far lower than in urban areas (Figure 2). The costs of service are higher in rural
areas because of low population density and greater average distances between subscribers and the local switch. Subsidizing rural areas simply because they have high costs is not implied by optimal pricing unless rural customers generate a much greater subscription externality than do urban subscribers.

Universal Service Policies in India

India’s first official universal service program was included as part of the 1994 National Telecom Policy. That policy defined universal service as the availability of certain "basic telecom services at affordable and reasonable prices" to all citizens (Telecommunications Regulatory Authority of India 2002). This policy was revised and made more detailed under the New Telecom Policy of 1999 (NTP ’99), which made providing telecom services in remote rural areas a higher priority.6

Among other goals, the NTP ’99 aimed to:

- Provide voice and low-speed data services to the 290,000 villages with no service by 2002;
- Provide Internet access to all district headquarters by the year 2000; and
- Achieve telephone on demand in urban and rural areas by 2002 (Government of India 1999).

In addition, policymakers hoped to increase rural teledensity from 0.4 telephones per hundred people in 2000 to 4 by 2010 (Telecommunications Regulatory Authority of India 2000). The

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6 According to DoT (2002), "The New Telecom Policy’99 envisaged provision of access to basic telecom services to all at affordable and reasonable prices. The resources for meeting the Universal Service Obligation (USO) shall be generated through a Universal Service Levy (USL), at a prescribed percentage of the revenue earned by the operators holding different type of licenses. Further, NTP’99 envisaged implementation of Universal Service Obligation for rural and remote areas through all Basic service providers who will be reimbursed from the funds collected by way of USL. Other service providers shall also be allowed to participate in USO provisioning subject to technical feasibility and shall be similarly reimbursed out of the funds of USL."
NTP states that universal service objectives will be funded through a universal service levy. When the 2002 goals were not met, the DoT (2002) issued clarifying guidelines on how universal service activities should proceed. DoT adopted two objectives: providing public telephones in villages and providing household telephones in rural areas. The first objective was given higher priority.

The universal service fund is based on an implicit assumption that competition among private providers will not generate service in rural areas, and that the magnitude of the subsidy can be minimized by allowing only one firm to receive a subsidy in each area. The cost of the subsidies is raised through two taxes. The first, the universal service levy (USL), is a tax of five percent of adjusted gross revenues on all telecommunications providers except “pure value added service providers” such as ISPs. These funds go to the Department of Telecommunications, which distributes them as discussed below. The second includes “access deficit charges” (ADCs), which are incorporated into interconnection charges and are paid directly to the incumbent state-owned enterprise (BSNL) in order to compensate it for providing below-cost service in rural areas. While collecting the USL is relatively simple, distributing the funds so that they actually help meet universal service objectives is far more difficult. The ADC, meanwhile, is intensely controversial. We discuss these two issues below.

Allocating the USF: Auctioning Subsidies

The USF is intended to reimburse the net cost (cost minus revenues) of providing rural telecom service. Because costs may differ among regions, separate auctions determine the actual reimbursement in different areas. Previously, in awarding licenses for cellular telephone service DoT had divided the country into 20 telecom “circles” (which loosely follow state boundaries). These circles were used as the basis for the rural subsidy auctions. The magnitude of the subsidy
for each area is determined through an auction mechanism that was proposed by Dr. Rakesh
Mohan, then a member of TRAI, in his dissent from a recommendation by the commission on
how to implement universal service. In this process, telecommunications firms submit bids for
providing service. The firm bidding the lowest subsidy, subject to the bid being no higher than a
benchmark established by information from the incumbent wire-line monopoly, is eligible to be
reimbursed that amount from the fund. Any firm with a license to provide basic or cellular
service in the relevant service area is eligible to bid (Department of Telecommunications 2002).
The winner receives a subsidy for seven years, subject to review after three years.

Subsidy auctions have been used elsewhere in the world with some success. In a fair
bidding process with multiple bidders, firms should bid the smallest subsidy necessary for them
to provide service. Chile and Peru were among the first to implement this method, giving
licenses to operators that agreed to serve areas for the smallest subsidy (Cannock 2001). In
Chile, the average winning subsidy from 1995-1999 was about half the maximum benchmark,
while in Peru the subsidy was only about one-quarter of the benchmark (Intven and Tetrault
2000). These experiences reveal that auctions are feasible and that the subsidies required were
far less than the incumbents had previously led policymakers to believe were necessary.

The Indian subsidy auctions yielded a different result. In 19 of the 20 circles only one
firm bid for the subsidies, the incumbent BSNL (Ghosh 2004). Not surprisingly, given the thin
market, BSNL bid exactly the benchmark amount, which was the maximum subsidy DoT was
prepared to provide.

The failure of the auction to create genuine competition for rural public service arose
from at least three problems. First, the calculations for the benchmark subsidy plausibly were
not based on accurate information or on the appropriate standard, which is the incremental cost
of public telephone service. The cost data used for calculating these benchmarks were provided by BSNL. While DoT officials insist that the incumbent could not have manipulated the data, others note that BSNL’s accounts are aggregated in a way that makes it impossible to separate costs for different operations (e.g., Ramachandran 2003), which in turn makes incremental cost calculations impossible.

Second, BSNL receives nearly all of the Access Deficit Charge cross-subsidies (discussed in detail below). The incumbent has potential gains from manipulating how cost information is aggregated across service categories and across high-cost and low-cost areas, because these data not only determine the benchmark subsidy for public telephones, but also the magnitude of the net deficit for all local access service. If some ambiguous cost elements are allocated to subsidized areas, the effect will be to increase both the public telephone subsidy and the ADC subsidy.

Third, bidding was open only to basic service operators already providing rural service in the area. BSNL, even though it historically has not served many villages, owns some facilities in these areas; however, few other firms have entered these markets, in part because they were opened only recently and in part because disputes about the terms and conditions of interconnection with BSNL remain unresolved. Firms not yet operating could bid for the public telephone subsidy only if no other bids were received or if the bids by others exceeded the benchmark (Intelecon Research and Consultancy Ltd. 2002). By precluding firms that were not already present, the subsidy scheme explicitly was designed not to encourage either entry or innovation in rural services.

The auction procedure that was set up advantaged the incumbent while providing no incentive to improve efficiency. In particular, if only a single firm can qualify for the subsidy
and if that firm is then reimbursed the difference between its own estimates of its revenues and costs, the subsidized firm has no incentive to reduce costs unless it can do so in ways that can be hidden from the DoT. Moreover, with only one subsidized firm in the entire nation, even benchmark competition (whereby differences between monopolies in different areas are used to evaluate performance and adjust the subsidy) is impossible, while the subsidies themselves make it impossible for non-subsidized firms to enter the market.

By 2005 the USF had disbursed Rs. 1700 crore (about $375 million). About 520,000 VPTs had been installed, nearly all by BSNL (Chidambaram 2005). In 2005-2006, an additional Rs. 1200 crore (about $250 million) is available from the USO with the hope of serving the remaining 66,000 villages by 2009 (Chidambaram 2005; Press Information Bureau 2005). Evaluating the effectiveness of this spending is virtually impossible. No estimates have been made of the number of VPTs that would have been installed without the program by either BSNL or others, especially if the interconnection dispute between them had been resolved. The sole metric available seems to be the gross number of VPTs installed. No data are available about the share of VPTs in working order, the price of phone calls in rural areas before and after the program began, or actual usage.

The subsidy scheme for encouraging investment in VPTs is only the first part of a two-part policy. The second step will distribute funds for connecting individual households. Neither the DoT nor TRAI have issued guidelines on how this objective will be accomplished, though the administrator of the universal service fund expects it to be quite controversial (Ghosh 2004).

The second step is potentially far more important than the first. Many more telephone lines are at stake in devising a plan for implementing extensive residential access than for providing more public telephones. While even in the best of circumstances firms might not have

7 1 crore = 10 million; US $1 = Rs 45 or Rs 1 = US $.022 cents in October 2005
found subsidies for a relatively small number of public telephones an attractive basis for entering rural areas, subsidies for a much larger number of residential lines clearly are more attractive. Thus, using the auction system that was used for public telephones to allocate the subsidy for household service would perpetuate an inefficient rural telephone monopoly.

Access Deficit Charges

Access deficit charges (ADCs) are essentially fees paid by private entrants to the incumbent based on the premise that basic access providers face unprofitable social service obligations and should therefore be compensated for them by entrants who are free to seek out profitable customers. These deficits arise from the assumption that TRAI’s price ceilings on basic monthly access service charges that are below the cost of service for a large number of customers. As one DoT official put it, “private operators started services from creamy areas, so they have a clear advantage over BSNL. The state-owned operator has to provide services in rural areas at a subsidised rate, which reduces its ability to compete with private operators in the creamy areas” (Intelecon Research and Consultancy Ltd. 2004).

The magnitude of the funds transferred through the ADC is not trivial. TRAI originally estimated the annual “access deficit” at Rs 13,000 crore (about $2.85 billion), but recently reduced its estimate to Rs 5,340 crore (approximately $1.2 billion) (Telecommunications Regulatory Authority of India 2003).

ADC charges are imposed only on some calls. Table 1 shows the original system of ADC charges, and Table 2 shows the charges that were adopted in 2005. The differences between the two systems are that the old system, but not the new, imposed higher charges on long-distance calls over 50 km between calling areas (circles) and that the new system has lower
charges for international calling, but introduces higher prices for incoming calls. No ADC charges are imposed on local calls or long-distance calls under 50 km that originate and terminate in fixed access networks. Likewise, no charge is imposed on these calls if they originate and terminate on wireless networks. All calls between fixed and wireless networks now pay Rs .3 per minute (about .7 of a cent US), whereas before 2005 they could pay as much as Rs .8 (about 1.8 cents). The incoming foreign charge has been cut from Rs 4.25 (about 9 cents) to Rs 3.25 (about 7 cents), with a further cut to Rs 2.5 (5.5 cents) for outgoing calls. The net impact of the ADC system is that private entrants, Indians who make international calls, and foreigners subsidize the state-owned incumbent.

The ADC fee structure is highly inefficient for two reasons. First, the price-elasticity of demand is much greater for usage than for access. Hence, taxing usage to finance access substantially distorts the former to obtain very little gain in the latter. The significance of this distortion is growing as the usage of the telecommunications network for wireless data services grows. Access to data service providers is usually over fixed lines, and third generation mobile telephones make extensive use of wireless data services. Thus, the ADC charge taxes a service of growing importance to consumers.

Second, the application of the tax to only some calls creates another distortion. An individual user that calls mostly people on one type of network has a financial incentive to acquire access service using the same technology as the parties being called. This incentive is not trivial: users who place five three-minute local calls per day can save Rs 135 per month (about $3) by using the same technology for access as the people they are most likely to call.

Eliminating the difference in prices according distance and whether the calls were between circles eliminated a third distortion. A call over a distance of 225 km between adjacent
states was taxed nearly three times as much as a call of the same distance within a state. Again, the difference was not trivial – Rs .5 (about one cent) per minute. This particular form of price discrimination had no plausible basis in efficiency, vertical equity (by income), or horizontal equity (within income groups), and the government made the correct decision to eliminate it.

The distribution of payments from the ADC charges also varies according to the type of call. For local calls between fixed and mobile networks, the fixed network gets the fee regardless of whether it originates or terminates the calls. For long-distance charges between fixed line carriers or other long-distance calls originating in a fixed line carrier, “bill and keep” applies – that is, the originating network keeps all of the revenue. For intra-circle calls (whether local or long distance) from mobile to fixed networks, the former pays the latter directly, but for inter-circle calls the long-distance carrier collects the tax and pays it to the terminating carrier. For international calls originating or terminating in a mobile carrier, the ADC charge goes to BSNL, the state-owned company that is the only wire-line access provider in most of India.

The magnitude of the ADC fee is the same for all fixed carriers, regardless of their actual cost of service. Thus, carriers for which usage is especially high receive a greater total subsidy than carriers for which usage is low. Local telephone networks typically have declining average costs per call as the number of calls increase, but the reimbursement formula gives greater subsidies to system with more calls per subscriber – and hence less of a need for a subsidy. Moreover, like most goods, telephone usage has a positive income elasticity of demand; hence, the reimbursement scheme provides a greater cross-subsidy from usage to access service in richer parts of India. Because rural areas generally have lower average incomes but higher costs per user, the magnitude of the subsidy is likely to be inversely proportional to a community’s ability to pay for service. In short, the highest per capita subsidies will flow primarily to fixed
carriers in the highest income urban areas. Fixed carriers in low-income rural areas with no mobile service will receive the smallest subsidy. Even within BSNL, which receives most of the ADC payments, the incentive created by this system is to extend access service in rich urban areas before service is provided to low-income and rural areas.

The mobile companies have complained vociferously about the ADCs. The Cellular Operators’ Association of India (COAI) noted that the case for subsidizing BSNL in this way is weak considering BSNL’s profitability and the fact that “there is no legal, structural or financial accounting separation for BSNL's various product lines,” making it impossible to know which of BSNL’s activities are provided below-cost (Ramachandran 2003). In effect, the ADC amounts to little more than a government mandate that private firms subsidize the incumbent state-owned enterprise.

International long distance carriers, notably the dominant firm VSNL, also object to the ADC. VSNL argues that the ADC charge has encouraged a grey market in international calls that are able to avoid the ADC (The Financial Express 2004). The presence of ways for some users to evade the charge raises more fundamental issues than simply the adverse economic impact on VSNL. First, the fact that the ADC charge applies to only some international service providers creates a wedge in prices and gives rise to the possibility that a more costly provider will capture customers from more efficient firms. The ADC fee of over 7 cents per minute is a significant fraction of the marginal cost of international calls and so drives a huge cost gap between the carriers that must pay the fees and those that do not.8 Second, if the ADC charge is set to recover the total net loss from basic service, bypass of this sort will cause the ADC charge to increase for users who do not have access to the bypass alternative. Thus, the gap in prices

8 Even between the US and India, many calling cards offer prices below $0.10 per minute from the USA to India (http://www.nobelcom.com/nobelcom/jsp/productselection/productselection.jsp?from_country=1&to_country=130), which is especially noteworthy given that the ADC alone is about $0.9 per minute.
created by the charge will widen, causing ever-widening distortions in patterns of use among services and providers.

TRAI had intended to impose ADC charges for five years, and has recently reduced the fee so that it now represents about 10 percent of the sector’s revenue rather than 30 percent when it was first introduced (Telecommunications Regulatory Authority of India 2004). Because of the rapid growth in telecommunications infrastructure now under way and because much of the investment in the telecommunications network is so durable, a five year period will have an enduring effect on the structure and efficiency to telecommunications in India. Thus, a subsidy system that encourages inefficiency and entrenches the state-owned monopoly provider can create lasting costs; the methods for subsidizing basic service should be re-examined to minimize these costs.

Other Promises and Pitfalls in Achieving Universal Service

While not explicitly part of India’s universal service plans, competition in mobile telecommunications arguably has done more to bring service to the poor than any policy to date. With the successful introduction of competition, mobile service has expanded dramatically (Figures 4 through 8). As the figures show, the number of mobile telephones substantially exceeds the number of fixed lines. While wealthy urban people are the first to adopt mobile telecommunications, the rapid growth in the share of the population with mobile phones reflects new access to telecommunications by people who were too poor or without the necessary political connections to get a telephone in the old state-owned monopoly regime.

Mobile telephony is predominantly available in urban areas, but is rapidly expanding into rural areas as well. TRAI (2004) predicts that by 2006 more than half of all rural villages, representing 70 percent of the rural population, will have mobile service. This rapid expansion
of mobile service into rural areas without subsidies suggests that the current universal service plan may be misdirected. Indeed, India’s policies to promote rural access may actually inhibit universal service. The ADC charges fall heavily on mobile users, including the poor. In other words, to the extent that the poor use mobile telephones, they subsidize the incumbent’s fixed line network, which serves mainly the middle class and businesses.

Subsidies and tariff regulations also discourage private investment. If a favored firm is subsidized for providing service in an area, other firms will be less likely to invest there. That is, a subsidized firm has artificially lower costs, making it more difficult for any other firm to compete. In addition, Singh (2005) notes that rural tariffs are lower than in other areas. Artificially low tariffs discourage investments and competition in high-cost areas by making it even more difficult for an investor to compete with an inefficient incumbent.

Conclusion

While slow starts with reform in the 1990s leave India still lagging other developing countries, like China, telecommunications has largely become a huge success story in India. After years of quite nominal growth and extremely poor service, competition has emerged largely from wireless providers, resulting in explosive growth in the availability of telecommunications services. Like nearly every country in the world, India’s telecom reforms have included policies intended to provide universal service to telecommunications services for all citizens.

India’s universal service policies have focused primarily on rural areas and are funded through two primary mechanisms: a universal service levy and an access deficit charge. The universal service levy is a fee charged to all telecommunications providers, and the funds raised
are distributed through an auction process. Unfortunately, the auction design has discouraged competition and the incumbent state-owned provider, BSNL, has been the main recipient of these funds. The access deficit charge is a complex set of usage charges paid from entrants to the incumbent to compensate it, in theory, for its historical provision of service in high-cost areas.

India’s universal service policies may unfortunately have the unintended consequences of deterring investment in precisely the areas it hopes to target. The subsidies discourage competition, and the most efficient operators are taxed to support the least efficient operator. Fortunately, most of the telecommunications market in India is so competitive that growth may not be hampered by these inefficient policies. Nonetheless, because telecommunications is such an important industry, it is crucial to minimize inefficiencies. India’s best approach for achieving universal service is to ensure that its policies promote competition and do not favor any single firm over another.
Figure 1: Fixed and Mobile Phones in India
Figure 2: Telephone Penetration in Low and Middle Income Nations

Source: Clarke and Wallsten (2002). Data from MEASURE DHS+ Demographic and Health Surveys.

Note: AFR is Sub-Saharan Africa; LAC is Latin America and Caribbean; ECA is Europe and Central Asia. Low are low-income countries; Middle are middle-income countries. Regional averages are computed as simple averages (i.e., no weighting). Classifications of urban and rural households are based upon original classifications in the DHS+ datasets. Coverage implies that the household has a connection to that service in their house (or yard for water). Data is for all countries in these regions for which data were available for various years between 1994 and 2000.
Figure 3: Share of Indian Households that Own a Telephone, 1999

This figure illustrates the share of households in urban and rural areas across different Indian states for the year 1999. The bars represent the percentage of households owning a telephone, with separate bars for rural and urban areas. The states are listed vertically, with the urban areas' bars in blue and the rural areas' bars in red.

The states shown include Whole Country, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Goa, Gujarat, Haryana, Himachal Pradesh, Jammu, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, New Delhi, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh, and West Bengal.

The graph provides a visual comparison of the telephone ownership rates between rural and urban areas across these states, highlighting regional differences in telephone adoption.
Figure 4: Number of Subscribers by Cellular Phone Company in India, 1997-2005
Figure 5: Number of Subscribers by Cellular Phone Company in All Metro Areas
Figure 6: Number of Subscribers by Cellular Phone Company in Circle A

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Figure 7: Number of Subscribers by Cellular Phone Company in Circle B
Figure 8: Number of Subscribers by Cellular Phone Company in Circle C
### Table 1
Access Deficit Charges
Until January 2005

<table>
<thead>
<tr>
<th>Access Deficit Charges in Rs per minute</th>
<th>Local</th>
<th>Intra circle calls</th>
<th>Inter Circle calls</th>
<th>ILD</th>
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<td>Local</td>
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</tr>
<tr>
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<tr>
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Source: TRAI (2003)

### Table 2
Access Deficit Charges
After January 2005

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<th>Access Deficit Charges in Rs. Per minute</th>
<th>Local Calls</th>
<th>Intra-Circle Calls</th>
<th>Inter-Circle calls</th>
<th>ILD Calls</th>
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<td>&gt;50 kms</td>
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<td>Fixed-WLL(M)</td>
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<tr>
<td>Fixed-Cellular</td>
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<tr>
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<td>Cellular-Cellular</td>
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<td>0.00</td>
<td>0.00</td>
<td>0.30</td>
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</tbody>
</table>

Source: TRAI (2005)
References


