The telecommunications sectors in most advanced countries are being buffeted by major changes. Once a set of tranquil government-owned monopolies, these sectors are being transformed into competitive industries. In the United States, the 1996 Telecommunications Act has been designed to open the markets for local telephone services to competition and to allow the regional Bell operating companies (RBOCs) to enter the long-distance market. In Canada, all telecommunications markets have been opened to competition. In Europe, the United Kingdom privatized its telephone monopoly in 1984 and then began opening the market to competition. Denmark and Finland followed in the 1990s, and all voice telephone services in twelve of the fifteen European Union countries were opened fully to competitive entry on January 1, 1998.

Elsewhere, government-owned telephone companies are being privatized and confronted with the threat of entry from new competitors, forcing these erstwhile monopolies to improve service, become more efficient, and therefore reduce employment. Independent regulatory authorities are replacing government postal, telephone, and telegraph (PTT) ministries as authorities that control telephone rates and services. This liberalization is occurring in diverse countries, such as Chile, Hong Kong, and Singapore.
The electromagnetic spectrum is being auctioned off to new mobile service operators in Brazil, South Africa, the Netherlands, the United Kingdom, and a number of others. Pressures from new entry will only intensify in the wake of the World Trade Organization (WTO) agreement on services, in which sixty-nine countries agreed to open their telecommunications market to competition, allow some degree of foreign ownership, and abide by open and transparent regulatory regimes. Equally important, the United States is leading a charge to reduce international telephone rates from their current stratospheric levels. These reductions in international rates will severely reduce the ability of national telecommunications carriers to use international services to support a variety of other services.

“Universal Service”

All of these decisions have much to commend them. Developing and developed economies require a healthy, dynamic telecommunications sector if they are to prosper in an increasingly global economy. But moving from public monopoly to private monopoly and ultimately to a relatively competitive telecommunications sector places strains on various government policies that were essentially hidden from public view for decades. The most obvious of these is the level of employment in the telecommunications sector, but an even more sensitive problem in most countries is cloaked in the concept of “universal service”—keeping monthly charges for residential service below incremental cost and making up the difference by allowing carriers to charge very high prices for long distance and other services. These policies are justified as necessary to ensure that virtually all residences are connected to the telephone network. If liberalization results in an end to such transfers and, therefore, higher residential charges for renting a local telephone line, some critics fear that many low-income and rural residences will simply disconnect their service even though recent studies of the residential demand for telephone service cast substantial doubt on such predictions.

The incredible pace of technical change in communications is even adding new dimensions to the political demand for universal service. Access to simple voice telephony is no longer enough in some countries. Advocates of universal service are now pressing for policies to provide consumers or public institutions, such as schools and libraries, with advanced, high-speed telecommunications services at prices below the costs
of these services. In the United States, for example, the 1996 Telecommunications Act that is supposed to open telecom markets to competition also requires regulators to add new universal service obligations for libraries, schools, and rural medical facilities to the existing residential voice-service requirements. These new obligations complicate the process of substituting competition for regulated monopoly and greatly increase the burden on other telecommunications services.

No one has carefully estimated the costs and benefits of the traditional or the new universal service obligations or carefully identified the recipients and sources of the subsidies—the gainers and losers. In this book, we analyze the demand for residential telephone service, calling patterns, and telephone expenditures across a variety of developed countries, with detailed data for the United States, Canada, and the United Kingdom. In so doing, we develop an estimate of the social cost of universal service policies for the United States while considering the U.S. requirements in an international perspective.

Two Definitions of Universal Service

This book examines public policies in the telecommunications sector, concentrating on the prices set for access to the telecom network and the prices for various types of calling. A decade or two ago, such a work would be focused on ordinary voice telephone service. Universality of telephone service in this older environment would simply imply that telephone service be available to everyone, that is, that the cost of connecting to the network, including free inward calls, and perhaps initiating a certain number of outbound calls, be affordable to citizens of all incomes. This version of universal service essentially turns on the definition of “affordable,” particularly in wealthy countries where the cost of modern telephone service is an extremely small share of even low-income household budgets.5 Affordability of basic telephone service in these countries is often related to the ability of certain individuals or families to limit their discretionary expenditures on national or international calls that are difficult to predict and, in some cases, to control. If these households are unable to control their use of such services, they discover that they are unable to pay their monthly telephone bills—of which the monthly cost of access may be but a small share—and therefore risk having their basic telephone service terminated because of unpaid long-distance charges.
Universal service has recently come to have another meaning: the availability of new, innovative services to all potential users. This concept of universal service has implications for national competition policy and for rate regulation. The narrowest version of this policy requires that all subscribers have access to new services, whether provided by their basic telephone service provider or by other companies. To facilitate access to these new services, many countries have begun to require that basic telephone companies interconnect with all other companies providing basic or enhanced telecommunications services. The rules and rates for such interconnection are at the center of the debate over how to admit competition in telecommunications in most countries in the Organization for Economic Cooperation and Development (OECD) today.

This second definition of universal service may be extended to the promotion of new services through prices that are below the network provider’s average cost, or even its marginal cost, because of network externalities. The development of e-mail provides an excellent example of the case for such pricing: one person’s decision to subscribe to an e-mail service increases the value of e-mail to all others who may communicate with that person. This externality provides a rationale for subsidizing the access to e-mail if, at the margin, the benefits to others from additional subscribers exceed the cost of the subsidy. Unfortunately, it is difficult to know which of a large potential number of new services may be worth subsidizing through below-cost pricing. The existence of network externalities is not a sufficient condition for a public (or private) policy of subsidizing a new service.

In the United States, the concept of universal service has now been extended to the provision of new, high-speed telecom services to public institutions, such as schools, libraries, and medical facilities. The aid to schools and libraries is for Internet access, and the assistance to rural medical facilities is to reduce their telecommunications charges to the level paid by urban health providers. Under this new universal service policy, not only poor and rural residences but now thousands of public institutions are to be the recipients of intraindustry subsidies—to be provided by a large indirect (excise) tax on all telecommunications service providers. These new taxes may not thwart liberalization, but they are surely an impediment to deregulation and to moving telecom rates toward cost.

Is the universal service justification for subsidizing households, services, or institutions unique to telecommunications? Why does it not exist
for other services, such as housing, electricity, or heating? Both the refrigerator and the television set are ubiquitous across the United States and other countries. In fact, their penetration rate (the percentage of households having the durable) is above that for telephones. Even in many poorer countries, TV penetration exceeds telephone penetration. Television sets, refrigerators, VCRs, and washing machines are often more expensive for users to buy and even perhaps to operate than telephones and have not been promoted or subsidized as critical “universal” services. Yet refrigerators, for example, surely generate positive externalities through keeping food from perishing, thus reducing the spread of disease. Even television may generate externalities—the ability to be informed or to be made aware of cultural values and icons.

Why is it that these other goods have household penetration rates approaching or exceeding that of telephones without any “universal service” program? Or put another way, is the universal service objective for telephony a euphemism for policies that have little to do with universality but were developed—as some have suggested—to prevent competitive entry, and are these practices now a significant barrier to competition? Moreover, is the extension of intraindustry subsidies to Internet access for schools and libraries necessary, and would alternative sources of such funding—such as general tax revenues—not be a more efficient method of funding these needs?

The Origins of Universal Service Policy in the United States

The U.S. telephone industry did not begin as a natural monopoly. Indeed, the source of monopoly in early telephony was not the nature of the distribution system, or network, but patents owned by the Bell Company. Once the last of these patents expired in 1894, the U.S. telephone industry began to be buffeted by entry into local services. Local rates began to fall, often sharply, in response to this entry. Price wars were common. Disputes over interconnection of competing networks became commonplace.

Even after Bell’s patents for the basic telephone expired, it had newer patents on long-distance service. Non-Bell operating companies were routinely denied access to the Bell long-distance network, prompting many complaints. However, as Milton Mueller points out, this refusal to interconnect was symmetrical—the new independent telephone companies at the turn of the century did not want to have to interconnect with the local Bell companies either. By the end of the first decade of the twentieth
century, there were as many independent exchanges as Bell exchanges; most cities had at least two competing telephone companies; and nearly half of all subscribers were connected to independent companies that did not interconnect with the Bell network.\footnote{15}

This fragmented structure of the early telephone industry gave rise to the first utterances of “universal service.” Mueller attributes the first use of the phrase to Theodore Vail, writing in AT&T’s 1907 Annual Report. Universal service was seen by Vail as the delivery of all telephone service through one “system,” guided by one “policy.”\footnote{16} Obviously, he saw universal service as requiring a nationally integrated single system, managed by AT&T. During the next few years, AT&T would expand its local exchanges dramatically while also purchasing many of its independent competitors. This activity, and the incessant rate wars between AT&T and the independents, attracted the interest of the antitrust authorities. As a result, Vail could only move AT&T toward his goal of a single, integrated national telephone company by accepting government regulation.

The 1913 Kingsbury Commitment, an agreement between AT&T and the Justice Department, ended much of this controversy. The Justice Department would drop its antitrust investigation of AT&T in return for AT&T’s agreement to sell its interest in Western Electric; cease its acquisitions of independent companies; and interconnect its long-distance network to the independent companies. Eight years later, however, AT&T’s acquisitions were to begin anew in response to the Willis-Graham Act of 1921 that immunized them from antitrust attack. Within a few years, AT&T would acquire many independent companies, leaving only about 20 percent of the country’s local exchange service in the hands of non-Bell companies.

This drive toward universality was the first incarnation of a “universal service” policy—a single, unified local and long-distance service in the hands of a regulated AT&T. Vail largely succeeded in achieving this goal, but it was a very different goal from that understood as “universal service” today. There was no deliberate policy of underpricing local residential connections by overpricing long-distance calls.\footnote{17} Businesses were not to be charged more for local connections than were residences. Indeed, on the eve of the Willis-Graham Act, the federal government’s seminal pronouncement in favor of Vail’s vision, only 35 percent of households had a telephone. Universal service did not mean that access to a telephone was universal in 1920, only that the telephone network was moving toward consolidation in AT&T’s universe.
The Origins of the New “Universal Service” Policy in the United States

For the past quarter century, more than 90 percent of U.S. households have had a telephone, and most of the remaining households are likely to have had relatively easy access to one. Telephone penetration—the share of households connected to the telephone network—grew steadily from the bottom of the 1930s Depression, almost doubling between 1935 and 1950 from about 32 percent to 62 percent.18 Yet this was a period in which there was little discussion of universal telephone service. Rather, regulators struggled with the formula to be used in apportioning the fixed (non-traffic-sensitive) costs of the telephone network between interstate and intrastate services for the purposes of establishing telephone rates. It was not until 1947 that regulators finally settled on a separations policy that divided these costs between the two jurisdictions, and the first rates based on this separation of costs were only filed in 1950. At that time only 3 percent of the non-traffic-sensitive, local-network costs were apportioned to the interstate jurisdiction, but this represented the first attempt to shift some of the fixed costs of connecting subscribers to the price of interstate calls.19

Another twenty-five years elapsed before the modern definition of universal service emerged—once again tendered by an AT&T that faced dire trouble. In 1974 the Department of Justice filed a massive Sherman Act case against AT&T, proposing to break AT&T into several companies to ameliorate its monopoly power. In response to this threat, AT&T hired Eugene V. Rostow (who had chaired President Lyndon Johnson’s 1968 Task Force on Communications Policy) to testify before Congress in 1975 on the threats to AT&T’s “universal and optimized” telephone network. Apparently, this was the first time AT&T had revived the notion of universal service, albeit a new definition. Universal no longer meant that all subscribers, whether they totaled 25, 30, or 60 percent of households, subscribed to the same network. Now universal service meant that the telephone was truly ubiquitous, that everyone—or nearly everyone—enjoyed access to plain old telephone service, regardless of the supplier.

The change in the definition of universal service was necessary because AT&T was confronted by a new kind of competition that developed out of the unfortunate politics of regulation. After 1950, the joint federal-state board that divided the non-traffic-sensitive costs of the local network between “state” and “interstate” jurisdictions moved an increasing share of these costs into the federal jurisdiction. By the mid-1970s, 20 percent of
these costs were assigned to interstate calls through this artifice even though such costs did not vary with minutes of calling in any jurisdiction. Quite simply, this was a “cross-subsidy” in the popular sense from interstate long-distance calls to local service. At the same time, state regulators allowed the price of local business connections to be set far above the rates for residential connections. They also generally permitted all local urban rates—both business and residential—to be substantially above rural rates even though the relative costs of service would have required precisely the opposite.20

These rate distortions began to invite a new kind of competition, not from independent local companies as was the case at the turn of the century, but at first from competitive long-distance carriers and later from local urban carriers (now known as CAPs, or competitive access providers).21 These entrants were clearly attracted by the prospects of arbitrage possibilities created by politically minded regulators. In 1969 Microwave Communications, Inc. (MCI) was granted a license by the Federal Communications Commission (FCC) to offer limited, private-line interstate service for business customers.22 In 1971 the FCC opened this private-line market to general entry, but it was not until 1974 that MCI began to offer its business customers a standard switched long-distance service that could connect with any U.S. telephone subscriber. This new service was not expressly authorized by the FCC, but MCI offered it anyway and survived attempts by the FCC to enforce an order in the courts to discontinue the service.

MCI’s competition in long-distance services exposed AT&T’s source of support for below-cost residential service to competitive attack. At this point, AT&T could have begun a long struggle to reverse the regulators’ unfortunate decisions to assign so much of the non-traffic-sensitive costs of its local networks to interstate long distance, or it could have attempted to fight off competition by frustrating MCI’s and others’ attempts to interconnect with its network while seeking legislation to limit the role of competition. It chose the latter course; hence, Rostow’s invocation of the new “universal service” proposal. The rate distortions had to be perpetuated to keep local service rates artificially low and thus “affordable” for millions of Americans, but AT&T needed relief from competition and antitrust to carry out this policy.

Obviously, AT&T lost this battle, but it won the war of the words. This new definition of universal service has achieved a prominent role in the regulators’ and politicians’ lexicon—that of defending a rate structure that cannot be defended on pure economic grounds23 and that cannot withstand the onslaught of competition unless formalized in a system of long-distance access charges. The new long-distance competitors had to be
charged their “fair share” of the cost of the local connections. The FCC and the states thus moved from an implicit decision to keep long-distance rates high through regulatory accounting of costs to a formal system of above-cost access charges that long-distance companies pay local-exchange companies to connect their calls.

When AT&T was subsequently broken up through a consent decree that settled the government’s 1974 antitrust case against it, the average interstate access charge was more than seventeen cents a minute. Today it is about three cents a minute and falling, but the per minute charge is still far above the long-run incremental costs of connecting a call. Intra-state access charges are even higher. This implicit support of local telephone service from long-distance services continues, as do the implicit transfers to local rural connections that are still embedded in the regulated rate structures.

The Shift to Explicit Universal Service Subsidies in the United States

Besides the implicit transfers and even “subsidies” embedded in the U.S. telephone rate structure, there are also direct subsidies paid directly from “universal service funds” to local telephone companies to fund reduced rates for low-income subscribers and to compensate local companies for high-cost operations. These funds are raised principally from a charge on long-distance companies.

The first of these programs, Lifeline, is a federal-state subsidy program designed by the FCC in 1984 and 1985 to reduce the monthly subscription rate for qualifying low-income households. The federal portion had been funded from revenues collected from long-distance carriers on the basis of each carrier’s presubscribed lines. The amount of the subsidy had been up to twice the federal subscriber line charge, or a maximum of $7 a month, with intrastate carrier operations funding half the cost. In 1987 the FCC supplemented the Lifeline program with a Link-Up America program, designed to subsidize the installation charge for qualifying low-income households. This latter program pays one-half of the initial installation charges up to a maximum of $30 and subsidizes the interest charges on deferred payment programs of up to twelve months for up to $200 of these connection charges. The cost of the federal portion of these two programs in 1998 was $464 million, or about $2.67 a year for each access line (table 1-1). This was equivalent to 13.4 percent of the average residential rate.
In addition, the FCC has subsidized a substantial share of the costs of local exchange companies in high-cost areas. This “high-cost assistance” program has also been funded from long-distance carriers in a complicated manner, and it has been far more expensive than the Lifeline and Link-Up programs combined. A Universal Service Fund (USF) was established through a tax on presubscribed long-distance lines to fund high-cost connections (local loops) to subscribers through a complicated formula. In 1998 this fund distributed $827 million to high-cost (that is, rural) local telephone carriers through a charge of nearly $5.00 per presubscribed long-distance access line. Local telephone companies have contributed annually to a fund to cross-subsidize high-cost companies even further through a “long-term support” program. In 1998 these payments totaled $472 million or nearly $3.00 a year per local line for the companies who provided the subsidy. Finally, there has been a program to fund high-cost companies’ allegedly high switching costs through a levy on the interstate access charges that are paid by long-distance carriers to originate and terminate their calls. This subsidy totaled $413 million in 1998. Thus, the direct high-cost subsidies paid directly to rural, high-cost companies ($1.712 billion in 1998) have been much more costly than the direct subsidies ($464 million in 1998) targeted on low-income subscribers. All of these programs were supported by what is, in effect, a tax of 3 percent on interstate telecommunications services.29

The incentive effects of the high-cost fund are likely to be substantially adverse to economic efficiency, given that a “high-cost” carrier is generally reimbursed in proportion to its costs. For instance, under the high-cost

Table 1-1. The Cost of Federal Universal Service Programs, 1998

<table>
<thead>
<tr>
<th>Program</th>
<th>Annual cost ($ millions)</th>
<th>Annual cost per local carrier line ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lifeline</td>
<td>422</td>
<td>2.43</td>
</tr>
<tr>
<td>Link-Up</td>
<td>42</td>
<td>.24</td>
</tr>
<tr>
<td>High-cost support</td>
<td>827</td>
<td>4.75</td>
</tr>
<tr>
<td>Long-term support</td>
<td>472</td>
<td>2.71</td>
</tr>
<tr>
<td>Switching costs</td>
<td>413</td>
<td>2.37</td>
</tr>
<tr>
<td>Total</td>
<td>2,176</td>
<td>12.52</td>
</tr>
</tbody>
</table>


a. Annual cost divided by total Universal Service Fund loops.
program the share of the fixed, non-traffic-sensitive costs reimbursed rose from 0 percent for areas whose costs were less than 15 percent above the national average to 75 percent of the costs for areas whose non-traffic-sensitive costs exceeded 150 percent of the national average. Moreover, the focus of the tax to support these payments on interstate carriers’ presubscribed lines provided an incentive for inefficient substitution of private lines, resellers, or call-by-call services for a preselected carrier.

Under the 1996 Telecommunications Act, most of these federal high-cost support programs are being replaced by a direct subsidy program that is to be based on the difference between the Federal Communications Commission’s estimate of forward-looking costs and a “benchmark” estimate of a reasonable rate for local service. The support payments are to be explicit, portable, and paid for by a tax based on all interstate and international revenues. Interstate access charges, the source of much of the support payments under the earlier regime, are to be reduced dollar for dollar by the new tax revenues, but the FCC decision to reduce these access charges was postponed until January 2000 while the commission settled on a final high-cost support policy.

The FCC spent three years in a controversial process of calibrating its “model” of forward-looking costs for this program that was originally to begin in January 1999. In late 1999, the commission finally completed the process of establishing the high-cost support levels for nonrural carriers, having set interim levels for rural carriers in 1997. The total projected cost of these programs for 2000 will be $1.925 billion, requiring a tax on interstate and international revenues of 2.6 percent. Although not required by FCC regulation or the 1996 Telecommunications Act, the replacement of indirect intrastate support of high-cost residential lines by a program similar to that enacted by the FCC is anticipated as local competition develops. Unfortunately, the federal subsidy program will remain complex and controversial in no small part because of the politics of redistributing revenues from low-cost to high-cost states and the jurisdictional rivalries inherent in the U.S. regulatory system.

The New (New) U.S. Concept of Universal Service

In a later chapter, we analyze the need to erect cross-subsidies to ensure virtual universality of subscription to telephone service in a country as advanced as the United States. But in the wake of the 1996 act, this is
obviously too modest a task. The act not only enshrines the notion of maintaining artificially low monthly rates for local residential voice service, but it even extends this philosophy to new services while at the same time professing to promote competition. Now the FCC is to establish a new program of federal support from taxes on telecommunication carrier revenues to pay for advanced services to schools and libraries and to establish below-cost telephone rates for certain rural medical facilities. The act requires a joint board of federal and state regulators to provide guidance for establishing the support levels for these programs. This board issued its report in 1996, and the commission subsequently voted to fund the schools and libraries program at $2.25 billion a year and rural medical facilities at $400 million a year. In the ensuing three years, the program has been enmeshed in continuing controversy over the amount of funding, the definition of the revenue base from which the funds are to be raised, and the efficiency of the administration of the entire program. By the end of 1999, the FCC was spending approximately $2 billion a year on these programs, requiring a tax on interstate and international revenues of 3 percent.

If Congress wished to vote for efficient, explicit subsidies for connecting high-cost residences, schools, libraries, or rural medical facilities, it could have funded such support from general revenues or from a relatively efficient tax. By leaving the setting of the tax to federal regulators, Congress implicitly encouraged them to continue the policy of levying taxes on services with relatively high price elasticities of demand, thereby continuing the inefficient policies of the past. As we describe in a later chapter, these taxes on price-elastic services cost society much more lost output than do taxes on less price-elastic services, such as basic connections to the network. These inefficiencies are likely to be magnified by the growth in the types of services to be supported. Thus, the newest universal service policy is likely to resemble the older policy in a new disguise—and one with far more services to support.

Other Countries

The United States is not alone in promoting universal service in telecommunications policy, but the complexity of its state and federal policies is unique. Other OECD countries are now actively debating the role of regulated rates in ensuring universality of telephone service, particularly as they privatize their national carriers and open up their traditional
telephone monopolies to competition. However, none is anticipating the myriad programs designed to subsidize high-cost operations or targeted facilities, such as schools, libraries, and medical establishments.

**Canada**

Although most telephone companies in Canada have always been private, Canada did not begin to liberalize its telephone sector until the mid-1980s. This liberalization was extremely limited before 1992 when the Canadian Radio-Television and Telecommunications Commission (CRTC) began to allow facilities-based competition. Subsequently, the passage of the 1993 Telecommunications Act clarified the CRTC’s jurisdiction over all telecommunications regulation in Canada, and the CRTC moved aggressively to begin the liberalization of local telecommunications. But Canada entered this new era with a rate structure that was even more distorted than that of the United States. This rate structure could not survive open entry and competition; therefore, the CRTC began to rebalance rates toward relative cost following its 1992 decision to open long-distance markets to competition.

The commission proposed to reduce “contributions” from long-distance to local exchange services by imposing a succession of three $2.00 a month local rate increases over the next three years. This proposal was delayed by the intervention of the Cabinet but was essentially reinstated in 1995. By the end of 1998, these increases would reduce the contribution from long-distance services to no more than two cents a minute.

The CRTC thus essentially affirmed its historical policy of internal cross-subsidies or “contributions” from long-distance services to local residential rates, arguing that it must do so because competition cannot be relied on to keep all residential rates “affordable.” This is in contrast with the United States, which is shifting to a more transparent tax on all telecommunications revenues to fund its interstate universal service requirement. But Canada is not extending its universal service policy to new services just yet; hence its universal service policy may turn out to be less onerous than those policies being established or perpetuated in the United States.

**Europe**

Because telecommunications liberalization only began in earnest on January 1, 1998, any discussion of universal service policy in European
countries is likely to be overtaken by changing regulatory policies. It is important to stress, however, that most European countries differ greatly from the United States and Canada in the method of charging for local telephone service. The European countries do not offer flat-rate service; rather, they generally charge relatively low, geographically uniform monthly “line rental” rates with substantial local usage (per minute) rates that vary with the time of day. As a result, European subscribers use their telephones far less than Canadians or Americans. In 1994–95, for example, the average number of local calls per line in EU countries ranged from 760 to 1,170 a year compared with 3,000 calls a year in the United States. Therefore, any analysis of European universal service subsidies for basic telephony must address the monthly line charge and the local usage rate.

As of 1996, most EU countries had universal service policies that extended solely to basic services (table 1-2). However, with liberalization being pushed by the European Commission through directives enforcing open networks and transparent, cost-based interconnection regimes, the commission has also introduced measures to prevent countries from using a universal service obligation to reduce competition. The commission states that universal service obligations can include geographic rate averaging for voice telephony, public phones, and public directories. The costs of the universal service obligations can be covered by a Universal Service Fund extracted from all operators. Any access deficit—the imbalance between revenues from customer line rentals and their costs—is not part of the USF, but it may be recovered as a separate tax only until 2000. If other services are added to the universal service obligation, these cannot be charged for in a USF.

Before the 1998 liberalization deadline, most EU countries had established their universal policies by statute, and most therefore had uniform (“affordable”) local rates. Surprisingly, few offered low-user discounts although most required some form of discount for the disabled. As in the United States and Canada, all but three countries allowed the telecom operator to terminate service for nonpayment of bills.

Traditionally, the most important characteristic of European universal service policies has been the low and generally geographically uniform monthly charge for a residential line. Table 1-3 provides comparable data for most OECD countries, including the EU, Australia, New Zealand, the United States, and Canada. Most of the EU countries have uniform rates, but the United States and Canada do not. We delve into the cost of providing local service in a later chapter, but for now we note that residen-
<table>
<thead>
<tr>
<th>Country</th>
<th>Legal obligation</th>
<th>Services covered</th>
<th>Affordability criterion</th>
<th>Uniform national rates</th>
<th>Low-user discounts</th>
<th>Disability discounts</th>
<th>Disconnect for nonpayment</th>
</tr>
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<tbody>
<tr>
<td>Austria</td>
<td>Yes</td>
<td>Basic</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Belgium</td>
<td>Yes</td>
<td>Basic</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Denmark</td>
<td>Yes</td>
<td>Basic plus ISDN</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Finland</td>
<td>Yes</td>
<td>Basic</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>France</td>
<td>Yes</td>
<td>Basic</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Germany</td>
<td>Yes</td>
<td>Basic, directory services, pay phones</td>
<td>Yes, but changing in 1998</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Greece</td>
<td>No</td>
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<td>Luxembourg</td>
<td>No</td>
<td>None</td>
<td>No</td>
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<td>No</td>
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<td>Yes</td>
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<td>Netherlands</td>
<td>Yes</td>
<td>Basic plus billing</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Portugal</td>
<td>Yes</td>
<td>Basic, leased lines, and ISDN</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Spain</td>
<td>Yes</td>
<td>Basic</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Sweden</td>
<td>Yes</td>
<td>Basic and fax</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>Yes</td>
<td>Basic</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

tial service over a terrestrial wire-based telephone network is likely to cost
about $20 a month in urban areas and much more in rural areas. Therefore,
countries such as Greece, Italy, and Spain have very large deficits in
offering traditional local residential telephone service. In many of these
countries, this deficit per line is surely greater than in the United States.

The European Commission has not directly ordered rate rebalancing,
but its requirement that access deficits not be part of a Universal Service
Fund in 2000 is putting pressure on individual governments to rebalance
rates.\textsuperscript{44} France began the process in 1997 with a 48 percent increase in local
rates and a corresponding 47 percent reduction in long-distance rates. The

\begin{footnotesize}
\begin{longtable}{lcc}
\hline
 Country & Monthly charge & \textit{Price per 3-minute local call} & \textit{Average cost with 75 local calls per month} \\
\hline
 Australia & 8.60 & 0.20 & 23.60 \\
 Austria & 15.90 & 0.20 & 30.90 \\
 Belgium & 18.80 & 0.20 & 33.80 \\
 Canada & 8.10$^a$ & 0 & 8.10 \\
 Denmark & 17.80 & 0.20 & 32.80 \\
 Finland & 7.10 & 0.10$^a$ & 14.60 \\
 France & 9.20 & 0.10 & 16.70 \\
 Germany & 17.20 & 0.10 & 24.70 \\
 Greece & 7.40 & 0$^a$ & 7.40 \\
 Ireland & 17.30$^a$ & 0.20 & 32.30 \\
 Italy & 8.60 & 0.20 & 23.60 \\
 Japan & 18.60 & 0.10$^a$ & 26.10 \\
 Luxembourg & 7.60$^a$ & 0.20 & 22.60 \\
 Netherlands & 13.60 & 0.10 & 21.10 \\
 New Zealand & 22.70 & 0$^a$ & 22.70 \\
 Portugal & 12.10 & 0.10 & 19.60 \\
 Spain & 11.60 & 0.10 & 19.10 \\
 United Kingdom & 13.00 & 0.20 & 28.00 \\
 United States & 19.49 & 0 & 19.49 \\
\hline
\end{longtable}
\end{footnotesize}


Netherlands allowed KPN Telecom to increase local rates by 27 percent in mid-1998 with corresponding reductions in calling charges. However, Greece and Portugal have not yet begun rate rebalancing. The United Kingdom, which began liberalization in 1984, provides an intermediate example. British Telecom was allowed to raise rates slowly through a price cap that was pegged to the annual change in the CPI plus 1.5 percent, an increase that BT took in every year through 1996 (except for 1986) when the constraint was removed. Even in those countries that have rebalanced, however, the monthly charge for a local line remains the same for urban and high-cost, rural areas. This remains an intractable issue that is not being addressed in most of Europe.

It seems that much of Europe has thus far avoided embracing new services in its universal service policies, perhaps because of lower Internet use in Europe than in North America. A survey of European national regulatory authorities and interest groups by Analysys Ltd. on behalf of the European Commission Directorate General XIII found that Europeans are not particularly supportive of broadening the definition of universal service to include new, innovative services. Analysys reports that a broad consensus exists to separate the policies for diffusing new services from those of ensuring universality of ordinary telephone services, including directory assistance and access to emergency services. However, recent developments in France suggest that an expanded universal service obligation is a potentially important tool to protect the incumbent, France Telecom.

The French Telecommunications Act of 1996 defines universal service as “the provision to the public of a quality telephone service at an affordable price.” Besides the basic telephone service, the act defines universal service to include information services, directory services (printed and electronic), provision of pay phones in public places and the provision of free calls to emergency services as this is consistent with the EU directives. Any operator with responsibility for universal service is required to provide service to any one who requests it. The act currently names France Telecom as the operator responsible for universal service, since the universal service obligation is national in scope although all telephone service providers are obliged to carry emergency calls free of charge. Besides these obligations, all licensed network operators must offer a variety of other services, such as high-speed ISDN service, packet-switched data services, enhanced voice telephony, and leased lines. The universal service obligations will be funded through interconnection charges (for as much as three years) and other levies on providers.
These French policies may have more to do with protecting France Telecom than with promoting universal service. In 1997 the deficit of France Telecom in providing local access (the “access deficit”) was estimated as 4.5 billion French francs, or more than $700 million for a country that is one-fifth the size of the United States. By comparison, in the United Kingdom there is little or no access deficit according to the regulator, Oftel. Similarly, a recent study of Sweden, a long and sparsely populated country, concluded that the net cost of the universal service obligation for Telia—the incumbent telephone company—after accounting for various other “nonfinancial” benefits of incumbency was in the range of $5 million to $20 million a year, a negligible magnitude.  

Any universal service subsidies that remain must conform to the policies established in Directives 97/33 and 96/19. These EU directives define the cost of universal service obligations as “the difference between the net costs of operating with and without universal service obligations,” but it does not provide guidance on how such costs are to be measured or allocated across services or users. This cost must then be recovered through charges levied on public telecommunications providers in an objective, nondiscriminatory manner that does not penalize new entrants. However, it appears that in several countries the cost will be recovered from interconnection charges that must be paid by new entrants, thereby discouraging entry. Clearly, much thought must be given to structuring European universal service obligations in a manner compatible with a competitive environment.

Recent Studies of the Effectiveness of Universal Service Policies

Most analyses of universal service policies assume that the goal of such policies is to ensure that low-income and rural households subscribe to the basic telephone network. Such analyses may examine the effectiveness of universal service policies, their effect on economic efficiency, or both. We summarize only some of the more recent work here.

David L. Kaserman, John W. Mayo, and Joseph E. Flynn estimate a cross-sectional model of access rates (the carrier common line rates), residential rates, and residential telephone subscription in the mid-1980s. Using only thirty-eight statewide observations, they find that an AT&T estimate of cross-subsidy per line has very little effect on U.S. residential
rates and that residential telephone subscription has a very low price elasticity. Therefore, they conclude that the attempts to cross-subsidize local rates from long-distance revenues has little or no effect on universal service.

Milton L. Mueller and Jorge Reina Schement look in detail at telephone penetration in one low-income city, Camden, N.J. They find that low penetration is not simply a function of low income. Renters and young households are less likely to have telephone service, in part because they are less creditworthy. Mueller and Schement find that a history of large long-distance bills is often responsible for the absence of a telephone because many customers fail to pay these bills and suffer a termination of service. However, the results of an interview survey they conducted suggest that cable television is generally more pervasive than telephones in part because some people receive cable TV illegally. Mueller and Schement conclude that usage costs are more important than network access costs in determining universal service.

In a sophisticated study of consumer expenditure patterns, Frank A. Wolak finds that expenditure elasticities for local telephone service are very low, but expenditure elasticities for long-distance service are high. Unfortunately, his data, drawn from the Bureau of Labor Statistics’ Consumer Expenditure Survey, do not permit him to match households with precise data on local and long-distance rates. Wolak therefore has only a rough approximation of the rates actually paid by his sample households. His analysis does not specifically examine the costs or benefits of universal service; rather, Wolak simply estimates the effect of raising local rates by 20 or 40 percent and reducing long-distance rates by 0, 20, or 40 percent. He concludes that raising local rates and reducing long-distance rates by the same proportion is welfare enhancing for all but a few households. Local expenditures rise very little for the average household with a 20 to 40 percent increase in local rates—presumably because second lines and vertical services decline—but long-distance expenditures rise substantially as long-distance rates are reduced by the same proportion.

More recently, Ross C. Eriksson, David L. Kaserman, and John A. Mayo examine the effect of universal service policies in 1984–93 by using pooled times-series, cross-section state data to estimate a recursive model of monthly local rates and subscriber demand. They find exceedingly low elasticities of demand with respect to the monthly local rate, the installation rate, and long-distance rates within a state. Some of these estimates may be biased toward zero because of an errors-in-variables problem—
local rates vary across communities within each state, a problem that they cannot address because they use statewide data. Nevertheless, Eriksson, Kaserman, and Mayo conclude that untargeted subsidies to local-exchange companies are much less efficient in promoting universal service than are the targeted programs (Lifeline and Link-Up). But even the targeted programs cost about $550 a year for each additional subscriber—certainly more than the cost of the service itself. Even these estimates are optimistic because they fail to take into account the negative effects on penetration from raising long-distance rates to fund these programs.

A study by Christopher Garbacz and Herbert G. Thompson uses 1990 Census of Population data to estimate the effect of subsidy programs on telephone penetration. This study concludes that telephone penetration is more sensitive to the installation charge than to monthly rates, a reflection of the fact that many nonsubscribers are low-income households with unpaid previous bills and low creditworthiness. Paying the installation charge and, perhaps, back bills, serves as a more powerful disincentive to subscribing to the network than does the monthly rate in one of the authors’ two models. While the targeted subsidy programs are successful in increasing telephone subscriptions, the elasticity of telephone penetration with respect to dollars spent on such programs is .003 to .008. Like Eriksson, Kaserman, and Mayo, they conclude that the likely effect of such subsidies, after accounting for the increase in long-distance rates to fund them, is minimal or even nonexistent.

Finally, Jerry Hausman looks at the efficiency of funding new universal service requirements in the United States—the new (new) universal service policy—from taxes on interstate telephone service. He concludes that the cost of such subsidies is an additional $1.05 to $1.25 per $1.00 raised in subsidies, far above the cost of using general federal revenues for this purpose.

Conclusions

Most developed countries have some form of implicit subsidy program embedded in their telephone rate structure. Typically, these policies involve charging less than the long-run incremental cost for local residential connections and recovering the difference from usage charges for local, national, and international calls. These transfers are generally buried in the rate structure in a manner that makes them difficult for voters to detect.
In the United States, however, these implicit support payments from business and long-distance services are supplemented by direct subsidies paid from long-distance carrier charges to high-cost rural local telephone companies and to local companies offering discounted monthly rates and connection charges to qualifying (generally low-income) subscribers. These U.S. policies are now changing as a result of the 1996 Telecommunications Act. Federal universal service support is derived openly and directly from a tax (charge) levied on interstate carrier revenues. Furthermore, the United States is the most aggressive country in expanding the domain of services eligible for universal service subsidies. Universal service has been expanded to cover technologically advanced services provided to schools, libraries, and medical facilities.

Most studies of universal service policies conclude that they have minimal effect on telephone subscriptions. First, they are exceedingly broad and principally fund those who would subscribe anyway (such as readers of this book). Second, these policies do not address the real causes of nonsubscription—installation fees and excessive past bills for long-distance calling. Finally, the taxes levied to pay for these subsidies are on calling—local and long-distance—taxes that feed back on the nonpayment problem. Perhaps more important is that there are substantial adverse effects on economic welfare owing to how these taxes are levied. We delve into this problem in the following chapters when we estimate the cost of current universal service policies and the likely costs of extending such programs to new telecommunications services in the United States.