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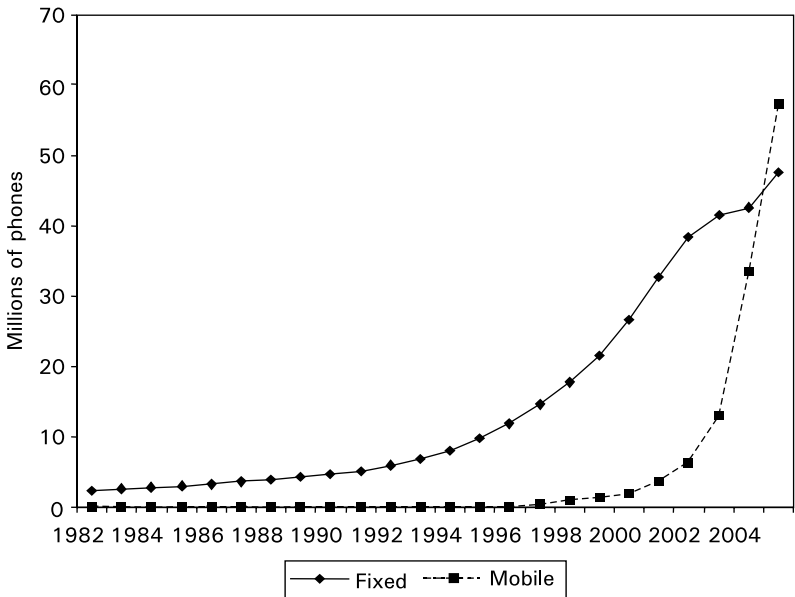
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Universal Telecommunications Service in India

Telecommunications reform in India began in the 1980s, but a struggle to find reforms that would substantially improve industry performance lasted for more than a decade. 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 rely primarily on subsidizing the incumbent state-owned carrier, despite its unimpressive historical performance.

An innovative part of India's universal service policy is a series of auctions in which providers bid the subsidy they seek for building village public telephone networks (VPTs) and rural household phones. In the first auction, the only bidder and hence the recipient of the subsidy was Bharat Sanchar Nigam Limited (BSNL), the incumbent state-owned carrier for nearly all of India. Subsequent auctions drew some private sector participation and helped reduce the subsidy that was provided. Nonetheless, the auction process has generally favored BSNL and is probably not the most 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.

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

FIGURE 1. Fixed and Mobile Phones in India

Source: Telecom Regulatory Authority of India. "The Indian Telecom Services Performance Indicators." Various years.

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 sections provide a brief introduction to Indian telecommunications and analyze universal service explicitly. The final section draws conclusions.

A Brief History of Indian Telecommunications Reform

Since 2000 the telecommunications sector in India has improved dramatically.¹ In 1982–85, before structural reform began, the annual growth rate of telephone penetration was about 7 percent. In 1986 telecommunications services were separated from postal services and divided into three

1. This section is based on Noll and Wallsten (2005). For a thorough and fascinating analysis of the history of Indian telecommunications, see Desai (2004).

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 Limited (VSNL) was created as a government-owned corporation to operate international telephone service. This reorganization increased the growth in telephone lines to slightly less than 10 percent a 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 private operators began to enter only at the end of 1995. During this period the state-owned enterprises (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 3 percent of lines, and mobile telephony accounted for about 10 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 private carriers accounted for most of the growth in wireless telephony. 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 more than 50 million.² 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 3 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

2. TRAI (2004; 2005b).

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 million 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 with 15 percent of all lines in March 2002. In June 2005 wireless telephony accounted for 63.5 million telephones, or 61 percent of telephone penetration, compared with 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.⁴ 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 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.⁵ If society

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.

4. Cremer and others (1998a; 1998b).

5. 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).

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.

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 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.⁶ 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 undersubscription and a need for subsidies. Third, all

6. See Cremer and others (1998 a,b) for a more complete discussion of this issue.

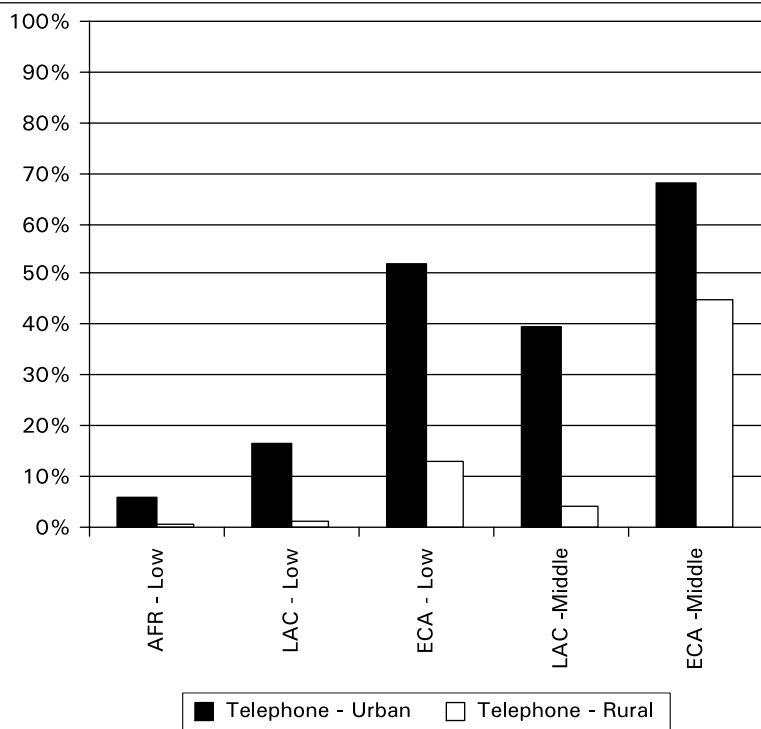
subscribers receive an external benefit from subscriptions by others, implying that each person should subsidize the service of the other. Consequently, on average the subsidy a subscriber receives to take service ought to be roughly equal to the amount of subsidy that subscriber should be willing to 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 (figure 2).

Economics research provides convincing empirical evidence that the case for extensive cross-subsidization in telecommunications is weak.⁷ Among the conclusions are the following:

- Cross-subsidization systems are inefficient because the amount transferred among services and households is much greater than the net subsidy to low-income consumers;
- 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;
- Low-income households, if given the choice, would generally prefer cash to a subsidy for telephone service; and
- In developing countries, almost no low-income households subscribe to access service while many make calls from pay telephones or call centers, so 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 twentieth century universal service policy arose from the desire by the Bell Telephone Company, which constructed the first telephone network in many nations

FIGURE 2. Telephone Penetration in Low- and Middle-Income Nations^a

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

a. AFR is Sub-Saharan Africa; LAC is Latin America and Caribbean; ECA is Europe and Central Asia. Low is low-income countries; Middle is middle-income countries. Regional averages are computed as simple averages (no weighting). Classifications of urban and rural households are based on original classifications in the DHS+ datasets. Coverage implies that the household has a connection to that service in its house. Data are for all countries in these regions for which data were available for various years between 1994 and 2000.

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.⁸ 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

7. See, for example, Clarke and Wallsten 2002; Crandall and Waverman 2000; and Rosston and Wimmer 2000.

8. Mueller (1997).

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 twentieth century.⁹ 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 in 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.¹⁰ 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.

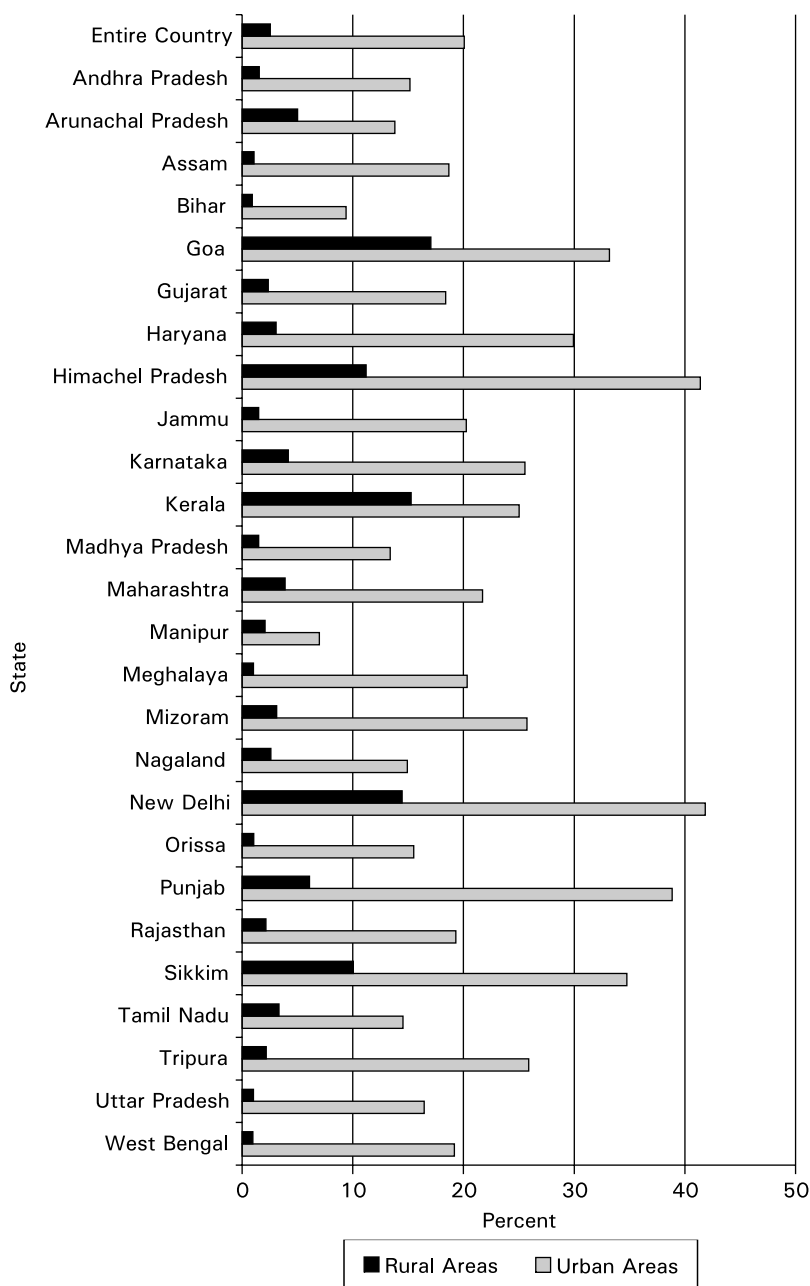
To achieve this goal, pricing policies seek to subsidize basic local access service (and increasingly data services as well) for customers in high-cost (typically rural) areas and for urban residential customers. In some cases, subsidies are targeted at residential customers with low incomes, but most 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 the Department of Telecommunications' (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, and in 1998 only 2.6 percent of rural households had telephone service (figure 3).¹¹ And, as Das and Srinivasan note, those numbers exaggerate the true state of telecommunications in rural areas because village surveys "revealed that more than 60 percent of ... VPTs were faulty. Of the remaining, a high percentage were disconnected due to non-payment of dues, so

9. Noll (2000).

10. Estache, Foster, and Wodon (2001).

11. Jain and Das (2001).

FIGURE 3. Share of Indian Households That Own a Telephone, 1999

Source: Derived from MEASURE DHS+ Demographic and Health Surveys, Survey of India, 1998–1999.

that in effect, very few are in actual use.”¹² Clearly, before 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 true 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, and especially in developing countries telephone penetration is lower in rural areas than in urban areas (see 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 telephone 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.¹³ 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.¹⁴

12. Das and Srinivasan (1999, p.673).

13. TRAI (2002).

14. According to Department of Telecommunications (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.”

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
- Achieve telephone on demand in urban and rural areas by 2002¹⁵

In addition, policymakers hoped to increase rural teledensity from 0.4 telephones per hundred people in 2000 to 4 by 2010.¹⁶ The NTP states that universal service objectives will be funded through a universal service levy. When the 2002 goals were not met, the Department of Telecommunications (DoT) issued clarifying guidelines on how universal service activities should proceed.¹⁷ 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, is a tax of 5 percent of adjusted gross revenues on all telecommunications providers except “pure value added service providers” such as Internet Service Providers (ISPs). These universal service funds (USF) 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) to compensate it for providing below-cost service in rural areas. While collecting the universal service levy 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 across different types of service and different service segments, separate auctions determine

15. Government of India (1999).

16. TRAI (2000).

17. Department of Telecommunications (2002).

the actual reimbursement to be awarded for each.¹⁸ Previously, in awarding licenses for cellular telephone service, DoT had divided the country into twenty telecom “circles” (which loosely follow state boundaries). These circles were used as the basis for geographic reference in 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 Telecom Regulatory Authority of India (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 set benchmark, is eligible to be reimbursed that amount from the fund. Benchmarks were set using information primarily from the incumbent, BSNL. Any firm with a license to provide basic or cellular service in the relevant service area was eligible to bid.¹⁹ The winner received 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.²⁰ In Chile, the average winning subsidy from 1995 to 1999 was about half the maximum benchmark, while in Peru the subsidy was only about one-quarter of the benchmark.²¹ 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 first two Indian subsidy auctions, relating to Primary VPTs and the replacement of Multi Access Radio Relay-based VPTs, yielded a different result. In nineteen of the twenty circles only one firm bid for the subsidies,

18. According to commentators at the National Council for Applied Economic Research, six auctions have taken place, covering the following six services and service segments: Operation and Maintenance of Village Public Telephones in certain villages (Finalized January 2003); Replacement of Multi Access Radio Relay-based VPTs installed before January 4, 2002 and technology upgrading of existing VPTs (finalized September 2003); Provision of additional rural community phones in larger villages with at least one VPT (finalized September 2004); Provision of VPTs in villages that remained uncovered (finalized October 2004); Installation of High Speed Public Telecom Information Centers (HPTICs) (not finalized as of this writing); and provision of household telephones in rural and remote areas identified for subsidy support (finalized March 2005).

19. Department of Telecommunications (2002).

20. Cannock (2001).

21. Intven and Tetrault (2000).

the incumbent BSNL.²² Not surprisingly, given the thin market, BSNL bid exactly the benchmark amount, which was the maximum subsidy DoT was prepared to provide. Additional firms bid in the following three auctions, yielding a more positive outcome. While the incumbent won one of those three auctions and parts of the other two, private providers did win parts of two auctions, and in two of the three auctions winning bids were substantially lower than the benchmark.

The failure of the first two auctions 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 primarily by BSNL. While there were rigorous independent attempts to verify the information, BSNL's accounts are aggregated in a way that makes it impossible to separate costs for different operations, which in turn makes incremental cost calculations extremely difficult.²³

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 determine not only 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 had not served many villages, owned some facilities in these areas; however, few other firms had 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 remained unresolved. The fact that the first two auctions covered VPTs already provided almost entirely by the incumbent operator thus gave a distinct advantage to the incumbent and limited the ability of private operators to compete. 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.²⁴ By precluding firms that were not

22. Ghosh (2004).

23. See, for example, Ramachandran (2003).

24. Intelcon Research and Consultancy Ltd. (2002).

already present, the subsidy scheme did not 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 nonsubsidized firms to enter the market.

By 2005 the USF had disbursed Rs. 17 billion (about \$375 million).²⁵ About 520,000 VPTs had been installed, nearly all by BSNL.²⁶ In 2005–2006, an additional Rs. 12 billion (about \$250 million) was to be distributed from universal service funds with the hope of serving the remaining 66,000 villages by 2009.²⁷ 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 yet 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.²⁸

The subsidy scheme for encouraging investment in VPTs is only the first part of a two-part policy. An auction for subsidies for rural household phones was concluded in 2004 as a first step toward distributing funds for connecting individual households. This 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 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. Indeed, this auction generated relatively substantial interest among private operators, and the winning

25. US \$1 = Rs 45 or Rs 1 = US \$.022 cents in October 2005.

26. Chidambaram (2005).

27. Chidambaram (2005); Press Information Bureau (2005).

28. As of the time of this writing, a mid-term review of the outcomes of the first two auctions was in progress and not yet available.

subsidy bid was about 40 percent lower than the benchmark. BSNL won subsidies for 1,267 Short Distance Charging Areas (SDCAs, the basic service unit identified for subsidies), while two private operators won subsidies for 418 SDCAs.²⁹ While the auction was a relative success, policymakers should be careful to ensure that the subsidies do not perpetuate an inefficient rural telephone monopoly.

Access Deficit Charges

Access deficit charges 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 price ceilings on basic monthly access service charges, set by the Telecommunications Regulatory authority of India (TRAI), 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.”³⁰

The magnitude of the funds transferred through the ADC is not trivial. TRAI originally estimated the annual “access deficit” at Rs. 130 billion (about \$2.85 billion), but recently cut its estimate by more than half to Rs. 53.4 billion (approximately \$1.2 billion).³¹

ADC charges are imposed only on some calls. The top panel of table 1 shows the original system of ADC charges, and the bottom panel 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 fifty kilometers 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 fifty kilometers 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. 0.3 per minute (about 0.7 of a U.S. cent), whereas before 2005 they could pay as much as Rs. 0.8 (about 1.8 cents).

29. According to comments received from NCAER, December 2005.

30. Intelcon Research and Consultancy (2004).

31. TRAI (2003).

TABLE 1. Access Deficit Charges

Rupees per minute

Access deficit charges	Local calls	Intracircle calls		Intercircle calls			ILD ^a
		0–50 kms	> 50 kms	0–50 kms	50–200 kms	> 200 kms	ILD
Before January 2005							
Fixed—Fixed	0	0	0.3	0.3	0.5	0.8	
Fixed—WLL(M) ^a	0.3	0.3	0.3	0.3	0.5	0.8	
Fixed—Cellular	0.3	0.3	0.3	0.3	0.5	0.8	4.25
WLL(M)—Fixed	0.3	0.3	0.3	0.3	0.5	0.8	
WLL(M)—WLL(M)	0	0	0	0.3	0.5	0.8	
WLL(M)—Cellular	0	0	0	0.3	0.5	0.8	4.25
Cellular—Fixed	0.3	0.3	0.3	0.3	0.5	0.8	
Cellular—WLL(M)	0	0	0	0.3	0.5	0.8	
Cellular—Cellular	0	0	0	0.3	0.5	0.8	4.25

Rupees per minute

Access deficit charges in Rs. per minute	Local calls	Intra-circle calls		Inter-circle calls	ILD calls ^a	
		0–50 kms	> 50 kms	All distances	Outgoing	Incoming
After January 2005						
Fixed—Fixed	0.00	0.00	0.30	0.30		
Fixed—WLL(M)	0.30	0.30	0.30	0.30		
Fixed—Cellular	0.30	0.30	0.30	0.30	2.50	3.25
WLL(M)—Fixed	0.30	0.30	0.30	0.30		
WLL(M)—WLL(M)	0.00	0.00	0.00	0.30		
WLL(M)—Cellular	0.00	0.00	0.00	0.30	2.50	3.25
Cellular—Fixed	0.30	0.30	0.30	0.30		
Cellular—WLL(M)	0.00	0.00	0.00	0.30		
Cellular—Cellular	0.00	0.00	0.00	0.30	2.50	3.25

Source: TRAI (2003; 2005b).

a. ILD means international long-distance; WLL(M) means literally, Wireless Local Loop (Mobile). This refers to a type of wireless service that was originally intended for only limited mobility.

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 who 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 a 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 to distance and whether the calls were between circles eliminated a third distortion. A call over a distance of 225 kilometers 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. 0.5 (about 1 cent) a 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 intracircle calls (whether local or long-distance) from mobile to fixed networks, the former pays the latter directly, but for intercircle 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.³² 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 has encouraged a grey market in international calls that are able to avoid the ADC.³³ 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 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 more than 7 cents a 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.³⁴ 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 created by the charge will widen, causing ever-widening distortions in patterns of use among services and providers.

TRAI had intended to impose ADC fees for five years and has recently reduced the fee so that it now represents about 10 percent of the sector's

32. Ramachandran (2003).

33. "ILD Operators Want Access deficit Charge Scrapped," *The Financial Express*, May 7, 2004.

34. Even between the U.S. and India, many calling cards offer prices below 10 cents a minute from the United States to India, which is especially noteworthy given that the ADC alone is about 9 cents a minute (http://www.nobelcom.com/nobelcom/jsp/productselection/productselection.jsp?from_country=1&to_country=130).

revenue rather than 30 percent when it was first introduced.³⁵ Because of the rapid growth in telecommunications infrastructure now under way and because much of the investment in the network is so durable, a five-year period will have an enduring effect on the structure and efficiency of 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 reexamined 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. As figure 1 demonstrated, 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 predicts that by 2006 more than half of all rural villages, representing 70 percent of the rural population, will have mobile service.³⁶ 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 fees 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 notes that rural tariffs are lower than in other areas.³⁷ 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.

35. TRAI (2004).

36. TRAI (2004).

37. Singh (2005).

Conclusion

While slow starts with reform in the 1990s leave India still lagging behind 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 access 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. The auction design initially discouraged competition, and the incumbent state-owned provider, BSNL, has been the main recipient of these funds, though subsequent auctions had more robust participation, reducing the subsidies. 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.

Comment and General Discussion

Harsha V. Singh: The article by Noll and Wallsten focuses on Universal Telecommunication Service, which is also referred to as Universal Service Obligation (USO) in common parlance. The paper's main conclusions are:

- Like nearly every country in the world, India's telecom reforms have included policies on universal access for all citizens.
- India's USO policies have focused primarily on rural areas.
- They are funded through two primary mechanisms: a universal service levy and access deficit charges.
- The auction design initially discouraged competition and the incumbent state provider, BSNL has been the main recipient of the funds.
- Access deficit charges are a complex set of usage charges paid from entrants to the incumbent to compensate, in theory, for its historical provision of services in high cost areas.
- India's USO policies may have unintended consequences of deterring investment in precisely those areas that it wishes to target.
- With subsidies, most efficient operators are taxed to support the least efficient operator.
- India's best approach to ensure achieving universal service is to ensure that its policies promote competition and do not favor any single firm over another.

The paper is a good attempt to understand and analyze the universal telecommunications service operations in India, but it remains subject to a number of shortcomings. I focus on these shortcomings in my comments, but that should not be seen as reducing in any way the positive contribution of the paper.

The shortcomings in the paper can be described, in parts, as

- being inaccurate or incomplete
- being out of date

The views are strictly those of the author and should not be ascribed to any other person, organization or institution.

- overlooking the fact that the policy may have been implemented in a particular manner for reasons that may have been specifically mentioned or discussed by the Telecom Regulatory Authority of India
- not fully accounting for the changes that have taken place with respect to both USO and the access deficit charge policy.

ADC Policy

The authors are correct in characterizing USO policy in India as being mainly, though not exclusively, focused on the rural sector. They are, however, not entirely correct when they identify two separate initiatives, the USO Fund and the ADC payments, as funding the USO. The USO program is not funded by the ADC program. The focus of the ADC regime is to help the fixed-line operators to phase in their adjustment during a period when they are not in a position to carry out requisite tariff rebalancing and face a sharp decline in long-distance tariffs and competition from services such as mobile, which have tariffs with surplus for monthly rental and shorter-distance call tariffs (that is, their tariffs are more rebalanced). This aspect can be seen, for example, in paragraph 2 of TRAI's Interconnect Usage Charge (IUC) Regulation of October 2003, which states, among other things, that:

Prior to the opening up of the telecom sector, the loss due to access deficit for basic service operators [BSOs] was being taken care of through a cross-subsidy from profits to BSOs from a share of the domestic and international long distance tariffs. With competition in the domestic and international long distance segments as well as among the fixed line/WLL(M) [wireless in local loop with limited mobility] and cellular mobile, leading to a sharp decline in the prevailing tariffs, the extent of cross subsidy has decreased in a major way. The competition in long distance markets continues and this will mean that the tariffs are likely to decline further. In such a scenario, since the access deficit for fixed line arises due to tariffs being specified for social reasons, there is a case for providing the access deficit amounts to these service providers. In contrast to the fixed line service providers, the other access providers have tariff forbearance for call charges, and are allowed to charge higher average amounts for local calls than those charged by fixed line operators.

This thought is reiterated in paragraph 42 of the TRAI's IUC Regulation of January 6, 2005, which states, among other things, that:

ADC funds have been provided to fixed line service providers to cover the short-fall in revenues for access (i.e. the deficit), and in a situation of incomplete tariff re-balancing, sustain the service even with intense competition in the long distance market. The Authority recalled in this context that either due to the Regulator or the Government, an upper limit was imposed on the fixed line

rental charged by BSNL, and the other fixed line service providers were also constrained since BSNL has been the market leader in this regard. Consequently an access deficit arises because the revenues from rental charged are much below the cost based rental, with the latter being calculated based on the capital cost for the local call portion of the network (please see the Regulations of 24th January and 29th October, 2003 for more detail). A major portion, i.e. about three-fifths of the cost base for estimating the cost based rental is accounted for by the capital expenditure in the last mile portion of the network.

There is, of course, an overlap between the USO and the ADC regime in the sense that when the ADC amount is calculated, the extent of USO support already provided (which is part of the revenue of the operator) is deducted to estimate the ADC net base. As the USO amount keeps increasing, the net cost base for the ADC is reduced. Also, one of the criteria for distinguishing the main beneficiary of the ADC is rural coverage. However, it is not the only criterion for this purpose, nor is the focus of ADC policy the USO regime. This is shown, for example, by the fact that the ADC is provided also to fixed-line operators that have a virtually negligible presence in the rural areas.

Thus, the discussion on the ADC does not pertain to USO policy as such. However, it is given major importance in the paper and is subject to some of the shortcomings that are relevant to the paper, so I address it here.

The paper is not correct in stating that the amount of ADC is collected mainly from the private operators. It is collected from all operators, including the incumbent, BSNL. This is shown, for example, by table 6 in the TRAI's IUC Regulation of January 6, 2005 (reproduced here as table 2). A noteworthy feature of the group of other operators to which the last column of the table refers is that it includes BSNL mobile operations. Of course, the amount transferred from private operators—that is, other than from Bharat Sanchar Nigam LTD (BSNL) mobile and Mahanagar Telephone Nigam LTD (MTNL) mobile—to BSNL fixed is a net subsidy from the private sector operators to the public sector incumbent.¹ However, the relevant amounts are much lower than the total amounts of ADC mentioned in the paper. It is noteworthy that in February 2006 the TRAI further amended the ADC regime and reduced the overall amount of ADC funding by one-third, in comparison to the amount calculated for 2005.

Further, the paper mentions that the ADC regime should apply equally to all service providers. The TRAI did consider such a regime, which would be based, for example, on share of revenue, but was unable to implement

1. MTNL is a public sector telecom operator providing services to Mumbai and Delhi.

TABLE 2. ADC Collections

Rs crores

<i>IUC regime applicable</i>	<i>Total amount of ADC</i>	<i>Amount of ADC funding to BSNL</i>	<i>Amount of self-funding by BSNL fixed</i>	<i>Net amount of ADC to BSNL fixed funded by others</i>
As per 24 January 2003 regulation calculations	13,518	12,381	10,084	2,298
As per 29 October 2003 regulation calculations	5,340	4,792	2,264	2,528

such a regime because it conflicted with some of TRAI's other important objectives, such as keeping the local charges for fixed calls low, not increasing the monthly rentals (as the amount of rental increase for collecting the same revenue for ADC would be very large), and keeping the tariff burden on domestic calls low. Thus, even though the TRAI wanted to switch to a revenue share regime for ADC (thus treating all service providers in the same way), it could not do so in view of its other objectives. Some of these points are discussed by the TRAI, for example, in paragraphs 49 to 60 of the Explanatory Memorandum of TRAI's IUC Regulation of January 6, 2005. The discussion in the Explanatory Memorandum specifically addresses a number of criticisms in the paper. As the situation has changed and the other objectives could be met together with imposition of a percentage revenue share regime, the TRAI has implemented such a regime for ADC. In the most recent amendment in the regime, dated February 23, 2006, the TRAI has changed the per minute ADC charge to a revenue share percentage (with revenues not including rural revenues for fixed-line service). It has kept the per minute ADC charge for international calls, while reducing the amounts per minute.

Another criticism in the paper is that the ADC regime does not cover all the calls in a similar manner. This too was considered by the TRAI and was not put in place for a combination of reasons, including the aforesaid objectives and the feasibility of implementing such a regime. The Explanatory Memorandum to the TRAI's regulations provides an indication of, and the reasoning for, the policy choices adopted by the regulator after weighing various objectives and taking into account the possibility of technically implementing various policy options.

Thus, in my view, an important weakness of the paper is that it has not adequately considered the issue of feasibility of implementation of policies. This is also valid, for instance, with regard to the criticism that the TRAI

stipulated the same charges for ADC without taking into account the difference in costs among operators. This point completely overlooks the problems that one faces with implementing a regime within the technical constraints prevailing in India. Problems relating to implementation are discussed by the TRAI in its regulations as well as the consultation paper.

Likewise, the paper raises the issue of grey area traffic arising from the ADC regime as if it is an issue that has not been addressed or discussed by the TRAI. The effect of the regime on grey traffic has been addressed by the TRAI in several contexts, including for example, in paragraphs 61 to 69 of the Explanatory Memorandum of the January 26, 2005, IUC regulation. There, the TRAI recognizes the choice that it has to make between two conflicting objectives (one of them being addressing grey markets), the choice that it does make, and the reasons for doing so. It would have been appropriate for the authors to examine and discuss these aspects rather than just note that the regime gives rise to grey traffic and its associated problems.

In the context of grey traffic too, the evolving market situation has allowed the TRAI to achieve more of its composite objectives. For example, in its revision of the ADC regime in 2006, the TRAI has reduced the difference arising due to the ADC from 7 cents to 1.8 cents for outgoing calls and to 3.5 cents for incoming calls. This is to be seen together with the supplementary monitoring regime in place, within a mechanism involving the ministry, the vigilance agencies, and service providers (TRAI discusses this in its January 6, 2005, regulation). However, even with the changes there is still a significant arbitrage margin, but with the rapid growth that is taking place, it is likely that this part of the ADC regime too may be converted to a revenue share next year, before the whole ADC regime is phased out in 2008.

Another criticism is that the ADC charges are imposed on usage and not on the access price, and that such a policy does not favor the poor users because the price elasticity of usage is much higher than that for access. This argument overlooks several points, starting with the reason for instituting the ADC regime itself.² The ADC was put in place to help the fixed operators adjust in a situation where tariff rebalancing could not take place through policy or the market. In this situation, imposing a charge on access would be akin to undertaking tariff rebalancing, which was not possible in the first

2. There are a number of other points also, including the fact that in India one of the reasons for the increase in the subscriber base has been a reduction in the prepaid card amount, which is similar to an access price. This would suggest a very high elasticity for a reduction in access price and would also suggest that increasing access price does not benefit the poor. For another work arguing that raising access prices is not pro-poor, see Asian Development Bank and others (2006).

place. Second, any charge on access price would have to be relatively large charge, making it impossible to implement. In fact, one major constraint for the policymaker, after doing the tariff rebalancing that it implemented from 1999 to 2001, was the inability to make large changes in the price for monthly access and local calls. In fact, when the TRAI increased somewhat the local call price in 2003, the public sector operator, under pressure from the parliament and the government, continued to charge the previous low local call price in its general tariff package. Ignoring this fact would have meant relinquishing to some extent the objective of allowing a phasing in of adjustment for the fixed operator, especially for BSNL which had a countrywide network and was the backbone for the telecom services in the country (even now, mobile network covers only about 35 percent of the country's population; in contrast, BSNL covers virtually the entire population: it has about 37,000 exchanges in the country, of which about 30,000 are rural exchanges. All of these exchanges are linked to reliable media; 90 percent are linked to fiber).

One also needs to remember that the ADC regime is time bound and will expire in 2008 (in contrast, the USO policy will continue). Moreover, the regime involves a reduced amount of ADC each year, and as the implementation issues get tackled, the regime is changed to achieve the additional objectives that were not possible earlier.

A major point arising from the discussion on ADC in the paper is that the distortions introduced by the regime would lead to an adverse enduring effect on the structure and efficiency of telecommunications service in India. While the point regarding distortions is correct, the conclusion on the enduring adverse effects appears to be an exaggeration. Since 2003 (the year when the ADC regime was implemented), the additional subscriber base in India, mainly mobile, has been increasing at unprecedented rates, achieving each year more than what the country had achieved in the first fifty years of its independence (table 3). The monthly additional subscriber base in March 2006 was over 5 million. With such growth, the point regarding lasting adverse effect needs to be seriously reconsidered.

USO Policy

I will not address the details of the discussion on whether USO in telecom is a valid public policy objective. It is a policy followed by most countries that emphasize timely roll-out of telecom services in areas that are otherwise commercially unviable or unattractive, given the large investments required to meet the small demand reflected in the market. A case can be made that

TABLE 3. Number of Fixed and Mobile Telephones and Telephone Density

<i>Year ended March 31</i>	<i>Fixed</i>	<i>Mobile</i>	<i>Total number of phones per 100 population</i>
	<i>Million</i>		
1948	0.08	—	0.02
1951	0.10	—	0.03
1961	0.33	—	0.08
1971	0.98	—	0.18
1981	2.15	—	0.31
1991	5.07	—	0.60
1992	5.81	—	0.67
1993	6.80	—	0.77
1994	8.03	—	0.89
1995	9.80	—	1.07
1996	11.98	—	1.28
1997	14.54	0.34	1.56
1998	17.80	0.88	1.94
1999	21.59	1.20	2.33
2000	26.51	1.88	2.86
2001	32.44	3.58	3.53
2002	37.94	6.43	4.29
2003	40.62	12.69	5.11
2004	42.84	33.69	7.17
2005	45.90	52.21	9.08
2006	49.75	89.92	12.73

universal service is socially important, but as the policy is in place (as it is in most countries), and will remain, it is more important to discuss the policies used to achieve the USO objective.

The paper has correctly identified the limitation of the Indian auctioning scheme for USO, in the sense that the first round of bids is allowed only for those operators that have a license for the relevant service area. However, the paper overlooks an important point regarding implementation. Since there are existing licensees for the relevant license area, if they are not allowed a first option in the USO bid, there could be legal challenges from them and the process could be delayed.

Further, the USO policy has evolved over time, taking account of the operational difficulties and implementing changes to address them. Thus the effectiveness of these policies has increased with the changes implemented in the scheme.³ While this is acknowledged in the paper, the bulk of the analysis focuses on the initial phase when the existing fixed operators were

3. See for example, Singh (2005).

not fully functional and their networks still have relatively narrow coverage.

Likewise, the paper mentions that a mid-term review of the outcomes of the first two auctions is in progress, but criticizes the USO scheme for not having adequate information on the number of village public telephones in working order. While this criticism was once valid, the USO scheme now has a built-in review process that will produce such information (and has already begun doing so).

Further, the government has been considering extending the coverage of USO policy to certain rural infrastructure for mobile service (such as towers and cable for part of the network).⁴ That would further enhance the effectiveness of the USO assistance. Moreover, once a national-level license is put in place by the government, as suggested by the TRAI in its recommendations on unified licenses, the legal issue restricting the number of operators in each license area would be largely addressed as each license area would have significant competition from the most extensive service providers.

In addition, within a few years, the mobile telephony is likely to cover most of the rural population (it presently covers about 35 percent of the population), and the need for supporting the present form of USO policy would be substantially diminished. The TRAI has recognized this likelihood in a number of its public statements and in some of its papers.⁵ Thus, the policy thrust with respect to telephony under USO will shift toward greater reliance on the market, and the focus of the future USO policy in India is likely to emphasize Internet and broadband over-time.

Over time, there is quickly going to be greater reliance on the market and on mobile services, and thus the policy is following the lines suggested in the paper. However, the paper does not discuss the ongoing shift of the USO support policy toward Internet and broadband. In this regard, it is noteworthy that the public sector operator, BSNL, has linked about 30,000 rural exchanges with fiber and has installed about 500,000 route kilometers of fiber in the country under the New Telecom Policy 1999. This provides a very good basis for extending Internet and broadband to most parts of India.

Conclusion

The paper is a good attempt to assess the USO policy of India. It has a number of shortcomings, however, including the fact that it overlooks the nature

4. The ministry is in the process of moving a proposal for the cabinet to change the relevant Act of Parliament for this purpose.

5. See for example, TRAI (2004).

of policies that it mentions as being used in India to support USO, implementation constraints faced by the policymakers, attempts by the policymakers to balance different objectives (which include some of the objectives emphasized in the paper), the reasons given for the choice of specific policies, and ongoing policy developments that address to a greater extent the objectives which earlier could not be fully addressed due to implementation constraints. It is noteworthy, however, that the general direction of policies followed by the Indian government and the telecommunications regulator are akin to those emphasized by this paper. Because of this and the rapid growth in the sector, the concerns outlined in the paper are perhaps not as serious as the authors project.

General Discussion

Abhijit Banerjee commented that the theory under which everybody ought to have a telephone and, therefore, the maximization of the number of telephones was a social objective seemed completely bizarre and somewhat distant from the economic objective. He then went on to ask how the scheme for village public telephone worked. What was the incentive to maintain the telephone? The problem in some villages is that the village public telephone has not been repaired for many years. So, how do you build incentives for the telephone to be repaired, even if you offer a subsidy for it?

Harsha V. Singh responded that the latest USO scheme actually incorporated an implementation mechanism. If the telephone was out of service from seven to forty-seven days, the quarterly subsidy due to the provider was adjusted on a pro rata basis. If it was out of order for longer than forty-five days, the provider got no subsidy. Monitoring was done in various ways, including sample surveys and the examination of consistency in the billing data.

Another participant stated that if India wanted to use wireless service to increase teledensity in the rural areas, which is probably the way to go, it needed to price the spectrum appropriately. For many rural areas the spectrum should be given free, at least for some period of time, because at the moment the shadow price of the spectrum is zero. In response, Harsha Singh advised everyone to read the recommendations of the Telecom Regulatory Authority of India, where the thoughts expressed by the participant had been reflected.

Suman Bery addressed the issue of private versus public sector as the provider of the universal service in telecommunication. India has a situation

where a public-sector incumbent exists and is here to stay, where the incumbent is powerful compared with the regulator, where the incumbent has most of the existing data and can manipulate them. This offers an interesting case study. If one tries to put an auction scheme in place on the basis of the data from the existing provider, a whole range of both institutional and public finance issues arises. The public finance issue is, of course, what determines the merit good and should this be a merit good? Once this set of issues has been sorted out, one must think of a clever auctioning mechanism—with ways of revealing willingness to supply, willingness to demand, and clear ways of designing the contract—that gets around some of these information problems. Bery suggested that the participants who thought analytically about these issues could give the authors a sense of the direction in which the paper could be extended.

Esther Duflo commented that there was no clear economic case for subsidizing use of the phone service. Arvind Panagariya concurred with Duflo, arguing that at best one could make a case for a subsidy to cover the fixed cost of laying down the line and putting up the phone booth. Beyond that, assuming a constant per-unit cost of making a call including the maintenance cost, the user should be charged for the service. Another participant stated that the marginal cost argument is important as a form of test as to whether the demand is sufficient to cover the maintenance cost.

Another participant responded to some of the issues raised. It had been mentioned that the price of the spectrum in the rural areas should be zero or heavily discounted. The TRAI is considering ways to introduce the spectrum pricing incentive to increase rural coverage in areas where the existing tele-density is very low. The participant also said that some participants appeared to have confused interconnectivity with roaming. For example, he said, if you are carrying, say, an Airtel mobile phone and you are going to some rural areas with BSNL coverage, but your telephone does not work, that is not an interconnection issue. The issue is whether BSNL has a roaming agreement with Airtel. The roaming agreement is a commercial agreement between two operators.

In the case of a new operator, the regulator intervenes to have the incumbent grant him a roaming agreement for a limited period, say, two years, during which the entrant must roll out his own network. After the end of that period, roaming agreements must be made by mutual consent on purely commercial grounds. It must be remembered that the BSNL entered the mobile market seven years after the mobile operators had been in business. For seven years these mobile operators could not significantly expand their mobile coverage in the rural areas. Now seven years after the BSNL has

expanded the mobile coverage, it would be wrong to expect the regulator to force the BSNL to offer roaming agreements to other operators. The same problem has arisen in other countries such as Italy.

Pradeep Baijal of the TRAI said that he was an outsider to the telecom sector and looked at the USO issue dispassionately. He went on to provide the contrary perspective. He said he did not understand why we talked of a universal service obligation. A couple of years back we had 1 percent teledensity. Then we said, my goodness, we will have universal service obligation, which really meant that this 1 percent of the population would subsidize the remaining 99 percent in the waiting list, or the government will come in and look after them. That is our present policy. We are very bothered about the 99 percent. We say, let the 1 percent existing subscribers bear the burden of service for the rest.

Baijal noted that despite all the big statements, teledensity rose to barely 1.92 per 100 people from 1948 to 1998, a fifty-year postindependence period. After the government and TRAI made some regulatory changes in 2003, we added about 2 percent teledensity both in 2003–04 and 2004–05 and would add 3 percent in 2005–06. At the current rate of monthly growth, we should add 5 percent teledensity in 2006–07. Despite a high rate of taxation in India, intense competition in the sector, brought in by regulation, against the earlier cost plus regulation, tariffs are three-fourths of the lowest tariff anywhere else in the world, including China. Returning to the universal service obligation, Baijal said that 70 percent of the potential consumers are in the rural areas. They have access to extremely low tariff and as a result, there is a huge demand in the rural areas. It may be recalled that the urban mobile growth in India was catalyzed by the introduction of the new cellular technology and introduction of intense competition in the sector. It can be replicated in rural areas if mobile towers cover such areas. Last year the geographical coverage of our population was 20 percent. This year the geographical coverage has expanded to 30–35 percent. We are looking for the coverage to go to 70 to 80 percent because the demand is huge, but the dispersal of population presents a slightly suboptimal business case for operators. The policy should therefore aim at coverage of a large part of the population by mobile towers.

The second element of the policy should be to make the sharing of infrastructure mandatory if a subsidy is used to put in the towers. The incumbent has 30,000 exchanges with optical fiber through public subsidy, which it is not prepared to share. It has the support of international precedents. The incumbent has the right to interconnect to anywhere in the world but it says you cannot roam on my network.

Baijal said teledensity in rural areas could be expanded by bringing down the entry costs. Let anyone put in towers. We know the number of towers that should be there, he said. Give capital subsidy to anyone who would put up towers. That capital subsidy can come from the USO fund, which has high annual accruals and huge balances. The fund is statutorily meant for giving rural connectivity.

The session concluded with Wallsten making three points. First, the argument that India is mostly rural and that there is a huge gap between urban and rural penetration is not by itself an argument in favor of universal service. One needs more than that to defend universal service obligation and there is not a clear economic justification for it. The poor people in rural areas have more pressing needs than telecommunication services.

Wallsten's second point related to the issue of whether mobile telephony should be subsidized in rural areas. Subsidies available to some providers reduce the incentives of others to invest, since their competitors will be subsidized. Reduced incentives to invest can delay competition, which is the best method of improving telecommunications services.

Finally, spectrum is an important but complicated question. The answer is not automatic that it should be given free in rural areas. Auctions have been used successfully for spectrum and there is no reason why it cannot be auctioned in rural areas. But one of the problems of auction is that government must understand that its purpose is not to raise money for the treasury, but to allocate spectrum efficiently.

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