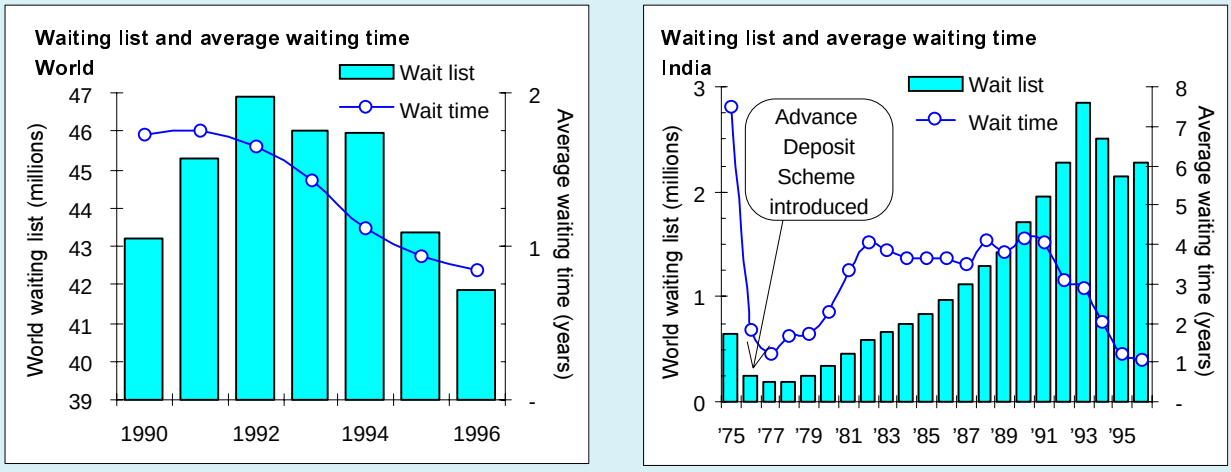
2. PRICING ACCESS

The history of telecommunications for most of its first 120 years or so has been about the battle to increase availability of service in an environment in which demand greatly exceeds supply. *Registered* demand for telephone service continues to exceed supply, although it is becoming plentiful in an increasing number of domestic markets. Globally, the number of people officially registered as waiting for a telephone line amounted to 42 million in 1996, down from a peak of 47 million in 1992 (Figure 2.1, left chart). As a result of the growth in the number of new lines added to the global network each year, average waiting time for connection has fallen from 21 months in 1991 to 10 months in 1996. In the 30 or more economies that have eradicated their waiting list, a telephone connection is available on demand.

But what is the *real* global level of demand for telephone service? For several reasons, the waiting list is at best an inaccurate proxy for the true level of unmet demand. First, many countries with low levels of access do not maintain a waiting list. Second, the willingness to sign up for telephone

Figure 2.1: Is this all the unmet demand?

Waiting list and average waiting time, worldwide, 1990-96, and in India, 1975-96



Note: Average waiting time is estimated by dividing the total waiting list at the end of a year by the number of new lines added during the year. Data for India refer to year ending 31 March.

Source: ITU World Telecommunication Indicators Database.

service is itself influenced by the likelihood of getting a telephone connection in the near future. If network development is progressing slowly, potential users will be discouraged and see little point in enrolling for a service that may take years to arrive. Third, and most importantly, the waiting list is strongly influenced by pricing. The waiting list in India, for instance, dropped by 60 per cent in 1975 following the introduction of an advance deposit scheme (Figure 2.1, right chart). Therefore the waiting list measures demand under the existing price structure but does not take into account latent or *unexpressed* demand: those who desire to have service but have not yet explicitly expressed this aspiration due to a variety of reasons.

When or, more correctly, if the imbalance between supply and registered demand is corrected, then another factor enters the equation: the *affordability* of service. The pricing of telecommunication services is the mechanism which provides the linkage between supply and demand, but it also sets the threshold level for being able to afford service. There is a trade-off between the desire to reduce the cost of telephone service (to the point that it becomes affordable for a broad segment of the population) and the need to generate funds for sustainable investment. That trade-off between affordability and sustainability, mediated through the pricing mechanism, is the main subject of this chapter. Section 2.1 looks at traditional pricing structures aimed at addressing social objectives, why they may not achieve their intended purpose, and how they are under pressure from liberalization of telecommunication markets. Section 2.2 shows how the concept of affordability can be measured and applied. Section 2.3 considers tariff strategies and the role of supply. Finally, Section 2.4 addresses pricing policies designed to increase the level of telephone access, for instance by targeting marginal users as well as those without access to a domestic telephone line.

2.1 Pricing structures for telephone service

2.1.1 Socially desirable pricing

How much is telephone service worth? There are two possible answers:

- The first relates to how much it costs to produce the service, at a particular level of quality and quantity, and how much it costs to bill and collect the necessary revenues.
- The second response starts from a different standpoint: that of society rather than the service provider. In this case, the social benefits of connecting as many subscribers as possible to the network outweigh the financial costs.[1]

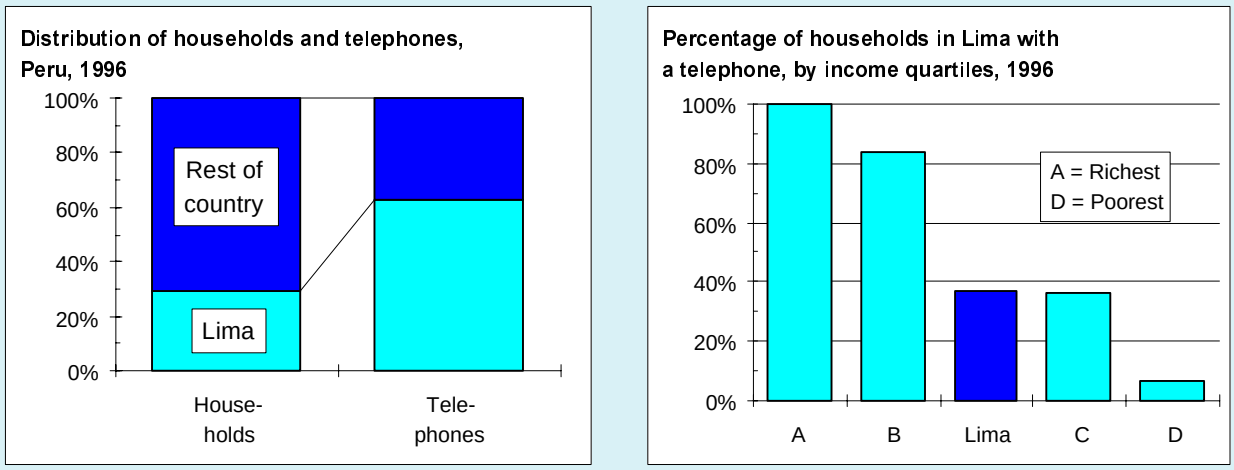
It is this second pricing philosophy—socially desirable rather than cost-oriented—which forms the basis for most traditional telephone pricing strategies. It is founded on the principle that, because telephone service is such an invaluable commodity, it should be offered to users at an affordable price. As one telecommunications minister puts it: "*We have deliberately kept the tariff low so as primarily to ensure that all persons get telephone facilities*."[2] Such a strategy dictates that the price of telephone connection would be low, usually unrelated to the cost of actually installing the line. Furthermore, the subscription price would be subsidized and the cost of making local calls would either be negligible or free. By contrast, long-distance and international calls, and business services, would be relatively expensive (see Table 2.1).[3]

One complication with this pricing philosophy is that the initial group of telephone users are usually not particularly poor. They represent the elite of society: government ministries, large businesses, hotels, embassies, and wealthy households (see Figure 2.2). They are relatively easy to serve because these types of user are often clustered in the commercial and political centres of large cities. With low tariffs, this group ends up paying much less than it could afford to. As a result "*most of the poorest households receive no subsidy at all because they have no access*."[4]

This group of users is precisely the one that should be priming the investment for further expansion of the network. The initial costs of establishing a telephone network are high (for instance, installing a central office exchange, building a satellite earth station, wiring the local loop, etc.). Thus the unit costs for providing service for this first group of users is also high. But with socially desirable pricing, there is often a failure to generate sufficient revenue to pay for these initial costs and to sustain further growth. Because installation is offered at a fraction of its true price, and because monthly subscription and local calls are offered at below cost, little or no cash is generated for fresh investment. The public operator may be forced into borrowing

Figure 2.2: Telephone service pioneers: rich and highly urbanized

Percentage of households with telephone service, by income level, Lima, Peru and distribution of population and main telephone lines in low income economies, 1996



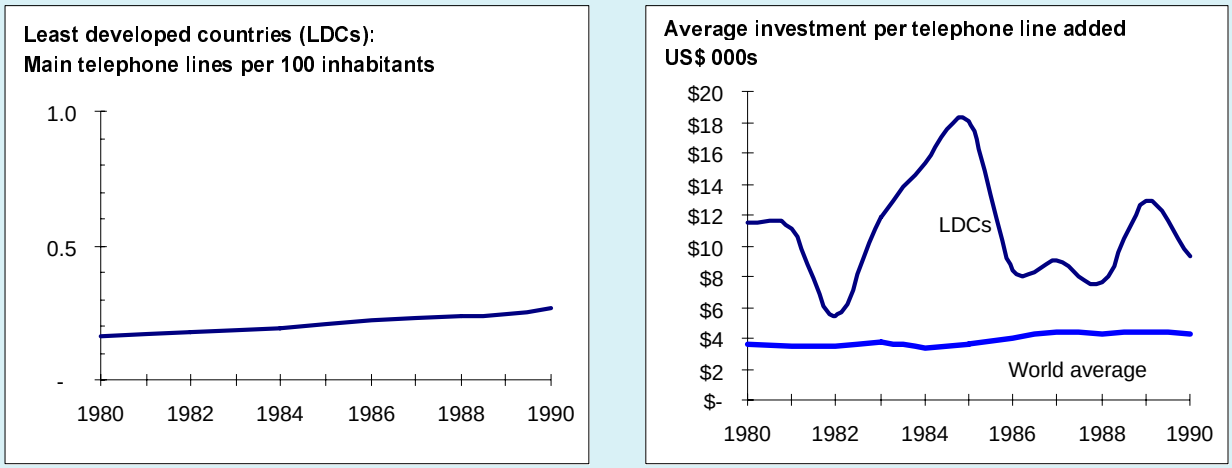
Note: Right chart excludes China and India.
Source: Organismo Supervisor de Inversion Privada en Telecomunicaciones (Peru) and ITU World Telecommunication Indicators Database.

money to cover the shortfall, further raising its cost structure because of the need to pay interest on loans.

The danger is that a country can slip into a trap from which it is difficult to break out: the first generation of users does not produce enough revenue to support new investment, or the government diverts the revenue which is raised to other causes, and so growth stagnates. As Figure 2.3 shows, low income countries have found themselves in this trap of low growth and high investment costs and most have still not emerged from it. Where there is little or no growth in a network, the average cost for installing each new line reaches levels at which revenues raised would never recoup the cost of repaying the initial investment.

Figure 2.3: The lost decade

Teledensity and investment per new line added (US$), Least Developed Countries (LDCs), in the 1980s



Note: The right chart is a rough measure derived by dividing total telecommunication capital expenditure by the number of main telephone lines added during the year. Therefore it does not reflect investment for lines that were replaced or other areas of network investment. Nonetheless, the majority of telecommunication investment in the LDCs goes towards expanding the fixed-link telephone network.
Source: ITU World Telecommunication Indicators Database.

2.1.2 Cost-oriented pricing

The principle of socially desirable pricing is commendable: charge consumers only as much as they are able to pay. But the danger is that the operator slips into a trap in which below-cost pricing for the few denies telephone access to the many. So, how can countries break out of this trap?

The traditional route has been to use high priced international calls to raise revenue per subscriber and cover the losses incurred by low residential tariffs. Many developing economies have a high dependence on revenues generated from international services. International calls accounted for 36 per cent of total revenue in developing countries in 1995 compared to 13 per cent in developed ones. In certain small states, islands, and tourist-dependent economies, this level of dependence is even higher (see Figure 2.4).

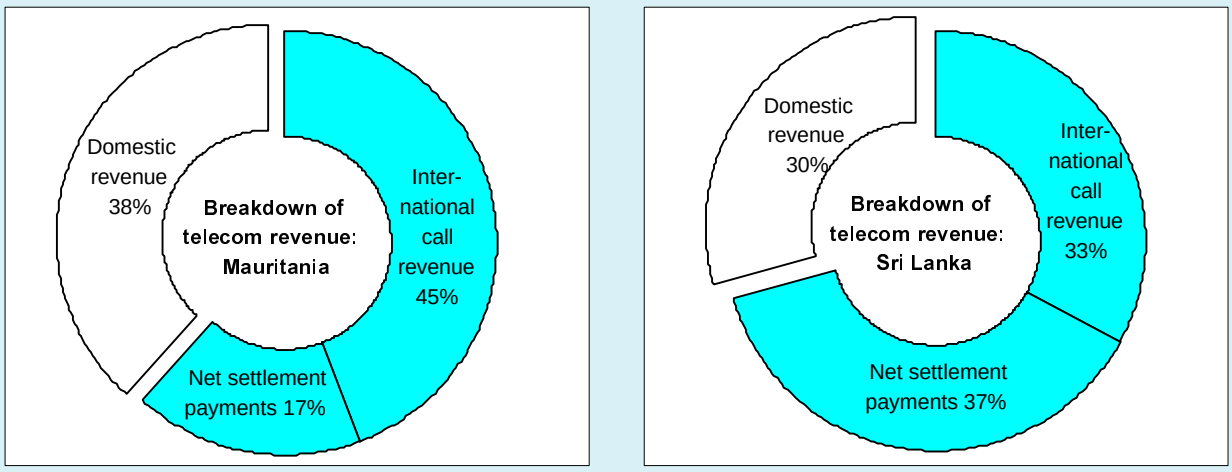
Until recently, dependence on international revenues had proved a winning strategy. International revenues for developing countries escalated through the early 1990s, largely as a result of traffic flow distortions introduced by the emergence of alternative calling procedures (such as calling card, country-direct and call-back services) which reverse the apparent direction of a call. Globally, some US$ 10 billion is transferred each year from developed countries to developing ones through the international accounting rate system.

However, there are growing strains on the current accounting rate system. As more and more countries have introduced competition into their telecommunication markets, pressure to reduce costs, including settlement rates, has grown. Other developments, such as international simple resale and Internet telephony, will result in a rising volume of traffic bypassing the traditional accounting rate system. A significant development is the recent US decision ordering its carriers to pay no more than a benchmark amount for settling international telephone traffic.[5] For developing countries, the implication is that telecommunication operators can no longer rely solely on high margin international calls to subsidize access and local call charges.

As a result, non-transparent methods for subsidizing residential tariffs are likely to be unsustainable in the increasingly competitive telecommunications environment. New competitors will generally try to enter those market segments where margins are highest, such as business services and long-distance and international calling. Incumbent operators will be under pressure to reduce subsidies. In consequence, where telecommunication markets are opened to competition, price structures will tend to gravitate towards costs. The trend that tariff rebalancing is taking is shown in Figure 2.5. While the cost of telephone service is coming down overall, rebalancing is likely to benefit users that make a higher number of long-distance and international calls. Customers that primarily make local telephone calls and receive

Figure 2.4: Depending on international revenues

Breakdown of telecommunication revenue by source, Mauritania and Sri Lanka, 1996



Note: Sri Lanka data refer to Sri Lanka Telecom.
Source: WTPF Country Case Studies.

incoming long-distance or international calls are likely to pay more.

Most countries that have achieved high levels of household access did so under a monopoly system where cross-subsidies were not challenged. Developing countries, particularly those that have achieved a medium level of telecommunication development, face a dilemma: in order to increase telecommunications access for a wider segment of the population, tariffs need to be affordable. The best route towards lower tariffs is allowing competition. But competitive market entry puts pressure on traditional cross-subsidy mechanisms.

So where does this leave affordability? First, it is important to have a better understanding of what affordability means. Here, notions about the cost of telephone service and how many people can pay for it are critical for determining the access strategies that countries should adopt. Second, questions about costs and pricing for local telephone service have been conditioned by constrained supply. The opening of local telephone markets to competition also has the potential to increase supply dramatically, further altering traditional pricing assumptions.

2.2 Defining affordability

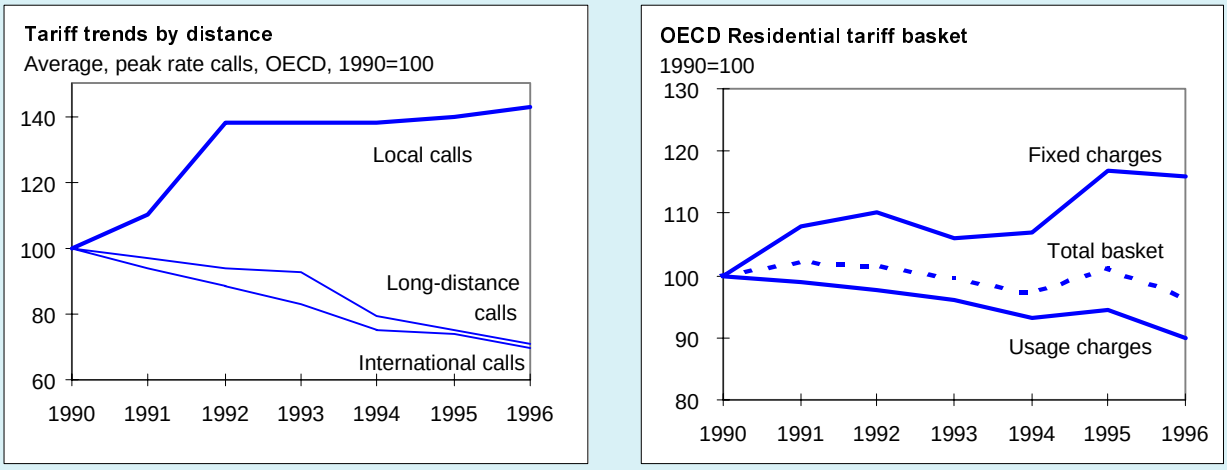
One way of defining affordability is *relative*: the cost of telephone ownership should not exceed a certain percentage of family income. Available data suggest that the threshold level is between one and two per cent of family income for those with telephone service. Figure 2.6 shows that in countries with a high level of household telephones, the proportion of total household expenditure spent on telephone charges is generally less than 2 per cent.[6]

In developing countries with low income, telecommunications policy makers naturally tend to think that a similar proportion of household expenditure should set the threshold for affordability in their countries. Unfortunately, telephone service is not a commodity like food, where the costs of production are directly related to the wealth of the domestic economy. The physical components of a telephone network, which account for more than half the cost of a telephone network cost roughly the same in Angola as they do in Germany. Countries with high levels of telephone penetration tend to be wealthy so, while the relative share of telephone service expenditures appears low, the absolute amount is significant (see Figure 2.6, right chart). If the same relative measure of affordability is used to establish telephone tariffs in lower income countries, this would result in insufficient revenue being generated to recoup network operating and expansion costs.

An alternative approach is to start by establishing the average operating costs for a telephone network. From this, an average tariff for telephone service can be

Figure 2.5: Tariff rebalancing in action

Tariff trends by distance, and by service for residential users, OECD countries, 1990-96



Note: The OECD residential tariff basket shown in the right chart, excludes Luxembourg and Mexico. For a review of the methodology used to construct the OECD tariff baskets, see OECD (1990) "Performance indicators for public telecommunication operators", ICCP No. 22. The distance bands in the left chart are local (below 7 km), suburban (27 km), long distance (greater than 490 km) and international. The international price is a weighted average of calls to all other OECD countries.

Source: Adapted from data in OECD Communications Outlook, 1997.

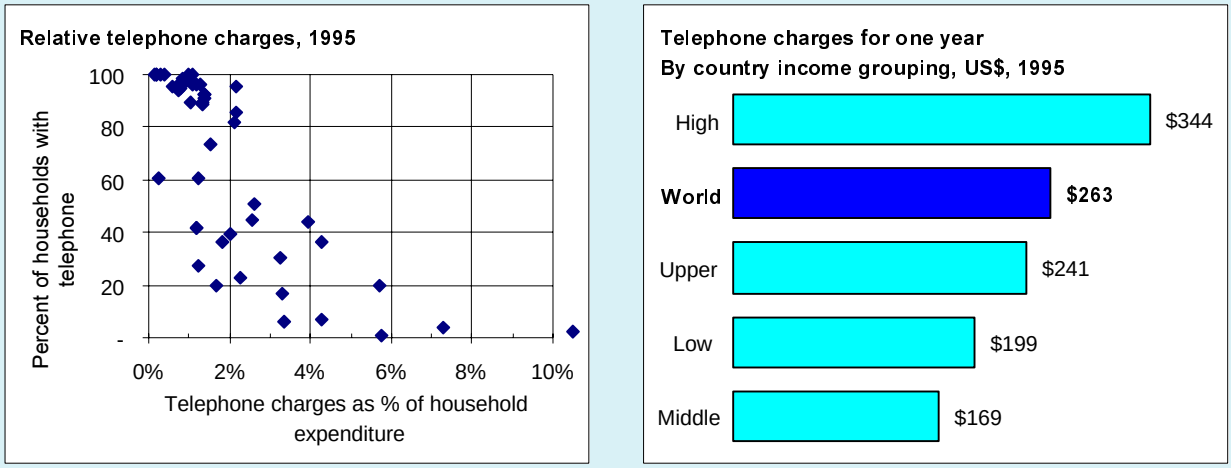
Table 2.1: Socially-desirable and cost-oriented pricing schemes, and relative cost trends

Tariff element	*Traditional socially-desirable pricing*	*Cost-oriented pricing*	*Cost trends and relevance to universal access*
Line installation and connection charge	Very low price: typically below US$ 50 per line. Waiting list used to ration demand. Same price charged for new installation as for transfer of use. A shadow market may develop in illegal resale of connection where demand is high.	Directly related to the costs of providing the line (e.g., length of circuit, inside wiring, labour and material costs). Typically in excess of US$ 700 except where kept at below cost to promote demand (e.g., in absence of waiting list, or under competitive pressure). Lower costs for transfer rather than new installation.	Line installation charges vary by geography but are tending to come down due to a combination of economies of scope, network roll-out. New technologies (e.g., WLL) offer lower cost alternatives for remote or thinly-populated regions. As waiting lists are eliminated, installation charges should come down, sometimes with assistance from regulators.
Line rental (subscription) charge	Relatively low price: typically below US$ 3 per month. Subscription often bundled with rental of telephone handset. Network congestion used to ration demand.	Related to shared long-run incremental costs of the local exchange switch and to the "local loop" portion of the network. Also includes averaged charges for maintenance, billing and customer support. Higher charges levied on businesses due to their higher demands for maintenance and service quality.	Cost trends highly dependent on age of network and level of teledensity. As maturity of network and teledensity increase, unit costs should be reduced and previous investment amortized. However, many costs associated with maintenance, customer care and billing, and competitive marketing are labour-intensive and may therefore
Local call charges	Very low, unmetered or non-existent local call charges, subsidized from other services. In some cases, a certain number of free units or unlimited local calls is bundled into the monthly line rental.	Calls charged per minute and in some cases with additional call set-up surcharge. Discounts for off-peak calling and special promotions. Size of call zone related to local exchange area with sliding zones applied at periphery. Per-second pricing being progressively introduced.	Ambiguous cost trends: increasing teledensity means smaller local call zones, but digitization of exchanges leads to larger call zones. Similarly, amortization of local loop and exchange costs should lead to lower charges, but ageing equipment has higher maintenance costs. Average length of local calls is increasing due to Internet users, who form a strong lobby in favour of keeping local calls charges low.
National long-distance call charges	High charges with multiple call zones. Longest distance typically charged at a multiple of 20 or more times local call rate.	Calls charged per minute with possible reductions for duration of call. Deep discounting during off-peak periods and during promotions. Ratio between longest distance call and local call in range of five to one or less.	Generally getting much cheaper as fibre replaces copper or microwave in the trunk network and as Signalling System No. 7 installed. Interconnect payments may be necessary between mobile and PSTN and in multi-player markets.
International call charges	Generally very high, especially to distant countries. Accounting rates kept high and number of outgoing circuits kept low to generate net settlement payments to cross-subsidize domestic network.	Calls charged per minute with possible reductions for duration of call. Deep discounting during off-peak periods and promotions. Ratio between international and national calls typically in excess of 3 to 1, but coming down due to accounting rate reform.	Significant price reductions associated with investment in new fibre optic undersea cable and satellite transponders. Capacity increases associated with volume growth which is reducing the unit cost. Tending to become cheaper on thick routes, to specific hubs, than on thin ones. Settlement rates and transit fees still a significant cost element.
Tax	Typically no sales tax applied with governments appropriating income directly from profit and loss account of operator.	Value-added or sales tax applied to all calls and other services along similar lines to other products and services in the economy.	Application of sales taxes becoming more widespread as the financial separation between the accounts of the government and major service providers is enforced.

Source: ITU.

Figure 2.6: Relative affordability and telephone access

Percentage of households with a telephone plotted against average annual telephone charges as per cent of household consumption, 1995 and average annual telephone charges, by country income group, 1995



Note: The annual telephone charges data are a basket based on one tenth of the installation charge, annual subscription in the largest local network, 700 local calls and 130 long-distance calls. Taxes are included.

Source: ITU World Telecommunication Indicators Database, Siemens.

derived on the basis of costs. This *absolute* measurement should help policy makers determine how many households in their country could theoretically afford individual telephone service. For those families for whom an average tariff is beyond their ability to pay, additional policies might be employed, such as financial assistance (see Section 2.4) or directing network development towards shared access (e.g., public payphones).

But what is *average cost*? By looking at a sample of operators from different regions around the world, it is possible to estimate the typical range of operating costs. In 1995, the annual average operating cost per telephone line fell in a range of US$ 200-750. The median value was US$ 300 while the lowest value, which could be considered as best practice, was US$ 200. Residential subscription tariffs (including local calls) tend to recoup about 40 per cent of operating costs (based on an analysis of the source of revenue for telephone operators) and are typically about half of business tariffs. This would put the annual charge in a range of US$ 64-122 (see Table 2.2).

As well as considering operating costs for the network as a whole, it is also necessary to consider connection charges to cover a portion of the cost of installing a new telephone line. The average value of connection fees charged by a group of operators is US$ 270, the median value is US$ 50 and the lowest value US$ 20. This amount is divided by 7, the average depreciation time for capital equipment, which results in an annual figure in the range of US$ 3-40.

In order to generate sufficient revenue to recoup operating costs and fund network development, low income countries must expect families to spend a greater proportion of household expenditure on telephone service than in high income countries. If the affordability threshold for basic household telephone service, including a pro rata share of line installation, is set at five per cent of income, the average household income required for telephone service would be US$ 2'060. For an efficient network with lower operating costs, the figure would fall to US$ 1'340 (Table 2.2). A figure of five per cent, in our view, is realistic. South Africa, for instance, has recently set residential tariffs on the basis of household expenditure at this level.[7]

Policy makers could use this approach to determine the number of households in their country that could reasonably afford telephone service. For example Table 2.3 shows the percentage of households that could afford telephone service for a selection of countries based on the assumptions described above and factoring in the distribution of income in the country. Policies could be reviewed in the light of the difference between existing household penetration and those that theoretically could afford service.

Table 2.2: Average residential tariffs

Average annual operating costs for telephone service and residential telephone subscription charge, 1995, US$

	Average	*Median*	*Best practice*
Annual operating cost per line	380	300	200
Annual subscription [1]	122	96	64
Annual connection fee [2]	39	7	3
Total annual charge for telephone service	160	103	67
Annual household income required to afford service [3]	3'200	2'060	1'340

Note: Annual operating cost per line is based on a sample of ten operators from different regions and country income levels around the world. "Best practice" refers to the operator with the lowest operating cost. Costs have been adjusted to reflect the portion of revenues the operators receive from fixed-link telephone service.
[1] Calculated as 40 per cent of operating costs discounted by 20 per cent (covered by higher business subscription charge). Includes free local calls. [2] Actual installation charges divided by seven. [3] Assuming telephone charges represent 5 per cent of income. Figures are rounded to the nearest US$ 10.00.
Source: ITU.

There are some notable observations about the projections shown in Table 2.3. First, no country has attained or surpassed a level of household telephone penetration that it could theoretically afford. Former command economies from Central and Eastern Europe and Central Asia come closest. Here a combination of low tariffs and relatively equitable income distribution result in higher than expected levels of telephone penetration. A second observation is the difference varying cost structures can make. If the higher median rather than best practice value is used for deriving average tariffs, then the level of income needed to afford service rises by over US$ 700. This would mean that up to 30 per cent of households would no longer be able to afford service in a number of countries. The effect would be significant in Belarus, where relatively low incomes spread fairly evenly would result in 30 per cent of households no longer able to afford service. The distribution of household income is also significant. In Brazil, where the average household income is over US$ 10'000, 80 per cent of families would be able to afford telephone service, compared to 100 per cent in the Czech Republic, Hungary and Slovenia, which have lower average income levels.

Projecting the affordability of telephone service based on an average tariff level reflecting average cost structures allows us to categorize demand for global telephone service worldwide (Figure 2.7):

- Households with telephone service (504 million);
- Households without telephone service, on the waiting list, could probably afford service (42 million);
- Households without telephone service, not on the waiting list, could probably afford service (244 million);
- Households without telephone service, not on the waiting list, cannot presently afford service (676 million);

The clear message from this analysis is that there are more families that could afford telephone service than currently have it; the vast majority of them have not expressed that demand by enrolling on a waiting list. One explanation is that tariffs are higher than the average cost structure, discouraging demand. Another explanation is that there is an insufficient stock of telephone lines because of inefficiency, financial constraints, or market restrictions. In both cases, new sources of supply could help, by lowering cost structures and increasing the quantity of telephone lines. This is the focus of the next section.

Table 2.3 : Affordability of telephone service

Percentage of households that could afford telephone service, 1995

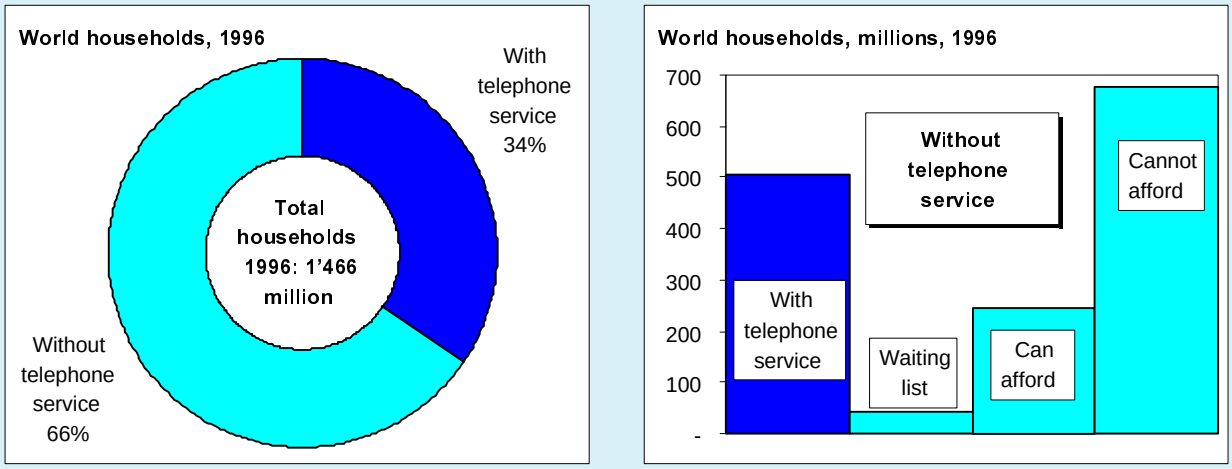
	Private consumption income per household US$ 1995	*Percentage of households with telephone service 1995*	*Percentage of households that could afford telephone service Threshold income: US$ 2'060 per year*	*Percentage of households that could afford telephone service Threshold income: US$ 1'340 per year*
Tanzania	619	0.8%	<10%	10%
China	901	7.9%	10%	20%
Vietnam	1'052	2.6%	20%	20%
Uganda	1'102	0.4%	20%	20%
Kenya	939	1.7%	20%	20%
Guinea-Bissau	1'630	4.2%	20%	30%
Ghana	1'418	0.9%	20%	40%
Lesotho	2'271	1.8%	30%	40%
Mauritania	1'901	0.9%	30%	50%
Zambia	2'118	2.3%	30%	50%
Guinea	1'987	0.4%	30%	50%
Moldova	2'237	35.7%	40%	60%
Honduras	3'055	12.0%	40%	60%
Pakistan	2'430	8.5%	40%	70%
Indonesia	2'492	5.5%	40%	70%
Senegal	3'980	5.8%	50%	70%
Sri Lanka	2'605	2.5%	50%	80%
Ecuador	4'179	19.8%	60%	80%
Kazakstan	3'078	34.9%	60%	80%
Philippines	4'100	6.7%	70%	80%
Brazil	10'608	20.5%	70%	80%
Belarus	2'632	53.7%	60%	90%
Lithuania	3'591	60.7%	70%	90%
Romania	3'236	36.8%	70%	90%
Côte d'Ivoire	4'243	4.7%	70%	90%
Costa Rica	6'886	42.0%	80%	90%
Latvia	3'884	60.8%	80%	100%
Morocco	5'053	19.7%	80%	100%
Thailand	6'402	18.4%	80%	100%
Tunisia	6'502	20.5%	80%	100%
Mexico	8'995	45.1%	80%	100%
Venezuela	13'748	41.8%	90%	100%
Malaysia	10'806	60.2%	90%	100%
Slovenia	16'261	75.9%	100%	100%
Slovak Republic	4'487	43.9%	100%	100%
Poland	5'702	36.2%	100%	100%
Chile	15'450	46.9%	100%	100%
Czech Republic	6'712	42.2%	100%	100%
Hungary	7'483	43.9%	100%	100%

Note: "Percentage of households with telephone service" is from census data or calculated by dividing the number of residential telephone lines by the number of households. "Percentage of households that could afford telephone service" is calculated by the decile of households where an average annual residential tariff based on international operating costs would be 5 per cent or less of annual income.

Source: ITU.

Figure 2.7: Affordability and demand

Distribution of households by availability of telephone service, World, 1996



Source: ITU.

2.3 Tariff strategies

2.3.1 Supply and demand

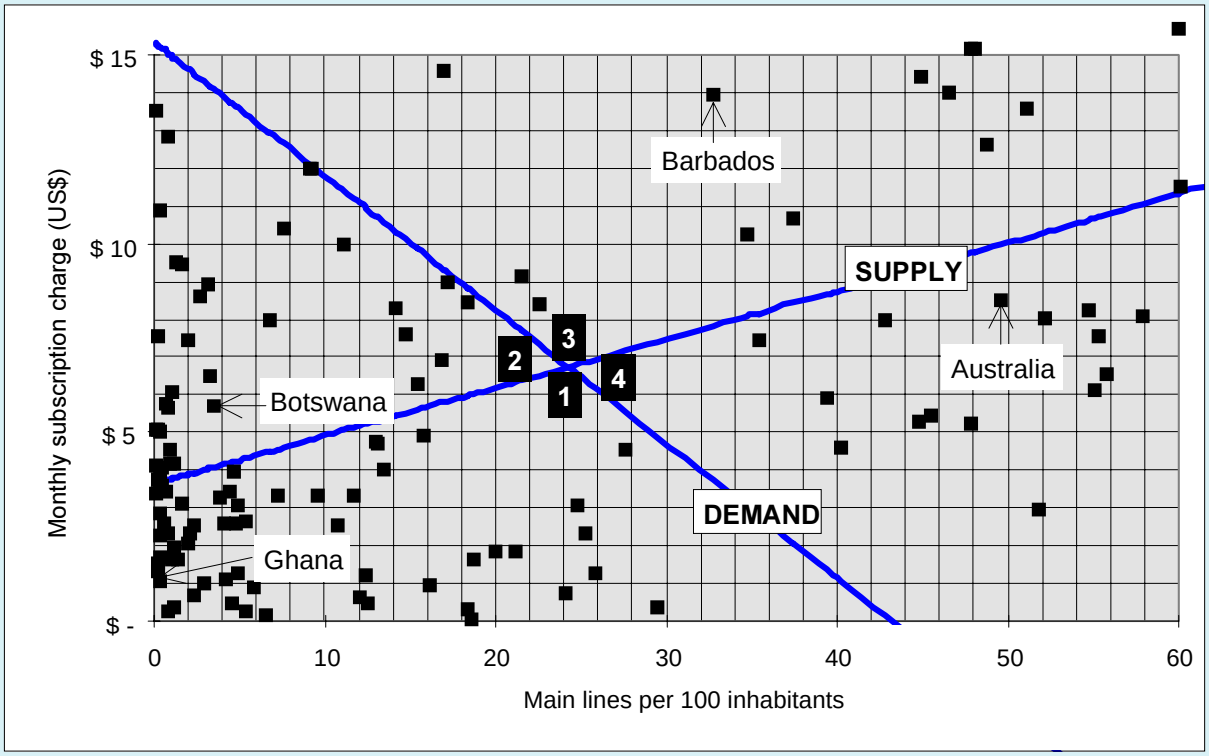
There is scarce data on the classical relationship between supply, demand and pricing in the telecommunication industry. The main reason is that supply has been artificially constrained as a result of monopoly service provision policies and prices have traditionally been regulated. Thus the textbook model where the demand for a product increases as the price falls and the supply of a product increases as the price rises has not been relevant to the telecommunication world. If it was, the relationship might look something like Figure 2.8, which plots average monthly telephone subscription charge and teledensity in different countries. The line going from top left to bottom right reflects demand for telephone service: as the price falls, more of it is demanded. The line going from bottom left to top right reflects supply of a product: the assumption being that in a free market there would be more supply of a product as the price rises. Each point represents one country. The points in the graph trend from top-left to bottom-right; that is, from higher charges in low teledensity networks to lower charges in high teledensity networks (where there is greater scope for achieving economies of scope).

By splitting the chart into quadrants, it is possible to analyse in general terms the different tariff strategies which are being followed and the potential impact of more liberal supply policies:

1. **Low teledensity, low access charges** (e.g., Ghana): Countries in this quadrant are charging too little for telephone service (the price is below the supply line). New telecommunication operators would be uninterested in entering these markets since they would not be likely to recoup their costs. Many of these countries are stuck in the trap of underinvestment and low network growth and are unlikely to break out without reform of their tariff structure. Outside sources, such as income from incoming international calls, may help in the short term, but a growth strategy without tariff reform is unlikely to be self-sustaining. Fortunately, in the case of Ghana, the dire nature of the situation has been recognized and the country is now well advanced in a reform package which involves increasing tariffs, privatizing the incumbent operator as well as introducing a second network operator and permitting competition in other services, notably mobile cellular and the Internet. Despite a 100 per cent increase in tariffs in May 1996, the increase in the number of main telephone lines was still over 20 per cent for the year, well above the 7 per cent average growth during the period 1990-95.

2. **Low teledensity, relatively high access charges** (e.g., Botswana): Countries in this quadrant are in a better position than those in quadrant 1 if they use the money raised from higher subscription charges to invest in new capacity in an efficient manner. New market entrants should be interested in these countries since prices are above costs and there is unmet demand. The danger arises where

Figure 2.8: Analysing pricing strategies
Monthly subscription charges (US$) plotted against Teledensity, 1995, with selected economies highlighted



Note: Each dot on the chart represents one economy.
Source: ITU World Telecommunication Indicators Database.

the telecommunication operator uses its monopoly position to extract higher profits which are not reinvested in the network. A government, for instance, might divert funds from its state-owned operator to an activity unrelated to telecommunications; a privately-owned operator might devote a larger share of profits as dividends to shareholders than reinvestment in network expansion. This has not been the case in Botswana which has progressively built up its subscriber network and now has the fourth highest teledensity (after Cape Verde, Namibia and South Africa) in sub-Saharan Africa.

3. **High teledensity, relatively high access charges** (e.g., Barbados): Here the temptation is to abuse a monopoly position by charging high rates for telephone access. In the absence of effective price regulation or competition, a monopoly operator may charge as much as the market can bear. This is a particular danger in countries which have privatized their operator without introducing competition. High charges might be justified if the operator is engaged in an aggressive roll-out strategy, or if the fixed charges include an element of free local calls (both of which are true for Barbados). However, in the absence of such mitigating circumstances, regulators in this category should consider whether charges reflect real costs. New market entrants would be interested in countries in this quadrant since prices are above costs.

4. **High teledensity, low access charges** (e.g., Australia). This is the ideal position to be in. There is a high level of access and the benefits of economies of scale are being passed on to consumers, either through effective regulation or competition. In the case of Australia, the main network competitor was given a head start in the marketplace by the granting of a duopoly status for a seven year period, which ended in 1997, and because the regulator took the step of balloting users on their preferences for service.

Thus the incumbent operator, Telstra, was less able to do what other incumbents in competitive markets have done and raise charges in that part of their operations where they faced the least competition (network access and local loop charges) while engaging in aggressive price cutting in competitive areas (long-distance and international call charges).

2.3.2 Mixing it up

Tariffs consist of *fixed* (installation and subscription) and *variable* (usage) charges. The essence of a tariff strategy is to try to create a set of incentives which make sustainable growth, based on locally-generated growth, possible. The type of strategy to adopt will depend on each country's specific economic and telecommunication circumstances.

In formulating a tariff strategy, the following components should be considered:

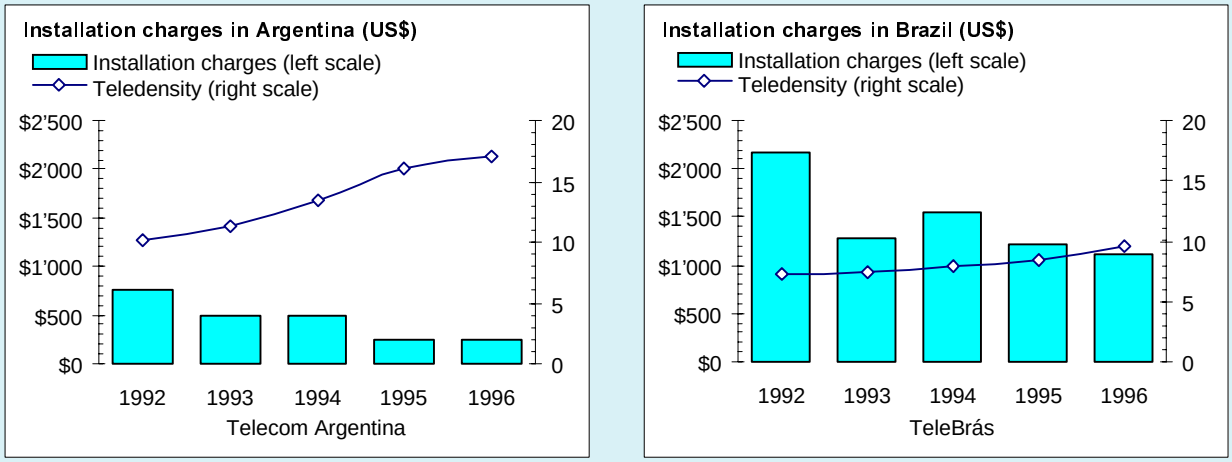
- **Installation charges.** The level of the installation or connection charge to establish telephone service depends on the costs of providing access and the level of demand in the country. Where there is high demand and low network development, installation charges should be raised to bring them closer to the cost of providing a new line. It is difficult to justify the practice of subsidizing installation charges for a lucky few in countries where there is still a substantial waiting list. Higher installation charges would provide a ready source of income for reinvestment by the operator. They would also provide additional revenues to the network developer by reducing or even eliminating the "black market". In this situation, the difference between what customers are willing to pay and the official installation charge, accrues to middlemen who promise rapid connection rather than to the network operator. Finally, higher installation charges make the waiting list more manageable by limiting it to those that can actually afford the service. Where waiting lists are coming down, countries may want to reduce installation charges to increase mass market penetration. This is the case in Argentina where operators were mandated to reduce installation charges over a period of time (Figure 2.9). In contrast, Brazil has had relatively high installation charges which may have discouraged demand.

- **Setting residential subscription charges at a rate which more closely reflects the costs of servicing the line.** A model for deriving residential subscription charges based on global average tariffs results in a range of US$ 5-10. It is unlikely that a lower tariff would generate sufficient revenue to recover an adequate portion of the cost. Countries as diverse as Hungary, Malaysia, Morocco and Uruguay have established residential tariffs in a range of US$ 6-8, allowing them to produce ample revenue to fuel growth in household telephone penetration (Figure 2.10).

- **Setting separate installation and subscription charges for business subscribers.** This would

Figure 2.9: Installation charges and demand

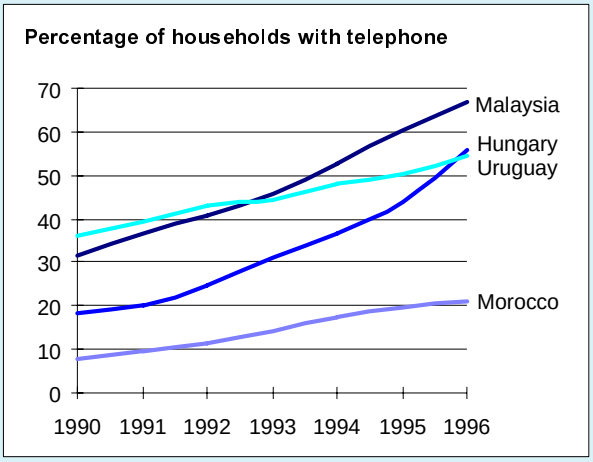
Installation charges, US$, and teledensity, Argentina and Brazil

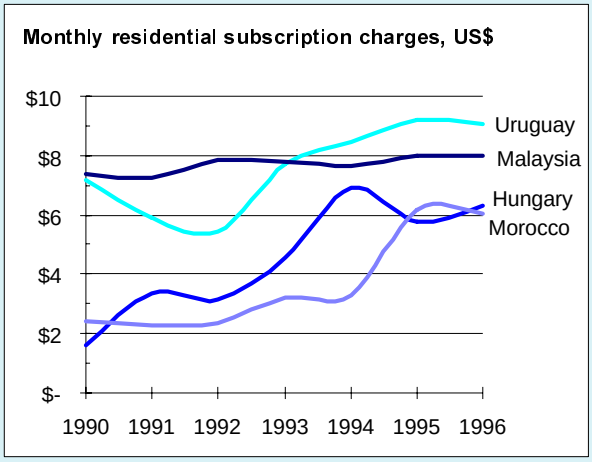


Source: TeleBrás, Telecom Argentina.

Figure 2.10: Sustainable residential tariffs, growing residential access

Monthly residential subscription charges, US$, and household telephone penetration, selected economies, 1990-96





Note: Monthly subscription charge, including taxes, converted by annual average exchange rates.
Source: ITU World Telecommunication Indicators Database.

Table 2.4: Business and residential telephone charges

Business and residential telephone installation and subscription charges, CIS, January 1997, US$

	Installation charge			*Monthly subscription charge*		
	Business	*Residential*	*Ratio*	*Business*	*Residential*	*Ratio*
Azerbaijan	488	122	4.0	7.30	0.21	34.8
Armenia	69	28	2.5	0.20	0.23	0.9
Belarus	323	97	3.3	2.40	1.94	1.2
Georgia	309	62	5.0	7.90	0.79	10.0
Kazakstan	284	71	4.0	18.50	2.84	6.5
Kyrgyzstan	60	18	3.3	1.10	0.50	2.2
Moldova	181	108	1.7	3.60	0.43	8.4
Russia	612	126	4.9	21.80	2.16	10.1
Tajikistan	229	9	25.1	18.30	0.91	20.1
Turkmenistan	246	30	8.3	9.80	0.25	39.2
Uzbekistan	329	37	9.0	16.50	1.10	15.0
Ukraine	1'059	132	8.0	11.60	1.60	7.3
Average	**349**	**70**	**5.0**	**9.92**	**1.08**	**9.2**

Note: The ratio is calculated by dividing the business tariff by the residential one. The average is a simple average.
Source: Regional Commonwealth for Communications (RCC).

reflect not only the greater ability to pay of business subscribers but also the greater demands they place on the network and on maintenance staff. This practice is followed in the Commonwealth of Independent States where changes to historically low residential subscriber charges (including free calls) are politically sensitive. As a result, all of the CIS countries have different residential and business installation and subscription charges (see Table 2.4). One pitfall of higher business charges is that some small enterprises may sign up for the residential tariff. Operators may also focus on business customers to the detriment of building up residential access, thwarting efforts to establish universal access.

- **Setting separate installation and subscription charges depending on quality of network connection.** Subscriptions to analogue exchanges, for example, might be set lower than those to digital ones. This is the practice in Lithuania where digital installation and subscription charges are eight and five times higher than charges for subscribers using analogue exchanges.

These steps could provide a platform for revenue generation from which a more diversified range of tariff options could be introduced. While the choices above focus on fixed charges, there is also room for experimentation with usage (call) charges. Introducing off-peak discounts encourages social calls in the evening or at weekends. Also many countries still maintain distance-based tariff charges for inter-urban calls which rise steeply, even though this practice is often not cost-based. Ultimately, there is no substitute for market research to discover how much subscribers are willing to pay for which service.

2.4 Tariff strategies to reach the *unphoned*

The discussion in this chapter has focused mainly on overall tariff strategies applied to most telephone subscribers. But what about those who are economically disadvantaged or physically disabled? Being *unphoned* can be a serious limitation. How do you find a job, for instance, when you are unable to leave a contact number? How do you report a crime if there is no payphone available?

The unphoned are far from being a homogeneous group. They may include, for instance, those who choose not to have a telephone as well as those who cannot afford one. Equally, the group may include those who have a telephone at home but are rarely there, such as students, hospital patients or travellers. Or, it may include those who cannot use a conventional telephone, such as those with visual or hearing impairments. Precisely because the group is so diverse, the tariff strategy to reach this group also needs to be diverse. Strategies to reach the unphoned, therefore, should comprise a wide range of options which may include:

- **Tariff reductions** aimed at disadvantaged users (low income, elderly, handicapped, rural). The United States has programmes for reducing connection charges and monthly bills for low income users while most of the European Union member countries have schemes targeted at specific disadvantaged groups (see Table 2.5). A number of countries offer lower tariffs for users in rural areas. In Malaysia subscribers connected to exchanges with less than 500 telephone lines are charged a monthly rental of RM 13 (US$ 5.18) compared to RM 20 (US$ 7.97) for those connected to larger exchanges.

- **Prepaid calling cards** aimed at those without fixed-line telephone service. Originally introduced for public telephones, prepaid cards are now being offered for mobile cellular service (see Box 2.1). Prepaid calls provide convenience for the user by not having to search for change and the security of not having to carry money. Also, card-only payphones are less vandalized and thus more likely to be working for those who need them. In the case of prepaid mobile, the user does not have to pay for connection or rental charges and therefore offers the possibility of telephone service for those who might not normally qualify.

- **Subsidized payphone calls** aimed at low income users. Public telephones will be heavily used by those who cannot afford individual telephone service. It is appropriate, therefore, to provide lower call charges for these users. However, since it would be virtually impossible to determine who has a low income when calling from a conventional card- or coin-operated payphone, low call charge schemes are directed towards community telephones. In Argentina, *semi-public* telephones are provided free of connection and subscription charges in places such as schools and municipal centres in low income areas. Call charges are over 70 per cent cheaper compared to private telephones. In South Africa, call prices for cellular community telephones are tariffed at less than half the standard cellular charge.

Table 2.5: Targeting the disadvantaged

Special tariff schemes for targeted user groups in the EC

Country	*Description*
Austria	Certain groups, including the *blind, handicapped, pensioners, low income, students*, are exempted from paying basic monthly connection fee and are entitled to one free hour of telephone use per month.
Belgium	i) *Social groups*: Around 370'000 people benefit from the social telephone rate (8.1% of the total number of connections). The following tariff reductions are applied: 70% reduction of connection charges, 50% reduction of rental fee, and 50 free units of traffic for 2 months. ii) *Elderly and handicapped*: Reduced tariffs for elderly (over 65) and handicapped.
Denmark	Specific text-telephone service for *hearing impaired users*, including provision of different types of terminal equipment. The service is provided on a non-commercial basis. Reduced tariffs for visually impaired and blind users when using directory services.
Finland	There are no special schemes regarding telecommunication charges. The state budget finances special services targeted to some special groups, which operators are not willing to provide (e.g., special services for disabled).
France	i) *Handicapped, elderly and social groups*: Reduced tariffs for special and social groups, such as the handicapped, those aged over 65 living alone or with their partner and war veterans. These reductions include a 50% reduction on subscription fee, 40 units free of charge per month, and free access to information services. ii) The *low user scheme* gives a reduction for those who use less than 26 units per month.
Germany	Reduced tariff scheme for *elderly, disabled, and low income groups.* These special groups receive a 5 DM reduction on rental charges and 30 units free of charge per month. There is no low usage tariff scheme and there is none foreseen.
Greece	i) *Disabled*: Special reduced rates have been introduced for blind subscribers. Blind subscribers are allowed 150 units a month free of charge on the first main telephone line subscribed in their name. Additionally, specially designed public card phones have been installed at airports, railway and bus stations and hospitals.
Ireland	i) *Disabled*: Deaf customers can use special text terminals to communicate with non-deaf customers. Due to the fact that this method is slower than normal speech, deaf customers are entitled to reclaim up to 70% of the cost of their calls subject to an annual maximum. Additionally, the State may refund the VAT element of the purchase price of the equipment for the deaf. ii) *Elderly and disabled*: The Department of Social Welfare provides state aid for free telephone rental for certain aged and disabled people living alone or with other excepted persons.
Italy	Since January 1995, there is a special scheme for *low consumption users* upon request (it includes a low rental fee and low tariffs for low consumption per month, i.e., up to 40 units/month: 50 lira).
Luxembourg	P&T Luxembourg has no plans to introduce specific schemes targeted towards particular social groups as the basic telephone tariffs are low.
Netherlands	There is no special scheme targeted to a specific group of customers.
Portugal	There are special tariff reductions for *retirees and pensioners* with a monthly salary less than the national minimum. The reductions are the following: a 60% reduction of subscription fees and at least 25 units free of charge per month. Operators are equally obliged to concede the following facilities for *population with special needs:* micro telephones with amplifier, a call warning, etc.
Spain	i) *Elderly and handicapped*: Special "social subscription" that consists of a 95% discount on the monthly fee and a 70% discount on the initial connection fee for those citizens over 64 and handicapped (only when they do not receive a certain level of income).
Sweden	There is a *low consumption subscription*. The quarterly fee must not exceed 70% of the regular quarterly fee and at least 10% of household customers should benefit from to this type of subscription.
UK	BT provides the following schemes: *Spread connection fee* - which divides the initial connection charge into five quarterly payments (plus an administration charge). *Deposits* - in 1996 BT introduced Usage Limits, whereby new customers agree a financial ceiling on call expenditure. This largely eliminates the need for deposits. *Low User Scheme* - BT provides this under its licence, the guidelines for which are negotiated with the regulator. *Elderly and Disabled* - new customers over 65 will not be asked for a deposit unless they owe BT money or are bankrupt. *Protected Service Scheme* - enabling elderly and disabled customers to nominate a third party to deal with bill payment. *Free Directory Enquiries* is offered to visually impaired customers and others who are physically unable to use the printed phone book. *Deaf users* - have access to Type talk, a national telephone relay service, which BT is obliged under its licence to provide and fund. A Text User's Rebate is available to acknowledge that calls made by text phones take longer than the voice telephony equivalent.

Source: European Commission.

Box 2.1: Prepaid mobile cellular calling cards

Cellular operators in a number of countries have introduced "pay-as-you-go" or prepaid services in order to attract new users. This has proven to be a way to reach segments of the mass market that would not otherwise be able to afford cellular service. Per minute calling charges are often significantly higher but users do not have to sign a contract or commit to a monthly bill. These services can be especially attractive to users that do not have the required credit-worthiness.

A prepaid customer typically buys or leases a handset and pays in advance for a block of airtime. Prepaid cards are used like standard telephone cards, until there is no money left. With prepaid mobile cellular cards, however, the user installs the card into the handset and is assigned a phone number to receive calls. These services offer an alternative for users who want to have more control over their spending; who may not be able to afford or qualify for normal telephone service; or who make relatively few calls. For cellular service providers, prepaid schemes have appealing cost benefits since they require little customer care and no billing costs. Prepayment plans also eliminate debt collection problems. The popularity of prepaid services in a number of countries suggests that they can help in enhancing universal access.

Baja Celular, a Mexican cellular operator, has experienced rapid growth in subscribers and traffic, thanks to its prepaid schemes. Its prepaid service introduced in late 1993 increased the number of subscribers by some 45 per cent. Subsequent lower-cost prepayment schemes, introduced in 1996, reduced activation costs by about 80 per cent and usage costs by some 40 per cent. In the 16 month period between May 1996 and September 1997, the number of subscribers went up by 180 per cent while airtime minutes increased by 70 per cent. Another Mexican cellular provider, Iusacell, launched its prepayment plan in 1996 and, by the end of the year, prepaid clients totalled 31 per cent of the subscriber base.

The South African cellular operator Vodacom has sold more than 300'000 prepaid starter packs and some one million recharge vouchers since the beginning of 1997. Its prepaid plan has attracted an estimated 65 per cent of the half a million prepaid users in South Africa. Vodacom reports having rejected as many as 40 per cent of its applications for post-paid services due to risk of bad debt. Another surge in the growth of prepaid services is expected in 1998 as Vodacom has launched a new recharge voucher for prepaid users which includes 40 minutes of free airtime, in effect reducing the tariff from R 2.50 to R 2.27 per minute. Additionally, users are given six months instead of two months to receive calls even if their account has not been recharged. The network will also reserve their number for another six months.

Another oft-cited example of the prepayment boom is Telecom Italia Mobile's (TIM) prepaid card service. Launched for TIM's GSM network in October 1996, it now has over three million prepaid customers compared to 570'000 in January 1997. In the month of April 1997 alone, TIM recorded one million recharges. TIM is now the largest cellular operator in Europe with prepaid customers accounting for a large portion of its growth. Its competitor Omnitel introduced a prepayment scheme in February 1997 and added 200'000 customers during the first two months of service. In December 1997, Omnitel launched a new service that enables international calls and roaming, not typically available with prepayment plans.

Prepayment has not been as successful everywhere. For instance, Vodafone started its prepaid service in the United Kingdom at the same time as TIM did in Italy. Whereas TIM had gained about 1.5 million prepaid customers by May 1997, or 25 per cent of its digital subscribers, Vodafone added only 22'000 to its prepaid service. One reason for this difference was the high price for Vodafone's service. Its charge was four times more than its subscription tariff. Another disadvantage are handset subsidies in the UK. In Italy there are no handset subsidies. Any mobile user, whether prepaid or regular tariff, pays the full price for handsets. In the UK handsets for conventional cellular service are subsidized, while for new services such as prepaid they are not. Countries with handset subsidies, therefore, may have difficulty in introducing prepaid services, unless there is a market for used handsets.

- **Supporting incoming calls.** Assuming that public telephones are widely available and working, then people without their own telephones can at least make calls. However these people remain truly "unphoned" since they cannot easily receive calls. One remedy is to promote low-cost alternatives for receiving calls such as radio-paging. This can be encouraged by liberalizing the radio-paging service provider market in order to promote supply and low prices as well as reducing or eliminating import tariffs on radio-paging devices. Another technological solution is voice-mail; this is being promoted for people without telephones in Brazil. One low-tech solution is to provide incoming call service at public telephones. This is being tried in Bangladesh where village payphone employees search for the person who has received a call. There is also a tariff aspect to incoming calls that can affect demand and the affordability of telephone usage for disadvantaged users who are more likely to receive than place calls. For instance, in some countries, both the calling and the receiving party pay for mobile cellular calls. Nations that have abolished this system in favour of the traditional calling party paying, such as Argentina and Peru, have witnessed large increases in subscribers and usage. The launching of the calling party pays system in April 1997 in Argentina led to its highest annual growth ever in mobile cellular subscribers. In Peru, mobile cellular calls increased over two hundred per cent following the introduction of calling party pays.

[1] "*The economic benefits to society as a whole of adding additional subscribers to the network will consequently exceed the "private" benefits to the new subscribers themselves, but the market mechanism, with cost-based prices, would tend to allocate less resources to expanding the network than would best serve the interests of economic efficiency.*" See Tyler, M. 1993. *Universal Service and Innovation: Fostering Linked Goals through Regulatory Policy*. Briefing Report prepared for the second ITU Regulatory Colloquium. Geneva: ITU. http://www.itu.int/itudoc/osg/colloq/briefrep/2ndbri/42513.htlm.

[2] "Address by the Indian Minister of Communications at the World Telecommunication Development Conference." See ITU. *World Telecommunication Development Conference*. Volume III. Geneva, 1994.

[3] This cross-subsidy is highlighted by the Brazilian operator Telebras: "*Historically, Federal government policy has been to maintain rates for international and domestic long-distance service at relatively high levels compared to rates charged for such services in other countries, in order to subsidise comparatively low rates for local telephone service and public telephone service*." The cross-subsidy, coupled with high levels of inflation prior to the adoption of a new currency in 1994, constrained the ability of Telebras to fund investment from internal sources. See Telebras. *Annual Report 1996 on Form 20-F*. 1997.

[4] Irwin, T. "Price structures, Cross-subsidies, and Competition in Infrastructure." *Public Policy for the Private Sector*. February 1997. http://www.worldbank.org/html/fpd/motes/107/107summary.html.

[5] Federal Communications Commission. "In the Matter of International Settlement Rates." 7 August, 1997. Washington DC: FCC. The report notes that "*...universal service subsidies are legitimate telecommunications policies*." But it argues "*...we disagree that foreign termination services from certain countries should be required to finance a disproportionate share of network costs, or obligations on termination services for foreign-originated calls*." The report goes on to note that the methodology it used to determine the benchmarks result in rates "*that are still above the cost of providing international termination service. As a result, the benchmarks include a generous contribution that could be applied to fund universal service and other social goals*." For more information on the benchmark order and on the general topic of accounting rates, see the ITU website at http://www.itu.int/intset.

[6] One study from the United States found that a 99 per cent household telephone penetration rate is achieved when the cost of telephone service is 0.7 per cent of household income. See Cooper, M. 1996. *Universal Service: A Historical Perspective and Policies for the Twenty-First Century.* Washington DC: Benton. Available at http://www.benton.org/Library/Prospects/prospects.html.

[7] For example in South Africa, a monthly household income of Rand 900 has been taken as the threshold for household telephone service. The share of residential telephone subscription charge at that level of income is 5.2 per cent. Households with lower incomes will be served by an accelerated programme of installing public telephones. See Ministry for Posts, Telecommunications and Broadcasting. *Partnership for the Future*. May 1997. Another example of the five per cent threshold comes from Chile. There municipal governments pay part of eligible household's utility bills with the aim of ensuring that no more than 5 per cent of the household's income is spent on water and sanitation services. See Irwin, T. "Price structures, Cross-subsidies, and Competition in Infrastructure." *Public Policy for the Private Sector*. February 1997. Washington DC: World Bank.