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# Universal Service and Rate Restructuring in Telecommunications, No. 23

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INFORMATION COMPUTER COMMUNICATIONS POLICY

23

# UNIVERSAL SERVICE AND RATE RESTRUCTURING IN TELECOMMUNICATIONS

OCDE
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PARIS 1991

INFORMATION COMPUTER COMMUNICATIONS POLICY

23

# UNIVERSAL SERVICE AND RATE RESTRUCTURING IN TELECOMMUNICATIONS

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ET LA RESTRUCTURATION DES TARIFS
DANS LES TÉLÉCOMMUNICATIONS

The studies in Parts I and II were undertaken for the Working Party on Telecommunications and Information Services as part of the work programme on the "Economics and Social Effects of Change in Telecommunication Service Structures in OECD Countries".

Part I of this report, prepared by Prof. Nicholas Garnham of the Centre for Communication and Information Studies, Polytechnic of Central London, United Kingdom, presents the first comprehensive study of universal service in the countries of Western Europe. It is complemented by a parallel study of universal service in Japan, prepared by Mr. Yasu Taniwaki of the Japanese Ministry of Posts and Telecommunications, which is presented in Appendix I.B.

Part II of this report, prepared by Dr. Robin Mansell, of the Centre for Information and Communication Technologies, Science Policy Research Unit, University of Sussex, United Kingdom, takes a close look at the treatment of cost and pricing issues in North America and the European countries.

The Committee on Information, Computer and Communications Policy recommended that this report be made available to the public. This book is published on the responsibility of the Secretary-General.

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# PREFACE

Despite their use of very similar technologies, the organisation of the supply of telecommunications in different regions of the OECD area has differed considerably. These differences are particularly visible in the ways in which two important concepts have been addressed in the United States and Canada and the Western European countries. Universal service, though never clearly defined, has long been an explicit policy objective in the United States and Canada. Progress toward this goal has been monitored by regulatory agencies and has generated public discussion at intervals throughout the history of the development of telephony services. Similarly, prices and their relationship to underlying supply costs have been of long-standing concern to PTOs and regulators in the United States and since the mid-1970s in Canada. The magnitude and direction of subsidies among services have attracted the interest of industrial users, consumer groups, regulators and, in the United States, the courts.

In Europe, the experience has been different. Until very recently the notion of "universal service" was not discussed. Instead an implicit concept of public service characterised governmental and PTO views of suppliers' responsibilities. The aim was to extend the telecommunication infrastructure and to introduce high quality services. Since they were not subject to detailed regulatory oversight, European PTO's did not develop sophisticated service cost and accounting systems as did their counterparts in North America. The relationship between service costs and prices was a matter for internal consideration and the resulting service prices were generally subject to governmental approval.

The two main studies in this report, "Universal service in European telecommunications" (Part I) and "Telecommunication rate restructuring: issues, patterns and policy problems for OECD countries" (Part II) explore why European countries are being forced in the 1980s to address both

universal service and pricing issues, and to do so more openly in the policy making domain.

Part I considers the claim that universal service goals for telecommunications are threatened by the process of liberalisation because it forces a move to "cost-based" pricing which undermines the cross-subsidies that are needed to provide universal service. In this study, the way in which universal service is understood by European PTOs is explored. The mandates under which PTOs operate, their ability to provide empirical evidence of the flow of subsidies, and their perceptions of regulatory or economic threats to traditional rate-setting practices are discussed.

Part II explains why the concept of "cost-based" pricing can be used in a variety of confusing ways to justify PTO efforts to restructure rates for switched network services and private circuits. This study presents and contrasts assumptions about the nature of cost causation in telecommunications and gives particular attention to the difficulties inherent in determining service supply costs where a variety of services use a common facility network. The study also outlines the differences between "cost of service" and "value of service" pricing showing how these approaches can lead to very different approaches to rate restructuring.

As the universal service report makes clear, European PTOs have not until very recently needed to examine the theoretical justification for different approaches to telecommunications costs and prices. Nevertheless, PTOs have been introducing sometimes quite radical changes in the structure of the prices for services. The second part of the rate restructuring study, examines the patterns of change in telecommunication tariffs that have been introduced over the past decade. The results show that pressures to introduce "cost-based" pricing have been expressed in a wide variety of trends in the components of service prices. In some cases rather dramatic decreases in international and domestic long distance telephone service prices have been accompanied by significant increases in installation charges and local usage charges. In others, the pattern of price restructuring is quite different. These patterns have implications for the universal provision of telephone and other services.

In virtually every OECD country, PTOs are being confronted with pressures to upgrade their networks and to provide new services that are responsive to business demand. The public switched telephone network, accompanied by separate data networks and private leased capacity, is not sufficient to satisfy the complex needs of larger firms for flexible, reliable,

"intelligent" services. The development of Integrated Services Digital Networks (ISDN), virtual private networks, managed data network services and many other service applications requires substantial investment by PTOs. At the same time that these new demands are being placed on PTOs, they are being confronted with competition from a range of service providers who seek to use their infrastructure to fashion services targeted primarily to the business community. In the UK, British Telecom must also contend with competition in provision of the underlying infrastructure.

A more competitive service environment is being promoted by the European Community's attempt to stimulate the telecommunication equipment and service market (with the exception of voice telephony). Operating as monopolies, PTOs have been able to fix prices that average the costs of supply geographically and of certain types of services. Cross-subsidies have been accepted as good practice to achieve social and economic objectives including the extension of services to higher cost regions, the contribution of revenues to postal operations, etc. In the face of new entry by service providers and technical change, PTOs have needed to reconsider their price structures. Rate and route averaging frequently appears unsustainable where competitors seek to serve customers in limited market segments and especially in metropolitan areas. But PTOs continue to operate under the implicit understanding that certain service delivery goals must be met. The political and economic question is what services should be provided and how the costs of provision should be recovered from their customers.

The first part of this question is related to the concept of "universal service". The study shows that it is necessary to distinguish two approaches to the concept, one politico-philosophical and the other economic. The first approach treats access to telecommunication services as a basic right of all citizens. The second sees access to services as an economic good that raises questions of efficiency and the distribution of economic welfare. Universality can be applied to geographical access, to the affordability of access, to service quality, and to tariffs, without specifying the type of service that should be subject to these conditions. The cost implications of extending universality to services beyond "basic" telephony, which itself is not universally available, are substantial. Which new types of "value-added" service can be regarded as essential for full membership in the social community is clearly a political judgement that will be addressed differently by OECD countries.

The second aspect of the question requires consideration of the difficult nature of cost allocation where multiple service providers rely on a common

telecommunication network facility system. Traditional pricing structures have made it possible for PTOs to work toward the implementation of some aspects of the universal concept. These price structures need to be altered to protect their revenue base against the threat of bypass and cream-skimming and it could become increasingly difficult for PTOs to provide voice (and other services) at an acceptable price. Because of its political sensitivity, rate rebalancing is the most visible adjustment of price structures that has been introduced. Rate rebalancing refers to the introduction by some, but by no means all European PTOs, of substantial reductions in long distance prices for public switched telephone network (PSTN) and associated increases in local usage charges. Upward trends in local usage charges enable PTOs to recover substantial switching costs from a broader customer base, but they also imply a threat to the affordability of what has long been regarded as "basic" telephone service. The extent to which bypass and cream-skimming actually do threaten traditional PTO price structures requires detailed assessment of the costs of both public and private network operators, and particularly of the local exchange bottleneck and traffic trends.

Attempts to undertake detailed assessments of telecommunications costs have not been high on the agenda of European PTOs. Drawing on the largely North American debate as to the relevant costs and cost standards against which proposed changes in price structures should be considered, it is demonstrated that there are two different approaches that must be untangled if cost and price relationships are to be properly understood. Both concern the treatment of common and overhead costs which comprise on the order of 60 to 80 per cent of telecommunications supply costs. The first approach advocates the recovery of these costs by allocation to services on the best estimates of cost causation. The second seeks to recover these costs by means of differentiated mark-ups above the marginal or direct costs of particular services. Each approach results in a different calculation of the relevant costs that should be compared with prices. Although there is growing agreement among European PTOs that service prices should bear some relationship to their costs of production, there is substantial disagreement on the measurement of costs and the circumstances where prices should deviate from costs to implement social or economic policy objectives.

The controversies as to costs and cost standards have not been widely debated outside North America. But the implications of the implicit adoption of different approaches in the face of competition and liberalisation of service provision in the European Community are far reaching. The empirical analysis shows that rate restructuring has not implied an inevitable trend

toward "rebalancing". There are, in fact, a variety of patterns emerging in prices for telecommunications services and some of these are more likely to enhance "universal" access to service than others.

Both studies conclude that the continued provision of universal services, by any definition, can be pursued through a variety approaches. This observation holds despite the fact that PTOs face common problems in the form of rapid technical change and the need to modernise the telecommunications infrastructure, the entry of new service providers targeting large business users, and the need to plan new service introduction in the face of market structures characterised by both monopoly and competitive supply. There is a clear need to debate issues related to social and economic policy for telecommunications more openly and with more attention to the implications of cost and universal service definitions for prices and the long-term viability of PTOs.

*Part I*

# UNIVERSAL SERVICE IN EUROPEAN TELECOMMUNICATIONS

# I. SUMMARY

The background to this study is the often made claim that universal service goals for telecommunications will be threatened by the process of liberalisation because it will force a move to cost-based pricing which will undermine the cross-subsidy arrangements which underpin universal service.

This study aims, in particular, to answer the following questions for each of the OECD Member countries in Europe:

1. What universal service mandate does the telecommunications administration have? Is it enshrined in laws/regulations and if so where? Or is it an implicit policy?

2. How is universal service defined? Does it cover only basic analogue telephone connection or is it deemed to apply to other and newer services? In particular, does it apply to digitisation and ISDN (Integrated Services Digital Network) and if so over what time scale and with what planning priorities is universal provision of these new services planned?

3. How is the achievement of universal service measured and monitored? In particular what are current penetration rates and are they collected on a regional or income group/social class basis?

4. What is the current level of cross-subsidy of local calls and/or domestic subscribers by long-distance calls and/or business subscribes or of rural by urban areas? What method of cost allocation is used in determining this subsidy level?

5. What is the relation between universal service and quality of service? What quality of service indicators are collected? Are they published? Is there a legal obligation to meet quality of service standards?

6. What telephone demand elasticity studies have been conducted and what is thought would be the effect on telephone penetration and usage of any rise in local and domestic subscriber service costs as a result of rate rebalancing?

7. Are there regulatory or economic developments which pose a threat to the provision of universal service? If so what are they and are there plans or proposals to protect universal service, for instance through the regulatory structure or by means of direct subsidies to low income groups?

8. Are there any special problems or regulatory requirements relating to the provision of service in rural areas?

# II. DISCUSSION OF THE ISSUES

## 1. Introduction

This report was commissioned as an input into the ICCP Committee's project on the "Economic and social effects of change in telecommunication service structures in OECD countries". The study focuses on how the issue of "universal service" in telecommunications is treated in the European OECD countries, and the possible impact of liberalisation on the provision of universal service in these countries. The study concentrates on a number of European countries where information was available: these countries are of different geographic size and at different stages of development with regard to their telecommunications infrastructure.

The concept of universal service lies at the heart of the debate on the liberalisation of the telecommunications service market. Arguments used to justify the retention of public, or publicly-controlled, telecommunications monopoly structures are based on the claim that only through such structures will there be an assurance of maintaining universal telecommunication service. This is because, it is contended, monopoly structures allow the cross-subsidy, and rate and route averaging necessary to meet the economic and financial requirements for the provision of universal service.

The concept of universal service is understood in a general sense in most OECD countries as access to the telephone network. The term "access" is usually qualified as implying access on a similar basis among different customers and equally on a geographical basis. In most OECD countries the meaning of "universal service" has not been precisely defined and no specific statutes or administrative procedures have been enacted to implement the concept in a concrete way. In the case of the UK, where the requirement for "Universal Provision of Telecommunication Services" is written into British Telecom's licence (see Appendix I.A), no mention is made of either price or quality characteristics of the service to be delivered. It needs to be recognised at the outset that it may be difficult to impose precise service delivery goals on public telecommunication operators (PTOs), thus requiring a flexible

interpretation of the concept. But it also needs recognising that vagueness in defining the concept of universal service makes it amenable for use in defending the status quo.

This report is aimed at:

a) what the concept of "universal service" entails in OECD European countries;

b) the ways in which and the extent to which "universal service" is incorporated into the regulatory structures and operations of each country's telecommunications system;

c) the extent to which "universal service", however defined and measured, has been or is on the way to being achieved;

d) the nature and extent of the threat posed to the provision of "universal service" by liberalisation of telecommunication market structures in Europe;

e) the regulatory safeguards needed to ensure the provision and protection of "universal service", where this is thought appropriate.

Data used in this study have been obtained through the analysis of regulatory, policy and statistical documents, the circulation of a questionnaire to PTOs and interviews with key officials.

Special attention has been given to the UK as an example of the most extensively liberalised telecommunication market in Europe and thus as a prime example of the likely impact of such liberalisation on the provision of universal service and of the resulting regulatory problems.

This study must be seen as very much a preliminary approach to the issue of "universal service" in European telecommunications. When embarking on the study it was assumed that much of the relevant data and supporting documentation would be readily available from PTOs. This has not proved to be the case. The evidence suggests, however, that most countries in Europe have not reflected (at least publicly), in a comprehensive way, on issues related to universal service and on alternate ways if necessary to provide and ensure that universal service is not jeopardised as a result of changes in telecommunication structures. This contrasts significantly with experience in North America where an important focus of public discussion has been on universal service issues.

Institutional, politico-legal, empirical and linguistic problems involved in such a multi-country study pose obvious resource constraints. It is clear that a much more extensive research effort is required than has been undertaken within the resource and time constraints of this study.

## 2. The Concept of "universal service"

There is a need to distinguish two different approaches to the concept of "universal service"; one politico-philosophical, and the other economic. Each can lead to a different set of policy prescriptions and in fact these are often confused in policy debate. Also there is a need to distinguish between the goal of "universal service" and the means for achieving it.

## 3. What is "universal service"?

The first approach conceives "universal service", defined as access to telecommunication services, as a basic right of all citizens, essential for full membership of the social community, and as a basic element of the right to freedom of expression and communication: thus, as with health and education provision, it should be provided centrally out of what is, in effect, tax revenue. In this approach, the goal of the provision of "universal service" overrides questions of pure economic efficiency and the provision should be raised directly by taxation or indirectly via the telecommunication tariff structure and what services should be included within the "universal service" mandate.

The second approach regards access to telecommunications as an economic good to be consumed in a market like any other good and thus questions of efficiency and the distribution of economic welfare become paramount.

From a perspective internal to the telecommunication sector itself it can be argued that "universal service" provision, in so far as it has been realised, stems ultimately from the nature of the telecommunications network and the positive consumption externalities, common costs and economies of scale and scope involved. Here the policy questions are both more pragmatic and more empirically based and relate to:

-- the extent of network externalities;

-- the balance to be struck between efficiency and distribution effects;

-- the extent of economies of scale and scope and their impact on the possibilities of competition and therefore on the nature of appropriate regulatory structures and mechanisms;

-- questions of cost allocation and the arbitrariness or otherwise of so-called cost-based tariffs;

-- penetration rates and elasticities of demand.

From this economics perspective, "universal service" can be seen as a question of infrastructural provision, that is an investment decision undertaken not on the basis of either telecommunication revenue or direct demand for telecommunication services, but on the basis of general economic benefits to be derived by the rest of the economy, or on the basis, as with the Minitel in France, of a supply-side equipment and services strategy.

In attempting to judge or measure the likely impact of liberalisation upon "universal service" provision and in proposing regulatory safeguards, the concept of "universal service" should be broken down into distinct subsidiary concepts.

a) First there is the concept of universal geographical availability. This concept is closely related to the development of nation states as political and economic realms with distinct territorial identities. According to this concept all citizens, wherever they are located within the boundaries of the State, have a right to equal access to that State's services. At the same time the provision of such services by a central power, especially infrastructural and communication services, binds the periphery to the centre with the aim of national political and economic unification. This is a concept of pure access.

b) Second, there is the concept of non-discriminatory access, that is, the equal treatment of all users in terms of price and/or levels of service. This concept relates to that of common-carriage.

It is these two essentially passive concepts of "universal service" that are expressed in the definition in the EC Green paper (1).

c) But, thirdly, there is a more active concept of universal penetration linked to the notion of reasonable costs or affordability. It is striking that this more active concept of "universal service", while central to the North American debate, has not in general been present in either European regulatory texts or debates.

These differing possible definitions of universal service must be distinguished because they require different measures of their achievement as policy goals and because liberalisation may have differential effects upon each one. For instance geographical availability can be measured in terms of differing regional penetration rates and it would tend to be susceptible to the undermining of route averaging and to any move away from universality in connection charges. Non-discriminatory access on the other hand can be measured by the simple presence or absence of universal, non-discriminatory tariffs and will be susceptible to such developments as rebalancing between residential and business subscribers and the introduction of volume discounts. The question of affordability can be measured in terms of both absolute penetration rates and of relative penetration rates in relation to income level. Affordability can also be measured in terms of price and income elasticities in

relation to the effect of tariff changes on the real cost of telecommunications. This concept of universal service raises policy questions relating to the need to subsidise telecommunications access for distinct disadvantaged social groups, and if so, the most appropriate mechanism for doing so.

## 4. The nature and quality of "universal service" provision

Clarifying the questions outlined above in relation to each country only takes us part of the way down the road to pinning down the concrete nature of "universal service" provision in practice. Most of the debate on "universal service" has concentrated on the provision of a simple connection to the analogue telephone network and has measured the universality of that provision in terms of penetration rates, either in lines per hundred inhabitants or in percentage of households with a telephone. Even in relation to analogue telephony this tells us nothing about the quality of service being delivered. Such penetration rates could disguise large divergencies between classes of customer, in terms of such quality of service measurements as fault repair and installation times, calls failing, etc. Thus this study is concerned with the extent to which, in each country, a given quality of service level is integrated into the "universal service" concept and how that quality of service is monitored.

Moreover, as the basic telecommunication network becomes a carrier for, and a means of, access to a range of new services, it becomes important to analyse the extent to which the "universal service" concept is being expanded to cover access to these services as well as to basic telephony. This is particularly important for two reasons: first, because one of the key arguments in favour of liberalisation is that it encourages innovation in service provision. In judging the impact of such liberalisation it is necessary to know what the distribution of those benefits will be; second because the impact of liberalisation may be misjudged if analysis is confined to its impact on the provision of voice telephony in a mature market rather than projecting its impact forward into a situation in which data and end-to-end digital services become of increasing significance.

## 5. Existing definitions of "universal service"

Usually "universal service" is defined, if it is defined at all, in the most general terms. All the countries examined are signatories of the convention of the International Telecommunication Union which recognises "the right of the public to correspond by means of the international service (...). The services, the charges and the safeguards shall be the same for all users in each category of correspondence without any priority or preference". The extent to which this amounts to a requirement to provide universal service turns on the definition of "category of correspondence", but it would appear to ensure access <u>on equal terms</u> rather than <u>universal</u> access.

The recent EC Green Paper states, after widespread consultation with the CEPT and its members, that "universal service" is taken to mean:

1. Provided with general geographical coverage;

2. Provided on demand to all users on reasonably the same terms regardless of the users' location within the service providers territory or franchise area and the cost of connection to the network.

What is seen here is a passive approach to universal service -- the provision of a service on request within a given tariff structure -- rather than a policy approach which actively promotes, for instance through tariff structures, universal service. It is striking that in general in Europe, even where provision of service on demand is a specific requirement, nowhere is there an attempt to link such demand to "affordability" as there is in the US and Canada. Only in the Swedish 3-year plan is there reference to making "good service and good quality available at low cost" and in the contract between the Spanish government and Telefonica to "tariffs which must not hinder telephone development".

The concern in Europe regarding universal service has thus not reflected the concerns expressed in North America as regards the impact of price changes on universal service and the possible exclusion of disadvantaged income groups from the telephone service. Important changes in prices have been introduced in several European countries for local charges (directly through price increases or indirectly through changes in metering rates) without significant consumer opposition or public discussions regarding universal service effects. More concern has been expressed (by telecommunications administrations) on the cream-skimming which might occur with liberalised entry in telecommunications, and the impact that this would have on the ability of the public operator to cross-subsidise, and therefore on universal service. This latter concern to some extent contradicts indifference regarding price increases on universal service.

## 6. Universal Service and public service

In most of the countries surveyed "universal service" is an implicit rather than explicit goal of telecommunication policy in the sense that individual citizens possess no legal right to telephone service on demand, or conversely telecommunications administrations are under no legal obligation to provide service. Thus the way in which universal service provision is interpreted is essentially voluntarist on the part of either the government or the administration or both -- a matter of changing political and/or administrative priorities and perceptions. The extent of this voluntarism is well illustrated by two examples. The first is the shift in France at the end of the 1960s, without any explicit regulatory change, from a policy of regarding the telephone service as a luxury, (a subordinate outpost of the postal and telegraph service), to one of rapid expansion and universal provision, not just of the

telephone, but also increasingly of other advanced telecommunication-based services, such as Minitel. Second, the fact that in the UK prior to liberalisation the Post Office operated, for reasons of national economic policy, a rate structure for both leased lines and for the balance between local and long-distance tariffs which favoured business over residential subscribers and perhaps contributed to the UK's relatively low penetration rates.

This voluntarism relates to the important fact that it is the term "public service" rather than "universal service" that has been used in general European regulatory discourse to date and that governs the thinking of European administrations and regulators. Indeed, it is significant that, for instance in France, only now has a discussion started of the concept of "universal service" in the face of liberalisation, and of the need to decide what service obligations to place upon private telecommunication operators. Similarly, in the UK it is only with liberalisation that the provision of universal service has been made both an explicit aim of government regulatory policy in the Telecommunications Act, and a specific obligation laid upon British Telecom and Mercury in their licences.

The concept of public service is stronger in those countries governed by Roman law rather than common law and derives from a Hegelian tradition which distinguishes the State, as the expression of the highest form of social rationality and of the public interest, from civil society, the subordinate realm of competitive private interest. Within this tradition the State, by definition, represents, through the political process, the best interests of all citizens. Thus the delivery of a public service by the State, whether directly or by delegated authority, does not require a more specific "universal service" remit nor is there a requirement for the State to be held accountable for its actions, legally or otherwise, to individual citizens. It is thus not subject to normal civil law, for instance for breach of contract. For this reason a shift to a more liberal regulatory regime can raise fundamental legal and constitutional issues which cannot be resolved by a simple appeal to economic rationality.

It is these issues which are currently bound up with the introduction of the concept of "universal" rather than "public" service in European regulatory debates. It raises the question, for instance, of the extent to which universal service shares with public service the obligation or expectation of continuous service delivery, i.e. universality through time. This obligation is not normally placed upon competitive private entities. Indeed the whole purpose of competition would be negated if companies could not stop trading. Moreover the obligation to provide universal and continuous service is normally associated with the granting of reciprocal privileges in respect of the overriding of normal private property rights and planning controls as regards way-leaves. This is important because the interrelationship between obligations and the granting of privileges in respect of infrastructural provision is often neglected in the liberalisation debate.

In short, the full implications of the universal service concept in relation to the current and proposed regulatory structures for telecommunications in Europe raise complex and far-reaching politico-legal questions, specific to the legal and political structure and history of each country; issues which are beyond the scope of this study, but which should be borne in mind when considering the necessarily brief national overviews contained in this report and upon which the development of appropriate regulatory structures for the future will depend.

## 7. The impact of liberalisation on "universal service": an overview

The question that has received most attention in the debate, at least in the US and to some extent in the UK, namely the effect on residential subscriber penetration and usage of rate rebalancing, seems from a survey of the European debate to be a very marginal question. It is not something that seems to concern those PTOs surveyed at least from an economic stand-point, although the Deutsche Bundespost did cite the potential political opposition of residential subscribers to rate rises as a brake on regulatory reform. The sanguine view of PTOs on this issue is borne out by demand elasticity studies. All such studies show very low price elasticity, of the order of 0.1 or less, for both telephone connection and calls and elasticity which declines, because of externalities, as penetration grows (2). Moreover as incomes rise, (a rise closely associated with general economic growth which is itself closely correlated with telecommunications system and demand growth), elasticities also decline. At the same time declining real costs of telecommunications mean that even after extensive tariff rebalancing in response to competition, as in the UK, bills even for the most disadvantaged customers are declining in real terms. Thus, as the most extensive recent study by the Canadian Department of Communication (3) shows, any loss of subscribers due to rate rebalancing in a mature national telecommunications market is likely to be negligible. This applies to most of the countries in Western Europe with the exception of Ireland, Portugal and Turkey. In addition it should be noted that the shift of the cost burden from business to residential subscribers resulting from rate rebalancing, which is the focus of debate in North America, will be significantly less in Europe because Local Measured Service is already universally used. It should, however, be noted that considerable additional de facto price rises can be achieved within local measured service by changes to time-pulse periods and zoning.

This finding does not of course mean that such a shift of the cost burden is either fair or efficient and is neutral as to monopoly or competitive provision. It only means it is compatible with one limited definition of universal service. It also means that:

a) Any existing barriers to universal telephone penetration are likely to stem from general problems of economic growth and wealth distribution rather than from tariff or service policies and should be addressed accordingly; and that

b) If non-possession of access to telephone service is seen as an unacceptable social deprivation, then the disadvantaged group requiring help is likely to be relatively small and the scale of financial aid required, whether through the social service system or through special schemes administered by the telecommunication operators, is likely to be small.

This still leaves a number of problems. First that of the non-mature systems named above. The question of whether a monopoly or competitive telecommunication market structure is likely to be optimal for systems growth in such countries is one which is outside the scope of this study. Those interested might refer to parallel work which has been done in relation to the EC's STAR programme (4) and to a recent OECD paper (5), although this work is concerned with regional problems rather than with the state of the whole infrastructure. However the following can be noted:

a) As we have seen, the relatively recent history of European telecommunications shows that a commitment to universal service goals by a national monopoly can be associated with very different patterns of growth (see Tables 1-2);

b) That within the EC, especially in the context of the introduction of a unified internal market in 1992, there is a special problem, namely that the logic of universal tariffs and thus of rate and route averaging cannot be confined within the boundaries of a national state or the reach of an individual PTO, but applies across the EC. This the Commission recognises, as its recent Green Paper makes clear. The problem is that it does not have the institutional mechanisms to bring about the unified tariff structure and the associated revenue transfers between national administrations that such a policy would entail. What it means for the purposes here, however, is that it is becoming impossible in the European Community context to examine the effects of liberalisation within one country in isolation;

c) Issues of tariffication in terms of geographical zoning may emerge as an important issue over the next few years in European countries.

This relates to a further problem in relation to the impact of liberalisation, namely its impact on universal geographical availability. The director-general of OFTEL (United Kingdom) recognised the problem in the recent review of BT's tariffs (6). BT responded to liberalisation immediately it was introduced by, in 1982, abandoning the principle of route averaging and universal tariffs and introducing two levels of trunk tariff, for high cost "b" routes and for low cost "b1" routes. In reviewing the effect of these tariffs OFTEL was concerned primarily with the question of competition and whether they were an example of predatory practice against Mercury. But the director-general also noted that he had a statutory responsibility to protect service to rural areas. It has also been suggested in the UK

Table 1

**Telephone Main Lines per 100 Inhabitants**
**(Ranked on the basis of 1985 data)**

| | 1974 | 1980 | 1983 | 1984 | 1985 | Growth 1974-1984 |
|---|---|---|---|---|---|---|
| Sweden (5) | 49.71 | 58.00 | 60.24 | 61.51 | 62.78 | 2.1 |
| U.S. (2) | 36.82 | 41.43 | 47.27 | 48.17 | 50.57 | 2.9 |
| Switzerland (1) | 37.01 | 44.46 | 47.75 | 48.95 | 50.18 | 2.8 |
| Denmark (6) | 31.71 | 43.43 | 46.98 | 48.24 | 49.74 | 4.2 |
| Canada (4) | 35.27 | 41.44 | 41.90 | 45.34 | 49.18 | 2.3 |
| Finland (8) | 26.45 | 36.40 | 41.62 | 43.08 | 44.68 | 4.9 |
| Iceland (12) | 32.56 | 37.28 | 39.66 | 40.42 | 42.39 | 2.4 |
| Luxembourg (15) | 28.49 | 36.26 | 37.98 | 40.16 | 42.08 | 3.6 |
| Germany (7) | 19.61 | 33.35 | 38.34 | 40.22 | 41.94 | 7.2 |
| France (11) | 11.81 | 29.95 | 38.26 | 40.20 | 41.75 | 12.2 |
| Norway (3) | 21.66 | 28.65 | 36.77 | 39.07 | 41.37 | 6.1 |
| Australia (9) | 24.49 | 32.28 | 37.01 | 38.81 | 40.38 | 4.7 |
| Netherlands (13) | 22.62 | 34.57 | 38.02 | 39.12 | 40.20 | 5.4 |
| New Zealand (18) | 31.01 | 35.08 | 37.14 | 37.63 | 39.80 | 2.3 |
| Japan (10) | 26.53 | 33.06 | 35.58 | 36.50 | 37.57 | 3.2 |
| U.K. (17) | 22.87 | 31.44 | 34.68 | 35.75 | 36.95 | 4.5 |
| Austria (14) | 18.29 | 29.02 | 33.75 | 34.97 | 36.12 | 6.4 |
| Belgium (16) | 18.08 | 25.01 | 28.85 | 29.94 | 31.05 | 5.0 |
| Italy (19) | 16.49 | 23.07 | 27.45 | 28.99 | 30.45 | 5.7 |
| Greece (22) | 17.55 | 23.54 | 27.56 | 29.57 | 30.15 | 5.0 |
| Spain (21) | 12.11 | 19.34 | 22.15 | 23.14 | 24.20 | 6.5 |
| Ireland (20) | 9.80 | 14.20 | 17.47 | 18.93 | 19.74 | 6.6 |
| Portugal (23) | 8.00 | 10.07 | 12.42 | 13.08 | 13.75 | 5.0 |
| Turkey (24) | 1.52 | 2.46 | 3.50 | 3.98 | 4.51 | 10.4 |
| OECD Average | 24.77 | 32.00 | 36.39 | 37.57 | 39.23 | 4.3 |

Bracketed numbers represent OECD ranking of countries in terms of Gross Domestic Product at market prices per capita at current US$ for 1983.

Source: International Telecommunication Union, Yearbook of Common Carrier Telecommunication Statistics (11th edition) and PTO Annual Reports.

that if simple resale competition is introduced on leased lines, then a levy might have to be charged to counteract cream-skimming and ensure cross subsidisation of low density, high-cost routes.

Table 2

**Waiting List for Telephone Main Lines as Percentage of Total Main Lines**

| | 1974 | 1980 | 1983 | 1984 | 1985 |
|---|---|---|---|---|---|
| Australia (A) | 0.65 | 0.22 | 0.88 | 0.10 | 0.12 |
| Austria (A) | 13.81 | 6.71 | 2.36 | 1.74 | 1.47 |
| Belgium (A) | 1.25 | 1.54 | 0.58 | 0.30 | 0.23 |
| Canada | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Denmark | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 |
| Finland | 0.00 | 0.08 | 0.05 | 0.07 | 0.07 |
| France | 15.27 | 3.52 | 0.50 | 0.26 | 0.16 |
| Germany (B) | 0.70 | 0.42 | 0.14 | 0.17 | 0.11 |
| Greece (B) | 15.96 | 35.15 | 33.20 | 31.89 | 0.00 |
| Iceland | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Ireland | 13.73 | 18.63 | 9.79 | 6.16 | 3.94 |
| Italy (B) | 4.43 | 6.36 | 3.08 | 2.41 | 1.90 |
| Japan | 0.00 | 0.30 | 0.26 | 0.24 | 0.17 |
| Luxembourg | 6.86 | 1.52 | 1.41 | 1.32 | 1.32 |
| Netherlands | 1.43 | 1.66 | 0.84 | 0.82 | 0.94 |
| New Zealand | 0.96 | 0.70 | 0.13 | 0.19 | 0.23 |
| Norway | 4.17 | 7.08 | 0.83 | 0.05 | 0.05 |
| Portugal | 17.10 | 12.50 | 9.56 | 6.55 | 3.16 |
| Spain | 14.50 | 7.37 | 3.50 | 3.01 | 2.71 |
| Sweden | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Switzerland (A) | 0.79 | 0.18 | 0.13 | 0.12 | 0.13 |
| Turkey | 112.85 | 140.57 | 109.10 | 94.85 | 80.90 |
| UK (C) | 0.00 | 1.49 | 0.02 | 0.00 | 0.00 |
| US | 0.06 | 0.07 | 0.00 | 0.00 | 0.00 |

The waiting list consists of applications for connection which cannot be completed owing to lack of technical infrastructure (equipment, lines, etc.). For each country the definition differs as to period, e.g. for Australia it comprises applications for subscriptions which cannot be completed within 3 months, in Germany the period is 4 months.

A = 3 months B = 4 weeks C = 8 weeks

Source: International Telecommunication Union (ITU) Yearbook.

It is clear from existing penetration figures that:

a) Considerable inequalities in regional penetration can co-exist with the supposed monopoly pursuit of universal service goals (see Tables 3-5); but that,

b) Even the threat of cream-skimming competition or by-pass is likely to place pressure on route averaging. The measurement of the impact of such a move on relative regional and urban/rural penetration rates and usage and the effect of that on relative regional development patterns will depend upon the specific economic structure of a given country and the structure of the public telecommunications network and of actual or potential private networks. That there is the threat of such an effect from liberalisation and that specific regulatory protection is required if the geographical aspect of universal service is to be maintained is not in question. Nor is it in question that if this is a problem within the boundaries of one nation, then it is also one on an even greater scale within the boundaries of Europe itself. Indeed the DGT (Direction générale des télécommunications) in France advocates working towards the "postalisation" of European telecommunication tariffs. As technology makes telecommunication costs less and less related to distance, then they argue, telecommunications used should be tariffed, as packet switching is at present, on a purely usage-related basis. In the context of European regulatory change and in particular in the context of the EC the feasibility and impact of such "postalisation" merits further study.

## 8. Distributional Issues

The concept of "universal service" raises equality issues which cannot be captured solely in terms of either penetration or usage rates. That is, the tariff rebalancing associated with liberalisation may not measurably effect these rates, but it may nonetheless distribute the welfare gains associated with such rebalancing in an inequitable fashion. This is not merely a normative question concerning the role of equity in the regulation of economic activities. It is also a question of practical politics since, as the US example shows, the perception of such inequitable treatment by citizens can lead to significant political opposition to regulatory reform.

Two issues are involved here. First the nature of the overall distribution effects and second the extent to which the primary goal of regulation should be economic efficiency.

The second point has been cogently explored by Zajac (7) who argues that even if the distributional effects of liberalisation could be shown to be a Pareto optimum, they may still and correctly be regarded as unacceptable by the majority of citizens. His argument, in brief, is that economic analysis ignores at its peril the fact that

Table 3

## Regional Variations in Telephone Subscribers per 100 Population (1980 and 1981 Data)

| Country | Region | | Telephone subscribers per 100 habitants | As per cent of National Average |
|---|---|---|---|---|
| United Kingdom | highest nat. aver. | London | 42 | 127 |
| | national nat. aver. | | 33 | |
| | lowest nat. aver. | N. Ireland | 23 | 70 |
| Germany | highest nat. aver. | West Berlin | 53 | 156 |
| | national nat. aver. | | 34 | |
| | lowest nat. aver. | Regensburg | 24 | 71 |
| France | highest nat. aver. | Paris | 40 | 133 |
| | national nat. aver. | | 30 | |
| | lowest nat. aver. | Franche Comte Lorraine | 23 | 77 |
| Italy | highest nat. aver. | Liguria | 36 | 156 |
| | national aver. | | 23 | |
| | lowest nat. aver. | Calabria | 12 | 52 |
| Netherlands | highest nat. aver. | Amsterdam | 43 | 126 |
| | national aver. | | 34 | |
| | lowest nat. aver. | Hengelo | 30 | 88 |
| Denmark | highest nat. aver. | Sealand/Mon | 49 | 109 |
| | national aver. | | 45 | |
| | lowest nat. aver. | Mid/N.Jutland | 41 | 91 |
| Belgium | highest nat. aver. | Brussels | 36 | 133 |
| | national aver. | | 27 | |
| | lowest nat. aver. | Hasselt | 19 | 70 |
| Greece | highest nat. aver. | Athens reg. | 35 | 141 |
| | national aver. | | 25 | |
| | lowest nat. aver. | Thrace | 9 | 38 |
| Ireland | national aver. | | 21 | |
| Luxembourg | national aver. | (end 1982) | 36 | |

Source: National Telecommunication Administrations, adapted from Gillespie, A.E., et al. "The Effects of New Information Technology on Less-favoured Regions of the Community", Regional Policy Series No. 23, Commission of the European Communities, Brussels, 1984.

Table 4

## OECD Country Main Telephone Penetration Rates by City, 1983

| Country | Total Main Telephones per 100 pop. | High City | Main Telephones per 100 pop. | Low City | Main Telephones per 100 pop. | No. of Cities | Average City Penetration |
|---|---|---|---|---|---|---|---|
| Austria | 32.3 | Bregnenz | 69.0 | Klagenfurt | 41.1 | 8 | 50.6 |
| Belgium | 27.6 | Brussels | 40.9 | Aalst | 25.7 | 15 | 33.0 |
| Canada (1) | 41.9 | Charlottetown | 129.7 | Earlton | 31.3 | 45 | 46.9 |
| Denmark | 45.6 | Copenhagen | 55.7 | Esbjerg | 44.3 | 6 | 52.4 |
| Finland | 36.8 | Helsinki | 63.4 | Vantaa | 32.9 | 11 | 48.9 |
| France | 35.6 | Paris area | 52.5 | Marseille | 41.2 | 3 | 49.5 |
| Germany | 37.4 | West Berlin | 56.0 | Karlsruhe | 32.0 | 30 | 46.8 |
| Greece | 25.8 | Athens | 41.3 | Volos | 22.2 | 12 | 37.0 |
| Iceland | 37.2 | Reykjavik | 49.1 | Akureyri | 36.3 | 4 | 46.2 |
| Ireland | 16.2 | Cork | 27.1 | Dublin | 25.4 | 3 | 25.6 |
| Italy | 25.9 | Milan | 44.3 | Naples | 26.0 | 20 | 36.3 |
| Japan | 53.0 | Tsuchiura | 84.8 | Funabashi | 38.0 | 150 | 61.4 |
| Luxembourg | 38.1 | Esch-Alzette | 55.8 | Luxembourg | 54.6 | 2 | 54.8 |
| Netherlands | 39.4 | Amsterdam area | 50.7 | Apeldoorn | 36.2 | 16 | 44.8 |
| New Zealand | 37.1 | Napier | 93.2 | Auckland | 41.3 | 14 | 54.2 |
| Norway | 53.5 | Oslo | 97.5 | Ringerike | 44.2 | 19 | 70.2 |
| Portugal | 11.7 | Lisbon | 34.2 | Braga | 8.9 | 9 | 26.9 |
| Spain | 19.9 | Barcelona | 44.3 | Cordoba | 23.0 | 14 | 35.4 |
| Sweden | 54.3 | Stockholm | 82.6 | Vesteras | 55.4 | 20 | 66.2 |
| Switzerland | 47.2 | Solothurn | 74.0 | Aarau | 43.9 | 15 | 57.5 |
| Turkey | 3.4 | Istanbul | 13.4 | Adana | 2.1 | 16 | 7.9 |
| U.K. | 34.6 | Manchester | 136.9 | Belfast | 34.7 | 18 | 1.0 |
| U.S. | 37.7 | Grand Rapids MI | 123.1 | Swlawik AK | 11.1 | 376 | 42.3 |

1. Total data for Canada in this source are in error. ITU 1983 Main Lines used here. Data not available for Australia. Calculated from Table 18, Telephones in the World's Principal Cities, AT&T. The World's Telephones, 1 January 1983.

Source: Mansell R. (1988) "The Role of Information and Telecommunication Technologies in Regional Development", STI Review, No. 3, OECD.

individuals, in their economic actions and their socio-political judgements, use different criteria of mutual material self-interest and of equity to those used by welfare economists. In particular, even if it could be demonstrated that everyone was economically better off from a given change, that change would not necessarily be regraded as equitable, since the over-all social distribution of welfare is considered to be as important, if not more important, than its absolute level.

In this context Perl (8) has demonstrated for the US case that while so-called cost-based tariffs will produce significant total welfare gains, these gains will be very inequitably distributed, with the poorest 30 per cent of households actually losing from cost-based pricing (see Table 6). Since he is in favour of cost-based pricing

Table 5

**Share of National Network Terminating Points Accounted for by the Largest Region, 1979**

| Country | Highest Share Region | Share of National Total |
|---|---|---|
| France | Paris | 43 per cent |
| Belgium | Brussels | 48 per cent |
| Denmark | Copenhagen | 37 per cent |
| Germany | Dusseldorf | 10 per cent |
| Ireland | Dublin | 79 per cent |
| United Kingdom | London | 43 per cent |
| Netherlands | Amsterdam | 25 per cent |
| Italy | Lombardia | 30 per cent |
| Greece | Attika | 93 per cent |

Source: Eurodata Foundation Reports. "Data Communication in Western Europe in the 1980s".

Table 6

**Distribution of Welfare Gains from Cost-based Pricing**

| Income Group (US$) | Percent of Households | Cost-based Pricing | Access Charge (US$) | Income-based Access Charge Annual Gain |
|---|---|---|---|---|
| $6,000 or less | 11.35 | -68.28 | 10.00 | 56.50 |
| $1,001-$12,500 | 19.15 | -7.83 | 15.30 | 62.47 |
| $12,501-$17,500 | 19.67 | 48.93 | 20.40 | 65.52 |
| $17,501-$25,000 | 16.03 | 99.03 | 25.00 | 66.44 |
| Above $25,000 | 33.80 | 181.95 | 32.00 | 88.83 |
| Average | 77.13 | 22.90 | 71.95 | |

Source: Perl, L. (1986).

for the general welfare gains he believes it to bring, he goes on to advocate income-based access charges as a means of evening out the distributional effects (see Table 7).

Perl's analysis, however, is based upon a prior analysis which shows to his satisfaction the considerable over-all welfare gains stemming from cost-based pricing. How valid is such an analysis? The studies done on this issue rest upon quantitative assumptions as to the price elasticity of demand for different telecommunication services, but also, and more importantly, upon marginal costs which are in their turn based upon telecommunication operators own cost calculations.

Two crucial points need to be made here. As the most recent study of this issue, undertaken by the CRTC in Canada, judiciously puts it, "in the absence of fuller knowledge as to the reasonableness of these assumptions, the specific results produced by these studies should be considered with caution" (9). Two important issues are involved here so far as this study is concerned. Firstly the existence of high levels of common costs, a level which current technological developments is increasing (the US Justice Department report estimates common and joint costs as between 70 and 90 per cent of total costs) (10), leads some analysts to doubt both the validity and possibility of applying marginal costing methods to telecommunication pricing. But secondly, even leaving aside this problem, our knowledge of costs and cost allocation methods for European telecommunication operators is simply inadequate to come to a judgement on this issue. This is therefore an area that needs urgent further research, before any judgements can be made on the need for or desirability of tariff changes, questions which must logically precede the analysis of the effects, in particular the general welfare and distributional effects, of liberalisation.

Table 7

**Telephone Penetration under Alternative Rates: Status Quo, Cost-based Pricing and Income-based Access Charges**

| Income Group (US$) | Status Quo | Cost-Based Pricing | Income-based Access Charges |
|---|---|---|---|
| 6 000 or less | 80.60 | 71.42 | 79.09 |
| 6 001-12 000 | 89.00 | 83.08 | 86.07 |
| 12 001-17 500 | 94.15 | 90.49 | 90.97 |
| 17 501-25 000 | 96.60 | 94.29 | 93.65 |
| Above 25 000 | 98.30 | 97.04 | 95.67 |
| Average | 93.05 | 89.19 | 90.35 |

Source: Perl, L. (1986).

Table 8

**Italy: Number of Subscribers per 100 Inhabitants and Income Per Capita (December 1983)**

| Italy | Telephone Sub-scribers | Telephone Sets | Television Sub-scribers | Vehicles in Circulation (1) | Income per Thousand liras |
|---|---|---|---|---|---|
| North | 31.78 | 48.80 | 28.30 | 39.71 | 10.930 |
| Central | 31.61 | 46.39 | 25.71 | 39.89 | 9.641 |
| South | 18.85 | 25.31 | 18.60 | 23.57 | 6.314 |
| Islands | 21.27 | 29.21 | 18.33 | 27.85 | 6.383 |
| Total | 27.39 | 40.37 | 24.30 | 34.46 | 9.042 |
| North/Centre | 31.73 | 48.08 | 27.53 | 39.77 | 10.547 |
| South/Islands | 19.63 | 26.57 | 18.51 | 24.96 | 6.336 |

**Percent of total (Italy - 100)**

| Italy | Telephone Sub-scribers | Telephone Sets | Television Sub-scribers | Vehicles in Circulation (1) | GDP | Population |
|---|---|---|---|---|---|---|
| North | 52.25 | 54.45 | 52.47 | 51.91 | 54.59 | 45.04 |
| Central | 22.04 | 21.94 | 20.20 | 22.11 | 20.36 | 19.10 |
| South | 16.67 | 15.19 | 18.55 | 16.57 | 16.86 | 24.22 |
| Islands | 9.94 | 8.42 | 8.78 | 9.41 | 8.19 | 11.64 |
| Total | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| North/ Centre | 74.29 | 76.39 | 72.68 | 74.02 | 74.95 | 64.14 |
| South/ Islands | 25.71 | 23.61 | 27.32 | 25.98 | 25.05 | 35.86 |

1. As of 31.12.1982.

Source: STET, Italy.

Table 9

**Italy: Growth of Selected High Technology Products (1960-87)**
**(Number per 100 Inhabitants)**

| Year | Telephone Subscribers | Number of Telephones | Television Subscribers | Automobiles in Circulation |
|---|---|---|---|---|
| 1960 | 6.07 | 7.66 | 4.21 | 3.92 |
| 1961 | 6.59 | 8.35 | 5.45 | 4.83 |
| 1962 | 7.15 | 9.12 | 6.78 | 5.94 |
| 1963 | 7.62 | 9.84 | 8.34 | 7.61 |
| 1964 | 8.14 | 10.67 | 10.06 | 9.02 |
| 1965 | 8.70 | 11.47 | 11.58 | 10.49 |
| 1966 | 9.26 | 12.32 | 13.05 | 12.10 |
| 1967 | 9.86 | 13.36 | 14.51 | 13.80 |
| 1968 | 10.51 | 14.59 | 15.70 | 15.55 |
| 1969 | 11.23 | 15.94 | 16.85 | 17.14 |
| 1970 | 12.00 | 17.40 | 18.04 | 18.91 |
| 1971 | 12.89 | 19.05 | 19.09 | 20.85 |
| 1972 | 13.99 | 20.79 | 20.06 | 22.86 |
| 1973 | 15.36 | 22.96 | 20.79 | 24.43 |
| 1974 | 16.44 | 24.77 | 21.37 | 25.85 |
| 1975 | 17.38 | 26.09 | 21.78 | 27.10 |
| 1976 | 18.21 | 27.31 | 22.17 | 28.53 |
| 1977 | 19.23 | 28.78 | 22.67 | 29.22 |
| 1978 | 20.38 | 30.39 | 22.89 | 28.89 |
| 1979 | 21.59 | 32.10 | 23.37 | 30.29 |
| 1980 | 23.05 | 34.14 | 23.66 | 31.32 |
| 1981 | 24.52 | 36.18 | 23.76 | 32.90 |
| 1982 | 25.90 | 38.21 | 24.05 | 34.46 |
| 1983 | 27.39 | 40.37 | 24.30 | n.d. |

Source: STET, Italy.

## 9. Universal service and penetration rates

It is normal to present telephone penetration rates in terms of main lines per 100 inhabitants (Table 1). This is not a very useful form of presentation for our purposes since it does not distinguish between business and residential subscribers.

Ideally for policy purposes, in order to monitor the impact of liberalisation, statistics for the penetration of analogue telephony and other telecommunication services are necessary, broken down firstly between households and business and then sub-categorised by socio-economic group for households and by type and size of business for business. These statistics also need to be presented on a regional basis. The nearest to this model currently available are the statistics produced by the DGT of France discussed in the next section.

Other useful indicators which it would be valuable to replicate for policy monitoring purposes are those produced by STET (Italy) which relate telephony penetration over time to TV subscribers, car ownership and gross domestic product per capita on a regional basis (see Tables 8-9).

From existing ITU statistics we can calculate household penetration rates as in Table 10. What can be said is that, with the notable exception of Sweden, while most countries in Europe are approaching a claimed saturation rate, this still leaves between 10 and 15 per cent of households without a telephone. How the relation

Table 10

**Telephone Penetration Rates, 1985**

| | Household Penetration (per cent) | Main Lines per 100 Inhabitants |
|---|---|---|
| Austria | 72.4 | 36.12 |
| Belgium | 71.0 (1987) | 31.05 |
| Denmark | 89.2 | 49.74 |
| Finland | 83.0 | 44.68 |
| France | 81.9 | 41.75 |
| Germany | 74.6 | 41.94 |
| Greece | 70.0 | 30.15 |
| Ireland | 49.5 | 19.74 |
| Italy | 68.9 | 30.45 |
| Netherlands | 84.7 | 40.20 |
| Portugal | 32.4 | 13.75 |
| Spain | 66.6 | 24.20 |
| Sweden | 113.0 | 62.78 |
| Switzerland | 83.3 | 50.18 |
| U.K. | 77.5 | 36.95 |

Note: These figures have been calculated as follows: Where a percentage of residential main lines is given this is used to calculate directly the percentage of household penetration. For the rest the range of percentage of residential lines given is, with the exception of Ireland at 64 per cent, within the range of 72.5 per cent to 79.7 per cent. The somewhat arbitrary figure of 75 per cent is thus used to calculate the remainder. The figures are given only for illustration since the percentage of residential lines will vary according to the general level of development of the telephone system in general and the particular characteristics of the business sector in particular.

Source: Based upon International Telecommunication Union, Yearbook of Common Carrier Telecommunication Statistics (11th edition).

between this fact and the claim to deliver universal service is interpreted will depend on the definition of universal service adopted and on an understanding of the reasons for non-subscription by households, which may have as much to do with cultural factors as with telephone service delivery and cost. This is a subject that deserves further study (11).

## 10. Geographical variation

Within these overall figures there remain not just significant variations between countries such as Ireland and Portugal, compared with the Western European norm but between regions within countries and between urban and rural areas. Figures collected for Austria show that in 1980 the level of penetration ranged from 71 per cent to 155 per cent of the national average (see Table 11).

Table 11

**Telephone Connections per 100 Inhabitants: Austria and Selected Regions**

| | Total Austria | Burgen-land | Karnten | Salzburg | Steier-mark | Tirol | Vienna |
|---|---|---|---|---|---|---|---|
| 1982 | 32.28 | 21.49 | 25.26 | 32.19 | 25.89 | 29.08 | 52.94 |
| 1983 | 33.75 | 23.35 | 26.87 | 33.19 | 27.63 | 30.15 | 53.92 |
| 1984 | 34.97 | 24.46 | 28.22 | 34.54 | 28.96 | 31.19 | 55.15 |
| 1985 | 36.13 | 25.42 | 29.64 | 35.51 | 30.02 | 32.34 | 56.72 |
| 1986 | 37.26 | 26.68 | 30.96 | 36.46 | 31.25 | 33.37 | 57.86 |

Source: Bundesministerium für Offentlichewirtschaft und Verkehr, 1987.

# III. UNIVERSAL SERVICE: COUNTRY SURVEYS

## 1. Belgium

When RTT (Régie des Télégraphes et Téléphones) was created in 1930, it was made responsible for delivery of telegraph and telephone services. It was implicitly assumed that these services would be considered "universal". "Universal service" is seen to cover two basic conditions: services are to be available throughout the national territory and tariffs are in principle the same for the whole country. A less basic condition is that RTT as a whole should be managed on a basis of cost recovery; excessive profits should be avoided.

All service supplied by RTT today are supplied under these "universal service" conditions (e.g. cellular radio and PSDN). Digitisation and ISDN will also be supplied as universal services. Digital private lines have been supplied since 1979 and ISDN will be supplied starting from the end of 1990 on a commercial basis. With this intention digital local exchanges are installed in an evenly distributed way so that from the beginning all potential users can be connected, albeit under the hypothesis of a slowly growing demand.

Periodically a full-cost calculation of the more important services is performed. Comparing these costs with current tariffs produces the following results:

a) Fixed costs are only partially recovered by subscription and connection revenue;

b) Connection costs are only partially covered by connection tariffs;

c) Traffic revenue exceeds traffic-linked costs;

d) Profitability increases with distance of call.

No exact figures are yet available for performing this analysis on a local basis, but it is assumed that densely populated areas are more profitable than rural ones.

The method of cost allocation described is at present under review; it would seem that with the present method some traffic-related costs are really driven by the number of subscribers.

It is accepted that a significant shift of tariffs away from traffic towards subscriptions would lead to a loss of subscribers, but no specific information is available concerning the extent to which such a rebalancing would be justified, nor concerning the exact subscriber loss to be anticipated.

At the present time a consensus seems to exist that all basis services and all network-related infrastructure should remain within the RTT monopoly and be subject to universal service conditions. Value-Added Network Services (VANS) are to be permitted on a case by case basis when it is established that a proposed VANS is genuine and does not provide a service already supplied by RTT itself.

On a longer time scale it is RTT's view that the main threat stems from the position articulated by the EC that the category of reserved service should be limited to telephony. Such a situation, in combination with a generalised ISDN, would drive tariffs towards costs which would certainly diminish the financial basis for universal service as defined at present. Depending on the extent of this phenomenon direct subsidies might be the only solution. There is no special policy towards rural areas.

## 2. France

To date in France the term "public service" has been used rather than "universal service". However, the concept of "universal service" is currently being developed in France in a special way.

Public service implies both equal treatment of all citizens and an obligation to provide continuity of service. This concept was only incorporated into the prior concept of the State's telecommunication monopoly (dating from the law of 1837) in the law of October 23rd 1984 which, for the first time, granted everyone the right to a telephone on demand (12). The law of 30 September 1986, La Liberté de Communication, Article 11, gives the CNCL (Commission nationale de communication et liberté) powers to ensure equality of treatment for all users of telecommunication systems. But this equality is that of common carriage, i.e. the right to equal treatment of all those who have access, rather than universal service, i.e. the right to equal access.

The extent and nature of the CNCL's powers over telecommunications awaits further legislation. Until this legislative process is completed, it is not clear to what extent there will continue to exist a State run or owned public telecommunication system outside the regulatory remit of the CNCL covering licensed private systems and services.

The draft law envisages a system whereby there would be a basic national telecommunication system, including the telephone service, telex service, data transmission service by packet-switched and circuit-switched networks and leasing of specialised links. The State guarantees the existence and availability of a general telecommunication network covering the national territory and providing international links. All basic services must provide equal access to all users in "identical situations". Licensed competitive entities providing both networks and certain basic services, e.g. cellular radio, can be required to meet conditions which are tantamount to universal service obligations, if only on a regional basis and an area of freely competitive services. The originality of the French approach was the notion that when and if these freely competitive services became sufficiently widespread to be of general economic or social importance, then the CNCL would bring them within the licensing regime and impose universal service obligations. The contentious issue clearly is the criteria that would be used to decide at what point a service reached this threshold.

Within the current regulatory regime there is no obligation to provide "universal service", rather as the recent history of French telecommunications demonstrates, the provision of universal service is voluntarist and depends upon the will of the government. The French telecommunication scene was characterised by relatively low penetration rates up to the late 1960s, followed by a great leap forward in the 1970s and 1980s. French progress in extending and digitising its user base is statistically the best documented of all OECD Member PTOs. As Tables 12 to 16 illustrate, the DGT collects figures on a regular basis for penetration rates by region, category of client, socio-professional category, industrial sector and by establishment size. The rapid rise in telephone penetration rates in France was achieved through the DGT's annual budget which must be approved by the Minister and voted by Parliament. In these budgets investment plans are agreed in relation to specific service goals.

An example of the above was the new tariffing policies introduced in 1981. In a press conference on 26th November 1981 M. Mexandeau, the then Minister, gave as the reason for the changes the need to "allow all French people to have access to the telephone" and stated that while the telephone still remained unequally distributed, it was now seen by all French people as essential as water, electricity and gas. It was thus proposed to cut connection charges, to introduce a rental differentiation between business and residential and to introduce public assistance to reduce or remove the fixed costs of telephone access for the most deprived and especially the handicapped. An additional aim of tariff restructuring was to support the movement towards decentralisation (13).

A debate on the concept of "universal service" and its applicability to telecommunications is at present in train in France. This debate takes two forms:

a) It has been set off by the proposal to introduce competition which brings with it the need for the first time to determine what service obligations should be laid on private operators, who may be subject to civil law remedies.

b) In response to the EC Green Paper, the DGT has argued the need to distinguish between basic service and universal service and in particular the need not to limit the concept of universal service to voice telephony. They argue that telecommunications administrations have historically, in line with successive technological developments, progressively made available a wider range of services over a wider geographical area; that those services are seen by users as essential to the proper functioning of business, domestic and leisure activities throughout the country; that each service is independent of the content transmitted and the use made of it, the operator guaranteeing perfect transparency; that in addition increasingly such services are independent of a specific physical infrastructural support and therefore the provision should NOT be equated with infrastructure provision. These services are described as "services à vocation universelle" and are distinguished from "services specifiques" which are aimed at a specific closed user group or market niche. Thus universal services are intended for eventual universal availability and consumption within a given service area and are taken to include the telegraph, telex, telephone, narrow-band analogue, medium band digital, videotex, telex, packet-switching and ISDN. Such universal services should be available throughout the service area at equal tariffs (which will require cost averaging) and with a common technical standard.

This distinction between universal and specific services is not seen as the same as the distinction between monopoly and competitive services. Universal service can be open to competition, but under regulatory controls that lay obligations of universal provision on the provider or providers and any resulting protection from competitive pressures to make the fulfilment of those obligations possible. This concept of universal service clearly underlay the recent draft of the proposed new telecommunications legislation.

Cost Allocation and Tariff Rebalancing

The DGT has been involved in a progressive rebalancing of its tariffs since 1981. Its eventual aim is to make all non-local tariffs non distance-dependent. Indeed it advocates a so-called postal regime, i.e. standard usage-based tariffs not only throughout France but throughout Europe. The DGT's tariff rebalancing was based upon extensive analysis of cost allocation and tariff strategies which, in contrast to other European countries, is in the public domain (14). The cost allocation method used is based on the average annual cost per subscriber or service (15). This cost is then divided between connection and traffic, but charges the cost of all network elements whose capacity is traffic sensitive to traffic, and loads all other costs onto connection. It is assumed that all traffic outside peak-time

Table 12

## France: Penetration of Equipment by Region at 1st January 1989

| | Average Density (No. of lines per 100 inhabitants) | Equipment Penetration for secondary residences (No. of lines per 100 secondary residences) | Penetration of Equipment per household (No. of lines per 100 households) | Penetration of Equipment by establishment (No. of lines per 100 employees) |
|---|---|---|---|---|
| Ajaccio | 43.2 | 26.7 | 89.1 | 28.0 |
| Amiens | 34.4 | 29.3 | 86.5 | 17.0 |
| Besançon | 34.5 | 26.1 | 82.3 | 17.7 |
| Bordeaux | 39.1 | 37.7 | 87.7 | 23.9 |
| Caen | 37.0 | 33.8 | 85.5 | 22.2 |
| Châlons/Marne | 35.5 | 25.3 | 84.6 | 19.8 |
| Clermont-Ferrand | 37.8 | 22.2 | 85.4 | 23.8 |
| Dijon | 38.5 | 35.9 | 86.1 | 21.0 |
| Lille | 32.7 | 31.8 | 83.4 | 17.0 |
| Limoges | 39.3 | 29.9 | 85.5 | 24.8 |
| Lyon | 39.8 | 27.4 | 87.7 | 21.6 |
| Marseille | 45.6 | 41.0 | 90.0 | 25.7 |
| Montpellier | 40.6 | 21.6 | 85.1 | 27.9 |
| Nancy | 34.1 | 22.4 | 84.9 | 15.3 |
| Nantes | 36.7 | 28.8 | 88.2 | 21.6 |
| Orléans | 38.6 | 41.4 | 88.0 | 19.9 |
| Poitiers | 37.0 | 32.2 | 86.6 | 23.4 |
| Rennes | 37.4 | 26.3 | 88.6 | 17.8 |
| Rouen | 37.5 | 50.1 | 88.4 | 17.8 |
| Strasbourg | 36.6 | 35.0 | 87.5 | 17.7 |
| Toulouse | 38.1 | 28.2 | 87.4 | 26.6 |
| PROVINCE | 38.0 | 31.2 | 86.9 | 21.6 |
| ILE-DE-FRANCE | 47.7 | 44.2 | 94.8 | 21.7 |
| FRANCE METRO. | 39.8 | 32.1 | 88.5 | 21.6 |

Source: Direction générale des télécommunications, France.

Table 13

## France: Distribution of Lines by Category of Client and by Region

| | Second-ary Resi-dences | House-holds | Independent Persons | Establish-ments | Multi enter-prise | Public Telephones | All Main Lines (1) |
|---|---|---|---|---|---|---|---|
| Ajaccio | 12 010 | 67 733 | 6 196 | 16 449 | - | 1 495 | 104 138 |
| Amiens | 18 450 | 450 313 | 51 344 | 52 406 | 103 | 7 613 | 602 410 |
| Besançon | 10 446 | 288 469 | 33 955 | 38 977 | 61 | 4 847 | 377 705 |
| Bordeaux | 50 900 | 744 806 | 118 158 | 123 668 | - | 11 106 | 1 054 460 |
| Caen | 34 835 | 351 110 | 73 587 | 43 955 | 146 | 5 671 | 511 803 |
| Châlons/Marne | 8 104 | 361 667 | 48 427 | 52 804 | - | 6 260 | 478 691 |
| Clermont-Ferrand | 22 841 | 349 456 | 67 380 | 51 387 | - | 5 940 | 499 399 |
| Dijon | 33 400 | 456 958 | 70 196 | 59 215 | - | 6 866 | 629 238 |
| Lille | 14 930 | 1 036 080 | 93 792 | 123 652 | 589 | 14 802 | 1 287 283 |
| Limoges | 14 644 | 199 251 | 43 452 | 26 754 | 122 | 3 337 | 289 113 |
| Lyon | 83 670 | 1 478 652 | 153 340 | 279 410 | 1 499 | 18 783 | 2 025 146 |
| Marseille | 133 668 | 1 335 409 | 94 885 | 262 098 | 924 | 19 232 | 1 858 635 |
| Montpellier | 45 852 | 551 421 | 79 147 | 106 201 | 155 | 10 381 | 797 808 |
| Nancy | 8 719 | 639 341 | 49 396 | 80 155 | - | 9 305 | 790 096 |
| Nantes | 46 357 | 791 375 | 130 317 | 111 002 | 709 | 10 859 | 1 094 904 |
| Orléans | 47 159 | 655 293 | 99 680 | 81 481 | 76 | 8 762 | 896 926 |
| Poitiers | 25 767 | 413 549 | 82 516 | 55 054 | 261 | 6 566 | 586 137 |
| Rennes | 46 618 | 723 967 | 140 911 | 101 558 | 1 470 | 11 830 | 1 029 095 |
| Rouen | 23 024 | 484 815 | 46 309 | 67 013 | 675 | 6 431 | 629 674 |
| Strasbourg | 7 695 | 455 324 | 39 160 | 68 311 | - | 5 679 | 578 161 |
| Toulouse | 32 449 | 612 925 | 125 084 | 105 275 | - | 9 864 | 892 437 |
| PROVINCE | 721 538 | 12 467 914 | 1 647 231 | 1 906 826 | 6 741 | 185 628 | 17 013 260 |
| ILE-DE-FRANCE | 69 465 | 3 685 128 | 144 786 | 855 610 | 27 526 | 25 999 | 4 839 965 |
| FRANCE METRO. | 791 003 | 16 153 042 | 1 792 017 | 2 762 436 | 34 267 | 211 627 | 21 853 225 |

1. "Total of principal main lines" regroups categories with few numbers, as well as the categories cited.

Source: Direction générale des télécommunications, France.

has zero cost. Using this methodology the following levels of cross-subsidy were arrived at:

(in millions of French francs, 1981)

| | Households | Business | Total |
|---|---|---|---|
| Connection | 8.7 | 1.5 | 12.5 |
| Local | 1.6 | -0.2 | 1.6 |
| Long-distance | -7.2 | -5.8 | -14.1 |
| Total | 3.0 | -4.6 | 0.0 |

Table 14

**France: Penetration of Equipment by Household (in thousands) by Socio-Professional Categories**

| | Number of Lines | Number of Households | France |
|---|---|---|---|
| Farmers and Salaried Farmworkers | 866 | 921 | 94.1% |
| Owners: Industry and Commerce | 1 132 | 1 054 | 107.4% |
| Professionals and Senior Executives | 1 606 | 1 589 | 101.1% |
| Middle Managers | 2 084 | 2 103 | 98.9% |
| Employees and Others | 1 920 | 2 131 | 90.1% |
| Workers and Service Personnel | 4 768 | 5 794 | 82.3% |
| Unemployed | 5 569 | 6 673 | 83.5% |
| TOTAL | 17 945 | 20 270 | 88.5% |

Source: Direction générale des télécommunications, France.

Cost based tariffs would imply multiplying the cost of connection and rental by 2.4 and raising local tariffs by 23 per cent and lowering long-distance by 58 per cent. It should be noted that these calculations were made prior to the introduction of measured local rates and indeed as part of the case for their introduction.

## 3. Germany

The obligation of the Deutsche Bundespost (DBP) to provide "universal service" does not have to be specified, because the Basic Law is a fundamental principle of German public law that all monopolies, whether public or private, must provide service to all citizens throughout the Federal Republic. This has been specifically confirmed in the case of telecommunications by a decision of the Federal Administrative Court. In addition tariffs are governed by Article 3 of the Constitution which lays down that any government authority must give equal

Table 15

**France: Penetration of Equipment by Category of Subscriber (1985)**
**All Subscribers: Average Density**

| | Number of Lines | Total Population | Lines per 100 Inhabitants |
|---|---|---|---|
| Ile-de-France | 4 840 000 | 10 152 000 | 47.7 |
| Rest of Country | 17 013 000 | 44 821 000 | 38.0 |
| France | 21 853 000 | 54 973 000 | 39.8 |

| | Secondary Residences | | | Households | | | Establishments | | |
|---|---|---|---|---|---|---|---|---|---|
| **In thousands** | No. of lines | No. of residences | Rate | No. of lines | No. of households | Rate | No. of lines | No. of employees | Rate |
| Ile-de-France | 69 | 156 | 44.2% | 3 830 | 4 040 | 94.8% | 1 028 | 4 730 | 21.7% |
| Province | 722 | 2 311 | 31.2% | 14 115 | 16 245 | 86.9% | 3 561 | 16 498 | 21.5% |
| France | 791 | 2 467 | 32.1% | 17 945 | 20 286 | 88.5% | 4 589 | 21 228 | 21.6% |

Source: Direction générale des télécommunications, France.

treatment to all citizens. This constitutional principle has been developed in the field of tariffs into the Offentlichesgebuhenrecht which specifically lays down the principle of uniformity of public tariffs. This includes the principle of Tariffeinheit im Raum, i.e. equal tariffs in a given area. Germany lawyers are at present debating whether this law forbids the DBP to offer volume discounts to large users.

In addition the Telecommunications Installation Act of 1928 specifies in Section 7 paragraph 1 that "Everyone shall have the right to send normal telegrams against payment of charges and to have access to a normal call handled via the installation intended for public telecommunications traffic" and in paragraph 2 that "Special privileges with regard to this use of the installation intended for public traffic and exclusion from such use shall be permitted only for reasons of public interests". Section 8 stipulates that "If telecommunication installations for local use against payment of charges are set up in any locality by the Duetsche Bundespost or the local authority or other undertakings, each property owner may demand connection to the local network under conditions laid down and announced publicly by the above mentioned entities". It has since been established in the courts that this stipulation applies to the occupants of properties, not merely the owners.

Table 16

**France: Penetration of Telex Equipment by Establishment**

| | Agri-culture | Industry | Banks & Insurance | Comm-erce | Marketed Services | Non-Marketed Services & Adminis-tration | Total |
|---|---|---|---|---|---|---|---|
| 1-9 Employees | Tot. 0.0 | 1.1 | 4.1 | 2.8 | 2.3 | 2.4 | 1.6 |
| 10-49 Employees | Tot. 1.9 | 17.2 | 27.1 | 32.7 | 16.3 | 6.6 | 17.5 |
| 50-199 Employees | Tot. * | 53.4 | 82.0 | 74.2 | 37.7 | 21.4 | 42.9 |
| 200-499 Employees | Tot. - | 88.2 | 81.6 | 87.4 | 49.3 | 52.2 | 73.8 |
| 500+ Employees | Tot. - | 96.9 | 98.3 | * | 34.8 | 54.1 | 73.0 |
| TOTAL | Tot. 0.0 | 5.9 | 10.8 | 6.2 | 4.1 | 5.2 | 4.0 |

* Insignificant number

Note: Telex equipment penetration depends on the size of the establishment but also to a large extent on the economic activity developed by the establishment.

Source: Direction générale des télécommunications, France.

Article 2 paragraph 3 of the basic Bundespost Law 1956 stipulates that the Federal Minister for Posts and Telecommunications is obliged to keep the installations of the DBP in good condition and to modernise and develop them. This can be interpreted to mean that there is an obligation to provide state of the art telecommunications on a universal basis. At present the DBP's position would appear to be that all new services, for instance ISDN and Bildschirmtext should, within an appropriate time scale, be provided on a universal service basis. So far as ISDN is concerned the present intention is to provide national coverage by 1992 by providing, where necessary, special ISDN links outside the limits of a local area but at local area tariffs and to meet EC penetration targets of 3 per cent of the 1985 customer base by 1992.

No tariff distinctions are made between business and domestic subscriber tariffs and the new ISDN tariffs are based on existing voice telephone tariffs. The one exception to this uniformity is that 2 Mbit/s ISDN will be provided at a lower rate than 144 kbit/s.

So far as cross subsidies and rate rebalancing are concerned, the current position is as follows. The Witte Commission has recommended (R11) that in principle, tariffs shall be in line with costs and that (R12) tariff distortions in the telephone service that are mainly due to excessive long-distance tariffs and extended local area tariffs, which as a rule do not cover costs, shall be gradually eliminated. They argued that there was a 4:1 cost relation between local calls and calls over 100km,

while tariffs were 40:1. But the DBP challenges this conclusion because the comparison was based on an 8 minute call in each case (8 minutes is the basic local area call unit) which does not reflect actual traffic patterns.

The DBP is itself at present carrying out internal cost-allocation studies to determine the true position and admits that it is not happy with the current cost-allocation methodologies or data. Thus statements about cross-subsidy and rate rebalancing need to be treated with care. The current internal method of cost-allocation is a version of fully distributed costs in which the total costs for connections, local, long-distance and international calls respectively are separated, with only the traffic-dependent costs of the local loop being assigned to long-distance and international. Subsequently a formula relating cost to distance is applied to these figures. On the basis of this system, cost recovery within the extended local area is about 50 per cent and a 10 per cent rebalancing between local and long-distance would be required for total cost recovery.

It should be noted however that because business-to-business and residential-to-residential traffic exhibits different peak-load characteristics and often involves different facilities, the DBP has adopted an internal budgeting system which makes investment decisions on a facility-by-facility basis independent of peak and off-peak pricing periods. Current cost-allocation studies are designed to take this into account.

Following the Witte Commission report, the regulatory changes being considered include the definition of three classes of service:

1. Monopoly real-time voice telephone service;
2. Regulated network services;
3. Unregulated services.

So far as universal service considerations are concerned, the status of regulated services is crucial. At present the situation is unclear. The intention of the Witte Commission would appear to have been that the DBP should be obliged to provide certain services, for instance packet switching, on a universal basis, but against permitted competition. The arguments concern which services should come within this category, whether they should be legally specified or determined from time to time by Ministerial Decree, and how the DBP should be compensated and/or protected against competition because of its universal service obligations.

## 4. Ireland

The Mandate of Bord Telecom Éireann is set down in the Postal and Telecommunications Services Act, 1983. In particular, Sections 14 and 15 of that Act set out the principal objects and general duty of the company.

Section 14 states inter-alia that:

1. The principal objects of the telecommunications company shall be stated in its memorandum of association to be:

   a) To provide a national telecommunications service within the State and between the State and places outside the State;

   b) To meet the industrial, commercial, social and household needs of the State for comprehensive and efficient telecommunications services and, so far as the company considers reasonably practicable, to satisfy all reasonable demands for such services throughout the State.

Section 15 states inter-alia that:

1. It shall be the general duty of the telecommunications company to conduct the company's affairs so as to ensure that:

   a) Charges for services are kept at the minimum rate consistent with meeting approved financial targets.

This remit is not confined to any particular type of technology or service. Present planning envisages that by 1990 exchanges at secondary and tertiary level in the switching hierarchy will be digital and that these exchanges together with primary exchanges which are digital at that time, will be linked via digital transmission systems.

Universal service is measured and monitored by reference to penetration rates and to trends in customer connections and unmet orders. Penetration rates are compiled on a regional basis. The current national household penetration rate is 55 per cent.

The establishing legislation records that the Company's exclusive privilege in the telecommunication network is granted on the basis that a viable national telecommunication system involves subsidisation of some loss-making services by profit-making services. In general terms, it is clear that, under the present pricing structure:

-- Large users subsidise low users;
-- Business customers subsidise residential customers;
-- Areas with high telephone density subsidise low density areas;
-- Call charges subsidise rental and connection charges;
-- Short local calls subsidise long local calls;
-- Trunk call charges subsidise local call charges;
-- International charges subsidise national charges.

A degree of rate rebalancing has been implemented in recent years and further rebalancing is planned. No recent quotable study of levels of cross-subsidisation is available and no demand elasticity studies have been carried out.

The main threat to the provision of universal service is seen as the straightforward cost of providing "long lines" in rural areas (these are provided at standard rentals) which, together with the low revenue generated, makes them totally unremunerative.

The only scheme of direct subsidy at present is a government scheme whereby the social welfare system bears the rental costs of telephone connections for certain categories of social welfare recipients.

## 5. Italy

Italian telecommunications is governed by the concept of "public service" rather than "universal service". Article 43 of the Italian Constitution reserves the operation of public services to the State and Article 1 of the Telecommunications Code of 29th March 1973 establishes telecommunications as a public monopoly. This Code includes no specific "universal service" requirements or goals and is primarily concerned with protecting the prerogatives of the State and its employees and agents rather than with service goals or subscriber rights.

Article 194 specifies that the obligations of public telecommunications concessionaires and stipulations as to the development and technical improvement of their networks is to be included in the relevant contract of concession.

The 1984 Convention between the Ministry of Posts and Telecommunications and SIP, Italcable and Telespazio specifies:

- In Article 13, that a network must be provided to meet public service needs and that the development of this network will be specified in plans agreed at regular intervals with the government;

- In Article 14, that the network must be kept in good repair;

- In Article 20, that annual development plans must be submitted to the government supported by subscriber and traffic growth projections;

- In Article 27, that a local exchange must be provided in any location not yet served where at least 25 people or businesses have been waiting three years and connection to that exchange must then be provided to everyone in the commune;

-- In Article 28, that published service guarantees must be provided to subscribers;

-- In Article 29, that quality of service targets laid down in the annual plan must be met;

-- In Article 30, that the concessionaire is obliged to facilitate and support telephone service in rural areas, especially through the provision of public call boxes.

The monopoly, and thus the public service obligations, is seen as covering the basic services of voice telephony, telex and data transmission.

New value-added services will be provided under competitive conditions and the licensees see their job as the progressive introduction of digital technologies and the realisation of ISDN in order to provide the setting for the development of VANS in a free competitive market. Current ISDN development plans are for a nationwide IDN serving more than 5 million subscribers by 1990, between 20 and 25 per cent of planned subscribers. At this point a wide coverage of ISDN will be introduced, but will meet the needs of business users first. CCITT No.7 signalling was introduced into the network in 1983. Digitisation of transmission is planned by 1990 to be 29 per cent of local junctions, 84 per cent district trunks, 75 per cent compartment trunks and 45 per cent inter-compartment trunks. Digitisation of switching will be 25 per cent in 1990 and 45 per cent in 1994. It is planned to have 50 per cent local digital exchanges by 2000.

The licensees are obliged to submit an annual statistical report to the Ministry of Posts and Telecommunications which provides indicators of the degree to which they are meeting universal service goals. These indicators are:

-- Number of subscribers, disaggregated on a regional basis and according to Subscriber classes (business/residential - see Table 15);

-- Subscribers and telephones per 100 inhabitants (see Table 17);

-- Local call trends;

-- Long-distance call trends;

-- Data transmission trends.

The existing tariff structure is designed to:

a) Make telephone service affordable to lower income classes through a cross-subsidy policy;

b) Enable each telephone company and the whole telecommunications sector to achieve a satisfactory rate of return.

Currently cross-subsidies operate such that the business rental is higher than the residential; revenues from long-distance cover part of local service costs; revenues are proportional to call volume and do not take account of fixed costs.

The 1988-97 National Telecommunications Plan envisages maintaining a monopoly on the network and for basic services in order "to provide service to anyone who requests it, throughout the national territory, at equal prices, in order not to penalise the less favoured regions or individuals, which is possible only if the cream-skimming of the most profitable elements is avoided".

So far as serving rural areas in particular is concerned, it should be noted that the telecommunication operators participate in national plans to aid the development of the Mezzogiorno. These plans are included as a special section of the agreed annual telecommunications plan. Thus the current plan calls in the next five years for more than 44 per cent of all new subscribers to be concentrated in that region in order to raise the participation rate to 33.2 per cent from 25.6 per cent at the end of 1987. By the end of 1992 85 per cent of families in the Mezzogiorno will be connected compared with 88.5 per cent nationally.

Demand elasticity studies show a low demand elasticity with respect of tariff modifications, between -0.2 and -0.1, but a high correlation between demand and GDP.

## 6. The Netherlands

The new telecommunication law which came into force in 1989 includes universal service requirements for telephone, telex, data transport, telegrams and includes ISDN. The exact definition of universal service i.e. distinguishing between basic telephony and VANS, will be included in an annex to the law. An earlier explanatory booklet on the new Netherlands' telecommunication structure (16) states that "The PTT's obligations will include the provision of public telephone, telegraph, telex and data transmission services (...). The PTT will furthermore be under obligation to work according to the universal service principle, i.e. to supply services throughout the country on the same terms and conditions (...). This applies equally to the provision of leased lines (...). The PTT will be obliged to provide such lines (...). The PTT will be required to ensure that the public has adequate information regarding the general conditions applicable to a given service, and will only be allowed to amend those conditions after recourse to the new PTT Consultative Body. These conditions will contain a description of the service involved and arrangements with regard to matters such as the provision, payment, degree of service, liability, measures in the event of default or misuse, grounds for refusal or discontinuation of service, procedures in the event of disputes and termination of service".

Under the new regime, the policy of the Netherlands' PTT will be geared to infrastructural facilities without distinction between business and residential. This applies also to the digitisation process and to the policy pursued regarding ISDN. The PTT's policy is aimed at enabling a start to be made towards the end of 1989 on the introduction of ISDN connections. Essentially, the Netherlands' PTT is adhering to the recommendations of the EC, which include a schedule calling for achievement, five years after introduction of ISDN, of a level of penetration equal to 5 per cent of the total number of telephone connections in use in 1985.

So far as cross-subsidies and rate rebalancing are concerned, no sector of the network (i.e. local or long-distance) is loss-making and since the introduction of time local tariffs in January 1987, there is no pressure for further rebalancing. Tariffs for local and trunk calls made by residential and business subscribers are determined according to an average cost price based on actual overall costs, plus a reasonable profit margin.

For the production of forecasts of the demand for telephone connections and for the performance of elasticity studies, use is made of marketing models for each individual segment, which include environmental variables and the marketing mix (including price). The price elasticity of demand is about -1.5. The annual increase in the number of connections is roughly 2 to 3 per cent, which, when taken with the price elasticity of -1.5, means that price elasticity for overall demand is roughly -0.04. The conclusion is that provided price increases are kept within reasonable limits, they do not have a major effect.

It is the view of the PTT that universal service might be threatened if dedicated circuits were to be used by third parties to provide services assigned to the PTT under the concession. For that reason, the proposed Act includes a stipulation to the effect that dedicated circuits may not be used for any services entrusted to the PTT by means of the concession.

## 7. Portugal

Telecommunications in Portugal is regulated by Law No. 199/87 of 30th April 1987 which reconfirms the law of September 1942 establishing the public telephone service as a State monopoly and a public service.

Article 3 of the Annex to Law 199/87 states that the public telephone service is to be offered throughout the national territory. Article 12 governs the rights of subscribers. Subsection 1 states that "all requests for telephone service must be dealt with by the operators in obedience to technical and functional criteria, with special regard for those public interests specially protected by law, for the relevant characteristics of socio-economic activities and with absolute priority for communication for the protection of life and internal or external public security. Subsection 2 states that other priorities can be established by the responsible

Table 17

**Italy: Index of Telephone Diffusion (1983)**

| Region | Sub-scriber Density | Density of Telephone Sets | Density per "Inhabitant" | Density per Business | Public Telephones |
|---|---|---|---|---|---|
| Piedmonte | 122 | 125 | 106 | 105 | 113 |
| Aosta Valley | 130 | 134 | 101 | 106 | 255 |
| Lombardy | 119 | 127 | 109 | 115 | 93 |
| Trentino A.A. | 98 | 114 | 87 | 148 | 148 |
| Venice | 93 | 96 | 88 | 132 | 95 |
| Friuli V.G. | 112 | 112 | 99 | 110 | 123 |
| Leghorn | 147 | 146 | 126 | 82 | 144 |
| Emilia R. | 119 | 121 | 105 | 119 | 132 |
| Tuscany | 120 | 120 | 114 | 104 | 128 |
| Umbria | 96 | 93 | 95 | 96 | 113 |
| Marche | 93 | 91 | 89 | 124 | 100 |
| Latium | 121 | 122 | 126 | 86 | 117 |
| Abruzzo | 86 | 86 | 91 | 87 | 112 |
| Molise | 72 | 65 | 75 | 79 | 88 |
| Campania | 72 | 64 | 89 | 71 | 65 |
| Apulia | 67 | 61 | 80 | 77 | 69 |
| Basilicata | 59 | 52 | 67 | 78 | 69 |
| Calabria | 56 | 51 | 65 | 71 | 80 |
| Sicily | 80 | 73 | 92 | 70 | 79 |
| Sardinia | 71 | 71 | 81 | 84 | 107 |
| Italy | 100 | 100 | 100 | 100 | 100 |

Source: Societa Finanziaria Telefonica (STET), Italy.

Minister. Subsection 3 states that requests for service must be responded to within 30 days and the operator must place the request on a waiting list or inform him/her when connection can be made.

There is thus no specific general right to telephone service, nor is there a regulatory requirement for universal tariffs.

Within this general legal structure the current policies of the operating companies -- Correios e Telecommuniagoes de Portugal (CTP) and Telefones des

Lisboa e Porto (TLP) are stated in their 1987-89 corporate plans. For CPT the fundamental strategic objective is defined as satisfying "society's need for communication by providing our existing service in the greatest quantity and at the best possible quality and price and to introduce new services which are in the real economic interest of the operator".

Within these broad policy objectives the Basic Policy objectives are defined as:

a) Raising the reliability, security and economic efficiency of the service to the average European level;

b) Giving priority to basic telephone and telex services;

c) Introducing new services as the market and the economic needs of the country require.

CTP's desire to move away from universal tariffs, and therefore the existence of an implicit universal tariff policy, is made clear in their discussion of the institutional problems facing them which include the present impossibility:

a) Of differentiating tariffs for different market segments;

b) Of restructuring long-distance tariffs;

c) Of providing a selective service to clients.

TLP states its principal corporate goal is "to increase quantitively and diversity the offer of service in order to satisfy a major proportion of the needs of an evolving population". It voices the same concerns in relation to serving special market niches, but in terms of their lack of knowledge of those niches rather than in terms of regulatory barriers.

## 8. Spain

It is clear from recent legal developments that the principal problem within the Spanish telecommunication structure has been the failure of the national concessionaire, Telefonica, to serve rural areas.

The contract of 21st December 1946 between the Spanish government and Telefonica is specifically directed at providing urban and inter-urban services.

-- Clause 1 states that "Telefonica (...) will establish, develop and operate throughout the Peninsula, adjacent islands and places under Spanish sovereignty a full and homogeneous urban and inter-urban telephone system with its appropriate auxiliary and complementary services and will extend

its services to the rest of the country and abroad according to the terms of this contract";

-- Clause 15 requires a distinct quality of service and enough inter-urban capacity and specifies an installation programme throughout Spain for automatic exchanges of the same model as Madrid. Beyond that expansion is only required when the company finds it of commercial interest;

-- This clause also obliges Telefonica to extend service within 10 years to all population centres with more than 1000 inhabitants. It is also obliged to install public telephones and must provide service on demand in all urban centres where there is an exchange and must set up an exchange if asked by 50 subscribers within 2 km of the exchange;

-- Clause 19 prescribes uniform, published tariffs which must be set at a level which does not limit telephone development.

That this contract did not provide adequate service to rural areas is made clear by an Order of 31st October 1978 on rural telecommunications, by a royal decree 1218/1981 which requires the installation of a public telephone by the end of 1984 in every population centre with 50 or more inhabitants, 50 per cent of the costs to be borne by the local authority and 50 per cent by Telefonica. Finally a royal decree 2248/1984 Article 1 demands "the creation of an infrastructure which permits the development of an up-to-date telephone service benefiting the largest possible number of inhabitants".

This regulatory structure has now been replaced by a new law. The draft law contains the following relevant conditions.

It defines telecommunications as "an essential service reserved for the state public sector".

Article 3 states that the state will ensure the spread and general use of the public telecommunication service.

Article 6 states that subsequent regulations will specify the rights and obligations of users.

Article 13 distinguishes between Servicio Finales de Telecomunicacion which are part of the public service monopoly, and VANS, the exact terms of the distinction to be defined by subsequent royal decree. Servicios Finales generally require switching and include urban, inter-urban and international telephony, automatic mobile telephony, public mobile maritime and aeronautic telephony, telegrams, telex, mobile maritime radio-telegraph, telefax, Burofax, datafax, videotex

and video conferencing. It also includes any services defined as of "universal character" by organs of the ITU and by the EC i.e. in particular ISDN.

Article 14 defines carrier services (Portadores) as those services which provide capacity for the transmission of signals from one network termination point to another.

Article 15 states that where "Servicios Finales or Portadores" are managed under contract this will be within a public service regime.

Under Article 16 the following principles apply to all Servicios Portadores and "Finales":

a) The area of coverage is the whole of Spanish territory;

b) With a uniform range of quality of service in its coverage area;

c) The ability to receive a given mode of service for all terminal equipment that can be legally attached to the network;

d) The application of uniform tariffs for equivalent service. Tariffs to be approved by the government according to the following criteria:

   -- Accessibility of citizens to the public services on fair and reasonable conditions;

   -- Sufficient to cover the costs of the services including the cost of equipment depreciation.

In particular this article guarantees "to all Spanish citizens the right of access to the telephone service both via public telephone and by subscribing in his home and to this end adequate mechanisms will be established to guarantee that this right can be effectively exercised throughout the national territory within the shortest possible time".

Article 19 states that all Servicios Finales and Portadores will be governed by regulations which will specify general public service obligations on maintenance, service coverage and contractual obligations between user and operator.

Article 23 states that VANS using private networks can only install such networks if public networks cannot provide service and can be cancelled when public networks can substitute.

Under Article 24 public telecommunication operators can be required to deliver a VAN when:

a) No private supplier of an important service is available;

b) When it is impossible to deliver it under competitive conditions;

c) When there is public and social interest in the development of such a service.

The same article requires that VANS be offered on a non-discriminatory basis to all users within a given coverage area.

Under Article 28 a National Telecommunications Plan will be drawn up by the government specifying the development and spread of the system. This national plan will lay down a timetable for achieving ISDN and broadband ISDN and goals for:

a) The level of extension of public telecommunication services to urban and rural areas;

b) A programme for the introduction of new services;

c) A calendar for the integration of networks and services;

d) Plans for network digitisation;

e) Plans for space communication;

f) ISDN pilot projects.

Current penetration rates, according to CTNE data, were in 1985 24.2 main lines per 100 households (12.1 in 1974). For figures on regional distribution see Tables 18 and 19.

According to a study carried out by the CTNE in 1984 the tariff/cost relations for the principal services in 1983 were:

| | |
|---|---|
| Line rental | 0.88 |
| Telephone rental | 0.86 |
| Local service | 0.15 |
| Long-distance | 1.26 |
| International | 1.74 |
| Data | 1.89 |
| Mobile | 0.61 |

This was based on a cost causation methodology.

Table 18

**Spain: Telephone Lines per 100 Inhabitants in Autonomous Regions (1985)**

| | |
|---|---|
| Madrid | 34.3 |
| Baleares | 32.4 |
| Cataluna | 31.2 |
| Pais Vasco | 29.1 |
| Aragon | 27.9 |
| La Rioja | 26.4 |
| Navarra | 24.8 |
| Valencia | 24.4 |
| Asturias | 24.4 |
| Cantabria | 23.2 |
| Castilla-Leon | 20.8 |
| Canarias | 19.1 |
| Murcia | 18.1 |
| Castilla-La Mancha | 16.9 |
| Andalucia | 16.2 |
| Galicia | 16.2 |
| Extremadura | 13.6 |
| SPAIN (average) | 24.21 |

Source: Direction General de Telecomunicaciones, Spain.

No demand elasticity studies have been carried out, but the results of studies carried out by other administrations e.g. the Canadian study of October 1986, "Federal-Provincial Examination of Telecommunications Pricing and the Universal Availability of Affordable Service" are considered as applicable to the Spanish case. The Spanish authorities have the impression that a raising of residential rates as a result of rebalancing would lead to a drop in subscribers and usage among low income households.

It should be noted that there is a very reduced tariff for certain disadvantaged social groups -- those over 64 and disabled with annual incomes of less than 500 000 pesetas -- which at present applies to 500 000 subscribers.

## 9. Sweden

It is important to note that there is no telecommunication law in Sweden. In 1980 a bill was passed by Parliament in which the government expressed its goals for Televerket and the basic rules of its operations. Every year Televerket

Table 19

**Spain: Provincial Distribution by Rate of Service Penetration (December 1987)**

| | (Per Cent) |
|---|---|
| Alava | 91.2 |
| Albacete | 89.4 |
| Alicante | 92.4 |
| Almeria | 81.2 |
| Asturias | 82.0 |
| Avila | 87.4 |
| Badajoz | 93.5 |
| Baleares | 93.2 |
| Barcelona | 97.6 |
| Burgos | 84.9 |
| Caceres | 91.8 |
| Cadiz | 89.9 |
| Cantabria | 87.6 |
| Castellon | 94.2 |
| Ciudad Real | 93.9 |
| Cordoba | 90.6 |
| Coruna, La | 67.9 |
| Cuenca | 90.2 |
| Gerona | 90.5 |
| Granada | 89.5 |
| Guadalajara | 85.3 |
| Guipuzcoa | 95.7 |
| Huelva | 92.5 |
| Huesca | 94.9 |
| Jaén | 88.6 |
| Leon | 77.9 |
| Lérida | 92.9 |
| Lugo | 45.7 |
| Madrid | 96.0 |
| Malaga | 89.5 |
| Murcia | 88.2 |
| Navarra | 94.6 |
| Orense | 48.1 |
| Palencia | 84.4 |
| Palmas Las | 95.4 |
| Pontevedra | 65.5 |
| Rioja, La | 95.5 |
| Salamanca | 90.3 |
| S.C. Tenerife | 98.9 |

| | |
|---|---|
| Segovia | 88.7 |
| Sevilla | 92.5 |
| Soria | 77.7 |
| Tarragona | 95.4 |
| Teruel | 93.6 |
| Toledo | 95.7 |
| Valencia | 95.0 |
| Valladolid | 95.5 |
| Vizcaya | 96.6 |
| Zamora | 77.8 |
| Saragoza | 96.6 |
| SPAIN (average) | 90.5 |

Source: Direction General de Telecomunicaciones, Spain.

submits a 3-year plan to the government for approval. This 3-year plan covers such things as the basic goals and rules for the operation, business plans for the various activities and economic projections, all of which must be approved by the government.

The concept used in these documents is "public service" rather than "universal service".

The 1980 bill states clearly that the government expects the public services to be accessible everywhere in the country at uniform prices. This commitment has been reaffirmed in all subsequent 3-year plans.

If universal service means that certain penetration ratios should be achieved one could probably say that an implicit requirement on Televerket is that it should maintain the close to 100 per cent penetration rate that was achieved for basic telephony in Sweden a long time ago, i.e. 100 per cent of all households should have access to the basic telephony service. Although there has been no explicit statement from the government that this penetration rate should be maintained, it is clear that the government would not want Televerket to carry out price changes that would cause significant reductions in penetration rates.

The requirements that a "public service" must meet, as stated in the most recent 3-year plan, are:

-- All-to all intercommunication between those who are connected to the service;

-- Publicly available, up-to-date and reliable directory information;

-- High availability and high technical quality;

-- Total international interconnectivity;

-- Maximum possible connectivity and interchangeability between different generations of equipment;

-- Uniform tariffs throughout the entire country;

-- Access to service throughout the entire country.

Public services include telephony, telex, facsimile and teletex. The conditions specified above apply with few exceptions to the public services. Thus uniform tariffs apply only to connection and subscription fees, not necessarily to the tariffs on traffic. Telephones in second homes are excluded from this commitment and connection fees for those depend on location and can be quite high, but still do not cover costs.

There is also a category which is referred to as "other public services". This category includes Datex, Datapak, Datel, videotex, mobile telephony and mobile paging. Televerket has also implicitly made a commitment to try to meet the conditions above also for these "other public services". However as these operate in a more competitive market, Televerket thinks that it may become necessary to depart from the above principles, especially as regards uniform tariffs throughout the country. To date Televerket has maintained uniform tariffs throughout the country for "other public services" as well.

Services other than basic analogue telephony, including ISDN, will not be expected to achieve 100 per cent penetration rates for a very long time since market demand alone will determine expansion. Televerket will attempt, if competitive conditions allow, to make new services available on a country wide basis at uniform prices.

Cross-subsidy and Rate Rebalancing

Current levels of cross-subsidy are quite large. The following price/cost relations apply today:

| | |
|---|---|
| Rentals | 0.3-0.4 |
| Local calls | 0.5 |
| Long-distance | 2.3 |

In monetary terms this means that the subsidy from long-distance and international calls to local calls and subscriptions is of the order of SKr 4 billion/year. It has been estimated that the price/cost relationship for business is about 1.2 and for household subscribers is about 0.9 due to their different telephone consumption mix; in absolute terms it is about SKr 600 million/year.

It is much more difficult to estimate the urban to rural cross-subsidy but a very rough estimate is that it is between SKr 600 and 1000 million/year.

Full cost allocation has been practised where overheads to the extent possible have been allocated to the production item responsible for them and beyond that as a uniform percentage of turnover. Capital costs have been calculated based on the estimated replacement costs from capital.

Price elasticities were calculated by Pousette in the mid-70s. They indicate that price elasticities for subscription demand are very low in Sweden, as in the rest of the industrialised world (below 0.05). Furthermore, there is good reason to believe that even those estimates are on the high side given that since the estimates were made income levels have risen, especially for lower income levels. Thus Televerket expects negligible effects on penetration rates from gradual rate rebalancing. Effects of de-averaging would be somewhat more significant if that were ever to be applied to basic telephony. A new study of demand and its relation to prices (own and competitors) and on information by customers about prices is being planned.

Regulatory Change, Competition and Tariff Policies

Televerket's exclusive right to connect high-speed voice modems was discontinued in 1988 and network service competition is allowed. In response Televerket plans faster structural adaptation of prices for network services supplied to business customers and the implementation of a selective investment policy under which market conditions will be accorded greater weight in the making of investment decisions.

A gradual adaptation of prices for network services, bringing them into line with actual production costs and market requirements, will take place during the next three years. Prices will also be adapted to the level of service received by the customer. The pricing policy must be uniform and fixed throughout the entire market. Discounts will only be granted in situations where corresponding cost reductions can be shown and they must not be general (that is to say, they must be time limited). Any special arrangements that are made must be reviewed at least once a year.

Under a decision made by the government on 13th November 1986, the changes in Televerket's tariffs will be oriented as follows:

-- Long-distance call tariffs will be gradually lowered;
-- Increases will be primarily for local call tariffs as well as installation and quarterly fees for subscriber line subscriptions;
-- Income for leased lines does not come close to covering Televerket's costs. Fees will now be increased to a level that will provide full cost coverage.

## 10. United Kingdom

The UK case well illustrates the point that the process of liberalisation, and the reregulation that accompanies it, may well be an opportunity to make universal service goals explicit and give them specific legislative and regulatory underpining.

The Telecommunications Act specifies in Part 1, Section 3 that the Secretary of State and the Director of OFTEL "shall each have a duty to exercise the functions assigned or transferred to him (...) in the manner which he considers is best calculated:

> To secure that there are provided throughout the United Kingdom, save in so far as the provision thereof is impracticable, such telecommunication services as satisfy all reasonable demands for them including, in particular, emergency services, public call box services, ship-to-shore services and services in rural areas".

The operators licences then go on to impose related conditions on the licensee the "universal service" requirements being laid on British Telecom being considerably more stringent, as the dominant operator, than those laid on Mercury.

The specifications of universal service in the BT licence are given in Appendix I.A.

The Mercury licence specifies under Schedule i, Part 2, Condition 1 that:

-- "1.1 The licensee must provide near national coverage within five years.

-- 1.3 The licensee must provide:

a) Voice telephony services; and

b) Other telecommunication services consisting in the conveyance of messages by means of Direct Service Lines connected to any node installed under para 1.1 or 1.2 to every person who requests the provision of such services by those means; and the licensee shall ensure that the Applicable Systems are installed, kept installed and run for those purposes."

It should be noted that considerable pressure was placed upon Mercury during the negotiation of the licence to accept the national coverage provision. The geographical location of the network nodes are therefore specified in the licence.

The major controversies since liberalisation have related to quality of service provision, which is dealt with in the next section of this report, and the adequacy

of the current price cap regulations to protect residential subscribers. The form of the tariff regulation regime which will replace the current system when it expires in 1989 is under current discussion. One option being considered is to specifically control rises in the level of median residential subscribers bills.

So far as the introduction of new services is concerned British Telecom has made it very clear that it is now market driven and that, for instance, ISDN is not planned as a universal service but will be introduced as and when there is demand for it.

# IV. QUALITY OF SERVICE

## 1. Introduction

It is significant that in the UK since liberalisation the question of the impact of that liberalisation on the quality of service has been the major issue of public debate, receiving much more media and political attention than the question of the impact of rate rebalancing. The concern has been that, in response to competitive pressures from Mercury, BT has devoted its investment and skilled manpower to providing the best possible service to its major business customers at the expense of that vast majority of their customers who have no competitive service option. Suspicions that this was the case were reinforced by BT's decision, in response to the introduction of liberalisation, to stop publishing regular quality of service statistics. Under pressure from OFTEL it agreed, as from March 1987 to resume publication of quality of service statistics on a six-monthly basis and to establish related performance targets. OFTEL has always recognised that the regulator cannot, in a market where a significant proportion of customers are subject to a monopoly service, regulate price without at the same time regulating quality. It thus has in the past carried out and will continue to carry out its own quality of service surveys in addition to those published by BT and will keep under review the desirability of obtaining independent audit reports on BT's own statistics.

A contentious related issue is the question of whether the telecommunications operator should be contractually obliged to deliver a given level of service quality and whether failure to deliver such service would make the operator subject to damages. At present in the UK as elsewhere this is not the case, but as discussions in Germany and France as well as the UK indicate, this is an issue which is immediately raised by the introduction of commercial competition into the telecoms market and is related to the distinction between "universal service" and "public service" discussed above. Certainly in the UK there is increasing pressure from both business customers and from consumer organizations to move in this direction.

There follows a brief survey of the current position in relation to quality of service in the countries surveyed as the basis for discussion of the possibility of

establishing both common quality of service indicators and targets and the role such indicators and targets should play in the regulatory structure.

The importance of this question hinges, of course, on the view taken of the likely or desirable level of competition in the telecommunication market, since in a truly competitive market quality of service is theoretically self-policed.

In judging the adequacy of both those quality of service statistics at present made available and of the level of service achieved, it might be useful to compare them with those recently advocated as ideal by David Hamer, General Manager Commercial of Mercury (17).

| | |
|---|---|
| Service information | Answer time 15 secs<br>Handling time 3 mins |
| Provision of service | Quoted waiting times<br>Actual waiting times<br>Per cent of customer installations meeting quoted waiting times, within 1 week, 1 month and 3 months<br>Over 90 per cent should meet quoted times |
| Dialled service | Length of delay before dial tone obtained<br>Is called number obtained at first attempt?<br>if not, why not?<br>No ringing tone?<br>Wrong number?<br>Number unobtainable?<br>Is call satisfactorily completed? If not, why not?<br>Faint reception?<br>Excessive noise?<br>Crossed line?<br>Cut-off? |

Quality of service monitoring should be carried out for national and international calls separately based upon the busiest hour plus two adjacent hours using methods recommended in CCITT Recommendations E 420-426.

| | |
|---|---|
| Operator assistance | Response time 10 secs, otherwise as for dialled calls |
| Quality of transmission | Data: 98 per cent of available time with a bit error rate not greater than 1 in 10 million and 99.5 per cent with a bit error rate not greater than 1 in 10 thousand<br>Totally error free available seconds of not less than 98 per cent. |

| | |
|---|---|
| | Voice: CCITT Recommendation, p. 74, and Supplement No. 2 to Vol. 5 |
| Availability of services | How long to accept fault report call? 15 secs<br>How long for engineer to arrive?<br>Residential: 24hrs<br>Business: 4hrs<br>Emergency: 1hr<br>How long to repair?<br>90 per cent within 6 hrs<br>98 per cent with 24 hrs |
| Fault incidence | No of faults per circuit per year<br>No of customer complaints per circuit per year |
| Public call boxes | Per cent in operation at any time |
| | Finally he stresses that quality of service must include the quality of the quality-of-service statistics themselves which must therefore be audited by an independent external body. |

**2. Belgium**

No regulatory requirement. Figures are not published on a regular basis, but are available on request by Parliament.

Quality of service is measured by:

-- Switching and blocking rates on switching plant;

-- Waiting list numbers and delays for new connections and repairs.

**3. Denmark**

No regulatory requirement. The average percentage of unsuccessful attempted trunk and toll calls is published nationally and by region. In 1986 this ranged from 1.4 to 6.2.

**4. France**

No regulatory requirement.

The following indicators are published:

Three Major Continuity of service indicators

-- SI: No of subscriber trouble reports per 100 main lines;

-- VR2: Percentage of trouble reports for which normal service is restored on same or next day;

-- VR8: Percentage rectified on same day or one of following 7 days.

Five Major network efficiency indicators

-- ADT: Percentage of calls where user waits more than 3 seconds for dialling tone;

-- EFIZ: Call completion rate for local calls;

-- EFIU: call completion rate for national, long-distance;

-- EFIN: call completion rate for international STD;

-- TEC: call set-up delay to called party answer.

All the above are calculated on monthly and 12 monthly basis. Finally a global indicator IGQS is computed from the values of SI, VR2, VR8, ADT, EFIZ, EFIU.

The values for these indicators in 1986 were (18):

| | |
|---|---|
| SI | 20.8 |
| VR2 | 87.0 |
| VR8 | 99.9 |
| ADT | 0.0 |
| EFIZ | 69.7 |
| EFIU | 68.6 |
| EFIN | 46.3 |
| TEC | 18.1 |
| IGQS | 96.4 |

## 5. Germany

There is no regulatory requirement and quality of service statistics are not published.

For internal management purposes the DBP collects:

-- Repair times -- average, maximum and minimum for each office and nationally;

-- No. of calls failing -- following CCITT recommendations: measured for local, long-distance, routed and non-routed.

There is no public discussion in Germany on quality of service and there are no recommendations regarding it in the Witte report.

## 6. Greece

The Hellenic Telecommunications Organisation (OTE) publishes quality of service data in its annual report, although there are no regulatory requirements to do so. The indicators published include the following:

| | 1984 | 1985 |
|---|---|---|
| Waiting list for main connections (automatic exchanges) | 809 072 | 865 516 |
| of which: in Athens/Piraeus | 28.7% | 27.6% |
| in rest of country | 71.3% | 72.4% |
| Waiting list for transfers | 33 986 | 34 966 |
| of which: in Athens/Piraeus | 51.3% | 51.2% |
| in rest of country | 48.7% | 48.8% |
| Manual Telephone: Mean waiting time to get to operator for a trunk call | | |
| Athens | 11 sec | 18 sec |
| Thessaloniki | 8 sec | 7 sec |
| Mean waiting time for the operator to establish call | | |
| Athens/Piraeus | 16 min | 15 min |
| Thessaloniki | 16 min | 17 min |
| Frequency of failures in local network per 100 inhabitants | | |
| Athens/Piraeus | 55.9 | 71.8 |
| Thessaloniki | 47.9 | 50.9 |
| rest of country | 59.0 | 60.8 |
| Number of failures in trunk network | | |
| Overhead network | - | 41 826 |
| Underground network | 246 | 246 |
| Coaxial cables | - | 50 |

## 7. Ireland

Specific quality of service standards are not imposed by legislation.

Telecom Eireann publishes in its annual report figures for:

-- Faults per station per annum, national, Dublin and provincial. The target is 0.5. This was achieved for Dublin, but for the rest of the country it was approx 0.55;

-- Call failure rate trend-local, divided between provincial and Dublin. Target 2 per cent; achieved 2 per cent Provincial and 1.8 per cent Dublin.

-- STD call failure rates for Provinces-Dublin, Dublin-Provinces and provinces-provinces. Target 4 per cent; achieved 3.7, 4.1 and 3.7 per cent respectively.

## 8. Italy

Average breakdown time and average waiting time are reported annually in the annual report of SIP. The 1985 figures were:

Average no. of hours to repair:

| | |
|---|---|
| All equipment | 18.6 |
| Basic equipment | 21.8 |
| Business equipment | 17.1 |
| Public telephones | 12.7 |

Average waiting time: 5.3 months

## 9. The Netherlands

There is at present (February 1988) no regulatory requirement and no quality of service statistics are published. The Netherlands' PTT collects, for its own internal use, delivery times, congestion (proportion of lost calls), availability and the time between faults being reported and their being cleared.

It is understood that the new Telecommunications Law will require, as from 1st January 1989, publication of the time taken to provide connection and time taken to repair faults. In addition the recently issued Telecommunications in the Netherlands: New Opportunities states that "Service also entails providing and maintaining telephone connections, issuing and managing telephone numbers and recording and collecting charges. On all these individual points, the PTT will be required to provide high-quality service to its customers."

## 10. Norway

There is no regulatory requirement to publish data, but the NTA have set service objectives.

The following are published:

A. Delivery of Service

| Average delivery times (in days) for: | 1984 | 1985 |
|---|---|---|
| Telephone installation | 20.8 | 15.4 |
| Removal of telephone | 16.0 | 11.5 |
| Installation of accessories | 8.2 | 8.3 |
| Telex | 29.3 | 42.3 |
| Datel-modems or leased circuits | 57.8 | 54.7 |

B. Grade of service in trunk network (1985)

| per cent of unsuccessful attempts to set-up calls | 2.3 | 2.1 |
|---|---|---|

C. Fault clearing service (1985)

Telephone: per cent of faults cleared within

| 8hrs | 16hrs | 40hrs |
|---|---|---|
| 63.4 | 81.8 | 94.0 |

## 11. Portugal

No regulatory requirement to publish data.

The following indicators are published annually by CTP (Correios e Telecomunicacoes de Portugal) covering the last three years. The most recent figures available are for 1985 (19):

A. Average waiting times

Average waiting time for installation of main telephone: (10 months)
Number awaiting connection: 46 955 (9 per cent of installed base)

B. Quality of communication

Per cent of dialled calls completed:

| | |
|---|---|
| Local | |
| Completed | 99 |
| With reply | 63 |
| Regional | |
| Completed | 99 |
| With reply | 62 |

Interurban

| | |
|---|---|
| Completed | 95 |
| With reply | 55 |

C. Faults

Subscriber reports:

| | |
|---|---|
| Reports per 100 main lines: | 119 |
| Faults repaired per 100 main lines | 70 |
| Per cent of faults repaired on the same day or following working day | 80 |
| Per cent of reports pending longer than following working day | 18 |

D. Account Queries

| | |
|---|---|
| Account queries per 1000 main lines: | 42 |
| Per cent of justified queries | 30 |
| Per cent of queries resolved within 30 days | 36 |

TLP (Telefones de Lisboa e Porto) publishes similar statistics for Oporto and Lisbon.

## 12. Spain

No regulatory requirement at present, but Article 16, subsection b) of the proposed new Telecommunications Law states that there must be equal quality of service throughout the service area.

Telefonica publishes the following indicators annually (with figures for 1986):

A. Connection waiting times

No. and per cent of demand met in:

| Current year | 1-2 yrs | 2-3yrs | 3-4 yrs | over 4yrs |
|---|---|---|---|---|
| 195 003 | 49 257 | 24 931 | 10 810 | 12 566 |
| 66.6 | 16.8 | 8.5 | 3.6 | 4.3 |

B. Traffic Quality

Dialled calls

a) Per cent of calls failing because of plant failure:

Urban

| | | |
|---|---|---|
| | sample | 0.9 |
| | all calls | 0.6 |
| Provincial inter-urban | | |
| | sample | 1.8 |
| | all calls | 2.0 |
| National inter-urban | | |
| | sample | 3.4 |
| | all calls | 3.6 |
| International | | |
| | sample | 12.2 |

b) State of the Network

No. of final sections overloaded: Total 12 (5.4 %)

No of sections overloaded: Total 49 (4.4 %)

| | |
|---|---|
| Overloaded urban switches and links | 218 |
| Overloaded inter-urban switches and links | 111 |

No. of overloaded sections in the International network Total 60 (18.6 %)

No of overloaded sections of the national network used exclusively for international traffic. Total 19 (2.0 %)

No of overloaded sections of the urban network used exclusively for international traffic 8

No of overloaded exchanges used exclusively for international traffic 8

c) Manual Interurban (per cent)

| | |
|---|---|
| Immediate service | |
| Electromechanical exchanges | 95.5 |
| Mechanical exchanges | 92.1 |
| Total | 93.7 |
| Rapid service (within 30 minutes) | 99.6 |

d) International manual

| | |
|---|---|
| Immediate service | 81.8 |

C. Maintenance Quality

1. Exterior Plant

a) Complaints and subscriber reported faults

| | |
|---|---|
| No. of complaints per 100 main lines | 4.63 |
| No. of fault reports per 100 main lines | 3.10 |
| No. of faults lasting more than 24 hrs per 100 fault reports | 23.77 |
| Subscribers with more than one fault report per 1000 subscribers | 5.28 |

b) PBXs

| | |
|---|---|
| No. of complaints per 100 connected PBXs | 5.1 |
| No. of faults reported per 100 connected PBXs | 3.9 |
| No. of faults lasting more than 24 hrs per 100 fault reports | 9.4 |

c) Public telephones

| | |
|---|---|
| No. of reported faults per 100 public telephones | 131.2 |
| No. of faults lasting more than 24 hrs per 100 faults reported | 14.7 |
| No. of public phones in operation per 100 in service | 96.4 |

d) Cables

| | |
|---|---|
| No of repairs per year per 100km of cable | 55.40 |
| No of repairs per year per 100km of urban cable | 53.28 |
| No of repairs per year per 100 km of interurban and coaxial cable | 65.15 |

e) Installation of Customer premises equipment.

| | |
|---|---|
| No or orders per year per 1000 subscribers | 16.57 |

2. Switching

a) Average service failures (per cent failed calls)

| | |
|---|---|
| International STD | 5.38 |
| Calls on the provincial network | 1.00 |
| Calls on the national network | 2.28 |

b) Service interruptions in PC32 exchanges.

| | |
|---|---|
| No of interruptions per 100 exchanges | 9.98 |
| Average duration of interruption (minutes) | 262.00 |

3. Transmission

a) Telephone circuits

| | |
|---|---|
| No of complaints per 100 complete circuits | 0.48 |
| No of faults per 100 complete circuits | 0.27 |
| Hrs lost per 1000 available hrs | 0.17 |
| Average duration of fault (hrs) | 8.32 |

b) Special circuits

| | |
|---|---|
| No of complaints per 100 complete circuits | 7.27 |
| No of faults per 100 complete circuits | 2.12 |
| Hrs lost per 1000 available | 0.17 |
| Average duration of fault (hrs) | 6.07 |

c) Impulse circuits

| | |
|---|---|
| No of complaints per 100 complete circuits | 4.48 |
| No of faults per 100 complete circuits | 1.46 |
| Hrs lost per 1000 available | 0.18 |
| Average duration of fault (hrs) | 8.32 |

d) Data circuits

| | |
|---|---|
| No of complaints per 100 complete circuits | 7.74 |
| No of faults per 100 complete circuits | 2.24 |
| Hrs lost per 1000 available | 0.17 |
| Average duration of fault (hrs) | 5.76 |

Source: Anuario Estadistico Telefonico Nacional, published by Compania Telefonica Nacional de Espana.

## 13. Sweden

Televerket is required by the government to publish quality of service statistics in its annual three year plan and to meet quality of service targets.

A working group within Televerket is developing uniform service criteria and measurement methods.

The government has requested that a local network performance indicator be added to existing indicators when the next three year plan is submitted.

Current indicators used are:

1) Per cent of successful attempts to make trunk calls.
   Best, worst and average area.
   Target: 12 month average of 97.5 per cent.
   Present figure 98.4 per cent
   1988 target 98 per cent

2) Per cent of successful attempts during busiest hour.
   Best, worst, average areas

3) Service delivery: Currently 17 days for standard telephone.

4) Fault clearance: 2.1 working days on average. 55 per cent of faults cleared within 8 working hours.

5) Fault reports per 1000 main lines 1985-86: 160
   In future this measure will be based on local lines because of growth in leased lines.

6) Public call boxes. Aim to keep 90 per cent in continuous operation.

## 14. United Kingdom

There is at present no regulatory requirement on licensed public telecommunications operators to publish quality of service statistics or to meet quality of service targets.

British Telecom ceased publishing regular quality of service statistics in 1983 as one of its first responses to liberalisation and the licensing of a competitive network operator. However under pressure from OFTEL BT has now agreed to publish regular quality of service statistics on a six monthly basis and has set quality of service targets. The figures published are as follows:

A. Fault repair

Service interrupting faults cleared within two working days:

| | |
|---|---|
| Full year 85-86 | 87.1 per cent |
| Month to March 1987 | 73.9 per cent |
| Month to Sept 1987 | 86.5 per cent |

| B. Installation service | Year 85/6 | Month to March 87 | Month to Sept 87 |
|---|---|---|---|
| Business orders completed in 6 working days | 60.8 pc | 28.4 | 48.3 |
| Residential orders completed in 8 working days | 59.4 | 18.0 | 42.5 |

In future these reports will be done on the basis of appointments made and appointments kept.

| C. Operator services | Year 85/6 | Month to March 87 | Month to Sept 87 |
|---|---|---|---|
| Operator calls answered in 15 secs | 85.6 | 83.5 | 79.4 |
| Directory Enquiry calls answered in 15 secs | 74.0 | 77.0 | 75.1 |

D. Public call boxes:

A target of 90 per cent reliability by March 1988.

| E. Network reliability | Year 85/6 | Month to March 87 | Month to Sept 87 |
|---|---|---|---|
| Local calls failed | 1.7 | 2.2 | 2.2 |
| Trunk calls failed | 4.1 | 5.4 | 4.3 |
| Customer premises equipment and network faults per line per annum | 0.48 | 0.54 | 0.43 |
| Network only faults per line per annum | 0.20 | 0.25 | 0.20 |

# V. CONCLUSION

This study shows that:

a) The concept of universal service is in general, in the countries studied, too imprecisely defined to serve as a useful guide to policy or to the goals and responsibilities of public telecommunication operators (PTOs);

b) All PTOs would claim to be pursuing universal service as a goal, but an examination of the historical development of penetration rates shows that there are major differences between PTOs in the speed with which the goal of universal access to voice telephony has been approached; differences that cannot be explained in terms of differences in GNP;

c) At present there is inadequate publicly available data on telecommunication costs and on the penetration and usage patterns of telecommunication services to come to any firm judgement on either the extent to which universal service is being delivered or on the likely impact of liberalisation.

If the concept of universal service is to be operationalised as a policy goal and laid upon public telecommunication operators as a specific responsibility for the delivery of which they can be held accountable, it requires more precise definition in terms of a range of distinct, realizable and measurable goals.

## 1. Universal service, public service and basic service

First universal service must to be distinguished from public service on the one hand and basic service on the other. While the concept of public service usually includes the idea of universal service it is a larger concept which entails the pursuit of normative social and political priorities which may over-ride strictly economic or technical criteria. Unlike the more limited concept of universal service, the achievement of public service goals is not susceptible to measurement. Basic service on the other hand is defined by technical criteria as those service elements upon which the delivery of other telecommunication services, variously designated

as "enhanced" or "value-added" or "telecommunication network-based", depend. There is much dispute within the wider debate on the appropriate extent of competition and monopoly in the telecommunication service market as to what services should be defined as basic, and if indeed any should be. In this debate basic and universal are often confused, i.e. those services are described as basic which it is thought should be universal. But to define a service as basic tells us nothing about the extent of its availability.

In brief public service concerns the relationship between the provision of telecommunication services and the pursuit of socio-political policy goals, basic service concerns the technical and economic relationship between different types and levels of service, while universal service is concerned with access to those services.

## 2. Universal service, what is it and how can its delivery be monitored?

Universal service then needs to be broken down into its constituent elements, each with its appropriate form of target and monitoring.

a) Universal geographical access. Under this heading an operator could be required to make available given standards of connection for a specified range of services in different regions and different sized population centres within a specified time scale. The extent to which certain regions were being prioritised, and the cost/benefits of such prioritisation, could then at least be made transparent. Failure to meet targets could then, in a regulated commercial system, be subject to penalties and in a public system would be more open to political accountability;

b) Universal affordable access. As a policy goal this assumes that telecommunication services are not like other goods and services and thus as far as possible economic barriers to 100 per cent penetration should be removed. Operators could be required to plan investments and adopt pricing policies so as to achieve given penetration rates, within a given time-scale, region by region. The achievement of this goal could be monitored by penetration rates for given socio-economic groups. In addition the relation between telecommunication service tariffs, disposable income and telecommunication usage could be monitored. Explicit policy decisions could be taken within this framework as to whether to subsidise given user groups and if so how;

c) Universal service quality. Quality of service indicators could be agreed with the operator and agreed targets could be required and monitored, with failure to meet targets being subject to penalty, such as rebates to customers. Whether within a universal basic quality of service it was appropriate or feasible to have different levels of quality at different prices could then be considered and transparently administered;

d) Universal tariffs. Here as with quality of service the key question is to what extent price discrimination between market segments or geographical locations should be allowed. In particular should volume discounts to large users be seen as a breach of this principle? The regulatory question is to what extent such price discrimination unfairly distributes system costs and benefits and the relation between such price discrimination and other universal service goals.

In all the above cases, even when applied to voice telephony, there is a need to be precise as to what is meant by access. Does it mean access to a domestic or business telephone on demand or is access to a public telephone sufficient?

The importance of making these distinctions is that policy makers can then decide that it is appropriate to deliver one form of universal service and not another, for instance universal geographical availability and not affordability. It also enables one to differentiate between different effects of liberalisation.

## 3. The impact of liberalisation

What impact is liberalisation likely to have on the delivery of these different types of universal service? First this study has shown that it is often the advent of liberalisation that forces the explicit definition of universal service requirements so that they can be built into licences. Thus there is no institutional reason why universal service should not be required of and delivered by either public monopolies or regulated private competitive operators. The question as to which mode is preferable from the universal service perspective rests upon the economics of delivery. The fact that the debate on this question is far from being resolved points to the need for flexible and non-dogmatic policy responses to this question. Clearly bypass and cream-skimming are potential threats to the revenue base of existing monopoly suppliers of telephone service, which might make it increasingly difficult for them to provide service to domestic subscribers in some areas at an acceptable price. More work based on detailed assessment of the costs of both public and private network operators, in particular of the local loop bottleneck, and of traffic trends needs to be done to make a reasonable assessment of the extent of this threat in Europe. Once that has been done, appropriate regulatory responses can be fashioned, whether through limitation of competition or through access charges and levies. Certainly North American experience does not point to any dramatic erosion of the dominant network operators ability to deliver universal affordable service.

## 4. The protection of universal service

Precisely because the concept of universal service has been so ill-defined and because it has been mobilised largely as a barrier to market liberalisation in defence of the status quo, little attention has been paid in Europe to developing mechanisms

to protect the delivery of universal service from the impact of liberalisation or, to put it another way, to ensure its delivery within a liberalised environment. As North American experience shows, if it is thought to be an important goal of regulatory policy to ensure the delivery of universal service, there are a number of tools in the regulators armoury, such as access charges, life-line service and universal service contracts. These options merit detailed research to assess their cost, feasibility and welfare effects in the European context.

## 5. Monitoring quality of service

What is also clear from this study, and from UK regulatory experience in particular, is that the question of quality of service has been seriously neglected. In no country, except Sweden, is there an explicit quality of service obligation and target and in most countries quality of service reporting is, compared with best practice, inadequate. There are two distinct issues here. Under a public monopoly regime consumers of telecommunication services need better access to quality of service monitoring data and better means of redress in cases of failure to meet quality levels if the claim to universal service is to be a reality. Secondly under a competitive, regulated regime, such as in the UK, licence obligations to deliver universal service and tariff controls need to be linked to explicit quality of service indicators and to contractual obligations between operators and their customers. As a first step work needs to be undertaken at the international level to agree appropriate common quality of service indicators and targets so that relative performance can be compared.

## 6. Universal service and new telecommunication services

In the medium term the shift to integrated digital networks and open network architectures will make average costing more necessary because of the impossibility of distinguishing between types of traffic stream and the shift of both network control functions and costs to customer premises equipment. In such an environment the relationship between services and the network will become much closer to that which at present exists between roads and motor transport i.e. service differentiation and the value derived from network use will come from private expenditure by users on terminal equipment. At this point questions of social equity and access, similar to those raised around the provision of public transport and the distribution of the costs of road network provision, will arise.

During the transition, however, the difficult question relates to access to new telecommunication services. To what extent should universal service goals be applied to these services and if they are to be applied over what time scale should they be achieved? This study shows that there are at present five approaches to this problem being developed in Europe:

a) The delivery of these new services should respond to market demand; the UK approach.

b) They should be subject to orderly, planned introduction as a public monopoly over a long time scale as universal services on the lines of the telephone service; the Bundespost model.

c) Their initial launch should be left to the market and competitive operators, but that once they achieve a significant level of penetration they should be brought within a tighter regulatory environment and have universal service obligations imposed upon them; the proposal in the new draft French Telecommunications Law.

d) Public investment in infrastructure and subsidy of terminals coupled with public organisation of tariffing and billing to ensure rapid market growth as a foundation for competitive service delivery; the Minitel model.

e) Reliance on a competitive market with the dominant or monopoly public carrier as a supplier of last resort to ensure universality; the proposal of the Witte report regarding so-called "required services".

## APPENDIX I.A

## EXTRACT FROM BRITISH TELECOM LICENCE

Condition 1 UNIVERSAL PROVISION OF TELECOMMUNICATION SERVICES

1.1 The Licensee shall provide or cause to be provided to every person who requests the provision of such services at any place in the Licensed Area:

a) Voice telephony services; and

b) Other telecommunication services

consisting in the conveyance of messages by means of the Applicable Systems, except where the provision of those services is not practicable, where there is no reasonable demand for them, or to the extent that the Director is satisfied that any reasonable demand is already met and that it would not be reasonable in all the circumstances to continue to require the Licensee to provide them.

Condition 2 PROVISION OF TELECOMMUNICATION SERVICES IN RURAL AREAS

2.1 Without prejudice to condition 1 the Licensee shall provide or cause to be provided to every person who requests the provision of such services in a rural area within the Licensed Area:

a) Voice telephone services; and

b) Other telecommunication services

consisting in the conveyance of messages by means of the Applicable Systems, except where the provision of those services is not practicable, or where there is no reasonable demand for them, or to the extent that the Director is satisfied that any

reasonable demand is already met and that it would not be reasonable in all the circumstances to continue to require the Licensee to provide them.

## Condition 3 PROVISION OF DIRECTORY ENQUIRY SERVICES

3.1 The Licensee shall provide directory enquiry services, that is to say telecommunication services whereby anywhere in the licensed area any person using any item of telecommunication apparatus lawfully connected to any of the Applicable Systems in such a way as to be capable of transmitting and receiving unrestricted two-way voice telephone services may be provided, by means of voice telephony or some other means, with directory information for the purpose of facilitating the use of the voice telephony services provided by the Licensee by means of the Applicable Systems.

3.2 The obligation in paragraph 3.1 shall not apply when the directory information relates to a person who has requested the Licensee not to provide directory information in relation to him.

## Condition 4 PROVISION OF INSTALLATION AND MAINTENANCE SERVICES

4.1 Where it provides telecommunication services in accordance with Conditions 1 and 2 the Licensee shall provide, if any person to whom those services are provided so requests, installation and maintenance services in relation to any item of telecommunication apparatus or any telecommunication system:

a) which is lawfully connected to any of the Applicable Systems; and

b) by means of which any message is transmitted, conveyed, switched or received, except:

i) Where the provision of those services is impracticable whether because the apparatus or system in question is beyond economic repair, because the necessary components or tools are no longer available or otherwise;

ii) Where the person requesting the service will not pay the cost of the service;

iii) Where the apparatus or system has been supplied by a person who is not a member of the Licensee's Group and the apparatus or system is not run under a licence which requires it to be maintained by a person of a description including the Licensee if it is to be, or is to be kept, connected to the Applicable Systems; or

iv) Where the approval of the apparatus for connection to the Applicable System does not require it to be maintained by a person of a description including the Licensee if it is to be, or is to be kept, connected to the Applicable Systems.

Condition 6 PUBLIC EMERGENCY CALL SERVICES

6.1 The Licensee shall provide a public emergency call service, that is to say a telecommunication service whereby anywhere in the Licensed Area any member of the public may, at any time and without incurring any charge, use any item of telecommunication apparatus lawfully connected to any of the Applicable Systems in such a way as to be capable of transmitting and receiving unrestricted two-way voice telephony services to communicate as swiftly as practicable with any of the emergency organisations.

6.2 In this condition:

a) "Emergency organisations" means in respect of any locality:

i) The relevant public police, fire, ambulance and coastguard services; and

ii) Such other similar organisations providing assistance to the public in emergencies as the Director may from time to time determine and whose names are inscribed on a list kept by him.

b) Telecommunication apparatus shall only be regarded as capable of transmitting and receiving unrestricted two way voice telephony services if it is capable of both:

i) Transmitting for conveyance by means of an Applicable System specific signals designated by the Licensee for the purpose of establishing communication with voice telephony apparatus controlled by the emergency organisations; and

ii) Transmitting and receiving uninterrupted simultaneous two way speech conveyed, or as the case may be to be conveyed, by means of that Applicable System.

6.3 The Licensee may restrict the telecommunication services provided under this condition in respect of any of the emergency organisations mentioned in paragraph 6.2a)ii) to the extent to which it is agreed by the authority responsible for the emergency organisation in question or, in the absence of such agreement, to the extent authorised by the Director.

Condition 11 PUBLIC CALL BOX SERVICES

11.1 The Licensee shall secure that call box services are provided at all public call boxes, whether installed before, on or after the date when this licence enters into force.

11.2The Licensee may cease to provide call box services at any public call box other than a temporary call box but only if:

a) Their continued provision is impracticable;

b) The revenue from the services provided at that box in any period of 12 months ending not more than 6 months before the cessation has fallen below the minimum figure agreed by the Director for the purpose in respect of that box or of boxes of that description (the "Minimum Figure") and the Licensee is not entitled to receive the difference between the revenue and that figure from any other person;

c) The box in question is located near another public call box at which such services continue to be provided and which is readily accessible from the place where the call box at which services will cease to be provided is installed;

d) The Licensee has, before the cessation, agreed with the Director that it will provide such services or cause them to be provided at another public call box to be installed in the immediate vicinity of the box at which they are no longer to be provided;

e) Such services are available to members of the public at a private call box

i) Which is near the box at which services are to cease to be provided; and

ii) Which is readily accessible from the place where the public call box at which services will cease to be provided is installed; and

iii) The person controlling that private call box has entered into a contract with the Licensee undertaking to give members of the public unrestricted access to the private call box at all times (or for such periods of each day as the Director shall have approved in writing whether in relation to that call box or all call boxes of that class) for the purpose of obtaining such services; the Licensee shall take all steps necessary to ensure that the terms of all such contracts are observed;

f) The Director agrees that such services need no longer be provided:

i) At the box in question; or

ii) In accordance with a decision under Condition 1 or 2.

11.3 Where the Licensee ceases to provide call box services at any public call box on the ground that their continued provision there is impracticable, it shall use its best endeavours to provide such services at another call box readily accessible from the place where the first mentioned call box was installed failing which it shall send to the Director, to the smallest unit of local authority in the area in which the public call box is located and such consumer bodies recognised to be representing the interests of consumers and other users of such services in that area as the director may specify, a notice specifying the reasons why it considers that the continued provision of call box services at that public call box is no longer practicable and inviting the local authorities and such bodies to make representations in regard to the proposed cessation to the Director within a period of 42 days from the giving of notice. The Licensee shall within a reasonable period resume the provision of the services at a public call box installed in a place which is readily accessible from the place where the public call box at which services are no longer provided was installed, if the Director, after considering the terms of the notice and any representations received by him in connection with it, concludes that the provision of call box services either in the place where the first mentioned call box was installed or in a place readily accessible therefore is practicable and within 70 days of the giving of the notice requires the Licensee to do so.

11.4 Where the Licensee proposes to cease to provide call box services at any public call box on the ground set out in paragraph 11.2(b) of this condition it may cease to provide those services at that box only if 28 days have elapsed after it has completed the following procedures, that is to say:

a) A notice shall have been posted prominently in or on the public call box specifying:

i) That the Licensee is proposing to cease to provide services there;

ii) The reasons for the proposal;

iii) The minimum figure;

iv) The steps (whether in the form of financial contributions or the provision of services) which if taken by others would oblige the Licensee to continue to provide services at that box;

v) The address of the Licensee's office to which representations or objections with respect to the proposal may be made;

b) A copy of that notice shall have been sent by registered post or recorded delivery to the smallest unit of local government for the area in which the public call box is located and to bodies recognised as representing the interests of consumers and of the users of such services in that area;

c) Consideration shall have been given to any representation or objection duly made with respect to the proposal within the period specified in sub-paragraph (a) (vi) above; and

d) A copy of the notice described in sub-paragraph a) above shall have been sent to the Director, together with copies of any representations or objections that the Licensee has received with respect to the proposal and its comments and conclusions thereon.

11.5 After consultation with the Director the Licensee shall from time to time in accordance with Condition 14 publish guidelines for determining when:

a) Public call boxes should be installed at new locations; and

b) Temporary call boxes should be installed at major events of national or international standing;

and shall install call boxes on request in accordance with those guidelines unless there are special circumstances which make it unreasonable to do so.

11.6Without prejudice to paragraph 11.5, the Licensee shall provide call box services at public call boxes or temporary call boxes installed in locations specified by any person who undertakes to pay to the Licensee its costs incurred in providing such services and to comply with the Licensee's terms and conditions.

11.7 In this paragraph:

a) Public call box" means any kiosk, booth, acoustic hood, shelter or similar structure to which members of the public have access at all times and at which apparatus is installed by the Licensee for the provision of voice telephony services;

b) "Call box services" means the installation, repair and maintenance of voice telephony apparatus at call boxes; the service of conveying by means of any of the applicable systems sounds or signals to and from such apparatus installed in such boxes; directory enquiry services; and public emergency call services;

c) "Temporary call box" means a public call box which is mobile or is installed but at which all box services are provided for limited periods of time;

d) "Revenue", in relation to services provided at any public call box means the actual amounts received by the Licensee in respect thereof, together with a notional sum equal to 25 per cent of the aggregate of such amounts representing revenue earned in respect of transfer charge, credit and similar facilities provided at that box and of services provided and paid for elsewhere which involve conveyance of messages to that box;

e) "Recognised consumer body" means a body recognised by the Secretary of State under section 25 of the Act to be representing the interests of consumers and other users of telecommunication services provided by means of the applicable systems or an advisory body appointed by the Director under section 56(2) of the Act.

## Condition 16 PUBLICATION AND IMPOSITION OF STANDARD CHARGES, TERMS AND CONDITION

16.1 The Licensee shall, except insofar as the Director may agree in writing and except in respect of terms and conditions agreed or determined for the purposes of condition 13.4 to 13.6 in relation to Connectable Systems run or to be run by public telecommunication operators:

a) Publish in the manner and at the times specified in paragraph 2 of this condition a notice specifying, or specifying the method that is to be adopted for determining, the charges and other terms and conditions on which it offers:

i) To provide each description of telecommunications service by means of or in relation to any of the Applicable Systems in pursuance of an obligation imposed by or under this Licence; or

ii) To grant permission to provide Connection Services by means of the Applicable Systems; and

b) Where it supplies telecommunication services or permits others to provide Connection Services, supply, or as the case may be permit to be supplied, those services at the charges and on the other terms and conditions so published and not depart therefrom.

16.2 Publication of the charges and other terms and conditions shall be effected by:

a) Sending a copy thereof to the Director not less than 14 days after the date on which this Licence enters into force and thereafter not less than two months before any proposal to amend any charge, term or condition or the method of determining the same, is to become effective, provided however that if the Licensee and the Director agree to any variation in a proposal to amend those charges, terms, conditions or methods in the said period of two months the Licensee shall not be prevented from making the amendments with variations two months after the date when the notice was first sent to the Director in accordance with this sub-paragraph;

b) Placing a copy thereof in a publicly accessible part of every major office of the Licensee in such manner and such place that it is readily available for inspection free of charge by members of the general public during such hours as the Secretary of State may prescribe under section 18(4) of the Act that the register of licences and orders is to be open to public inspection;

c) Sending a copy thereof or such part or parts thereof as are appropriate to any person who may request such a copy.

16.3 In this condition "major office" means the office of the General Manager of each Telephone Area established on the appointed day or such other offices as the Director may agree from time to time.

## Condition 17 PROHIBITION ON UNDUE PREFERENCE AND UNDUE DISCRIMINATION

17.1 The Licensee shall not show undue preference to, or exercise undue discrimination against, any person or persons of any class or description as respects

a) The provision by means of or in relation to the Applicable Systems of any telecommunication service in fulfilment of an obligation imposed by this licence; or

b) The granting of permission to provide Connection Services by means of the Applicable Systems.

## APPENDIX I.B

# UNIVERSAL SERVICE IN TELECOMMUNICATIONS IN JAPAN

## I. INTRODUCTION

There has recently been a lively discussion concerning the precise nature of the trade-off between public welfare and economic efficiency in the telecommunication business. There is a danger that the introduction of competition, while giving the public telecommunications operator (PTO) an incentive for higher economic efficiency, may result in a loss of public welfare. On the other hand, where deregulation is coupled with technological progress, there is the possibility of ensuring the continuity, and perhaps improvement, of public service, for a lower consumer cost.

The trade-off discussion is characterised in telecommunications by the concept of "universal service". In spite of the importance of this issue, there are still no generally accepted concepts of universal service in Japan as in some other OECD countries. Therefore, this paper adopts as a working definition the concept of universal service described earlier. These may be defined as:

a) Universal geographical access;
b) Non-discriminatory access; and
c) Reasonable costs or affordability.

In addition,

d) Uniformity of service quality

may also be included in the concept of universal service.

This paper first outlines the present regulatory framework concerning universal service of telecommunications in Japan, and then sets out the related issues under discussion after the deregulation of telecommunications.

## II. REGULATORY FRAMEWORK

The general concept of universal service in telecommunication services in Japan, set out in Article 7 of the Telecommunications Business Law, is fairness in use of telecommunication services which took effect in April 1985:

> "Any telecommunication carrier shall not discriminate unfairly in providing telecommunication services."

Based on this article, Type-I carriers should follow the two precepts of the Telecommunications Business Law as follows (20):

i) Prohibition of unfair discrimination on tariffs (Article 31) (21);

ii) Prohibition of refusal of services within the service territory (Article 34) (22).

The maintenance of service quality is mentioned in Article 41 of the Telecommunications Business Law. According to this, in order to maintain telecommunication services of adequate quality, telecommunication facilities should conform to the technical standards stipulated in the applicable ordinance of the Ministry of Posts and Telecommunications.

Along with these provisions in the Telecommunications Business Law, Article 2 of the Nippon Telegraph and Telephone Corporation Law (NTT Law) has imposed on NTT a requirement for the stable provision of nationwide telephone services as follows:

> "The Company (NTT) shall contribute to securing the provision of stable nationwide telephone services throughout Japan by providing such services as are indispensable to the people's life at appropriate conditions and impartially."

This article aims to ensure universal geographical access of universal service.

The coverage of the concepts of universal services is summarized in Table 20 as follows:

i) a) is applicable only to the telephone services of NTT in the NTT Law;

ii) the concepts through b) to d), reflected in the Telecommunications Business Law (Articles 7, 31, 34 and 41), are applicable for all telecommunication services provided by all Type-I carriers in the Telecommunications Business Law.

Table 20

**Regulatory Framework for Universal Service**

| | | NTT | NCCs |
|---|---|---|---|
| Universal service (A7 of TBL) | a) universal geographical access (A2 of NTT Law) | X (telephone service) | |
| | b) non-discriminatory access (A34 of TBL) | X (all telecommunication services) | X |
| | c) reasonable costs or affordability (A31 of TBL) | X (all telecommunication services) | X |
| | d) uniformity of service quality (A41 of TBL) | X (all telecommunication services) | X |

Note: TBL = Telecommunications Business Law.

It should be noted that only the telephone service provided by NTT must satisfy all the four concepts of universal service. The term "telephone service" can be considered to be limited to non-mobile voice telephony (23).

## III. NTT'S ROLE AS A NATIONWIDE SERVICE PROVIDER

One of the main reasons why only NTT should play a role as a nationwide service provider is because it inherited the nationwide telecommunication network from NTT Public Corporation (NTT-PC) when the latter was privatised in April 1985 and because its network is regarded as a social as well as an economic infrastructure.

This recognition is derived from the history of the development of its network; NTT-PC endeavoured to disseminate telecommunications through six five-year projects between 1953 and 1982. During this period, the two foremost goals were to meet growing demand for telephones and to complete the programme of providing nationwide automatic exchanges:

i) The projects were realised on a monopolistic basis under the supervision and protection of the Japanese government; and,

ii) Fiscal assistance was provided to ensure sufficient funds for expanding facilities and equipment. NTT-PC applied the Fiscal Investment and Loan Programme and it also established a subscriber telecommunication bond system based on the law concerning Provisional Measures for Expanding Telecommunications Facilities (24, 25);

iii) NTT-PC was able to take advantage of preferential tax treatment.

The two major objectives of the five-year projects were successfully attained by FY 1979 (Tables 21 and Figure I-1). NTT maintains a public function in providing nationwide telephone service for the benefit of the nation.

NTT's role in providing a nationwide telephone service is important for the interconnection of the networks of the new Type-I carriers or New Common Carriers (NCCs). In September 1987, a rival long-distance telephone service was introduced by three NCCs: Daini-Denden, Japan Telecom and Teleway Japan. However, as shown in Figure I-2, their services are currently available only to telephones connected to NTT's electronic exchange system. Even in those areas in which these three companies offer their services, only 26 per cent of the exchange equipment is of the specified electronic type (as of the end of FY 1988).

In response to the social demand for promotion of the network digitisation, NTT has decided, for the budget of FY 1988, to invest about 500 billion yen in the introduction of digital exchanges (subscriber exchange equipment with 6.3 million terminals and transmission exchange equipment with 450 000 circuits) and for the establishment of digital transmission lines (530 optical fibre lines and 120 microwave lines). Undoubtedly, this digitisation plan has been devised by NTT in order to facilitate the NCCs in launching their new services.

## IV. PROBLEMS OF REBALANCING THE TARIFF STRUCTURE

The fact that the NCCs need to interconnect their networks with NTT's has caused certain rate restructuring problems among the carriers. The rate for local calls provided by NTT can be interpreted as the access charge to be paid by the NCCs to NTT. Competition has allowed carriers to decrease their long-distance call charges so far, but their competitiveness is seriously influenced by the level of NTT's access charge.

In July 1988, the Ministry of Posts and Telecommunications (MPT) revised the telecommunication business accounting rules, so that Type-I carriers are now obliged

to disclose a detailed statement of their overall earnings and expenses for each of eight services (telephone, telegram, telegraph, leased circuits, data communications, digital data transmission, radio paging and others). In addition, the item of telephone service is broken down into categories such as subscriber telephones (divided between local and long-distance), public telephones and mobile telephones. These measures should prove useful for preventing cross-subsidisation among services and eventually for establishing appropriate tariffication. In particular, a detailed statement of long-distance calls, should influence the tariffication of access charge paid by the NCCs to NTT. A detailed statement of earnings and expenses by service has been submitted to MPT for disclosure, and in 1988, it was decided that those results should appear in the report of each of the Type-I carriers shareholders. However, a more detailed statement of telephone services, which is still under preparation by each carrier, is not yet included and needs to be considered further.

Table 21

**Japan: Diffusion Rate of Telephones per 100 Inhabitants**

| Year | 1952 | 1957 | 1962 | 1967 | 1972 | 1977 | 1982 | 1985 |
|---|---|---|---|---|---|---|---|---|
| Diffusion Rate(%) | 2.0 | 2.9 | 5.0 | 10.2 | 20.8 | 30.6 | 34.9 | 37.4 |

Source: Nippon Telegraph and Telephone Corporation, Japan.

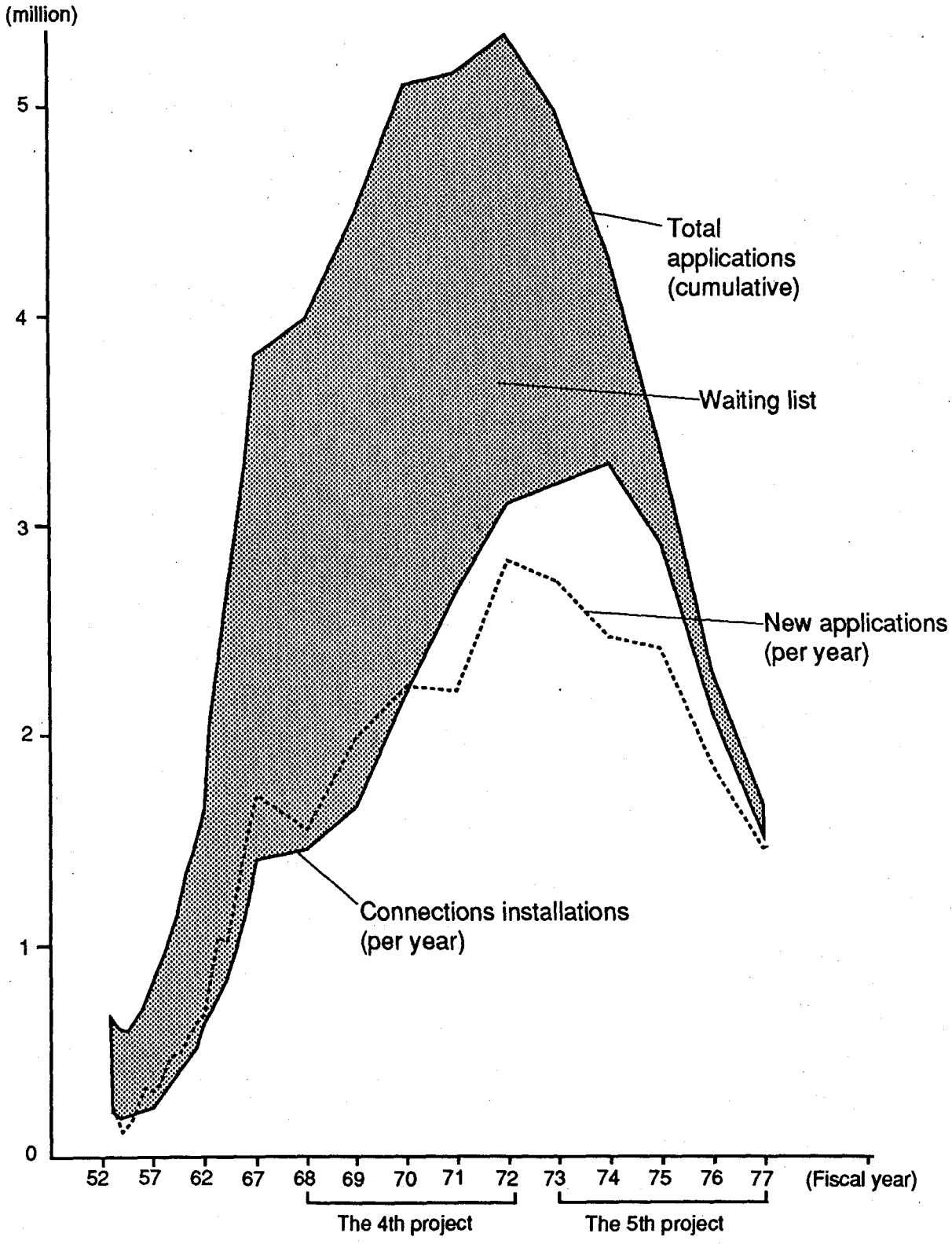
## V. CONCLUSIONS

In the Japanese telecommunication regulatory framework, only non-mobile real-time voice telephone service provided by NTT is currently recognised as a universal service. However, NTT needs to be regarded as a special case, having inherited the full wealth of NTT-PC including the nationwide network, an unrivalled technological base and considerable earning power, developed under its previous privileged status as a government body. Furthermore, NTT is an exceptionally large company, controlling around 99 per cent of total Japanese telephone revenues.

Under such circumstances, provision of NTT's telephone service, as described in Article 2 of the NTT Law, has not yet been seriously influenced by introduction of competition into the telecommunications market. In this context, there is no real problem of a trade-off between economic efficiency and public welfare in the provision of universal service. There is rather, a more serious problem of ensuring universal service at a lower tariff, which can be realised through improvement of

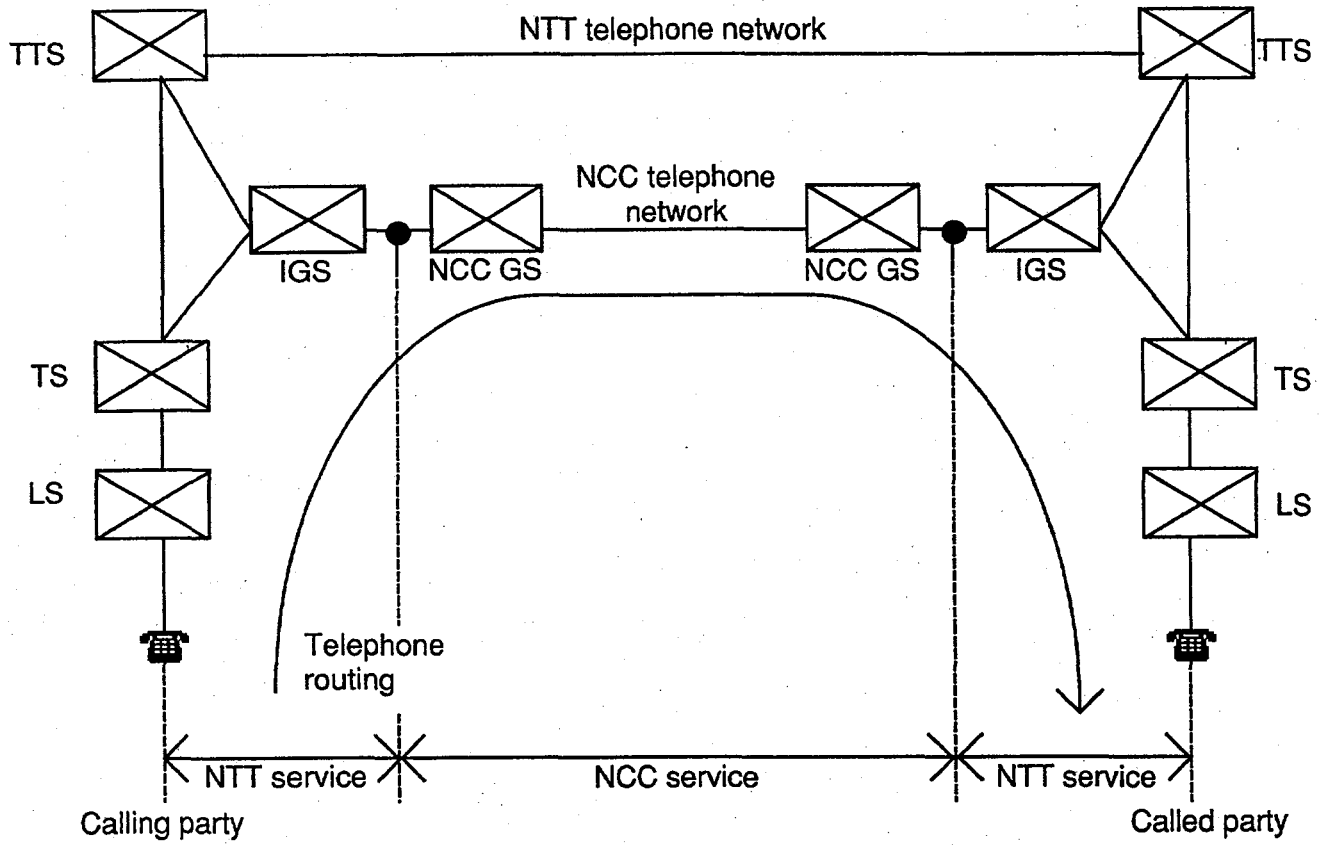
NTT's management efficiency through competition. The environment of fair and effective competition between NTT and the NCCs should be ensured and it is for this reason that reform of telecommunications business accounting has been carried out.

Figure I-1. **DEMAND AND SUPPLY FOR TELEPHONE SUBSCRIPTION**




*Source:* Ministry of Posts and Telecommunications of Japan.

Figure I-2. **CONNECTIONS BETWEEN TELEPHONE SUBSCRIBERS, NTT AND NEW COMMON CARRIERS**




Note: ● = Point of connection between NTT and NCC

NCC = New Common Carrier
LS = Local Switch
TS = Toll Switch
GS = Gateway Switch
IGS = Interconnecting Gateway Switch
TTS = Toll Transit Switch

*Source:* Ministry of Posts and Telecommunications of Japan.

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14. See Curien, N., "Cost Allocation and Pricing Policy: The Case of French Telecommunications", in Young, H.P. (ed.) Cost Allocation: Methods, Principles, Applications, Amsterdam, North-Holland, 1985; and Curien, N., (ed.) "L'économie des télécommunications", Special Issue of Revue Economique, Vol. 8, No. 2, March 1987.

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16. Telecommunications in the Netherlands: New Opportunities.

17. See "Quality of Service in a Competitive Environment", Le Bulletin de l'Idate, No.28, 1987.

18. See Aiming for Excellence: The French Approach to Quality of Service in Telecommunications, DGT, Paris, March 1987.

19. Relatorio e Contas, 1985, for CTP.

20. The Telecommunications Business Law categorises Type-I and Type-II telecommunication businesses as follows:

    Type-I: The businesses in this category provide telecommunication services by establishing telecommunication circuit facilities;

    Type-II: Any telecommunication business other than Type-I telecommunication businesses. Special Type-II carriers are telecommunication businesses which provide for the use of communication by many and unspecified persons, telecommunications facilities which exceed in scale the standards specified -- (or) which provide telecommunication facilities designed for communications between Japan and foreign points for the use of communication by others. General Type-II carriers are businesses other than Special Type-II carriers.

21. Part of Article 31 of the Telecommunications Business Law states that:

    (1) A Type-I telecommunication carrier shall establish a tariff which sets forth provisioning conditions including charges and any other terms relating

to telecommunication services and shall obtain authorisation of that tariff from the Ministry of Posts and Telecommunications. The same shall apply where such a tariff is to be amended.

(2) The Ministry of Posts and Telecommunications shall grant authorisation under the preceding paragraph if he determines that an application for the authorisation under the same paragraph conforms to each of the following items [including]: (...)

V) A tariff shall not include any provision that unfairly discriminates against any person.

22. Article 34 of the Telecommunications Business Law states that:

Any Type-I telecommunication carrier shall not, without due reason, refuse to provide telecommunication service within its service territory.

23. The interpretation of the term telephone service is from Article-by-article Comments on the Telecommunications Business Law by the Study Group on Telecommunications Legislation (June 1987, in Japanese).

24. The Fiscal Investment and Loans Program (FILP) is outlined in the technical notes of OECD, Economic Surveys: Japan 87/88, August 1988, as follows:

"FILP is organised by the Central Government, financing the various activities to meet national objectives. Its funds consist of private sector savings (Postal Savings), accumulated savings in state pension funds, and repayments of loans and interest receipts. The applications of funds are to finance the activities of the general government and to purchase government bonds --both in a way that is meant to be consistent with overall fiscal policy. The sum of loans to public corporations mainly engaged in public works roughly correspond to public works expenditure by FILP. The plan for the FILP is made every year with the approval of the Diet."

25. This Law was abolished on 31st March 1983 after the end of the six five-year projects.

*Part II*

# TELECOMMUNICATION RATE RESTRUCTURING: ISSUES, PATTERNS AND POLICY PROBLEMS FOR OECD COUNTRIES

# I. SUMMARY

The gradual introduction of competition, together with regulatory and technological change, have heightened the visibility of telecommunication pricing issues in OECD countries. Rate restructuring is being discussed widely among policy-makers. Yet there are few reports on the underlying pressures to implement changes in price structures or on changes over the past decade. Pricing policy in Europe has been discussed primarily within the relatively closed domain of public telecommunication operators. The increasing heterogeneity of telecommunication network-based services is resulting in rate restructuring and the implications are important for the future of "universal" telecommunication services and for the competitiveness of industry.

The objectives of this part are to review the determinants of telecommunication rate restructuring and to analyse patterns of structural change in selected service tariffs. In Section III, "cost-of-service" and "value-of-service" pricing concepts are discussed. The implications of "cost-based" pricing and the presence of common costs are considered in the light of the development of telecommunication networks which support increasingly diverse services. The different ways in which cost and price relationships in telecommunications have been treated in the United States, Canada, Japan, the European Community and in the United Kingdom are also examined in this section.

Section IV presents an analysis of structural changes in tariffs for public telecommunication operator services (telephone, telex, leased circuit) for 18 selected countries from 1980 to 1987. The results show the magnitude and direction of changes within countries and the tendency for OECD countries to reduce charges for international services. However, variations in the increases and decreases or prices for other services suggest that there has been little consistency in the treatment of local exchange or inland charges for switched services or for domestic private circuits. This part concludes that if appropriate cost standards are not subject to public debate, it will become increasingly difficult for policy-makers to determine whether prices for telecommunication services are related to costs. This study is

intended as a contribution to the task of developing a more consistent empirical foundation for policy debate on pricing issues. Although prices are only one of the factors that affect network and service development, greater attention to pricing policy is probably inescapable in the future.

# II. INTRODUCTION

Telecommunication rate restructuring is both cause and consequence of technical, structural and regulatory change. It is influenced by the diffusion and application of telecommunication network-based services and by the gradual introduction of more competitive markets. As the OECD countries edge closer to becoming "networking economies", pricing strategies are becoming increasingly central issues for policy.

Differentials in prices for public telecommunication operator (PTO) services are potentially damaging to the growth of existing and new service markets. In the European Community, divergent pricing practices may slow the implementation of the internal community market. Business users are particularly sensitive to the problems created by inconsistent pricing.

> "(...) charges vary greatly and according to no self-evident logic between countries. In particular, trans-European prices look high in comparison with US prices. There is a danger that excessive long-distance communications charges are creating a significant handicap to the efficient development of the European internal market" (1).

Policies intended to create a more positive environment for telecommunications by introducing greater competition are resulting in the examination of cost and pricing issues. If telecommunications is to play a role as an instrument of national policy (i.e. to stimulate business demand and/or to ensure access and increased use of voice telephone and other services by residential subscribers), cost and pricing debates are likely to move into the sphere of public debate.

With the development of new technologies and alternatives to PTO network supply pressures have mounted to bring telecommunication service prices in line with costs on the grounds of economic efficiency. New pricing policies are needed as PTOs move from the use of administered monopoly prices to accommodate the new more competitive service environment. Rate restructuring can ensure that PTOs do not lose business simply because their rate structures have not been based on

costs. For many PTOs a step in the rate restructuring process is rate rebalancing to compensate for cross-subsidies. Many types of subsidy underlie traditional rate structures, but one of the most visible and controversial is the assumed subsidy from long distance to local telephone service subscribers. Thus at the heart of the rate restructuring problem is the "universal" or "public" character of voice telephone and other services.

Another source of pressure toward rate restructuring is the expansion of service opportunities beyond voice telephony. Many large firms and multinational companies are establishing their own networks. Traditionally, PTOs supplied voice telephone service and a limited number of service variations. Today there is an increasing variety of telecommunication network-based services that can be supplied over a common network facility. PTOs are unlikely to be able to meet all demand and rate structures must be redesigned to accommodate new services which allow expanded consumer choice based on a rational and efficient tariff structure. Rate restructuring reflects a shift from supply to demand-based services and price structures.

The pricing regimes adopted by OECD countries create incentives to follow alternative paths in the evolution of networks and the diffusion and application of services. Where pricing policy is subject to public control, it can be used to implement social and economic policy objectives and fluctuations in prices have considerable impact on decisions to opt for new combinations of private and public networks and services.

PTO tariff structures have to accommodate existing and new services, changing regulatory and trade frameworks and competition in some market segments. Single networks with a limited number of voice grade services are being superseded by common facility networks used to supply a wide variety of very different types of services. There is a growing need to unravel the technical, economic and political pressures that are leading to changes in tariff-setting practices. This study is intended as one of many contributions that will be necessary.

## Objectives

The study has two major objectives:

1. To provide an overview of the determinants of rate restructuring in OECD countries and to present the issues so as to be useful to those involved in policy debates;

2. To develop and analyse patterns of structural change in telecommunication rates within Member countries to provide a consistent empirical foundation for policy debate.

Methodology

The OECD/ICCP report, Telecommunication Network-based Services: Policy Implications (2), found that telecommunication rate restructuring can be attributed to several factors: technical change and shifts in underlying telecommunication facility cost structures; the introduction of tariffs more closely related to cost so as to offer services in a competitive market; minimisation of various forms of telecommunication bypass and resale; alignment of tariffs with those in other countries; response to potential or actual competition (domestic and international); and reduction in the cost of telecommunications for the business community to enhance the competitiveness of nationally-based firms.

The present study examines the factors underlying rate restructuring. In Section III an introduction to the main concepts that underlie different approaches to telecommunication pricing is provided. Thee approaches have often been debated with little consideration for the ways in which they influence actual pricing practices. The view of PTOs, private network and service suppliers and users are also examined. The ways in which the policy issues have been presented in North America are contrasted with Europe. There are substantial differences of opinion on whether and how technical change outweighs other factors in telecommunication rate restructuring. New network technologies are central to pricing debates and the status of plans to bring fully digital telecommunication infrastructures onstream are reviewed in Appendix II.A.

Patterns of rate restructuring within OECD countries are examined in Section IV to trace the magnitude and direction of these changes from 1980 to 1987. Although considerable attention has been given to international comparison of telecommunication prices (3), this has been limited by the absence of comparable tariff definitions, incomplete data, and controversy over methodologies.

To overcome some of these problems, this study focuses on tariff changes at the intra-country level. The analysis examines prices changes in components of telephone, telex, voiceband, narrowband, and wideband leased circuit tariffs over the period 1980 to 1987 in 18 OECD countries. The results provide a retrospective view of changes in pricing policy. They show that rate restructuring has not been implemented on the scale that is sometimes reported in the trade literature. In most countries, there is an opportunity to assess which pricing strategies will provide the best foundation for the future development of telecommunication services.

## III. RATE RESTRUCTURING: DIVERGENT NETWORKING AND POLICY PRIORITIES

There are two "world views" on the costing philosophies that underlie telecommunication price structures. The first, known as "cost of service" pricing, reflects the perception that price structures should lead to an optimal allocation of resources as would occur in competitive markets. This approach focuses on maximising economic efficiency, stimulating investment and the general movement of prices to accommodate the introduction of new telecommunication infrastructures and competition. The second, "value of service" pricing, is associated with traditional rate-making practice, national industrial and economic policy, social and public service objectives and a monopolistic telecommunication framework.

Despite the currency of the former in today's debates on rate restructuring, both "cost of service" and "value of service" pricing find their roots in the history of telephony. Differences of opinion on the role these concepts should play in telecommunication rate-making are confounded in practice by the priority given to different aspects of policy. A wide gulf exists between telecommunication pricing theory, understanding of telecommunication cost/price relationships, and empirical evidence.

Rate restructuring in support of economic efficiency can be characterised as focusing on the need to:

> "(...) build on our strength in telecommunications, the infrastructure of the information economy. In order to achieve competitive efficiency for our production process in an information economy, we must have economic efficiency in the underlying communications system. An efficient communications infrastructure is also fundamental to developing the market for goods and services" (4).

Universal or "public" service policies are often juxtaposed with efficiency goals. For example,

"(...) the universal accessibility of service is, and will remain, of fundamental importance both to protect subscribers and to maintain the value of the telephone network. In consequence, it is important to consider the extent to which rebalancing could be in conflict with this principle (5)."

Although pricing issues are usually discussed in abstract economic terms, the reality of economic and political policy frequently supersedes this debate. The main characteristics of "cost of service" and "value of service" pricing and the positions of telecommunication regulators, PTOs and users in the United States, Canada and the European Community are examined below. In each case a different path has been chosen to move tariffs toward a structure more appropriate to a competitive and innovative service environment.

## A. Telecommunication Pricing Concepts

Given the formal and public nature of telecommunication regulation in the United States and Canada, both "cost of service" and "value of service" pricing have been fully discussed. There is general agreement that telecommunication tariffs in Europe have not been designed on the basis of costs. Under monopoly supply this permitted the pursuit of a variety of objectives without significant pressure from the marketplace. For many PTOs pricing policy included subsidising certain types of subscribers, the postal service or general government revenues. Attention was not given to cost of service details and, in many cases, the accounting and statistical records necessary to measure costs were not available.

When the experience of most PTOs is examined in the light of debates in the economics literature on pricing, it seems that there was no conscious decision to accept or reject cost as basis for establishing rate structures. "Cost" simply was not the criterion that was used. Rather prices were set in response to more global objectives. Most PTOs have felt it unnecessary to attempt to determine which services are being subsidised by other services until recently.

The experience in North America is different. There have been ongoing policy debates and multiple studies examining pricing policies and the role of costs in telecommunication rate structures. These appear in the professional (economics, law, and policy) literature, in decisions by regulatory authorities and, in the United States, in Court decisions.

These debates about the criteria for designing rate structures have a long history in other industries with public service characteristics, most notably transport and electricity. The appropriate structuring of rail and electricity tariffs spawned serious debate and in-depth study before the turn of the century raising virtually all of the issues now being discussed in telecommunications (6).

The economic theory of pricing explains that market prices are determined by the conditions of supply and demand. The quantity supplied depends upon the cost of production. Higher prices will bring forth more supply. The quantity demanded depends upon the "value of the service" to the purchasers. Lower prices will bring forth greater demand. Historically, the pricing debate has been about the appropriate role of "cost of service" and "value of service" principles in the design of pricing structures, the concepts of "cost" and "value" that should be used, and the methods of measuring these concepts.

It should be recognised that there is a different concept of "value of service" that is used in telecommunications. "Value of service" sometimes refers to the number of telephones that can be reached within a local area from a telephone. For instance, there is greater "value of service" in a community of 100 000 telephones than in one of 10 000. This can be used as a basis for higher rental charges in the community with greater "value of service". In economic terms, this is a difference in quality of service. It is an entirely separate issue from the treatment of "value of service" as a measure of intensity of demand at alternative possible price levels.

In the economic theory of competitive markets, prices are driven to costs (including a fair return to cover the cost of attracting capital). The amount of demand that is met is for those who will pay the cost-based price. All those buyers who are willing to pay a price that covers the cost of production will be served on a non-discriminatory basis. The analysis of the competitive market model has led some parties to the conclusion that prices should be based on "cost of service".

Others argue that because there are substantial economies of scale and scope in the supply of telecommunication systems and services, the marginal (or incremental) cost of adding higher volumes of service and new services will be less than the average unit cost. They claim that the appropriate cost concept is marginal cost, which should represent the minimum price. Actual prices should be set at marginal cost or above, depending on "value of service" (demand elasticity) considerations. Thus, the primary determinate of the structure of prices for services will be "value of service".

Proponents of value of service pricing generally have not proposed unbridled monopolistic "value of service" pricing. There is some agreement that such a pricing practice would lead to exploitative and discriminatory monopoly pricing. Instead, "value of service" pricing should only be used to permit the telecommunication monopoly to cover its total cost (or revenue requirement) including a fair return on its invested capital. In earlier debates on railroad and electricity pricing, this was commonly referred to as using "value of service" pricing to cover the overhead or common costs. According to Clark:

> "overhead costs must be levied upon those parts of the business as will stand the burden, while other parts of the business, which otherwise cannot

be had at all, are charged what they can pay, regardless of overhead costs" (7).

In the terminology of the more recent literature in electricity and telecommunications, it is referred to as applying a mark-up of price over marginal cost in terms of relative inelasticity of demand (e.g. Ramsey pricing). The most inelastic demand should receive the greatest mark-up of price over marginal cost. For example, local telephone service is believed to have a relatively inelastic demand compared with long distance service. Therefore, local service should have a higher mark-up over marginal cost than long distance service.

Most PTOs do not have the necessary information to implement any version of either side of the traditional telecommunications debate on price structures. New accounting and information systems are being introduced, since implementation of new price structures in the future environment of multiple services on a common telecommunication system will be more complex than in the past. However, it is worth emphasising that cost is part of all approaches to price structure debates. In the new telecommunication environment, PTOs may elect to use cost differently in achieving their policy objectives. But greater attention to cost is inescapable and essential to the successful implementation of telecommunication policies.

There is considerable debate over the concept of cost that is applicable and the appropriate treatment of common and overhead costs. Many "cost of service" advocates believe that most, if not all common and overhead costs can be allocated on a cost causation basis. "Value of service" advocates argue that common and overhead costs cannot be allocated on a cost causation basis. Instead, the additional revenues necessary to cover total costs should be realised by charging prices in excess of marginal cost reflecting "value of service" (i.e. the relative demand elasticity) considerations.

In summary, one approach proposes to recover common and overhead costs by allocation to services on the best estimates of cost causation. A second approach proposes to recover these costs by means of differentiated mark-ups above the marginal or direct costs of particular services. Unfortunately, in much of the literature on cost-based pricing, the distinction between "cost of service" and "value of service" pricing is not clear.

In recent times this debate has been pursued in greatest depth in the United States. Cost-based pricing at first glance is more attractive than pricing "without regard to cost". Costs can appear to have quantitative rigour and empirical criteria can be devised as the basis for tariff-setting. Unfortunately there is no unanimity on what criteria or cost standards should be used. In most OECD countries PTOs have had great latitude in price setting. In those countries where there has been debate on cost standards, it has revolved around the common cost problem.

"At the core of almost all the pricing issues in telecommunications is the fact that the products of this industry are a large and increasing diversity of services issuing from common facilities (...). The issues tend to be framed in terms of the proper apportionment of their common costs among them, a task further complicated by the fact that some of the services have become subject to competition, while others continue to be offered by a single supplier, under close regulation (8)."

In the determination of telecommunication service costs it can be assumed that a major share of costs associated with the local exchange network should be recovered from charges to the local telephone service subscriber regardless of actual use. Common costs are not apportioned among the various services that use these common facilities. Since traditional price structures generally have set prices for long-distance service above its direct costs, the argument is that local telephone service is being subsidised by long distance service. Rate-rebalancing, a specific case of rate restructuring, is needed to bring prices into alignment with "costs".

There are also those who argue that to judge the reasonableness of prices, it is necessary to allocate common costs in proportion to their relative use by different services. In this case a proportion of the costs associated with commonly used exchange plant and equipment are allocated to services in relation to how the services benefit from the use of common facilities. Using this approach, prices for services that depend on a common network reflect the design characteristics and associated costs each service incurs in its production. Cost studies using this approach generally show that traditional prices for long distance service make a reasonable contribution to common costs.

It should be noted that in addition to problems relating to the ways in which costs underlying the supply different telecommunication services should be treated and their relationship to service prices, there are issues concerning appropriate ways of developing cost methodologies. Debates in North America have centred on whether historical or prospective costs should form the basis of analysis. They also have been concerned with whether it is possible to accurately establish cost causation, i.e. the relationship between investment in plant and equipment and a marketed service that makes use of elements of that plant. All costing methodologies are dependent on multiple assumptions as to the use of plant and equipment (fungibility) and detailed records of investment be aggregated (or highly disaggregated) accounts must be available in conjunction with sophisticated computerised costing systems. In European countries such methodologies are beginning to be developed by PTOs as they enter an environment characterised by elements of monopoly and competitive service provision. Few of these models are available for scrutiny in the public domain and it is not the purpose of this part to explore the problems associated with cost methodologies.

Even where the adoption of a particular approach to analysis of underlying telecommunication costs leads to the conclusion that rate restructuring is not required on the grounds of costs alone, there can be other relevant justifications for changes in tariff structures. For example, there may be reason to recover substantially greater revenues from local telephone service subscribers to reduce costs to business users who rely more on long distance service. New pricing strategies can be designed to stimulate the diffusion of new services or to implement broad industrial policy objectives. Changing technologies provide a basis for rate restructuring, but the common cost problem remains.

There is growing agreement in the OECD area that service prices should bear some relationship to their cost of production. Disagreement centres on the measurement of cost and the circumstances where prices should deviate from cost to implement policy objectives (i.e. social policies to extend access to services and economic policies to stimulate demand).

There are fundamental differences in approaches to pricing in the United States (to some extent Canada) and countries in Europe. In the former, regulation has required that prices be set in reference to cost. The question has been one of the appropriate cost standard and the grounds for departures from it. In Europe, PTOs generally have been left to their own devices in setting prices. "Public service" responsibilities have provided the constraints within which prices have been set (9).

This situation is rapidly changing and there are different views on telecommunication pricing. Even if cost-based pricing were to be widely adopted, prices would invariably depart from cost. The next section illustrates the arguments for "cost of service" or "value of service" pricing that have been used by focusing on rate rebalancing as a special case of rate restructuring.

## B. Rate rebalancing in selected OECD countries

### 1. United States

Rate rebalancing issues have been addressed in the United States by the Federal Communications Commission (FCC) in the context of the implementation of subscriber line access charges. Subscriber line access charges were introduced in 1985 as a method of recovering a larger share of common local exchange costs from local service subscribers rather than from long distance charges. In its "access charge" decision the FCC said that:

> "Access to telephone service has become crucial to full participation in our society and economy which are increasingly dependent upon the rapid exchange of information. In many cases, particularly for the elderly, poor, disabled, the telephone is truly a lifeline to the outside world (...). Our responsibilities under the Communications Act require us to take steps,

> consistent with our authority under the Act and the other Commission goals (...), to prevent degradation of universal service and the division of our society into information "haves" and "have nots (10)."

The implications of increasing rates paid for local access to the public switched telephone network were linked to "universal service". The access charge plan relied on the argument that the rate structure should ensure that all "non-traffic sensitive" costs of access to the network are assigned directly to customers. An access fee was to be introduced that did not vary with use of exchange line facilities. The "rebalancing" of rates implied by this plan aroused controversy in Congress and elsewhere and the plan was revised. The charge introduced in June 1985 recovered only a portion of the common "non-traffic sensitive" costs of the local exchange network. Local subscribers began paying US$1 per month in addition to existing local charges (generally there is no local usage charge). This charge later rose to US$2.60 per month. These revenues had previously been recovered interstate charges to long distance telephone users.

It has been suggested that the 1984 divestiture of the AT&T Long Lines Department from the local exchange Bell Operating Companies was a major contributor to rate rebalancing. The combination of open entry for most services and divestiture is believed to have exacerbated rate rebalancing. However, if a different approach to cost had been adopted, the divestiture of AT&T in itself would have had little impact on local rates. The traditional methods used to divide interstate and intrastate revenues (jurisdictional cost separations) could have remained in place. As important was the simultaneous move by the local exchange companies to revise depreciation practices, to treat some previously capitalised expenses as current expenses and to increase their allowed rates of return (11).

These factors, together with the FCC's policy requiring a growing proportion of network access costs to be recovered from local subscribers are the major contributors to changing rate structures in the United States. The FCC's access charge plan has been criticised as failing to fully implement the theory upon which it is based. In fact it may create conditions that do not maximise efficiency in production of both local and long distance services.

Despite the fact that a full access charge plan has yet to be implemented, the FCC has had to develop a "Lifeline Telecommunications Policy". By 1988, 17 States had adopted policies offering lifeline telephone service plans. Federal matching funds for low income discounted service are available and some States have adopted policies to obtain the federal reimbursement (12). Telephone penetration rates in the United States remain high, despite increasing local charges, but the effectiveness of targeted subsidy programmes has been criticised (13).

Requests for increases in revenues from intrastate operations (local and intrastate long distance) began to grow in magnitude long before the 1984 divestiture of

AT&T. Between 1978 and 1982 increases over the latter two years were from three to seven times greater than for the earlier years. At the end of October 1983, requests at the State level had been made for increased local revenues totalling US$12.3 billion, only $4.6 billion of which was related to the expected access charges. The increases for local rates extended up to 200 per cent over existing prices but a smaller percentage of increases was actually allowed in these cases (14).

Thus increasing rates for local telephone service can be attributed to many factors in addition to the introduction of access charges and divestiture. Rate increases also stem from liberalisation of depreciation policies and faster recovery rates; accounting changes in treatment of customer premises equipment; and inside wiring deregulation.

Bell Operating Companies tend to find the causes of rate rebalancing in competition and the way the market forces prices closer to "cost". For example:

> "Because competition forces prices for a service toward the specific costs of that service, broad average prices or aggregation of several service elements for one price is no longer appropriate. The Company has responded to these competition pressures over the past several years and has provided more services priced in relation to the costs of the services and the market's expectations. The forces of competition are causing the Company to unbundle or disaggregate the rate elements and provide the array of services as stand-alone elements. In this manner, discrete customer needs can be met in terms of services provided and payment for the services used (15)."

Since 1984 there has been considerable rate upheaval in the United States. Local residential rates (including monthly recurring charges, non-recurring charges, telephone set rental, the shift in recovery of inside wire costs and rebalancing) increased from 1983 to 1986 by 35.5 per cent. In long distance telephone service markets, AT&T remains the price leader and price differences among the competitors and AT&T have declined dramatically.

In the post-divestiture world multiple exchange carriers interconnect to supply access and local connection and distribution services to interexchange carriers, enhanced service providers, and users. Although there has been a formal separation of functions, the local exchange facilities of the Bell Operating Companies continue to be used in common to supply many services. The cost-based pricing issue has not vanished magically with the disappearance of the pre-divestiture industry structure and the introduction of access charges.

The shift in cost recovery from long distance to local service is also the result of the perceived threat of bypass. In the competitive long distance market the Bell Operating Companies have argued that increasing local prices will lead large users

to construct their own networks. Similarly the three major facility-based long distance competitors have argued that if they have to generate revenues to contribute to local exchange costs, some users will bypass their networks (i.e. direct rooftop satellite distribution, etc.) However, studies have shown that for the States of Maryland, New York, New Jersey and Pennsylvania, bypass is not likely to have a significant impact on local telephone companies. In these studies, the PTOs responsiveness to customer needs has been found to be as a major factor influencing bypass decisions (16).

The Bell Telephone Company of Pennsylvania's performance, post-divestiture, confirms these findings. Between 1984 and 1986, the company's access revenues grew by 27.2 per cent or 12.8 per cent compounded annually. A study of bypass showed that 99 per cent of the largest customers obtained at least three-quarters of their local usage from the telephone company. Of firms using some form of facility bypass technology (38 per cent) less than one-seventh had systems connected to the public switched network (17).

Underlying this complex picture of rate rebalancing is the cost problem. The need to develop cost standards for judging the reasonableness of rate increases and decreases remains. Rising local telephone rates are confronted at the State level and it is to the State regulators that the Bell Operating Companies turn to request increases in local and intrastate charges. They have argued that increases in local rates are necessary to implement federally imposed access charges; to enable them to compete more effectively; and to discourage bypass. These proposals could also reflect their attempts to improve their position in the market for interexchange services by increasing the revenue contribution from local exchange services to their total costs.

The problem of cost standards has been addressed by most State regulatory commissions. Bell Operating Companies submit embedded direct cost analyses (EDA) and incremental cost studies. In both, local exchange service costs are comprised of two components, the "dial tone line" (subscriber line and associated costs) and local usage costs. Costs are assigned to different services (local and long distance) on the basis of where the facilities are located (i.e. in the exchange or transmission network), rather than on the basis of why the relevant plant has been put in place. The method of costing assumes that facilities on the customer side of the exchange switch should be recovered from the customer and that these costs are not usage or system related. The result is a continuing growth in local exchange service costs. Network improvements that produce overall system efficiencies, paradoxically result in constant pressure driving up costs of local telephone service.

An example illustrates the problem. Assume that a telephone company incurs costs to upgrade its network to provide high speed data transmission and that these facilities are used for data transmission and voice traffic. If the investment is independent of the mix of voice and data traffic which is carried, the telephone

company cost analysis would assign the costs of the facility to each service on the basis of relative use of the services. Pressure would be created for local service prices to rise. Alternatively, if the costs of the facilities are assigned on the basis of those needed for the efficient provision of each service independently, the costs of the new facility would be included in those for both the local and data service, but the incremental cost of upgrading the facility would be unique to the data service. In the latter case, the introduction of new services using common local exchange facilities would not create inordinate pressure for increases in local rates.

The former approach to cost predominates in the United States both at the federal and state level. The latter view has been considered by several state commissions in regulatory proceedings and may have influenced regulatory commissions that have awarded less than the full price increases requested by Bell Operating Companies.

Debates on cost allocation and standards in United States regulatory proceedings have been more detailed than in other OECD countries. Detailed evidence is required to substantiate the major contending positions on cost and pricing issues. This, together with the adversarial nature of proceedings, can sometimes lead to a tendency to lose sight of the essential and broader economic and political considerations that telecommunication rate structures ultimately must serve.

It would be difficult if not impossible to introduce this "style" of regulation into other systems of government and policy-making. Nevertheless, other countries (e.g. the United Kingdom and Japan) that have introduced competition in telecommunications have found that they must address rate restructuring problems. Regardless of the pace of telecommunication liberalisation in other OECD countries, the pressure to restructure rates in preparation for competition means that rate rebalancing will come onto the policy agenda. The competing objectives of expanding the diffusion of telephone and other services and the need to reduce telecommunication costs for high volume large business users are not amenable to technical solutions. The remainder of this section examines the ways in which other OECD countries are addressing rate rebalancing policies.

2. Canada

In March 1988 the Canadian Radio-television and Telecommunications Commission (CRTC) authorised rate reductions for transCanada long distance telephone service and for long distance telephone service within Bell Canada's territory (18). In 1985 Bell Canada had responded to the possible introduction of competition in the long distance voice telephone market by proposing rate rebalancing for its local services. The objective was to achieve a zero net revenue impact by reducing long distance rates by C$125 million and increasing local revenues by approximately the same amount.

In its "rebalancing" decision, the CRTC denied Bell's application to increase local rates (which have remained at the same level since 1983) on the grounds that Bell's allowable rate of return (12.75 per cent) would be exceeded due to excess total revenues amounting to approximately C$90 million generated by existing rate levels. In denying Bell's proposal to implement a local rate increase which amounted to C$1.25 per month for business and residential local exchange telephone services, the CRTC concluded that:

> "With regard to Bell's application to rebalance its telephone rates, the Commission considers that significant social and economic benefits would result from rate rebalancing. However, at this time, there were sufficient excess revenues available to eliminate any need for the local rate increases proposed by Bell. Any future applications to rebalance rates would have to include detailed plans on monitoring, among other things, the number of people that would discontinue their telephone service specifically because of local rate increases and ways of maintaining universality of telephone service (19)."

Canada's economic links and geographical proximity to the United States make it an interesting illustration of the pressures toward rate rebalancing. If technical change and competitive pressures are major factors leading to rate rebalancing, incentives should be strong to reduce rate disparities between the two countries. What has enabled the Canadian regulatory agency to take a more cautious approach to rate rebalancing than has been the case in the United States?

Bell Canada has argued that rate rebalancing is warranted to recognise cost and revenue imbalances, the most important of which is in the long distance and local categories. Existing imbalances should be corrected by moving prices toward costs and by the introduction of a more economically efficient pricing system. Such a system should be implemented to achieve the desired benefits without affecting the affordability of telephone service (20).

Bell Canada's rate proposals were influenced by the extent to which telecommunication bypass was likely to threaten company revenues. The company offered examples of private communication systems including broadcast cable, hospital microwave systems, hydro-electric and gas utility networks, public systems and United States border operators who could extend links to Canadian customers.

Bell Canada determined the extent of its local service revenue shortfall on the basis of studies that treat local exchange access costs as common to all network services but to which no revenues are assigned. On the basis of these cost studies, Bell argued that if local rates were not increased, the local service revenue shortfall would grow from C$1.4 billion in 1984 to C$1.9 billion in 1988 and C$2.4 billion in 1991. The contribution by long distance revenues to cover common access costs was expected to grow from C$1.5 billion in 1984 to C$2.0 billion in 1988 and C$2.6 billion in 1991 (21).

The CRTC's response to the company's arguments found that while long distance calling "would be significantly expanded, the cost of telephone service for the majority of subscribers would be increased. Moreover, without the development of a subsidy program, basic telephone service could become unaffordable to some subscribers". However, reductions in long distance charges were believed to carry substantial economic and social benefits:

> "A lowering of MTS/WATS [long distance] rates is necessary at this time to reduce the communications costs experienced by Canadian businesses. In addition, a reduction of such rates will lessen the potential for future diversion of traffic, from Canadian telecommunications carrier networks, within Canada and through the US and will reduce the incentive to divert investment and jobs to areas outside Canada...a lowering of MTS/WATS rates will thereby strengthen Canada's economy and its ability to play a leading role in the emerging global information economy (22)."

Other social benefits were expected to include increased communications and understanding both within and among regions of the country and reduced incentives for uneconomic entry.

The CRTC has not ruled out a gradual process of rate rebalancing in Canada. But it has found that the Canadian marketplace for telecommunication services allows Bell Canada to earn its overall revenue requirement in the face of long distance rate reductions, without increases in local rates.

The importance of reduced charges for long distance telephone service for business users was illustrated by showing that approximately 70 per cent of total business real input of telecommunication services is used in the transportation and storage, communications, wholesale trade, retail trade, finance, insurance and real estate, education and health services, and services to business management sectors. Telecommunication costs for these sectors varied between 6.2 and 19 per cent of total real intermediate input costs in 1981. Between 1971 and 1981 total business expenditure on telecommunications grew in real terms in Canada by 12 per cent annually. Bell Canada argued that the sharp decline in long distance charges in the United States had put Canadian business at a relative cost disadvantage.

A study commissioned by Bell Canada assessed the macroeconomic benefits:

> "The change to the price of telecommunications produces a larger Canadian economy, both in terms of real output and employment, lower inflation and an improvement in government balances. The telecommunications price changes [proposed by Bell Canada] (...) cause the real output for the economy to rise on average by C$223 million (1986 dollars) over the years 1988-90, while the consumer price index drops by 0.07 per cent (...) (23)."

Supporters of the proposal included Canadian business organisations (e.g. Business Telecommunications Alliance, Manufacturers' Association, Association of Data and Professional Service Organisations, etc.) Among those expressing concern and/or opposition were: the Consumers' Association of Canada, the National Anti-Poverty Coalition, the Canadian Independent Telephone Association and Le Syndicat des travailleurs et travailleuses en communications et en électricité du Canada.

Opponents suggested that the onus was on Bell Canada to show potential negative effects of not implementing rate changes (24). That is, Bell should be able to show that a failure to rebalance rates had resulted in economic harm either to itself or Canadian business. The Canadian telecommunication industry is technologically advanced, financially strong, and growing rapidly despite the absence of rate rebalancing. Long distance messages have grown at a compound annual rate of 7.8 per cent (1983-85) which is line with previous growth rates. Despite rate rebalancing in the United States (local rates increased between 1983 and 1986 by 35.5 per cent as compared with the stability of Canadian rates), both systems performed similarly with Bell Canada experiencing slightly greater growth (See Table 1).

Opponents also suggested that bypass in Canada is unlikely to cause significant erosion of the company's revenues. In fact in the United States between 96 and 99 per cent of long distance messages were still flowing through the local exchange networks of the Bell Operating Companies in 1987 (25). Facility bypass is more likely to accommodate growth in existing customer needs or generate new service demand than to divert existing traffic (26). Canadian data have led to the conclusion that "the current extent of bypass is limited, both domestically and internationally" (27).

The rate rebalancing proposal was premised on cost reductions due to technological change. Fibre optic transmission and digital switching systems can create economies of scale and scope when they are fully deployed. Over the next 10 years forecasters predict an overall reduction on the order of 50 per cent in installed fibre costs. Bell Canada argued that these cost reductions should be reflected in long distance charges. However, others suggested that "rate rebalancing, the movement of prices more toward costs (...) is perhaps a prescription for a disease that Canadian telecommunication markets do not have" (28). Differences in market size, geography, and the absence of significant bypass combine to suggest that there is no need for Canadian PTOs to follow the United States model in rate rebalancing.

Rate rebalancing opponents also suggested that the primary impact would be to increase the telephone bills for approximately four-fifths of all residential customers and three-fifths of all business customers. Although local telephone service consumes only one-half of one per cent of disposable income for the average

Table 1

**Bell Canada and United States Telephone System Growth**

| | 1980 - 1983 United States | 1980 - 1983 Canada | 1983 - 1986 United States | 1983 - 1986 Canada |
|---|---|---|---|---|
| Rates | | | | |
| Local/Res. | 34.4 | 32.7 | 35.5 | 4.9 |
| Inter-LD | 21.9 | 7.3 | -12.9 | 0.0 |
| Intra-LD | 17.8 | 40.6 | 6.3 | 3.3 |
| System Performance | | | | |
| Access Lines | 5.2 | 6.7 | 10.5 | 11.1 |
| Total LD | 5.5 | 12.7 | 31.5 | 30.5 |
| General Economic Indicators | | | | |
| Real Output | 2.8 | 2.0 | 12.1 | 12.5 |
| Consumer Prices | 20.9 | 31.8 | 10.1 | 13.0 |

Notes: Data from Bell (CRTC) 11 May 87 - 1737 RRB, Attachment 2; Bell (CNCP) 11 May 87, 17RRB, p.2; Bell (CNCP) 11 May 87, 34RRB, Attachment p.1; Bell (CRCT) 09 Jan 81, 204, p.3; Bell (CRTC) 24 Jan 86, 202 ARRR; J. Lande and P. Wynns, Primer and Sourcebook on Telephone Price Indexes and Rate Levels, FCC, April 1987; US Department of Commerce, Statistical Abstract of the United States, 1987, Table 909 and FCC, Statistics of Common Carriers, various issues and Form M; Economic Report of the President, Washington DC, Appendix B, Tables B-2, B-60.

Source: CRTC, "Evidence" of M. Cooper, W. Bolter, and R. Huriaux on behalf of the Consumer's Association of Canada re CRTC Public Notice 1987-15, 21st August 1987.

household in an urban Canadian area, some claimed there would be a negative impact on "universal service" (currently at a level of penetration of between 98 and 99 per cent per household in Bell Canada's territory) and an increase in disconnections. The macroeconomic benefits were too small to justify price changes. The macroeconomic studies failed to account for local rate increases and assumed that business would pass on all savings from long distance rate reductions.

Bell Canada sought greater efficiency in its tariff structure by eliminating subsidies. However, public interest advocacy groups argued that if common network access costs were assigned to a separate cost category, then local service revenues would be on the order of 74 per cent greater than local service costs. The key issue is how common network access costs were allocated among the network services. If a decision had been taken to allocate a proportion of common access costs among services using local exchange facilities, allocation criteria would have to be established. However, the CRTC's view was that long distance service users had been paying bills in excess of the costs serving them.

> "Given the growing importance of the information and service sectors, the Commission considers that rate rebalancing would ease the burden of access recovery on these industries and augment their ability to obtain cost effective communications (29)."

In summary, in Canada the rate rebalancing issue is unsettled. The CRTC is of the opinion that rate rebalancing is in the public interest and that "universal service" must be maintained. It has not allowed rebalancing because of the revenue excess that Bell is able to generate. Decreases in long distance charges have been implemented to reduce the gap between the level of charges in the United States and Canada, but local rates have not increased.

AT&T's description of the future role of local exchange facilities (regardless of the supply structure of the industry) is likely to become a reality over the next decade.

> "(...) the local network is rapidly evolving into a flexible, all-purpose communications delivery system, capable of handling information in whatever form customers desire -- voice, data, graphics, or video (...). Providing wideband transmission services over the loop plant holds great potential for extending a full range of Information Age Services to home and business customers (30)."

In the near term, cost reductions and technical developments in the local exchange portion of networks are unlikely to offset growing upward pressures on local rate levels. Policy-makers are confronting pressures to rebalance rates. Their decisions on how the costs of the future telecommunication infrastructure will be shared among large business, small and medium-size business and residential users will shape future public and private network use.

3. Japan

The long-distance services offered by the New Common Carriers (NCCs) are currently available only to telephones connected to Nippon Telegraph and Telephone's (NTT) electronic exchange equipment. However, only 53 per cent of

the specified exchange equipment is digital (as of end of FY 1987) and pressure has been put on NTT to replace the existing system with new digital exchange equipment. In this context, NTT has achieved 26 per cent of digitisation of its network including transmission and exchange equipment (as of end of FY 1988) and has been trying to accelerate its digitisation programme.

The fact that the NCCs need to interconnect their networks with NTT's has caused certain rate restructuring problems among the carriers. The rate for local calls provided by NTT can be interpreted as the access charge to be paid by the NCCs to NTT. Competition has allowed carriers to decrease their long-distance call charges up to now, but their competitiveness is seriously influenced by the level of NTT's access charge.

In July 1988, the Ministry of Posts and Telecommunications (MPT) revised the telecommunications business accounting rules, so that Type-I carriers are now obliged to disclose a detailed statement of their overall earnings and expenses for each of eight services such as telephone, telegram, telegraph, leased circuits, data communications, digital data transmission, radio paging and others. In addition, the item of telephone service is divided into categories such as subscriber telephones (divided between local calls and long-distance calls), public telephones and mobile telephones. These measures should prove useful for preventing cross-subsidisation among services and eventually for establishing appropriate tariffication.

Under the reformed telecommunications business accounting rules, a detailed statement of earnings and expenses by service has been submitted by common carriers to MPT for disclosure. In April 1989, NTT disclosed its earnings and expenses by service, arguing that long-distance calls gained a profit of 960 billion yet with losses of 150 billion yen for local calls (Table 2). However, the (local call) charge for long distance calls is now calculated as one of the items in long-distance calls, which is now claimed by MPT to be categorised in local call charges. The decision on how a more detailed statement of each service might be disclosed was still under preparation at the time of writing.

In summary, there is general agreement that it will be some time before the public switched network meets all large business user requirements. In fact, there are those who argue that at least some of these requirements will always be more advanced than the capabilities of public switched networks. To examine the process of tariff restructuring within countries in the European Community the cases of the United Kingdom and Italy are considered in greater detail.

4. European Community

The Commission of the European Communities' Green Paper on Telecommunications considers the future structure and level of telecommunication tariffs. For example tariff principles could include:

"(...) recognition of the fact that telecommunications tariffs should follow overall cost trends and that a certain amount of rebalancing of tariffs will be inevitable, as far as compatible with public service goals. This applies in particular to tariffs for national and intra-community long distance traffic (...) a fair trade-off between cost-orientation and the aim of universal service on reasonably the same terms for all will have to be developed (31)."

Table 2

**NTT'S Balance Sheet for Telephone Services for FY 1987**

| | (1) Service Earnings | (2) Service Expenses | (3) Service Profit (1)-(2) | (4) Financial Expenses | (5) Total Expenses (2)+(4) | (6) Differences between Profit and Loss (1)-(5) |
|---|---|---|---|---|---|---|
| Basic Charge | 9 244 | 11 056 | -1 812 | 1 053 | 12 110 | -2 866 |
| Local calls | 7 958 | 8 711 | -752 | 771 | 9 482 | -1 523 |
| Toll calls | 21 834 | 11 262 | 10 571 | 1 001 | 12 264 | 9 570 |
| Other | 3 263 | 3 473 | -209 | 173 | 3 645 | -383 |

Source: New Era of Telecommunications in Japan, No. 87, 1 May 1989.

The Green Paper calls for a consensus on tariff principles, but makes clear that the Commission does not expect to establish systematic monitoring of prices (or costs) and that tariff setting is a component of PTO commercial strategy. However, since PTOs are subject to competition rules cases of unfair pricing must be avoided. Comments by the business community to the Green Paper (32) show the importance attached to rate restructuring and "cost-based" tariffs. The cost principle is supported by most organisations and firms.

For example, the American Chamber of Commerce in Belgium "endorses the Commission's intention to promote a cost-oriented approach for telecommunications tariffs for reserved services" and "shares the view of an inevitable trend towards rebalancing local and long distance tariffs" It argues that there is no inevitable conflict between "universal service" obligations and cost-based pricing.

Themes that have been debated in the United States resonate in the Chambers' view of the benefits of cost-based tariffs:

> "An increase in local rates and a decrease in long distance rates. While this will have an immediate positive effect on the business community, it will also be beneficial for the whole of society as it will help offset the inequities between residents of large urban areas and those in remote regions. If there is a social need to subsidize local rates, it should be done in a "transparent" way, either from public funds or from revenues of the same service (i.e. telephone service). We see it as unfair to cross-subsidize among different types of services (i.e. telephone service subsidized from public data network service or vice-versa)."

The Belgian Telecommunications User Group (BELTUG) calls attention to the need for guidelines on tariff setting. "Tariffs should reflect closely actual costs, and eliminate cross-subsidies and artificial, non-cost related approaches..". The association points out that PTOs in Europe are mostly government-owned and tariffs are set without the pressures of domestic network competition. Different financial and commercial objectives and arrangements for taxation, accounting, levels of productivity and disparate geographical and demographic factors combine to suggest that harmonised tariffs could not be "cost-based". British Telecom draws attention to inconsistencies: "recognition of social goals and a consequent need for tariff flexibility; the desirability of moving towards cost-based tariffs; and the aim of moving towards harmonised tariff principles and, perhaps ultimately, to unified European tariff zone".

The Council of Netherlands Industrial Federations says that: "the tariff structure for each transmission service of a PTT should be consistent with the network-facilities used, and be based on the costs of the service provided (...) a system of charge 'what the market can bear' is utterly out of place in a monopolistic environment. Improvements in cost/performance achieved by advances in technology should be built in the tariffs (...)". The European Computing Services Association "agrees that the setting of tariffs is a major component of a Telecommunications Administrations' overall commercial strategy; but the abuse of dominant positions must be halted. Increasingly pressure must be exerted for local tariffs to follow true basic cost trends. As the cost of provision of long distance traffic has fallen much more than the cost of provision of local traffic, tariffs should become less distant-dependent".

IBM Europe's position echoes that of other large telecommunication users: "We observe that there is a critical need to rebalance today's distorted tariffs for switched services, not only as a matter of equity to business users but also as the best means to assuage Administration fears of 'cream skimming' (...)". IBM argues that reserved services should be priced on the basis of costs (including operating expenses, interest on loans, depreciation and a reasonable return on investment).

"In telecommunications, the well-known cross-subsidisation of local telephone services by long distance has been a burden on heavy users of long distance services, primarily businesses. Most Telecommunications Administrations are taking unreasonable advantage of their exclusive franchises and are 'cream skimming' their large customers in a way that is no longer affordable or in the public interest."

IBM cites the Director General of the UK Office of Telecommunications in support of its position. Although decreases in long distance rates generally imply an increase in local rates, this can be beneficial for regions. Where rate rebalancing implies a threat to telephone service penetration levels, visible targeted subsidies should be used. The International Telecommunications User Group (INTUG) reinforces this position and makes the additional point that "cost-based" tariffs should not discriminate among different uses of the same facilities.

"The format and content of information are the concerns of the user and not of the network provider. In the approaching digital environment, it will not be practicable to distinguish between data, text, image or voice in the network (...)."

Business users see a need for a major change in the emphasis given to economic and social policy objectives. The International Chamber of Commerce notes that "(...) telecommunications networks can no longer be considered merely a convenience. Business relies on their effective and efficient operation in order to develop in the same way as raw materials are required for the manufacture of goods. Companies will invest in an area where they can get facilities and plan for costs, but the reverse is also true".

Shell International Petroleum makes a key observation on the absence of cost-information.

"Examples are known where the Administration just does not know what is the true cost of providing specific facilities and services. They will admit that, even given the philosophical challenges posed by the integrated nature of telecommunication facilities, accounting practices are only now starting to be adopted which will identify costs and hence lead to vastly improved control and hence reduction in costs."

In summary, large firms and their representative organisations are consistently in favour of rate rebalancing. There are differences on whether "harmonised tariffs" should take precedence over "cost-based" tariffs. There is virtual unanimity on the issue of the cost standard that should guide future rate-making. The "costs" of local exchange service are include all those required for network access and local calls.

By any definition if "cost-based" tariffs are to be implemented it seems reasonable to expect some public body to know the costs and cost standards that are being used. If this is not the case, it is impossible to know whether tariffs are, or are not, cost-based. Where these issues are not open to examination, rebalancing can be used to support any movement in price and cost relationships.

In the European community there has been little public discussion on rate rebalancing. Some countries want to keep local service rates at a low level to implement social, regional and other policy objectives. BEUC (Bureau européen des unions de consommateurs) has expressed concern about the combined impact of technological change, a more commercial orientation on the part of PTOs, and rate rebalancing:

> "Partly because there is likely to be more competition in the business sector of telecommunications and partly because business users are getting organised to negotiate with telecommunications administrations, telephone charges to residential consumers may well be looked on as a source of monopoly profits, to be used to subsidise other services."

> "(...) BEUC is concerned that any changes in tariff structure that arise from the Commission's policies should not lead to a "rebalancing" of telephone charges which benefits business users and penalizes residential consumers. There is always the possibility that telecommunications administrations might offer reduced telephone charges to business as an inducement to getting their custom for new value added network services, where they may be in competition with other service providers (33)."

Part I of this report shows that some PTOs see rate restructuring as a threat to their financial viability and to their continued ability to meet public service objectives. Some (Belgium, Germany, the Netherlands, Portugal, Sweden, the United Kingdom) are developing methods of cost allocation. But with the exception of France, these are not in the public domain (34). The distributional impact of pricing strategies may be given greater attention than has been the case in the United Kingdom and the United States. European experts suggest that:

> "The average consumer will conceive this process [of rebalancing] as a zero-sum game and it will appear to him that he is going to lose and large business users are going to win. This impression will be reinforced by the fact that the dynamic advantages of competition will manifest themselves first in the business sector. It is certain that politicians will not hesitate to make the consumer's cause their own in particular as universal service provisions play a prominent role (35) (...)."

This review has focused on rate rebalancing. On rate restructuring issues, large users of leased circuits agree that capacity should be priced at a reasonable mark-

up over cost. Usage or volume sensitive pricing for leased circuits is not favoured. Few large users agree with the view (of some PTOs) that prices for leased circuits should be increased to encourage migration to the public switched network (e.g. virtual private networks). Instead, they favour cost-based pricing which implies that service charges should reflect the relative costs of switched versus leased services. Network choices would then be made on the basis of the rate of modernisation of public switched network facilities; the extent to which new facilities meet technical specifications; the importance of control over network use and management; and quality, reliability and security factors.

i) United Kingdom

In regulating British Telecom's prices (rather than rate of return as in the United States and Canada), the Office of Telecommunications (Oftel) has argued that rate rebalancing is a necessary prelude to effective competition. In 1984 British Telecom's prices for some services were deemed to be considerably out of line with their associated costs. Table 3 provides a summary of price changes from 1984 to 1987. The Director General of Telecommunications has put the case for rebalancing as follows:

> "Rebalancing could (...) be expected to produce longer-term economic benefits by offering to consumers prices which more nearly reflected costs of provision, thereby providing better signals to motivate decisions affecting the deployment of resources (36)."

For exchange line service British Telecom undertook not to increase prices by more than RPI+2 (Retail Price Index) over the period 1984 to 1989. Even with this agreed "cap", residential line rentals rose by 20 per cent over the period 1984-1987. Residential connection charges which were not included in the "basket" of regulated prices rose by 35 per cent.

With rate rebalancing largely complete as far as local and national calls are concerned, Oftel has considered whether price caps should apply to some individual services. British Telecom's accounts suggest that imbalances remain for charges for calls versus line rentals. The Director General, has said "there may be merit in holding the connection charge and the exchange line rental below cost to increase the number of people connected to the network (...) if this is possible, given the various economic and social constraints (37)". A new pricing formula has been agreed by Oftel and British Telecom. From August 1989, price changes are set at RPI-4.5 on average. Inland operator controlled calls (and possibly directory inquiries if charges are introduced) have been added to the basket of services. British Telecom agreed to retain RPI+2 for exchange line rentals and to extend this to connection charges (connection charges are not included in the main RPI-4.5 basket).

Table 3

**British Telecom Price Changes Controlled by Licence Condition 24 1984-87**

| | Nov 84 (%) | Nov 85 (%) | Nov 86 (%) | Nov 87 (%) |
|---|---|---|---|---|
| Change in RPI in Base Period: | 5.1 | 7.0 | 2.5 | 4.2 |
| RPI minus 3 | 2.1 | 4.0 | -0.5 | 1.2 |
| Permitted Increase (1) | 2.1 | 4.1 | -0.1 | 1.3 |
| Change in Price of: | | | | |
| Exchange Line Rental (2) | | | | |
| Residence | 7.1 | 8.5 | 3.7 | 0.0 |
| Business | 6.8 | 8.8 | 3.9 | 0.0 (3) |
| Change in the Effective Price of: | | | | |
| Local Calls | | | | |
| Peak | 6.8 | 6.4 | 18.9 | 0.0 |
| Standard | 6.8 | 6.4 | 0.0 | 0.0 |
| Cheap | 6.8 | 6.4 | -3.6 | 0.0 |
| National "a" | | | | |
| Peak | 6.8 | 6.4 | 1.6 | 0.0 |
| Standard | 6.8 | 18.3 | 1.1 | 0.0 |
| Cheap | 23.1 | 6.4 | 2.7 | 0.0 |
| National "b1" | | | | |
| Peak | -10.3 | -14.0 | -12.0 | 0.0 |
| Standard | -10.2 | -13.8 | -12.0 | 0.0 |
| Cheap | 6.8 | 6.4 | -12.0 | 0.0 |
| National "b" | | | | |
| Peak | -14.0 | -6.2 | -16.0 | 0.0 |
| Standard | -13.9 | -4.9 | -17.0 | 0.0 |
| Cheap | 6.8 | 6.4 | -6.2 | 0.0 |
| Weighted Average | 2.0 | 3.7 | -0.3(4) | 0.0 |
| Not in basket: Change in res. connection charge | 0.0 | 13.3 | 11.8 | 10.5 |

1. After allowing for carry-over of unused allowances from previous years.
2. Exchange line with a basic telephone instrument in November 1984; exchange line excluding telephone instrument thereafter.
3. No increase in standard business line rental, but rental for low loss exchange lines was increased.
4. In computing the weighted average price change in 1986, an adjustment has been made for the effect of transferring some routes from "b" to "b1".

Source: Compiled by OFTEL in The Regulation of British Telecom's Prices: A Consultative Document, January 1988, p.5.

Consideration has been given to cost standards for judging the reasonableness of prices. British Telecom's method of allocating common network costs has been accepted for the present by Oftel. But the Director General has recognised that:

"(...) any allocation of this kind is inevitably imprecise. Further, examples can easily be found to show that two different, but apparently acceptable, methods of allocation can lead to very different conclusions about the profitability of a service. If therefore, a basket were to be narrowed to cover only the prices of the local network this would put a heavy reliance on cost allocation procedures. Some uncertainty would be inevitable (38)."

Rate rebalancing has increased the bill of the average residential customer by less than the rate of inflation. Oftel has shown that rebalancing is justified on the basis of cost and that the changes have been fair (i.e. they have not forced people who make long distance calls to subsidise the telephone bill of people who make many local calls).

Competition has had the effect of reducing British Telecom's prices on long distance routes. Rates that differ on the basis of traffic density and precise routings have been introduced. Oftel's examination of price differentials (as between b and b1 routes) has found that these are justified in relation to cost. Competition in local services has not materialised on a scale likely to prevent British Telecom from seeking to lower prices further on competitive routes and to raise prices for services where de facto monopoly control remains. Thus there could be a return to the question of cost and the problems of rate restructuring.

ii) Italy

The evolution of telephone tariffs in Italy has been strongly affected by government policy. During the 1970s, this policy has pursued social objectives and the protection of the real value of workers' income. In the 1980s, the control of the prices of specific categories of goods and services, including telephone service, has been an aspect of policy.

For example, telephone tariffs were not modified from 1 January 1977 to 31 December 1979, despite an increase of inflation equal to 54 per cent in the same period. An increase of 37 per cent in telephone tariffs was applied in 1980, but this was not sufficient to reduce the gap of three years, plus inflation in 1980 equal to 21 per cent.

During the past decade, a new policy was adopted by the government in the area of State-controlled prices with the objective of reducing inflation rates and the public deficit. As a result, tariff revisions were implemented with greater regularity. The new tariff values were defined so as to introduce rate increases less than the scheduled inflation rate. The goal of achieving an inflation rate comparable to those in most industrialised countries, led the government to adopt stricter price control measures in 1983 and 1984, especially with regard to regulated prices. Table 4 shows the changes in telephone prices over the period 1980-87 and relates them to the consumer price index. Changes in the main components of telephone tariffs which occurred over the same period are shows in Table 5.

Table 4

**Italian Telecom Price Changes and Consumer Price Index 1980-88**

| As at 1st January | Consumer Price Index (a) | Telephone Price Index (Current Pr.) (b) | Telephone Price Index (Constant Pr.) (b/a x 100) |
|---|---|---|---|
| 1980 | 100.0 | 100.0 | 100.0 |
| 1984 | 187.3 | 155.3 | 82.9 |
| 1989 | 244.4 | 191.9 | 78.5 |

Source: Italian Delegation to OECD.

The objective of achieving a stronger correlation between tariffs and the relative costs of services is being pursued in Italy with the adoption of specific measures. Although some degree of cross-subsidisation will be maintained, these measures will particularly concern the level of rental charges and a closer linking of traffic costs with the relevant tariffs. New tariffs will bring about an implicit rebalancing of charges among different service categories. The intention is to gradually achieve the following main objectives:

- Time charges extended to all urban networks, with the application of suitable pulse rhythms;
- Application of urban tariffs to traffic between adjacent urban networks whose centres are at a distance less than a determined value;
- Extension to urban traffic of the same time-of-day reductions applied to long distance traffic;
- Reduction of the number of long distance tariffs steps; and
- Reduced tariff differences between local and long distance traffic.

Table 5

**Italy: Changes in Telephone Tariffs, Italy 1980-87**

| | Percentage Change (Current Pr.) | Percentage Change (Constant Pr.) (Base 1/1/80) |
|---|---|---|
| Installation Charge | | |
| Business | + 11 | -54 |
| Residence (Simplex Line) | + 33 | -45 |
| Rental Charge | | |
| Business | + 83 | -25 |
| Residential (Simplex Line) | +103 | -17 |
| Inland Dialled Call (Highest Charge) (3 minutes) | | |
| Short Distance (15km) | +152 | + 3 |
| Longer Distance (>120km) | +103 | -17 |
| Inland Dialled Call (Shortest Charge) (3 minutes) | | |
| Short Distance (15km) | +100 | -18 |
| Longer Distance (>120km) | + 73 | -29 |
| International Dialled Call (3 minutes) | | |
| Rome/Paris | +118 | -11 |
| Rome/New York | + 82 | -26 |

Source: Italian Delegation to OECD.

# IV. RATE RESTRUCTURING: PATTERNS OF CHANGE

Telecommunication prices are controlled indirectly by rate-of-return regulation (United States and Canada); by "price caps" (United Kingdom, Australia and the United States); and by less formal governmental review processes (other OECD countries). Users make decisions about the mix of network-based services in the light of many considerations, but the level and structure of prices are clearly important. Pricing policy, and its effects on efficiency and welfare, are often discussed in abstract terms. Such discussions generally include implied assumptions about the relationships between costs and prices. As pricing debates continue, PTOs are implementing complex telecommunication infrastructures. They are bringing on stream new services and traditional services continue to grow. Appendix II.A reviews changes in network infrastructure and service provision in OECD countries and provides descriptions of country policies with regard to tariff restructuring.

As indicated in Section III, tariff restructuring is attributable to many factors. Apart from increasing competition, one of the most significant is the introduction of new network capability based on innovative technical configurations. Commercial Integrated Services Digital Networks (ISDN) and the increasing availability of virtual private networks creates pressures for rate restructuring as PTOs introduce new price relationships between switched and unswitched service offerings. If there is an eventual diffusion of ISDN to most customer premises, the cost of accessing telecommunication networks could rise significantly. For the foreseeable future, the Public Switched Telephone Network (PSTN) will be an option for subscribers, but it could become necessary for PTOs to raise PSTN prices in an effort to migrate users to the ISDN.

A variety of new tariff offerings have been introduced in the United States and in some countries in Europe. These tariffs apply to new networks, such as AT&T's Software Defined Network (SDN), MCI's Vnet and Sprint's Virtual Private Network (VPN) and provide different types of connections and access to transmission facilities. The charges for these offerings and other switched network services (e.g. voice telephone and leased circuits) are creating a complex set of tariffs for the large user. As services become increasingly competitive, the pressure to reduce

transmission costs is likely to grow. Combined with further reductions in long distance prices, this could result in escalating local service prices.

Additional pressures on rate structures stem from the increasing costs of software support for virtual private networks. These software costs may be reflected in charges for local exchange voice service since software design features are difficult to disaggregate among services that depend on the common public network infrastructure. Thus the problem of the appropriate treatment of common network costs could become substantially more complex in the all-digital environment of the future.

Some aspects of the rate restructuring problem as between the United States and Europe differ in magnitude. In the United States, for example, a package price is often charged for access to the telecommunication network and for local service calls. In other OECD countries the practice is to charge separately for access and for usage of the local telephone network. In the United States, allocation of common network costs associated with the local exchange must be made to the local and to long distances services. Given that such costs often comprise 50 to 60 per cent of the investment in the typical telephone network this is a major task. In contrast, in Europe and most other OECD countries, the problem is one of determining the appropriate costs of connection, rental and usage. However, this difference does not eliminate the problem of rate restructuring. Judgements are still required on the components of cost that should be recovered by "local" usage tariffs and by connection and other charges.

The discussion of pricing philosophies in the preceding section (Section III) has highlighted the rather academic nature of debates on the question of tariff principles that could be adopted by OECD countries. In the pragmatic world where PTOs must establish tariffs, they are confronted with the fact that price elasticities are not known with any degree of precision and measures are subject to different interpretations in monopoly and competitive environments. They also have to contend with the fact that cost allocation procedures are always imperfect. In addition, the theory underlying "value of service" (or Ramsey pricing) does not provide easy solutions in cases where oligopolistic conditions prevail since price elasticities become relatively meaningless. The theory also fails to deal adequately with the fact that network local access is a necessary condition for the use of many other services. Thus a prescription that suggests that prices for subscription should increase may cause revenue losses and it may also affect call revenues.

Regardless of whether "cost of service" or "value of service" is advocated, the general expectation throughout the OECD area is that prices for access and local calls should rise as quickly as possible and that prices for long distance and international calls should be reduced. Although most countries support this general principle, there are substantial differences in the extent to which they are implementing the necessary tariff restructuring policies. Although there is growing

discussion of pricing issues throughout the OECD area, there is very little empirical data on past pricing practices. There is even less evidence on the actual price changes that have taken place over time. This section takes a step toward clarifying one aspect of the changes in tariff structures over the period 1980 to 1987.

## A. Rate restructuring analysis: methodology

The main objective is to develop and analyse the patterns of structural change in telecommunication tariffs within selected OECD countries. This section reports the results of an analysis of rate changes within each of 18 countries for selected switched services and leased circuits (1980-87). The study does not provide cross-country comparisons of relative tariff levels. This would require the resolution of difficult methodological problems.

The objective of the analysis has therefore been limited to examination of general trends in tariffs over time using a consistent data source and method of calculation. Any database collected over time and covering a large number of countries must be expected to contain some discrepancies as compared to nationally collected databases. Such deficiencies can account for differences in results calculated using other data sources. The purpose of the present exercise is to provide an overview of overall structural trends in rates. It is not intended to offer prescriptions for pricing policy. Pricing strategies are matters for national policy, but the results of policies carry international implications since telecommunication service users purchase service from PTOs in several countries. (A more detailed discussion of the methodology is provided in Appendix II.B).

A data set containing rates for services was required to meet the following criteria:

- Coverage of a reasonable number of OECD countries;
- Coverage of the 1980-87 time period;
- Consistency in reporting of charges;
- Elements of service costs reported for major service categories, e.g. local, trunk, international and by distance.

These criteria were met by the Tarifica database provided by Logica UK Ltd. Tarifica: Western Europe Telecommunications Information Service covers 18 OECD countries (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom and the United States). Charges for services are reported on a cost per minute/cost per month basis. Cost per minute usage charges cannot be used to determine costs for multiple minutes of use. They also cannot be combined with usage data to develop profiles of charges for the "typical user".

To maintain consistency in the methodology, analysis of other OECD countries rate structures has not been included. Given the limited resources available for this study, certain parameters that can effect the impact of price changes on the cost of service to users have not been addressed. Thus, for example, regional variations within countries in price structures and intercity communication costs have not been analysed and variables such as the average length of call have not been factored into the analysis. Despite these limitations, the analysis provides a preliminary overview of general movements in prices for telecommunication services over a substantially longer period, and at a greater level of detail, than is available elsewhere.

The analysis focuses on: structural changes among services within countries; patterns of rate changes in each country within service classes, and variations in rate patterns among selected countries. The purpose is to examine the general direction and magnitude of rate restructuring over the period. The calculation of percentage changes from 1980 to 1987 is sensitive to prices in effect in the base year and end year. By choosing 1980 as the base year, the preceding history of tariff changes is not captured. For example, in the Italian case, tariffs remained unchanged from January 1977 to the end of December 1979 because of a three year period of high inflation. Since the present methodology involved the use of data from January 1980, the magnitude of changes in tariffs for Italy is overstated.

In addition, some observed changes are a reflection of the fact that countries are starting from different positions in the base year and results cannot be attributed simply to tariff adjustments. However, as the data below suggest, there are trends in the expected direction which confirm that the methodology used here is reasonably accurate in indicating trends in prices.

The following telecommunication services have been included:

- Telephone: connection and rental charges, inland dialled call charges, international dialled call charges;

- Telex: connection and rental charges, usage charges for inland calls, usage charges for international calls;

- Voiceband Private Circuits: charges for normal quality inland 2-wire circuits, charges for normal quality international circuits;

- Narrowband Private Circuits: charges for inland circuits (50 baud 2-wire), charges for international circuits (50 baud, country end);

- Wideband Private Circuits: charges for inland groups (48 KHz), charges for international circuits (48 KHz).

Tarifica data are reported in national currencies (current prices). It is possible to convert these data using OECD exchange rates/PPPs, but this has not been done to discourage the temptation to use this study to examine changes in the relative level of prices for services among countries.

The determination of service charges for each of the years 1980-87 relied on several "rules of thumb". All tariff updates from November 1979 to January 1988 for service and country were examined to determine the charge in effect for the longest period within any given year (data used are January 1980 to December 1987). For example, in some cases the data reflect tariffs in effect for a full year (or more), in others for only several months. This method has the advantage of avoiding the need to average charges reported at different price levels within a year. It has the disadvantage that it fails to reflect significant changes within a year. A check on the data revealed that most changes occurring within a year have been captured in the preceding or following year. In cases where anomalies in reported data were found, they were checked with preceding or subsequent issues of the Tarifica data. Data on discounts (except for time of day) and/or multipliers applied to charges for use of the same service for different applications were not included.

To investigate variations among peak and off-peak periods and tariffs for usage over shorter and longer distances, it was necessary to specify the rate elements to be used for each country and service class. This involved a degree of judgement. Because this study is concerned with the magnitude and direction of changes in tariffs, details on the specific rate elements used are not provided and it is not possible to recalculate the results using alternative data sets (39). Comments provided by several OECD countries on the results differ in some cases from those obtained using other data sets, selecting different rate elements for comparison, or using different assumptions. Where there are significant differences in the magnitude or direction of tariff changes, these are reported as footnotes to the text.

Charges for services are reported in current and constant prices (1980=year base). OECD price indices (GDP) in OECD National Accounts were used to convert current to constant prices. For 1987, the price indices were estimated using OECD indices for 1986 and growth rates drawn from other OECD sources.

## B. Rate restructuring: overall trends

The main purpose of the analysis is to illustrate the rate restructuring that occurred from 1980 to 1987. Figures 1-5 show trends across three major service classes (telephone, telex and leased circuits). The Figures indicate the percentage change in costs per minute (per month) calculated using current prices. The results are reported primarily in current prices. The use of current prices enables an examination of the magnitude and direction of the changes in tariffs that have been introduced. These changes can be attributed to actual changes in tariffs which have been implemented by PTOs. In order to contrast these results with the effect of price

changes once inflation is taken into account, constant price changes are given in some instances. Results in constant prices indicate the impact of tariff restructuring in terms of real money values, but this method of reporting camouflages some changes. Tariff changes that have resulted from the implementation of policy decisions are based on many factors in addition to the desirability of ensuring that prices for telecommunication services do not exceed the rate of inflation.

Where current price calculations show charges to have increased, a portion of the increase is attributable to inflation. Therefore, the interesting comparison within each country is the relationship between charges that have increased, remained level or decreased despite inflation.

A pattern of decreasing prices for international telephone, telex and voice and narrowband leased circuits is shown in the majority of countries. This pattern is particularly evident in the case of Austria, Germany, the Netherlands, Norway, Sweden, and Switzerland. The expected trend toward lower international rates can be contrasted with the increases or lack of change in exchange line installation and rental charges and for inland telephone and telex charges in most countries.

There are several notable exceptions. The installation component of exchange line charges has actually declined in four countries (Belgium, France, Germany and Spain). In France the monthly rental charge has declined and in the Netherlands, rental charges have declined with installation remaining stable.

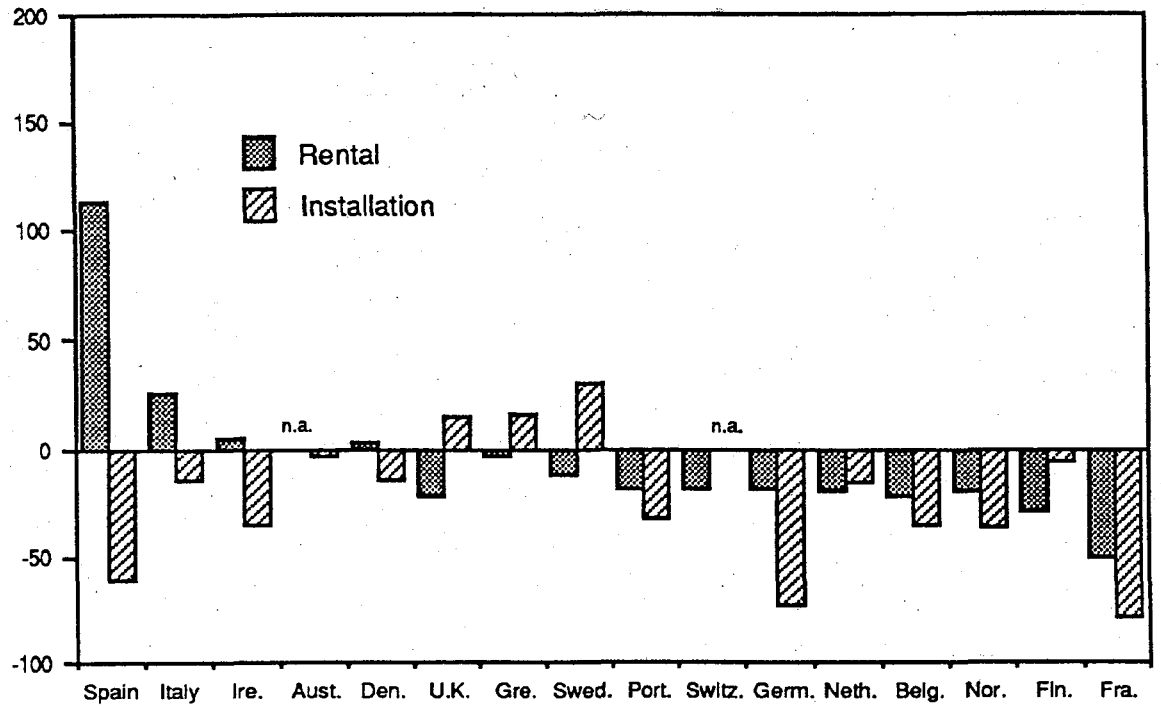
The Netherlands provides an interesting example of decreasing or stable prices for exchange line charges, inland telephone, international telephone, inland and international telex, as well as leased circuits. There is a similar, though less pronounced pattern in Germany and Switzerland. In the former case, inland off-peak calls over longer distances have not decreased, and in the latter, decreases have not been applied to local usage charges or to peak calls over short distances. Where data are available, charges for local usage have increased except for the Netherlands. The patterns shown for Sweden and the United Kingdom suggest clear evidence of rate restructuring. In both cases there are relatively large increases in exchange line components, local usage charges and inland calls over short distances. Increases for inland peak calls over longer distances in Sweden are substantially less than over shorter distances, and in the United Kingdom there have been decreases for these calls as well as for international telephone and telex calls.

The patterns shown for Greece, Italy, Portugal and Spain should be considered separately as the effects of inflation are stronger. Increases in charges appear to be much larger than those in other countries. In Greece there are off-peak decreases for inland calls over short and longer distances and decreases for international telex calls. In Italy the magnitude of increases for inland longer distance calls (peak and off-peak), international telephone, telex, and leased circuits is much smaller than for other service elements. In Portugal increases for inland calls are greater than for exchange line charges while increases for all international services tend to be smaller

than those for inland calls. In Spain the pattern is similar, except for the large increase in exchange line rental charges.

Taken together, these charts demonstrate that OECD countries are implementing policies to reduce charges for international services. But there are variations in the increases and decreases in charges for other services within each country which suggest that this has not led to consistent treatment of local exchange rental and usage charges or inland call charges. These differences are an illustration of the scope that exists to pursue national telecommunication pricing policies to meet different priorities and objectives. The presence of increasing competition, market liberalisation and technological change has yet to produce a unified response in pricing policy.

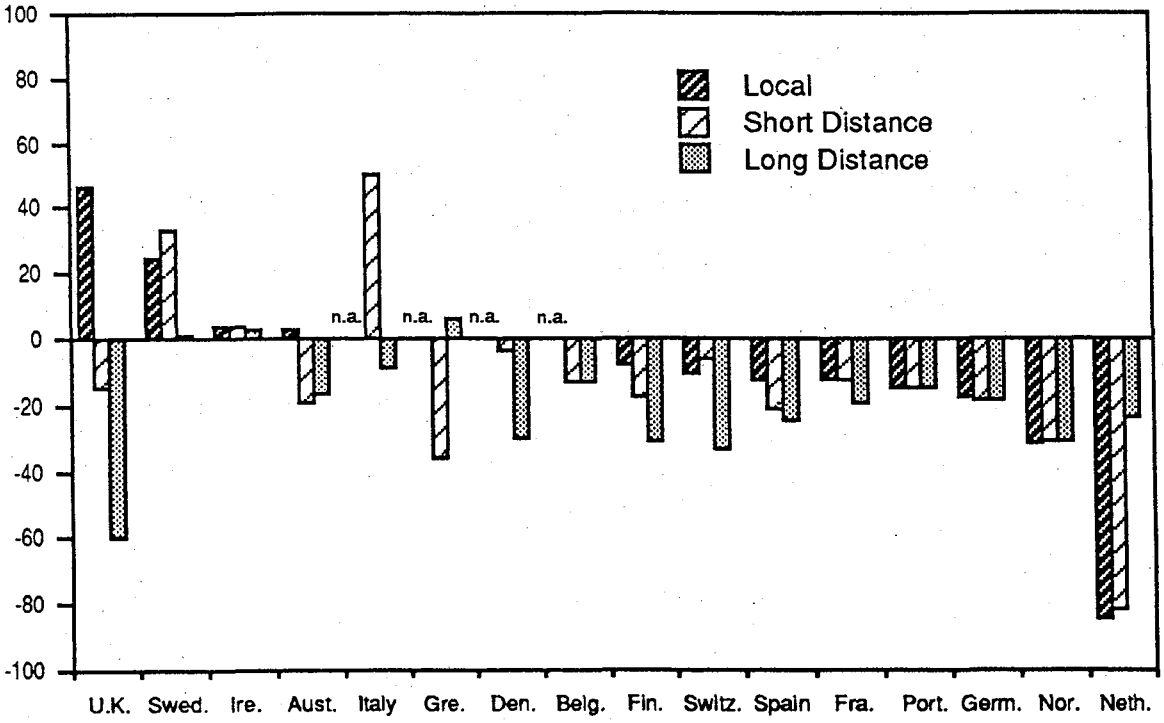
Figure II-1. **PERCENTAGE CHANGE IN FIXED CHARGES, 1980-87**




*Note:* Constant 1980 prices.
n.a. = not available.

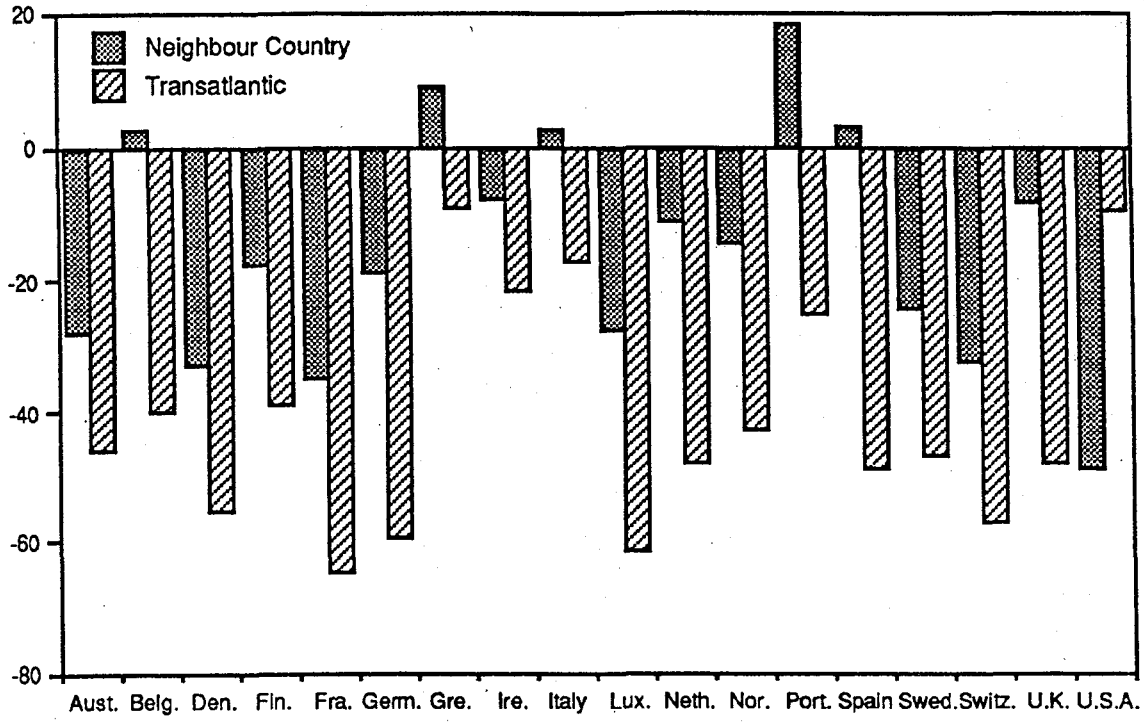
Figure II-2. **PERCENTAGE CHANGE IN NATIONAL CALL CHARGES, 1980-87**

Peak rate call charges



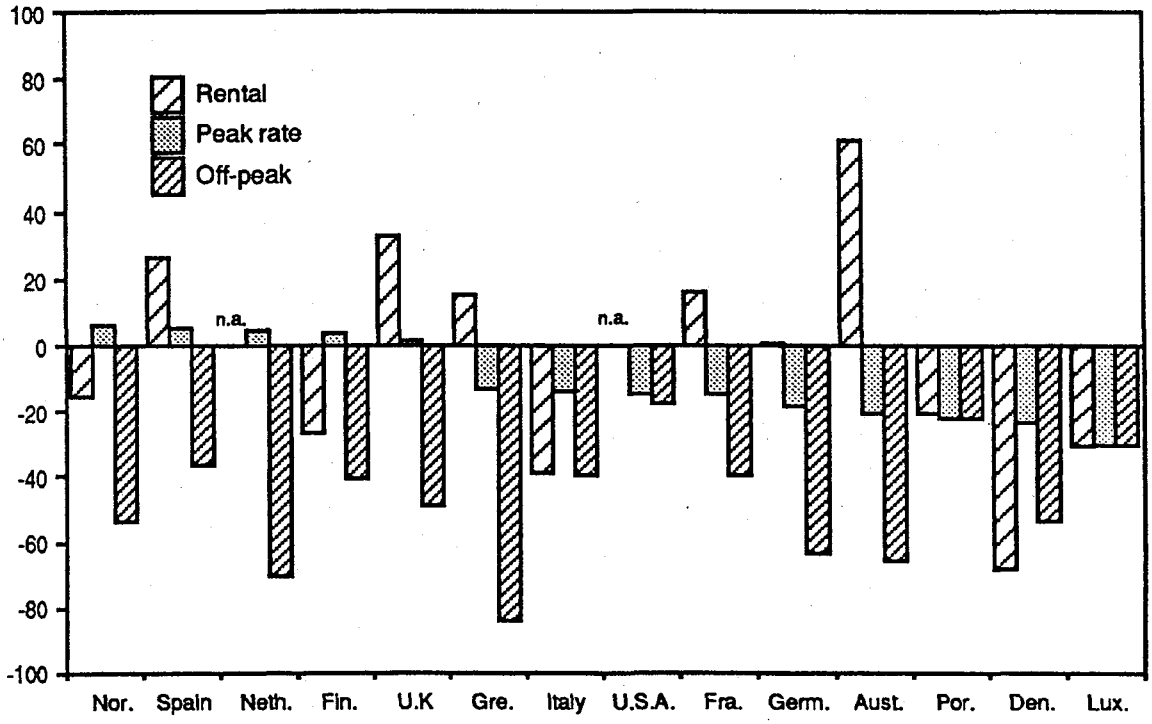

*Note:* Constant 1980 prices.
n.a. = not available.

Figure II-3. **PERCENTAGE CHANGE IN INTERNATIONAL CALL CHARGES, 1980-87**



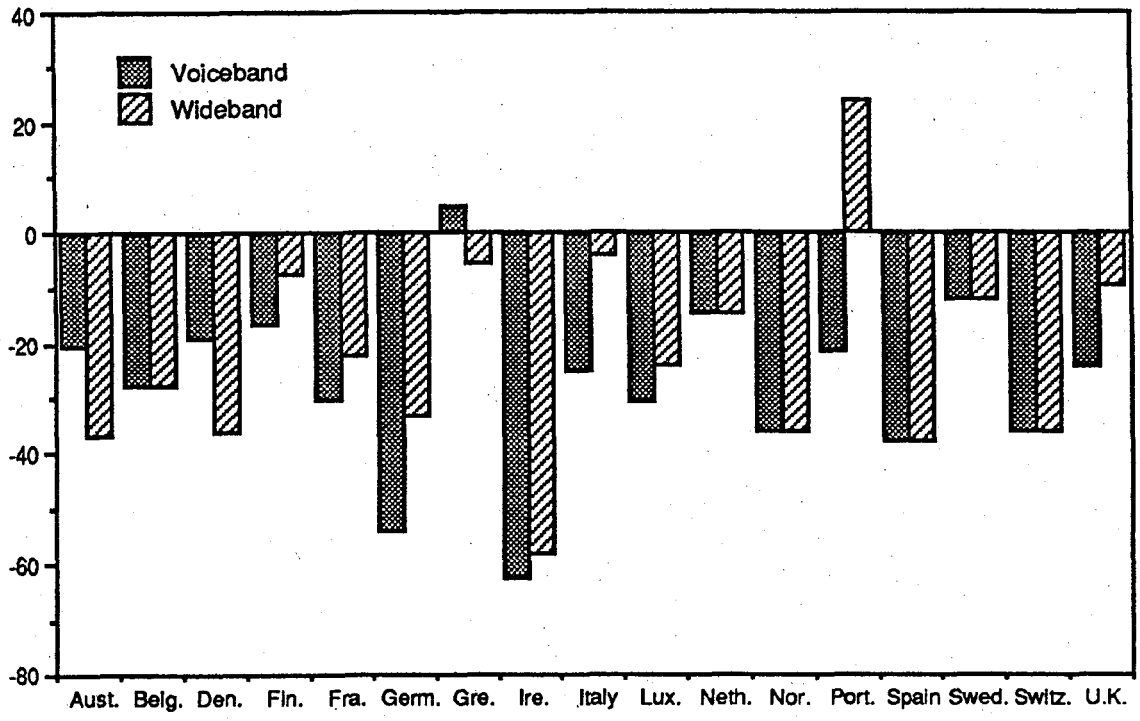

*Note:* Constant 1980 prices.

Figure II-4. **PERCENTAGE CHANGE IN TELEX CHARGES, 1980-87**




*Note:* Constant 1980 prices.
n.a. = not available.

Figure II-5. **PERCENTAGE CHANGE IN LEASED CIRCUIT RENTAL CHARGES, VOICEBAND (1980-87) AND WIDEBAND (1983-87)**




*Note:* Constant 1980-83 prices.
Voiceband circuits — Normal quality.

Table 6

**Telephone Exchange Line Rental Charges - 1980-87**

| Country | Install Cur.Pr. % | Install 1980 Pr. % | Rental Cur.Pr. % | Rental 1980 Pr. % |
|---|---|---|---|---|
| Austria | 29.0 | -5.0 | (1) | (1) |
| Belgium | -10.6 | -35.5 | 9.3 | -21.1 |
| Denmark | 39.2 | -13.9 | 67.7 | 3.7 |
| Finland | 54.5 | -5.2 | 16.7 | -28.5 |
| France | -64.3 | -78.6 | -17.0 | -50.3 |
| Germany | -67.5 | -73.5 | 0.0 | -18.4 |
| Greece | 300.0 | 15.6 | 233.3 | -3.6 |
| Ireland | 20.0 | -35.3 | 95.8 | 5.6 |
| Italy | 98.5 | -8.6 | 174.5 | 26.3 |
| Luxembourg | 0.0 | -30.5 | 33.3 | -7.3 |
| Netherlands | 0.0 | -14.7 | -5.7 | -19.6 |
| Norway | 0.0 | -36.2 | 20.5 | -23.1 |
| Portugal | 137.5 | -32.5 | 188.8 | -17.9 |
| Spain | -23.0 | -61.7 | 329.3 | 113.2 |
| Sweden | 119.1 | 29.7 | 48.5 | -12.1 |
| Switzerland | 33.3 | 0.3 | 8.8 | -18.1 |
| United Kingdom | 72.7 | 14.8 | 47.2 | -2.2 |
| United States | NA | NA | NA | NA |

1. Austria data are for connection and rental.
NA = Not available.
Source: Calculated on basis of Tarifica, UK Ltd., 1980-87 and Appendix II.B.

## C. Tariff structures by service class

Tables 6-16 provide details on the patterns of rate changes within each of the service classes (telephone and telex services and for voiceband, narrowband and wideband circuits (international only).

### 1. Telephone service

Tarifica reports installation or connection charges and monthly rental charges under the category "Exchange Line Rental". The price changes reported in Table 6 are based on selected rate elements. For example, the data for Belgium represent

a medium-sized subscriber zone. In Denmark, they are for only one of the private operating companies.

Rate rebalancing implies an increase in the prices charged for access to the public switched telephone network. The results in Table 6 show that in current prices from 1980 to 1987, installation (connection) charges increased in 10 of 17 countries with Greece, Portugal and Sweden experiencing the largest increases. Luxembourg, the Netherlands and Norway had no increase, while charges declined in Belgium, France, Germany and Spain. In real terms, however, installation charges declined in all but Greece, Sweden, Switzerland and the United Kingdom. Line rental charges increased in all but two countries (France and the Netherlands), but real price increases occurred in only four countries (Denmark, Ireland, Italy, and Spain). Changes in installation as compared with line rental charges are inconsistent. This illustrates the different strategies of PTOs in recovering local exchange facility costs. In France, for example, both types of charges have decreased although by different magnitudes. In Spain installation (connection) costs have declined in both current and real terms and exchange line rental has increased substantially.

Tables 7 and 8 report changes in inland dialled telephone calls in current and constant prices. These represent usage costs per minute. Changes in metered unit charges are not reflected unless they resulted in a change in the average charge per minute of use. In these tables, "Highest Charge" refers to highest rates charged during the peak period, "Lowest Charge" to the lowest off-peak rates. "Short Distance" and "Longer Distance" refer to rate groups for calls over different distances (40).

The impression in current prices (Table 7) is one of increases in prices for peak charges and decreases for off-peak calls. In real terms, prices in most countries decreased in all categories. The most significant increases in local peak charges are in the United Kingdom, followed by Sweden, Luxembourg, Ireland and Austria. Short distance calls increased in Italy, Sweden, Luxembourg and Ireland. Relatively smaller increases are shown for calls over longer distances (peak) for these countries and for Greece.

A feature of rate rebalancing is a tendency for rates over shorter distances to increase at a faster pace than over longer distances. Some countries such as France have a policy of eliminating distance as a factor in pricing usage-based charges for network services. Table 8 suggests that except for Austria and the United Kingdom metered local call charges have changed by the same order of magnitude as charges for calls over short distances in peak periods. This relationship seems to hold for rates in the off-peak period, except that the rate of increase or decrease tends to be lower. Exceptions are Switzerland where the off-peak charge has decline significantly for local, short and longer distances, and the Netherlands where the

Table 7

**Telephone, Inland Dialled Call Charges, Current Prices - 1980-87 (percentage change)**

| Country | Peak charges | | | Off-peak charges | | |
|---|---|---|---|---|---|---|
| | Local | Short dist. | Longer dist. | Local | Short dist. | Longer dist. |
| Austria | 39.0 | 9.0 | 12.0 | NA | -7.0 | 9.0 |
| Belgium | NA | 20.2 | 20.0 | NA | 20.3 | 20.2 |
| Denmark | NA | 56.7 | 13.4 | NA | 47.5 | 11.9 |
| Finland | 50.0 | 35.0 | 12.5 | 50.0 | -10.0 | -21.1 |
| France | 46.0 | 45.8 | 34.8 | 3.2 | 3.4 | -2.6 |
| Germany | 0.7 | -0.2 | 0.0 | -1.0 | -0.2 | 74.7 |
| Greece | NA | 120.0 | 266.6 | NA | -71.3 | -53.7 |
| Ireland | 91.5 | 91.5 | 90.9 | 91.5 | 89.7 | 90.6 |
| Italy | NA | 226.6 | 98.8 | NA | 146.9 | 64.7 |
| Luxembourg | 66.7 | 67.0 | (1) | 66.7 | 67.0 | (1) |
| Netherlands | 7.1 | 7.1 | 2.8 | 7.1 | 7.1 | 2.4 |
| Norway | 7.5 | 8.3 | 8.7 | 225.7 | 15.7 | 20.8 |
| Portugal | 200.0 | 199.5 | 199.5 | 180.0 | 202.4 | 202.4 |
| Spain | 76.9 | 59.0 | 51.2 | 76.9 | 60.7 | 52.8 |
| Sweden | 111.1 | 125.0 | 70.0 | 5.6 | 15.0 | -14.4 |
| Switzerland | 19.0 | 25.0 | -11.7 | -40.5 | -24.2 | -16.5 |
| UK | 120.0 | 28.4 | -38.9 | 65.9 | 50.1 | 17.4 |
| US | NA | NA | NA | NA | NA | NA |

1. Luxembourg, all calls except local charged by step.
NA = Not available.
Source: Calculated on basis of Tarifica, UK Ltd., 1980-87 and Appendix II.B.

local charge (off-peak) has increased considerably. In peak periods, where there is a large difference between the changes for calls over short and longer distances -- shorter distance calls have increased or by larger amount. The exceptions are Greece and the Netherlands.

Table 9 provides a summary of results for international dialled call charges. "Range - Highest" and "Lowest" refers to the highest or lowest changes from a given country to the other countries. For example, for France the largest cost per

Table 8

**Telephone, Inland Dialled Call Charges, 1980 Prices - 1980-87**
**(Percentage change)**

| Country | Peak charges | | | Off-peak charges | | |
|---|---|---|---|---|---|---|
| | Local | Short dist. | Longer dist. | Local | Short dist. | Longer dist. |
| Austria | 3.0 | -19.0 | -17.0 | NA | -31.0 | -19.0 |
| Belgium | NA | -13.3 | -13.4 | NA | -13.2 | -13.3 |
| Denmark | NA | -3.1 | -29.9 | NA | -8.8 | -30.8 |
| Finland | -8.0 | -17.2 | -31.0 | -8.0 | -44.8 | -53.5 |
| France | -12.0 | -12.6 | -19.2 | -38.1 | 38.0 | -41.6 |
| Germany | -17.8 | -18.6 | -18.4 | -19.2 | -18.5 | 42.6 |
| Greece | NA | -36.4 | 6.0 | NA | -91.7 | -86.6 |
| Ireland | 3.3 | 3.3 | 3.0 | 3.3 | 2.3 | 2.8 |
| Italy | NA | 50.3 | -8.5 | NA | 13.6 | -24.2 |
| Luxembourg | 15.8 | 16.1 | (1) | 15.8 | 16.1 | (1) |
| Netherlands | 12.0 | 12.0 | 19.0 | 12.0 | 12.0 | 19.0 |
| Norway | -31.4 | -30.9 | -30.7 | 107.7 | -26.2 | -23.0 |
| Portugal | -14.7 | -14.9 | -14.9 | -20.4 | -14.1 | -14.2 |
| Spain | -12.2 | -21.1 | -24.9 | -12.2 | -20.2 | -24.1 |
| Sweden | 24.9 | 33.1 | 0.6 | -37.5 | -32.0 | -49.4 |
| Switzerland | -10.4 | -5.9 | -33.6 | -55.2 | -43.0 | -37.2 |
| UK | 46.2 | -14.7 | -59.4 | 10.2 | 5.0 | -22.0 |
| US | NA | NA | NA | NA | NA | NA |

1. Luxembourg, all calls except local charged by step.
NA = Not available.
Source: Calculated on basis of Tarifica, UK Ltd., 1980-87 and Appendix II.B.

minute increase (9.2 per cent) from 1980-87 in current prices was for calls from France to Belgium, Denmark, Germany, Ireland, Italy, Luxembourg, Spain, Switzerland, and the United Kingdom. The largest decrease (41.2 per cent) was for calls from France to the United States. In this instance, calls from France to Greece and Portugal decreased by 30.5 per cent, and to Austria, Finland, Norway, and Sweden increased by only 4.2 per cent.

Table 9 gives an indication of trends in international tariffs. Except for Austria, Switzerland and the United States, some charges to at least a few countries increased in current prices. In real terms this holds for Belgium, Greece, Italy, the

Table 9

**Telephone, International Dialled Call Charges - 1980-87**
**(Percentage change)**

| Country | Range-highest (Cur.Pr.) | Range-highest (1980 Pr.) | Range-lowest (Cur.Pr.) | Range-lowest (1980 Pr.) |
|---|---|---|---|---|
| Austria | -3.0 | -28.0 | -28.0 | -46.0 |
| Belgium | 22.2 | 2.9 | -16.7 | -39.9 |
| Denmark | 9.2 | -32.5 | -27.5 | -55.1 |
| Finland | 35.0 | -17.3 | 0.0 | -38.7 |
| France | 9.2 | -34.6 | -41.2 | -64.7 |
| Germany | 0.0 | -18.4 | -49.9 | -59.1 |
| Greece | 278.1 | 9.3 | 215.5 | -8.8 |
| Ireland | 71.2 | -7.7 | 46.1 | -21.2 |
| Italy | 123.8 | 3.0 | 80.2 | -17.1 |
| Luxembourg | 4.6 | -27.3 | -44.4 | -61.4 |
| Netherlands | 10.0 | -10.8 | -39.0 | -48.0 |
| Norway | 34.9 | -14.0 | -10.0 | -42.6 |
| Portugal | 316.7 | 18.4 | 163.9 | -25.0 |
| Spain | 108.0 | 3.3 | 3.2 | -48.8 |
| Sweden | 28.0 | -24.3 | -10.0 | -46.7 |
| Switzerland | -10.0 | -32.3 | -42.9 | -57.0 |
| UK | 38.3 | -8.1 | -21.9 | -48.1 |
| US | -31.3 | -48.8 | -44.0 | -9.1 |

Source: Calculated on basis of Tarifica, UK Ltd., 1980-87 and Appendix II.B.

Netherlands, Portugal, and Spain. In current prices calls from each of the countries to several other countries declined in cost except for Finland, Greece, Ireland, Italy, and Spain (prices in these countries all declined in real terms).

In only Austria, Switzerland and the United States have long distance charges for calls from each of these countries declined in both current and real terms. In real terms only, calls from 12 countries (Austria, Denmark, Finland, France, Germany, Ireland, Luxembourg, Norway, Sweden, Switzerland, the United Kingdom, and the United States) to all other countries declined in price. In real terms charges for calls from Finland, France, Germany, Italy, the Netherlands, Sweden, Switzerland and the United Kingdom to the United States all experienced relatively large decreases. In other countries, there is no strong evidence that charges have decreased as a result of competition or liberalisation.

2. Telex service

Tables 10-13 provide results for telex service. Data from the Tarifica source are less complete for this service than for telephone service. Table 10 shows results for connection and rental charges. These are for electronic equipment and line charges except for Austria, Belgium, Denmark, Germany, Greece, Luxembourg, the Netherlands, Norway, Spain, Sweden, and the United Kingdom, where they are for the line only. In current prices, monthly charges for installation (connection) increased for 7 countries, remained stable in 3 countries, and decreased in only two (Denmark and Finland). Spain, the United Kingdom, Portugal and Greece experienced the largest increases (greater than 100 per cent). However, in real terms

Table 10

**Telex, Connection/Rental Charges - 1980-87**
**(Percentage change)**

| Country | Install (Cur.Pr.) | Install (1980 Pr.) | Rental (Cur.Pr.) | Rental (1980 Pr.) |
|---|---|---|---|---|
| Austria | 37.9 | 2.2 | 117.4 | 61.1 |
| Belgium | NA | NA | NA | NA |
| Denmark | -79.3 | -87.2 | -48.3 | -68.0 |
| Finland | -13.3 | -46.9 | 20.0 | -26.4 |
| France | 43.9 | 17.7 | 41.5 | 15.9 |
| Germany | 0.0 | -18.4 | 23.1 | 0.5 |
| Greece | 100.0 | -42.2 | 300.0 | 15.6 |
| Ireland | NA | NA | NA | NA |
| Italy | 50.0 | -31.0 | 33.3 | -38.6 |
| Luxembourg | 0.0 | -30.5 | 0.0 | -30.5 |
| Netherlands | NA | NA | NA | NA |
| Norway | 0.0 | -15.1 | 0.0 | -15.1 |
| Portugal | 133.3 | -33.7 | 178.8 | -20.8 |
| Spain | 1284.3 | 587.4 | 155.3 | 26.8 |
| Sweden | NA | NA | NA | NA |
| Switzerland | NA | NA | NA | NA |
| UK | 388.9 | 224.8 | 100.0 | 32.9 |
| US | NA | NA | NA | NA |

NA = Not available.
Source: Calculated on basis of Tarifica, UK Ltd., 1980-87 and Appendix II.B.

charges increased only in four countries (Austria, France, Spain and the United Kingdom). Rental charges followed the same pattern although there is no clear trend among countries to increase (decrease) rental costs more significantly than installation costs.

Table 11

**Telex, Inland Dialled Call Charges, Current Prices - 1980-87**
**(Percentage change)**

| Country | Peak charges | | | Off-peak charges | | |
|---|---|---|---|---|---|---|
| | Local | Short dist. | Longer dist. | Local | Short dist. | Longer dist. |
| Austria | 27.3 | 30.8 | 9.0 | 27.3 | 30.3 | 8.8 |
| Belgium | NA | 0.0 | (1) | NA | (1) | (1) |
| Denmark | NA | 27.7 | (2) | NA | (2) | (2) |
| Finland | NA | -20.0 | (3) | NA | (3) | (3) |
| France | NA | 93.3 | 47.6 | NA | 93.3 | 47.7 |
| Germany | NA | 0.0 | 0.0 | NA | 0.0 | 0.0 |
| Greece | NA | 230.0 | (4) | NA | 230.0 | (4) |
| Ireland | NA | 193.7 | (4) | NA | 193.7 | (4) |
| Italy | 333.3 | 250.4 | 173.3 | 333.3 | 251.1 | 173.3 |
| Luxembourg | NA | 0.0 | (4) | NA | 0.0 | (4) |
| Netherlands | NA | 25.0 | (4) | NA | 25.0 | (4) |
| Norway | NA | 886.7 | (4) | NA | 886.7 | (4) |
| Portugal | NA | 162.5 | (4) | NA | 162.5 | (4) |
| Spain | NA | 57.9 | (4) | NA | 57.9 | (4) |
| Sweden | NA | 37.5 | 33.3 | NA | 37.5 | 33.3 |
| Switzerland | NA | 0.0 | (4) | NA | 0.0 | (4) |
| UK | NA | 40.0 | 40.0 | NA | 40.0 | 40.0 |
| US | NA | NA | NA | NA | NA | NA |

1. Belgium, all speeds, all times.
2. Denmark, all calls, all areas.
3. Finland, all calls.
4. One charge only.

NA = Not available.

Source: Calculated on basis of Tarifica, UK Ltd, 1980-87 and Appendix II.B.

Most countries have only one charge for inland telex calls and the issue of rate rebalancing between short and longer call distances does not arise. In countries where charges do vary along this dimension (see Tables 11 and 12) charges for longer distances decreased more (constant prices) than for shorter distances in

Table 12

**Telex, Inland Dialled Call Charges, 1980 Prices - 1980-87 (percentage change)**

| Country | Peak charges | | | Off-peak charges | | |
|---|---|---|---|---|---|---|
| | Local | Short dist. | Longer dist. | Local | Short dist. | Longer dist. |
| Austria | -5.7 | -3.1 | -19.2 | -5.7 | -3.4 | -19.3 |
| Belgium | NA | -27.8 | (1) | NA | (1) | (1) |
| Denmark | NA | -21.1 | (2) | NA | (2) | (2) |
| Finland | NA | -51.0 | (3) | NA | (3) | (3) |
| France | NA | 15.9 | -11.5 | NA | 15.9 | -11.5 |
| Germany | NA | -18.4 | -18.0 | NA | -18.4 | -18.4 |
| Greece | NA | -4.6 | (4) | NA | -4.6 | (4) |
| Ireland | NA | 58.4 | (4) | NA | 58.5 | (4) |
| Italy | 99.4 | 61.2 | 25.8 | 99.4 | 61.6 | 25.8 |
| Luxembourg | NA | -30.5 | (4) | NA | -30.5 | (4) |
| Netherlands | NA | 6.6 | (4) | NA | 6.6 | (4) |
| Norway | NA | 529.3 | (4) | NA | 529.3 | (4) |
| Portugal | NA | -25.4 | (4) | NA | -25.4 | (4) |
| Spain | NA | -21.6 | (4) | NA | -21.6 | (4) |
| Sweden | NA | -18.6 | 21.1 | NA | -18.6 | -21.1 |
| Switzerland | NA | -24.8 | (4) | NA | -24.8 | (4) |
| UK | NA | -7.0 | -7.0 | NA | -7.0 | -7.0 |
| US | NA | NA | NA | NA | NA | NA |

1. Belgium, all speeds, all times.
2. Denmark, all calls, all areas.
3. Finland, all calls.
4. One charge only.

NA = Not available.

Source: Calculated on basis of Tarifica, UK Ltd, 1980-87 and Appendix II.B.

Austria, France and Sweden. In Italy the increase in charges is less over longer distances (41).

Table 13 shows the range of increases (decreases) for telex international dialled call charges. In 11 countries the magnitude of price increases (current prices) at the high end of the range is greater than for international dialled telephone calls (Austria, Denmark, Finland, France, Germany, Ireland, Norway, Spain, Sweden, the United Kingdom and the United States). This relationship holds for most of these countries. Calls from Austria, Belgium, Denmark, Finland, France, Germany, Italy,

Table 13

**Telex, International Dialled Call Charges - 1980-87**
**(percentage change)**

| Country | Range-Highest (Cur. Pr.) | Range-Highest (1980 Pr.) | Range-Lowest (Cur. Pr.) | Range-Lowest (1980 Pr.) |
|---|---|---|---|---|
| Austria | 7.4 | -20.4 | -53.7 | -65.7 |
| Belgium | 0.0 | -27.8 | -32.5 | -51.3 |
| Denmark | 22.9 | -24.0 | -25.0 | -53.6 |
| Finland | 69.2 | 3.7 | -3.0 | -40.5 |
| France | 42.0 | -14.8 | 0.0 | -40.0 |
| Germany | 11.1 | -18.4 | -55.6 | -63.7 |
| Greece | 200.0 | -13.3 | -44.4 | -83.9 |
| Ireland | 146.5 | 33.0 | 44.2 | -22.2 |
| Italy | 87.7 | -13.6 | 30.9 | -39.8 |
| Luxembourg | 0.0 | -30.5 | 0.0 | -30.5 |
| Netherlands | 23.1 | 4.9 | -64.9 | -70.1 |
| Norway | 66.7 | 6.3 | -26.5 | -53.1 |
| Portugal | 175.0 | -21.9 | 175.0 | -21.9 |
| Spain | 111.5 | 5.0 | 28.2 | -36.3 |
| Sweden | 31.4 | -22.2 | -40.4 | -64.7 |
| Switzerland | -13.0 | -34.5 | -58.3 | -68.6 |
| UK | 53.3 | 1.9 | -22.7 | -48.6 |
| US (1) | 14.7 | -14.5 | 10.8 | -17.4 |

1. US based on ITT, RCA, TRT, WUI, all times.
Source: Calculated on basis of Tarifica, UK Ltd., 1980-87 and Appendix II.B.

Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom to the United States declined in real terms by a considerably greater amount than calls from these countries to other countries. Decreases from countries to the United Kingdom show no particular pattern in relation to other countries. In real terms the price decreases for international telex service are generally larger in most countries than those for inland telex service.

3. Leased circuits

Percentage changes in charges per month for the rental of voiceband, narrowband and wideband international circuits (one end only) are shown in Tables 14-16. Wideband data are for 1983-87. Charges have declined in current and real terms for voiceband circuits only in Germany, Ireland, and Switzerland.

Table 14

**Voiceband Private Circuits - 1980-87**
**(percentage change)**

| Country | International Circuits - CEPT Coefficient 0.75 | | | |
|---|---|---|---|---|
| | Range-Highest | | Range-Lowest | |
| | (Cur. Pr.) | (1980 Pr.) | (Cur. Pr.) | (1980 Pr.) |
| Austria | 7.4 | -20.6 | -11.0 | -34.0 |
| Belgium | 0.0 | -27.9 | 0.0 | -27.8 |
| Denmark | 0.0 | -19.0 | 0.0 | -19.0 |
| Finland | 36.3 | -16.4 | -21.2 | -31.7 |
| France | 16.5 | -30.2 | -25.0 | -55.0 |
| Germany | -47.5 | -53.9 | -66.5 | -72.7 |
| Greece | 262.8 | 4.9 | 214.1 | -9.2 |
| Ireland | -30.0 | -62.2 | -58.6 | -77.7 |
| Italy | 63.0 | -25.0 | 52.1 | -30.0 |
| Luxembourg | 0.0 | -30.5 | 0.0 | -30.5 |
| Netherlands | 0.0 | -14.7 | 0.0 | -14.7 |
| Norway | 0.0 | -36.2 | 0.0 | -36.2 |
| Portugal (1) | 327.9 | -21.6 | 93.5 | -45.0 |
| Spain | 25.2 | -37.9 | 14.7 | -43.0 |
| Sweden | 48.6 | -12.0 | 15.9 | -31.4 |
| Switzerland | -15.2 | -36.2 | -37.8 | -53.2 |
| UK | 13.8 | -24.4 | 0.0 | -33.5 |
| US | NA | NA | NA | NA |

1. Portugal, CEPT Coefficient 1.0.
NA = Not available.
Source: Calculated on basis of Tarifica, UK Ltd., 1980-87 and Appendix II.B.

Generally, voiceband circuits have decreased in price (in real terms) considerably less than narrowband circuits.

There is controversy over the pricing of leased circuits. This study suggests that prices for voice and narrowband circuits per month for most countries have declined in real terms by more than 30 per cent from 1980 to 1987.

Table 15

**Narrowband Private Circuits - 1980-87**
**(percentage change)**

| Country | International Circuits - 48 KHz Circuits | | | |
|---|---|---|---|---|
| | Range - Peak Rate | | Range - Off Peak | |
| | (Cur.Pr.) | (1980 Pr.) | (Cur.Pr.) | (1980 Pr.) |
| Austria | -14.9 | -37.0 | -6.4 | -45.2 |
| Belgium | 0.0 | -27.8 | 0.0 | -27.9 |
| Denmark | 3.5 | -36.0 | -31.0 | -57.3 |
| Finland | 51.4 | -7.2 | -12.2 | -46.2 |
| France | 29.6 | -22.3 | -25.0 | -55.0 |
| Germany | -18.3 | -33.3 | -48.7 | -58.1 |
| Greece | 226.5 | -5.6 | 179.3 | -19.2 |
| Ireland | -22.1 | -58.0 | -54.0 | -75.2 |
| Italy | 108.9 | -3.9 | 12.5 | -48.2 |
| Luxembourg | 9.0 | -24.2 | -27.7 | -49.9 |
| Netherlands | 0.0 | -14.7 | -25.0 | -36.1 |
| Norway | 0.0 | -36.2 | -21.5 | -49.9 |
| Portugal | 336.8 | 24.1 | 55.2 | -55.9 |
| Spain | 25.2 | -37.8 | 14.7 | -43.0 |
| Sweden | 48.6 | -12.0 | -6.5 | -44.7 |
| Switzerland | -15.2 | -36.2 | -37.8 | -53.2 |
| UK (1) | 9.0 | -9.5 | 0.0 | -16.2 |
| US | NA | NA | NA | NA |

1. United Kingdom, 1983/87.
NA = Not available.
Source: Calculated on basis of Tarifica, UK Ltd., 1980-87 and Appendix II.B.

## D. Variations in rate restructuring by country

The results for six countries are examined in this section to illustrate patterns of rate restructuring. The six countries -- Denmark, France, Germany, Portugal, Sweden and the United Kingdom -- represent very different conditions. Pricing policies could be expected to vary as a function of, for example, population, geographic size and topography, telephone penetration, pace of network development, priority given to "universal" service goals and to telecommunications as a tool of industrial, economic or regional policy, and economic performance.

Table 16

**Wideband Private Circuits - 1980-87**
**(percentage change)**

| Country | International Circuits - 48 KHz Circuits | | | |
|---|---|---|---|---|
| | Range - Peak Rate | | Range - Off Peak | |
| | (Cur.Pr.) | (1980 Pr.) | (Cur.Pr.) | (1980 Pr.) |
| Austria | NA | NA | NA | NA |
| Belgium | 0.0 | -14.1 | 0.0 | -14.1 |
| Denmark | 0.0 | -19.0 | 0.0 | -19.0 |
| Finland | 58.9 | 29.2 | 19.1 | -3.9 |
| France | NA | NA | NA | NA |
| Germany (1) | -6.2 | -23.4 | -33.0 | -45.3 |
| Greece | 66.5 | -14.1 | 47.6 | -23.9 |
| Ireland | 0.0 | -19.5 | -29.6 | -42.5 |
| Italy | NA | NA | NA | NA |
| Luxembourg | NA | NA | NA | NA |
| Netherlands | 0.0 | -2.8 | 77.4 | 72.4 |
| Norway | 0.0 | -15.1 | 0.0 | -15.1 |
| Portugal | NA | NA | NA | NA |
| Spain | NA | NA | NA | NA |
| Sweden | 48.6 | 14.8 | 15.9 | -10.5 |
| Switzerland | -20.5 | -29.1 | -41.7 | -48.- |
| UK | 0.0 | -16.2 | 0.0 | -16.2 |
| US | NA | NA | NA | NA |

1. Germany, 1980-87.
NA = Not available.
Source: Calculated on basis of Tarifica, UK Ltd., 1980/87 and Appendix II.B.

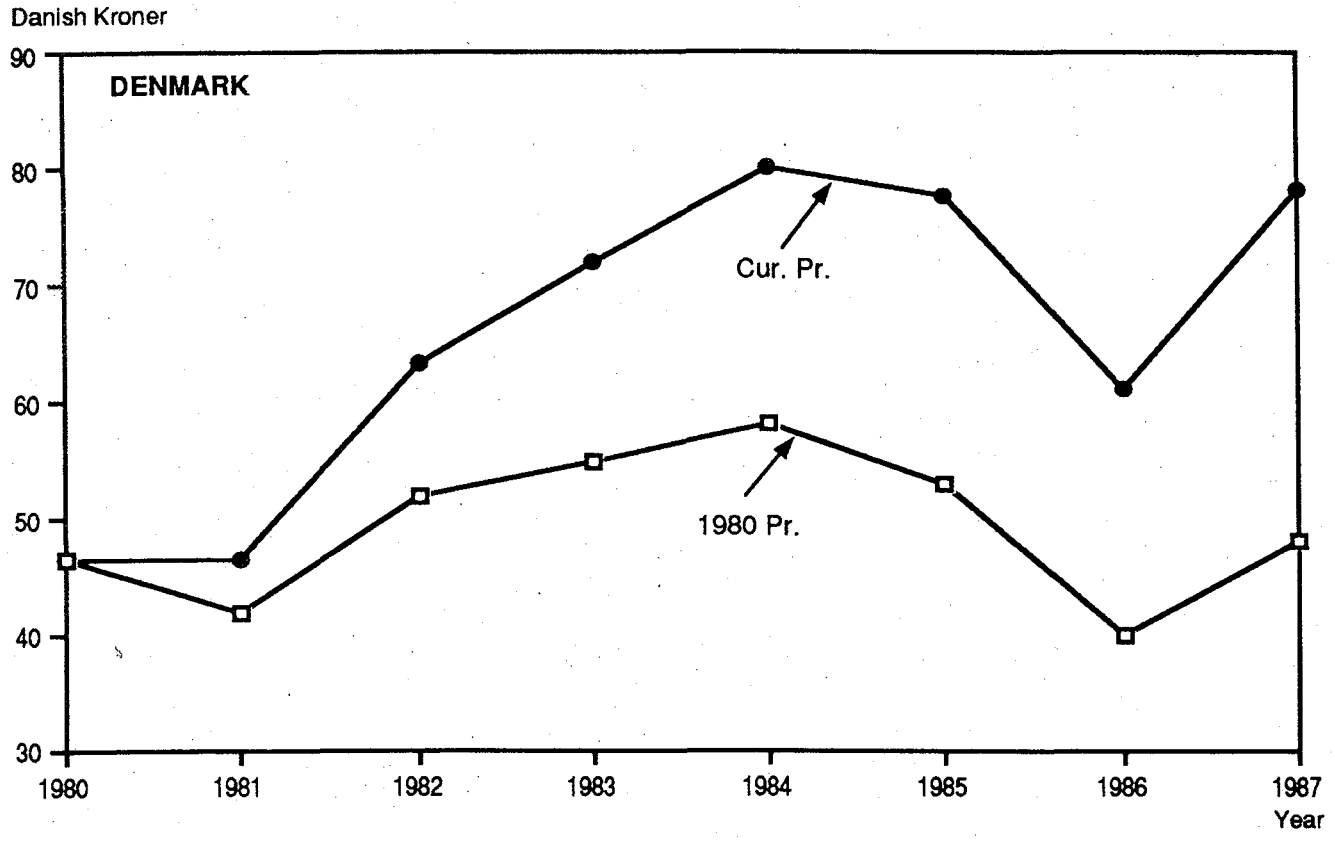
Figure II-6 shows exchange line rental charges by year in current and constant 1980 prices. Constant prices have remained more or less stable in Denmark, Portugal and the United Kingdom. In France, Germany and Sweden, they have declined. Figure II-7 illustrates overall percentage changes for inland telephone charges (cost per minute) calculated on the basis of 1980 prices (high and low refer to peak and off-peak tariff schedules). In Denmark there are signs of distance-related rate restructuring with the largest decreases in price for calls over distances of more than 100 kilometres. In France, changes for local (Paris only) calls and for those over shorter and longer distances are of the same order of magnitude. In Germany, the pattern is similar to that in France, except for a significant increase in charges for calls over 50 kilometres in off-peak periods. In Portugal there is

little evidence of distance-related changes. But the cost per call in local areas in off-peak periods declined more than for other types of calls. Data for Sweden show divergence in percentage changes for calls in peak and off-peak periods and there is a suggestion of restructuring on the basis of distance. Assuming data for the United Kingdom are reasonably accurate, they show the "classic" model of rate rebalancing, one that no other country demonstrates to the same degree. Local cost per minute increases in constant prices for both peak and off peak calls are countered by a small increase or decrease for calls under 56 kilometres, and a substantially greater decline in charges for calls over 56 kilometres.

## E. Summary

This analysis confirms that rate restructuring is well underway. For the most part, increased charges in current prices translate into decreases in real terms. There are only a few cases where rate rebalancing both between local and long-distance telephone services, and for calls or circuits over short and longer distances, have resulted in real prices increases. The results suggest that rate restructuring has yet to run its course in most countries in Europe and that there is scope for policy debate on the best rate structures for the future.

Figure II-6. **EXCHANGE LINE CHARGES, COST/MONTH RENTAL, CURRENT AND 1980 PRICES**



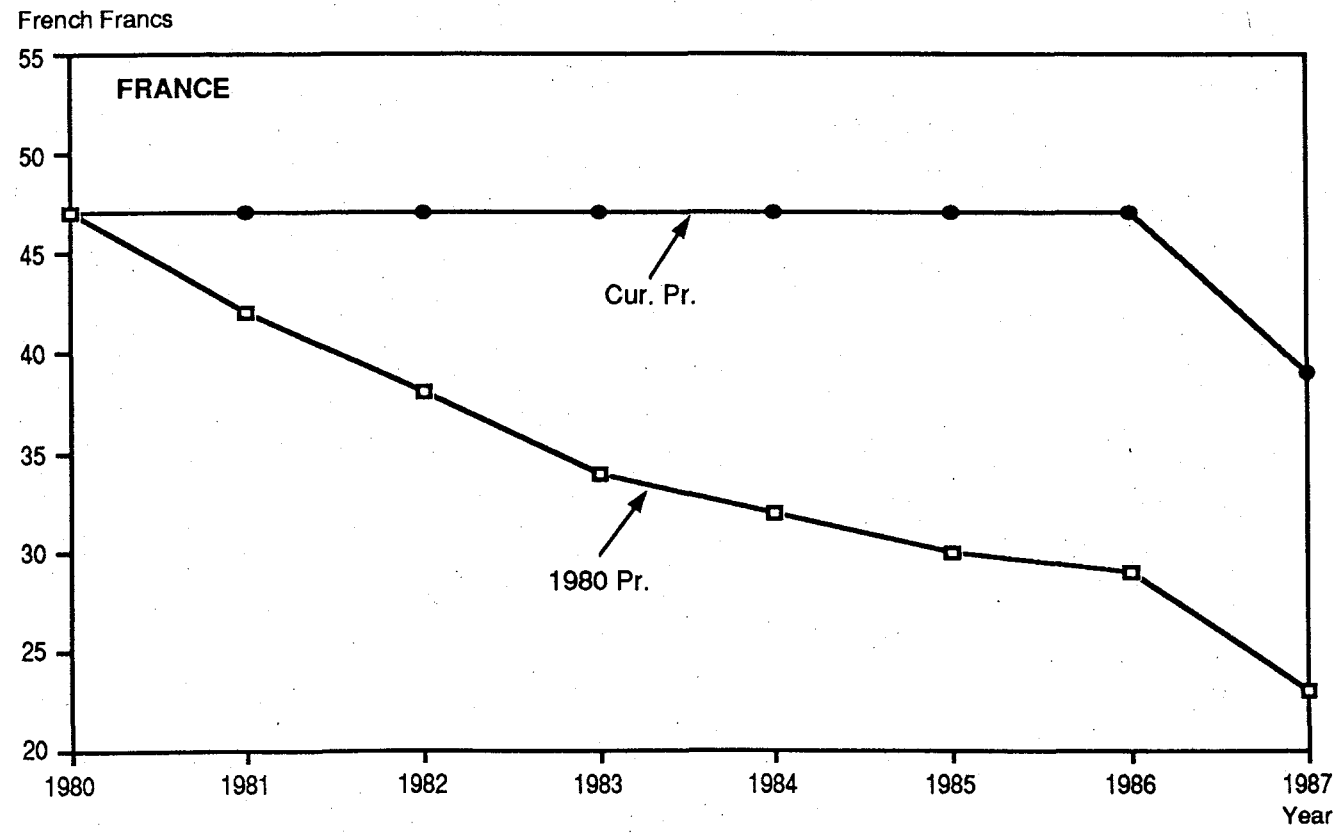
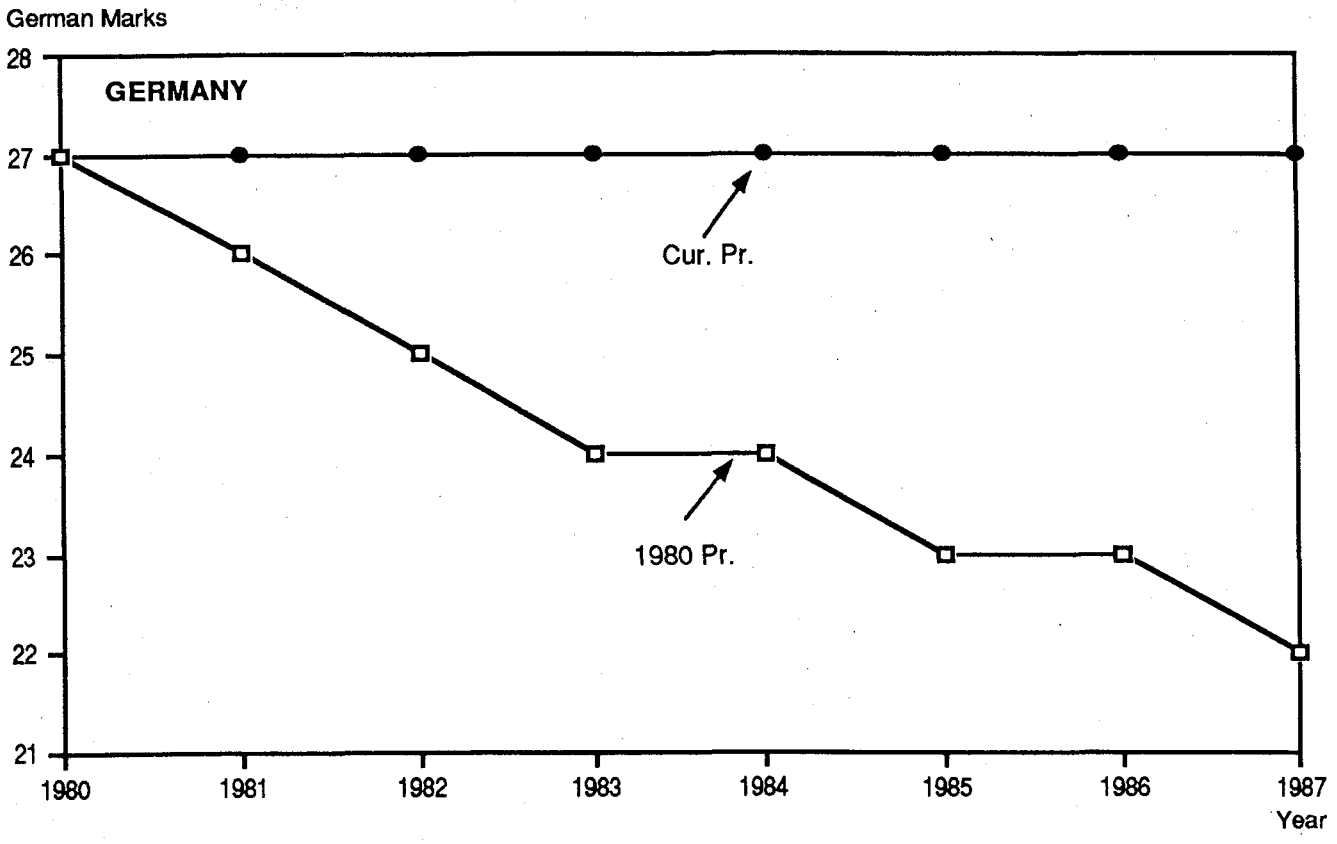



Figure II-6 *(Continued)*



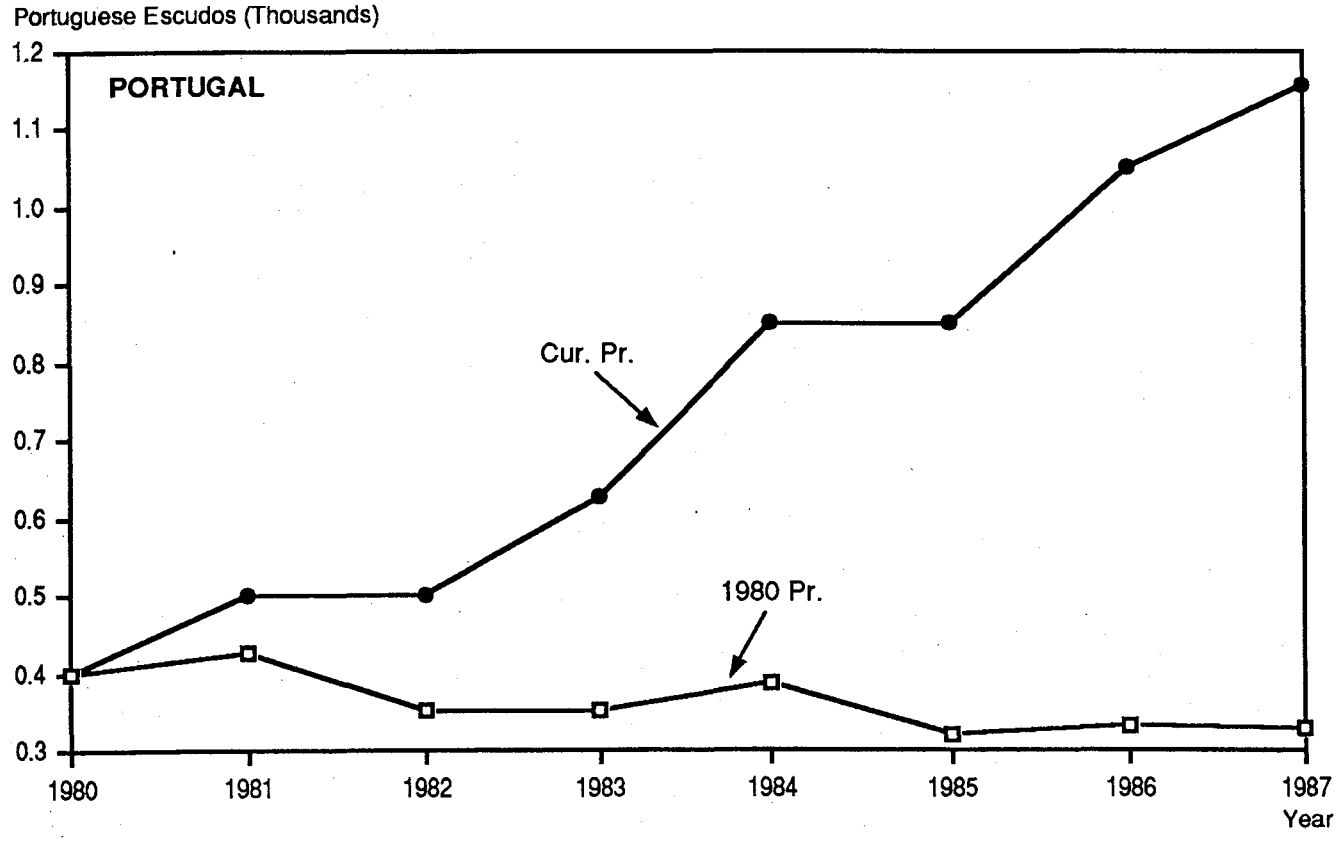
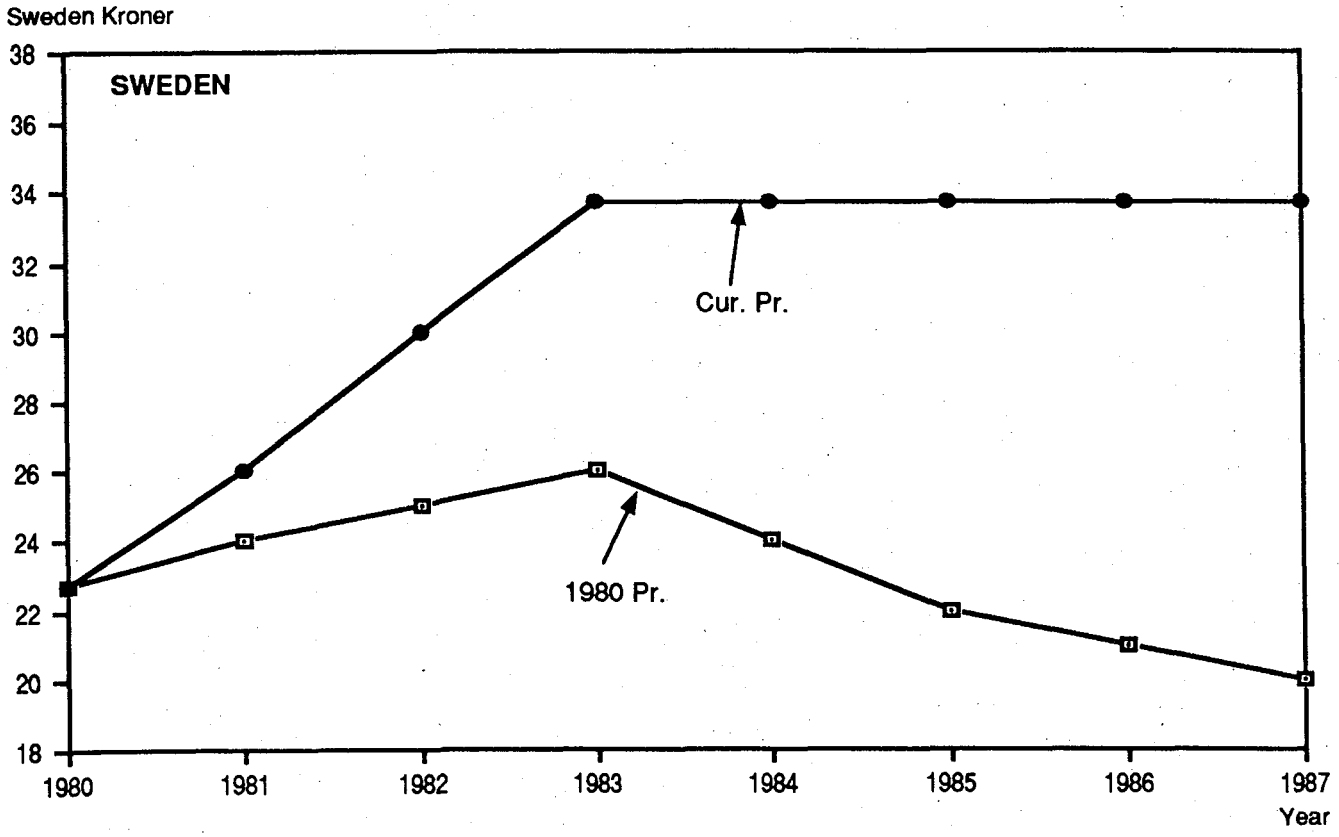



Figure II-6 *(Continued)*



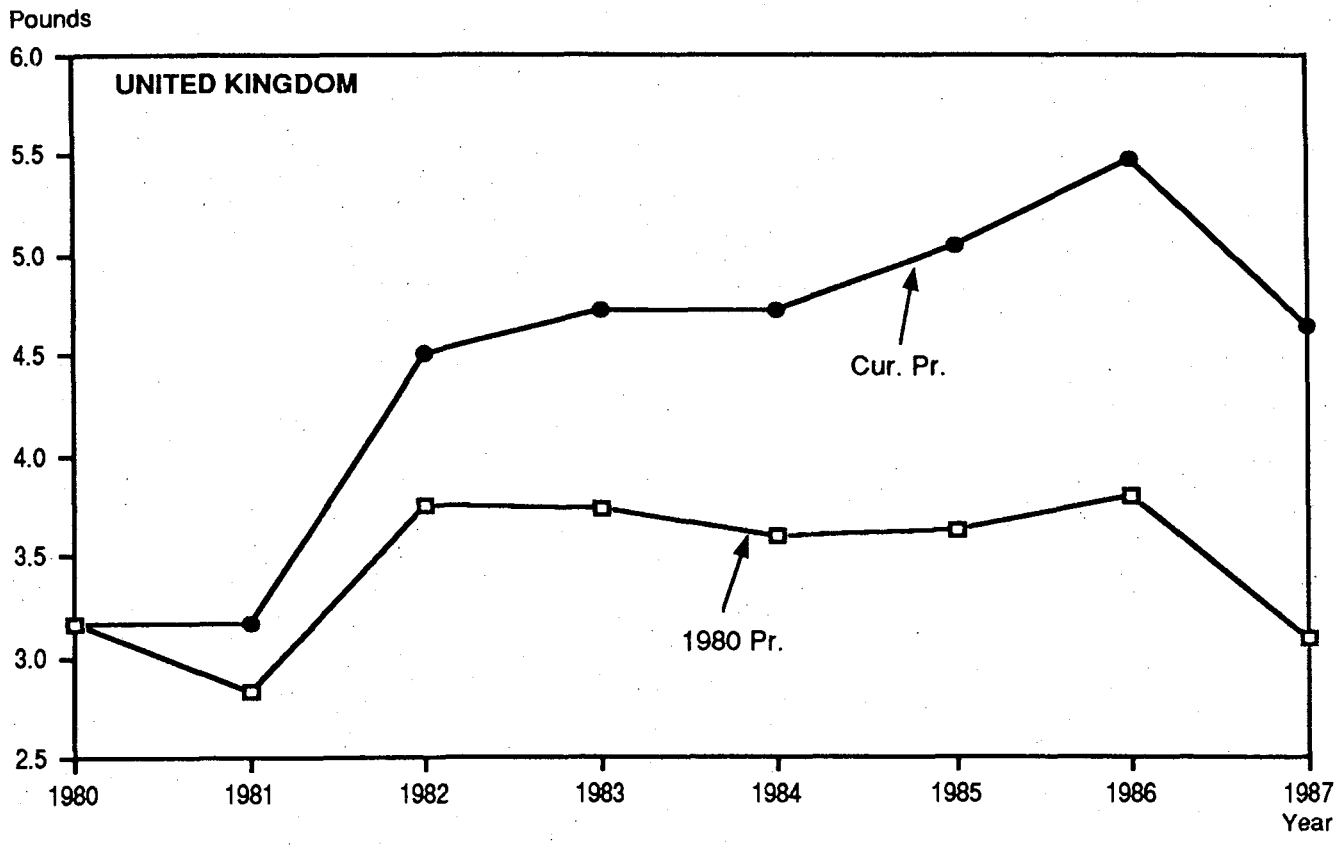
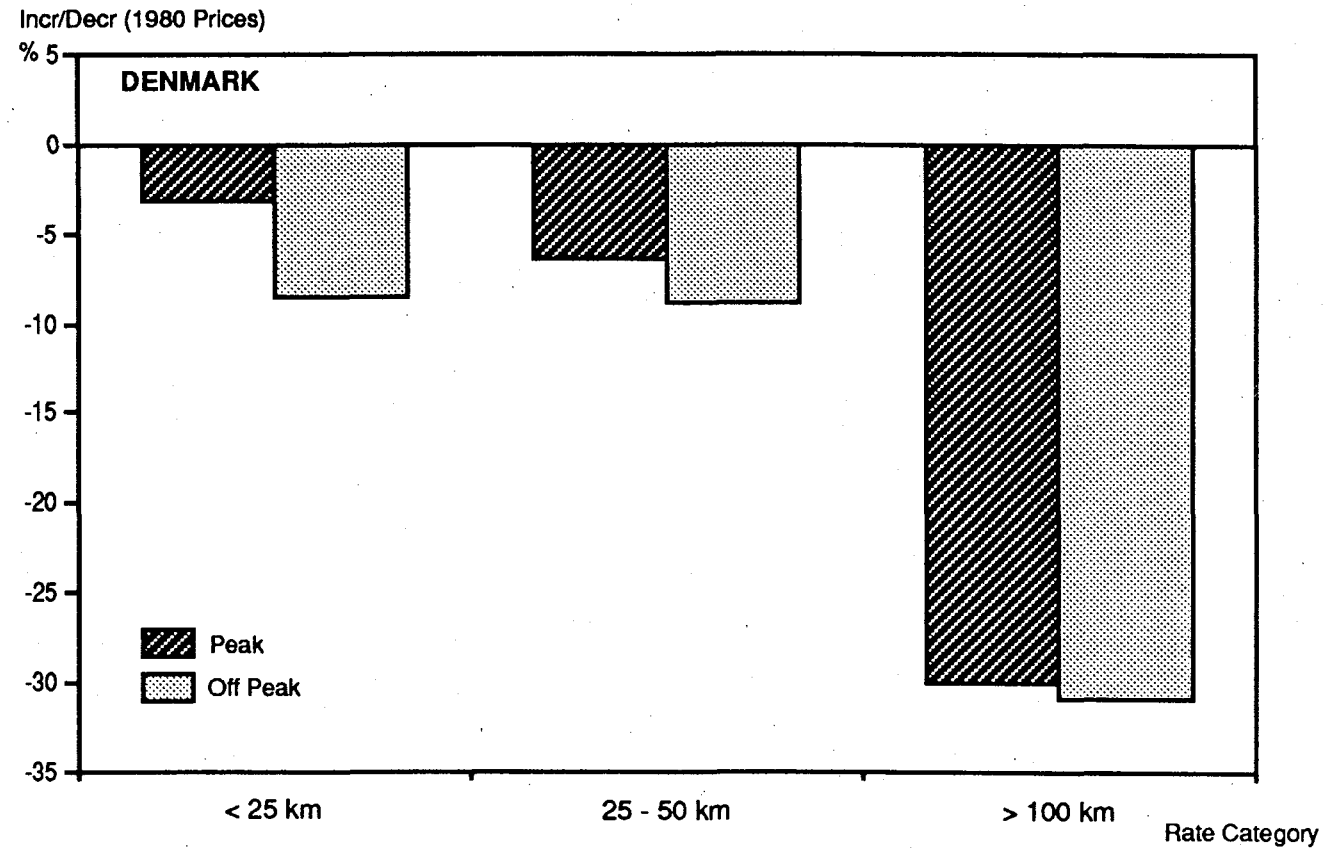



Figure II-7. **INLAND TELEPHONE, COST / MINUTE PERCENTAGE CHANGE 1980-87**



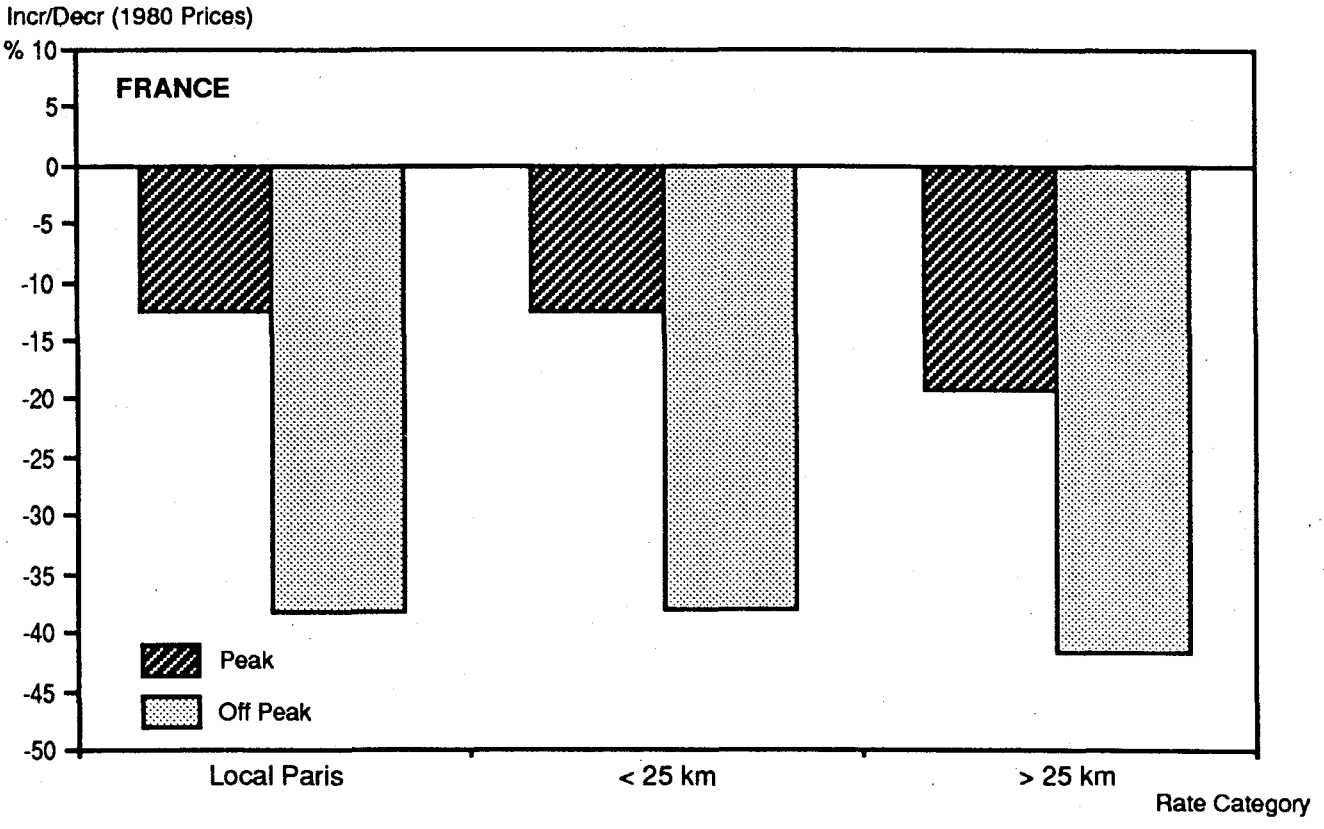
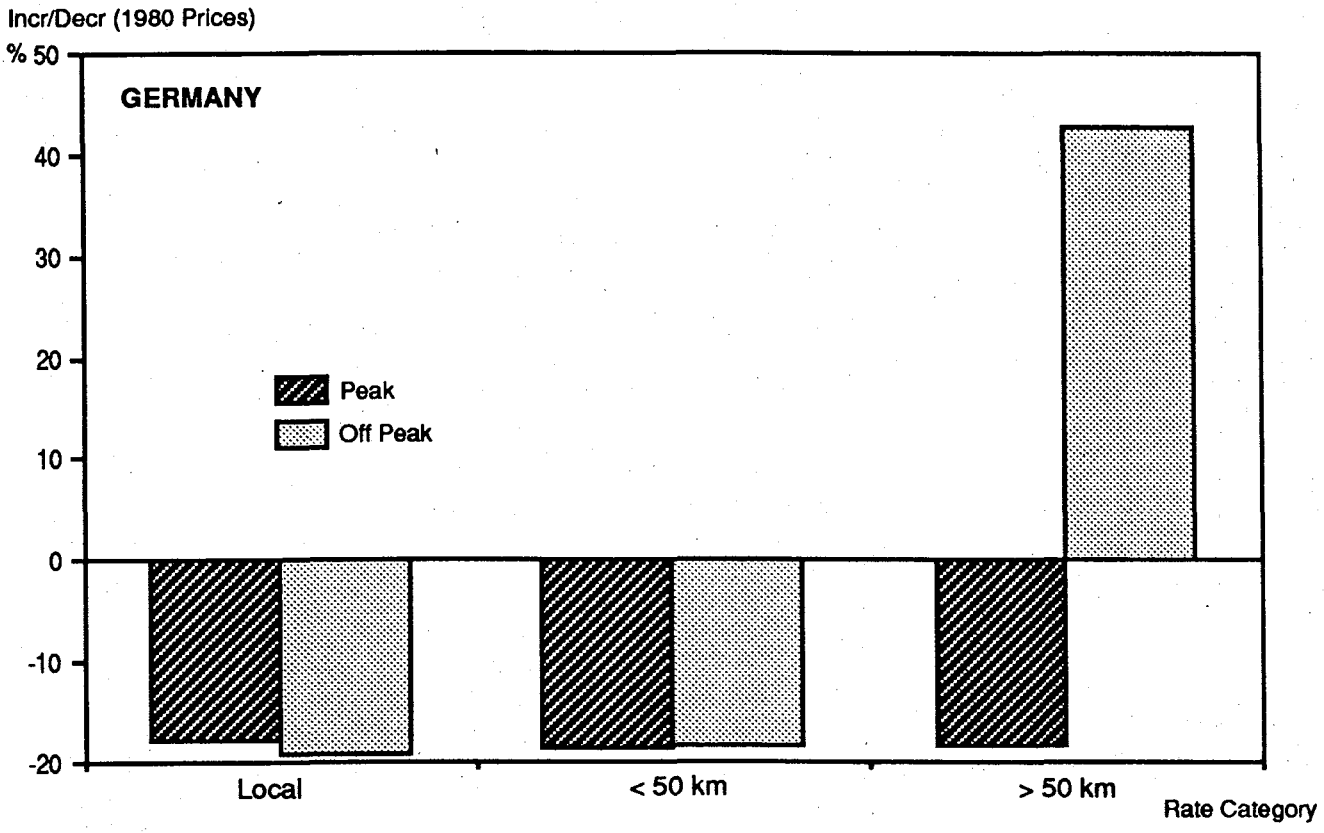



Figure II-7 *(Continued)*



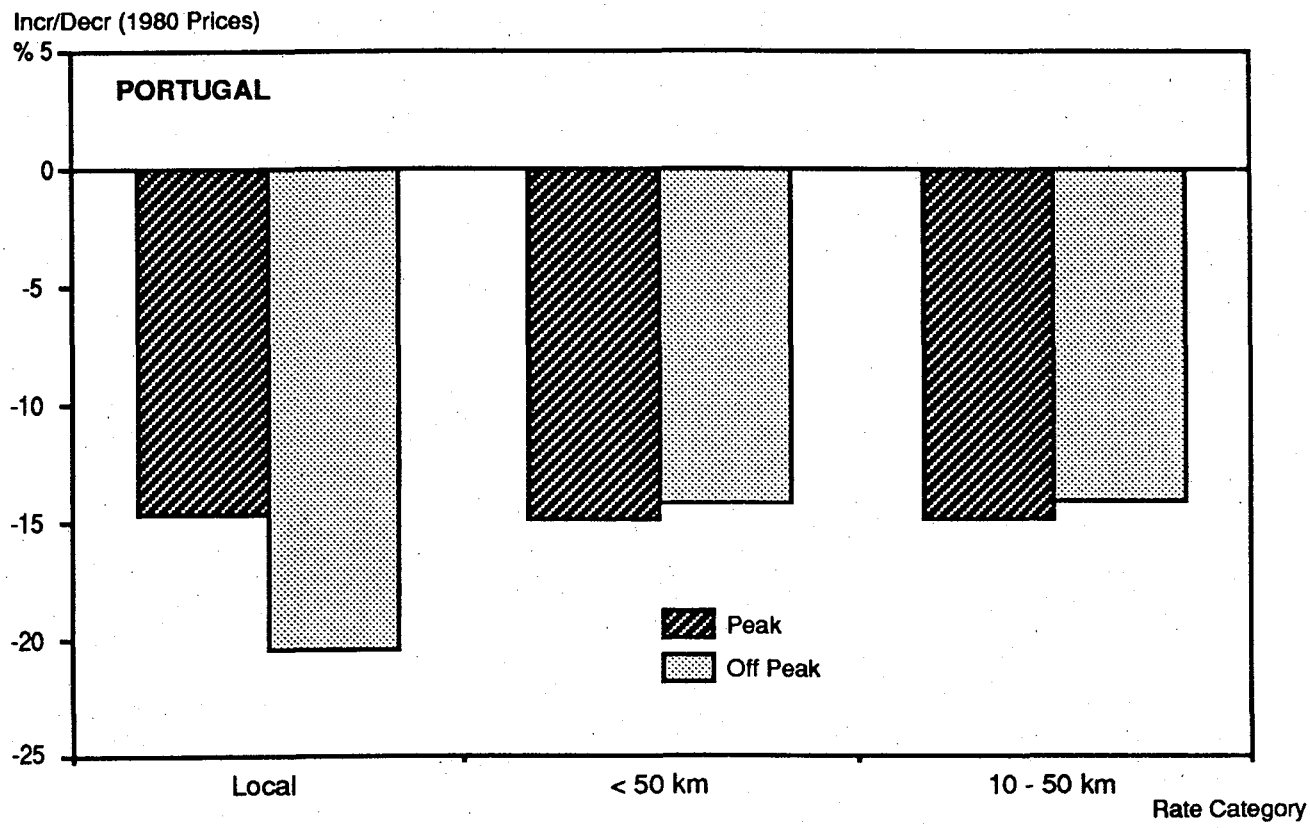
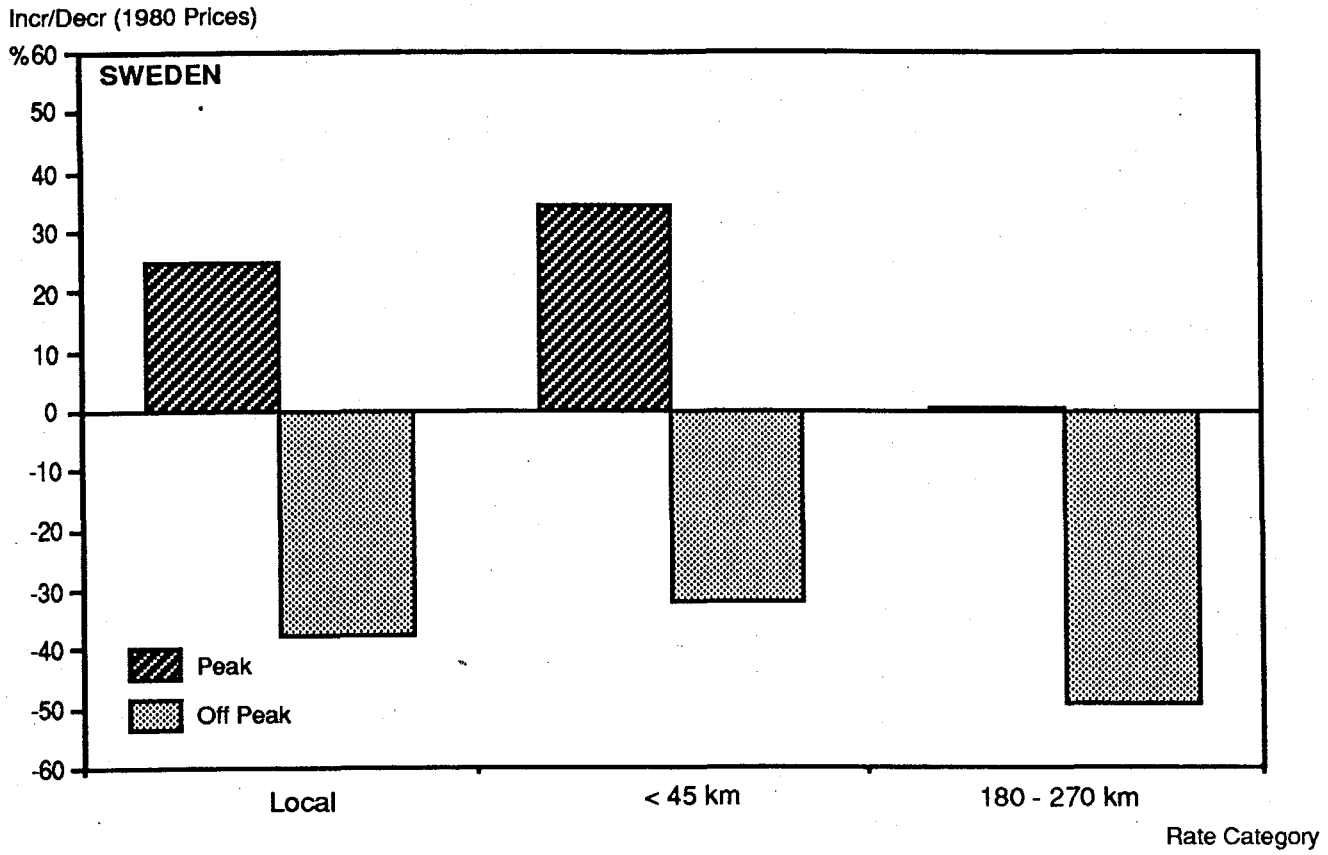
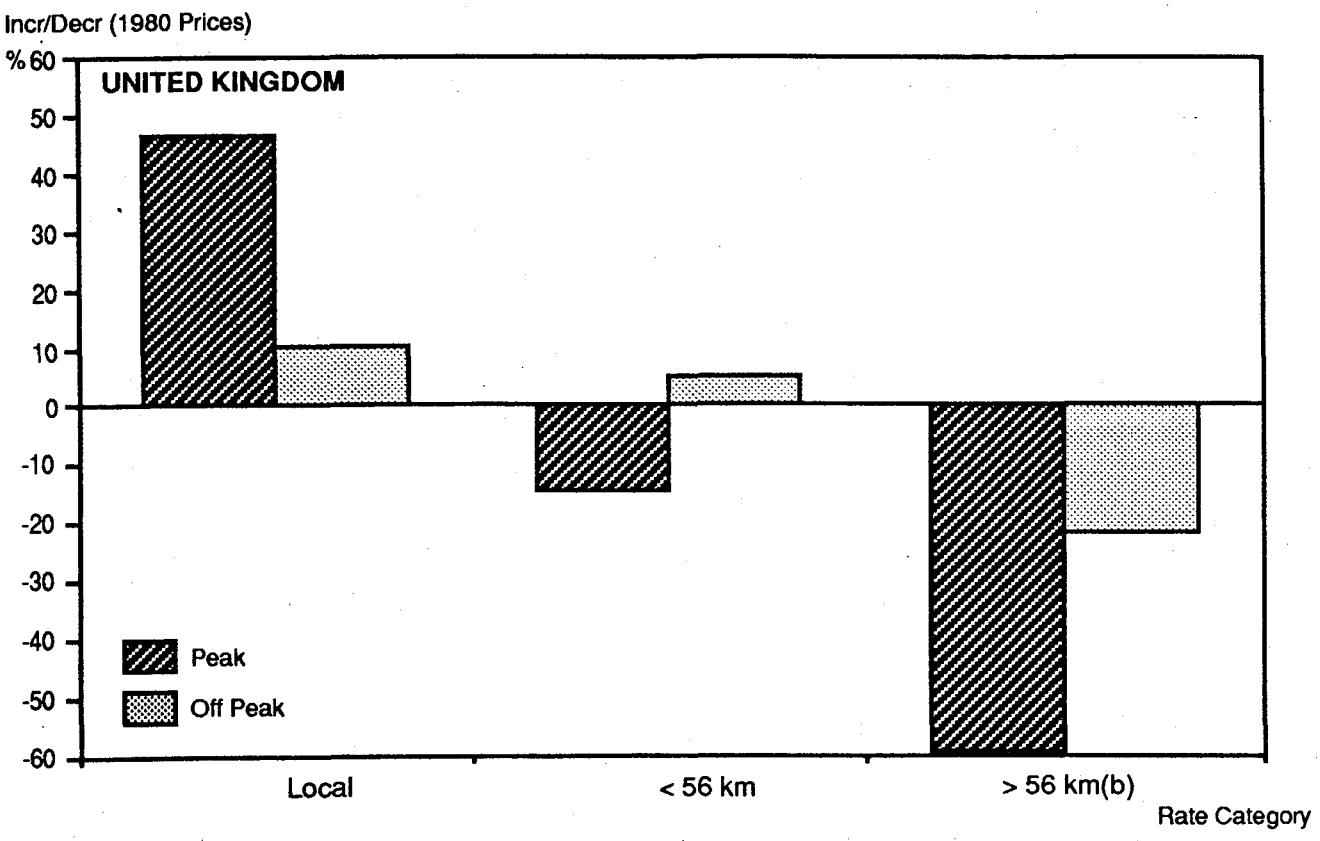



Figure II-7 *(Continued)*



# V. CONCLUSION: TELECOMMUNICATION PRICING AND THE POLICY AGENDA

This review of pricing concepts and the experiences of several OECD countries indicates the extent to which the meaning of "cost-based" pricing will need clarification if policies are to be considered by a wider community of interest. Rate restructuring is necessary in the changing telecommunication environment. However, restructuring should not be equated with an inevitable trend toward "rebalancing" of local and long distance telephone service tariffs or with the introduction of competition.

Most OECD countries have begun to restructure tariffs but they are not adopting the same policies. Aside from a clear trend toward declining international tariffs for telephone and telex services, and in some instances for leased circuits, there are many patterns. National telecommunication policy priorities are reflected in the pricing of exchange and inland service tariffs.

The analysis demonstrates that the increasing importance of telecommunications in the economy has meant that "cost", however defined, is beginning to play a significant role in pricing decisions. This does not imply that prices must be set to reflect "costs". But there are increasing pressures to make the relationships between costs and prices explicit to justify changing rate structures. A wider public debate on alternative cost standards for "cost-based" pricing would enable residential and small and medium-sized business telecommunication users to participate more effectively in pricing debates.

## Appendix II.A

# TELECOMMUNICATION NETWORK EXPANSION AND TARIFF POLICY

# SELECTED OECD COUNTRIES*

In Australia new price controls for telecommunication services were introduced in June 1989. In order to improve Australia's competitiveness through greater efficiency, rate of return and price-cap regulation have been applied to two of the country's public telecommunication carriers, Telecom Australia and OTC Ltd. The policy intention is that the combination of the price-cap and rate of return targets will encourage the carriers to achieve further gains in efficiency. The new price controls were implemented in July 1989 and are administered by the Australian Telecommunications Authority (AUSTEL) and apply to specified reserved services by limiting average price rises to a minimum annual percentage below the rate of inflation (CPI-X).

The price-cap is intended to operate for three years. Carriers must inform AUSTEL of proposed tariff changes and show how these conform with any relevant determinations issued under the Telecommunications Bill 1989 by the Minister for Transport and Communications. Carriers are not allowed to implement the tariff changes unless informed by AUSTEL that the proposed changes conform with any relevant determination.

The government has set "X" in the CPI-X formula initially at 4 per cent per annum. This figure was decided after consideration of the available productivity gains in the telecommunication enterprises and of factors affecting the carriers' rate of return targets. With respect to rate of return targets, these are being developed within the context of Australia Telecom and OTC's corporate plans. These include values for capital expenditures, borrowing requirements, taxation assumptions, and the impact of asset revaluations, changes in financial structures and variations in operating costs. In addition, the carriers are required to make dividend payments of a certain order to the government. The dividend will be determined in part by the level of profitability of the carriers.

The two major factors considered in the determination of "X" are: achievable cost reductions resulting from productivity growth and efficiency improvements; and the setting of minimum target rates of return. The value of 4 per cent was judged appropriate to permit the carriers to generate sufficient revenues to meet their rate of return targets, capital investment needs, income tax, required dividend payments and costs of community service obligations. The level of "X" is to be reviewed by AUSTEL before the end of the first three years and the government may increase it in subsequent periods. The CPI figures of the previous financial year are used in the formula. If the CPI-X figure is substantially negative, the carriers will be required to reduce prices within a given year. To prevent undue implementation costs, carriers are not required to make immediate adjustments for negative outcomes of less than one per cent, and are permitted to offset them against increases in later years.

Domestic services subject to the price-cap comprise the standard monopoly services such as business and residential rentals and local and trunk call charges. Standard OTC services are subject to a similar price-cap. For OTC, these comprise international direct dial and off-peak and operator-handled tariffs for various categories of countries for which OTC charges differential rates. In applying the price-cap to an average of a range of standard services, each service is weighted by its relative revenue contribution from the previous year. This avoids the need to forecast revenue growth for individual services or to implement retrospective adjustments.

Prices for other than standard services are a matter for commercial determination by Australia Telecom and OTC in the first instance. However, the government may use its power under the Telecommunications Bill 1989 to declare specific reserved services for the purposes of price control and such services would become notifiable and subject to disallowance by the Minister.

In Austria, the Post un Telegraphenverwaltung (PVT) is responsible for tariff policy. Tariffs are set on the basis of actual costs. Tariffs for long distance telecommunication have fallen due to the use of the most modern technologies which are considerably less costly than earlier plant installations. On 1 January 1987 tariff reductions of 21 per cent were introduced for automatic dialled long distance telephone calls to 16 European countries. On 1 July 1987, a reduction of more than 53 per cent was implemented for long distance calls to the United States and Canada.

A substantial reduction in the tariff for calls to 165 countries was implemented on 1 September 1988 with the discontinuation of the five zone tariff for communication with foreign countries. These steps have had the effect of making telephone calls to Belgium, France and Italy during peak hours in effect 50 per cent less expensive than calls from these countries to Austria. In the context of these

tariff reforms which began in 1987, tariff reductions for evening and weekend calls to 40 European countries and to North Africa have resulted in a noticeable decrease in the cost of service from 1 September 1989.

The tariff for the national digital data network (Datex-P) has been reduced from 1 January 1989 with the introduction of tariffs which are independent of distance and the speed of transmission. Similarly, tariffs for international private digital circuits have been adjusted for some countries and are roughly the same in both directions. In the case of national private digital circuits, tariffs have been adjusted to reflect actual costs for a very long time. In addition, for private circuits the tariffs do not take into account the volume of data that is transmitted. The PVT tariff policy is to ensure that prices primarily reflect costs and that prices are maintained as low as possible through the use of innovative technologies.

In Belgium, 8.2 per cent of all lines were connected to electronic digital switches, 40 per cent to analogue and 51.8 per cent to electromechanical and semi-electronic switching equipment in 1986. Régie des Télégraphes et des Téléphones' (RTT) investment plans include the extension of digital switching to the local network and the replacement of electromechanical switching by 1998. The objective for the replacement of existing switching is by the end of 1988 to reduce electromechanical switching to 37.8 per cent, to maintain analogue switching at 40 per cent and to increase programmable digital switching to 22.3 per cent. The introduction of commercial ISDN is planned for 1990.

By 1990 it is expected that local switching equipment will be connected with the transmission network to carry traffic at 2 Mbit/s. A new digital network is expected by the end of 1988 using monomode fibre optic cables and optoelectronic systems capable of handling 565 Mbit/s. RTT forecasts that a pilot local integrated wideband service could be in place by 1993-94. Between 1985 and 1986, zonal traffic grew by approximately 13 per cent, intrazonal by 7.6 per cent and international by 6.4 per cent.

In May 1986, reductions in tariffs between Belgium and the United States were introduced for voice telephone service and reduced prices for customer dialled calls were put in place. RTT does not have a specific policy of realigning service tariffs with costs. Both the Minister of Posts and Telecommunications and RTT have the authority to introduce tariff changes.

In Denmark, the transformation of the telecommunications infrastructure is underway. In 1987, for KTAS (Copenhagen Telephone Company) which operates under a state concession to serve the island of Sjaeland and surrounding islands (supplying approximately 49 per cent of installed telephones) the share of digital connections reached 7.3 per cent. It is expected that by the year 2000 more than 50 per cent of connections will be digital. Subscribers per 100 inhabitants reached 57.4 in 1987 and telephone sets, 91.0. KTAS regards itself as being in the business

of telematics. In 1985, the company reported that approximately one-half of newly constructed cable was being reserved for private networks to supply permanent connections between digital exchanges or circuits for data transmission. In 1987, 34.1 per cent of revenues were derived from the telephone network. The remaining revenues were derived from other telephone services including private networks, office automation, the data communication network, cable television and service centre activities.

Cost reductions are expected with the installation of digital equipment and optical fibre capable of operating at 565 Mbit/s. KTAS operates a hybrid network for the distribution of programming using fibre optics. This technology also is being installed in the public network. In 1987 the company established with IBM, danNet A/S to provide value added network services. The prices charged by KTAS and three additional concessionary companies are under the control of the General Director of Posts and Telecommunications. Telecom Denmark is responsible for international services and connections between the regional companies.

In Finland in 1981, the Telecommunications Administration was responsible for 26 per cent of telephones (32 per cent of the population, 75 per cent of the land area), and the 61 private companies, for 74 per cent of telephones (68 per cent of the population). As of 1982, voice telephone traffic accounted for over 90 per cent of volume and over 80 per cent of all telephone traffic was local traffic. In 1982, revenues from long distance calling represented 44.6 per cent of total revenues, other call revenues 24.9 per cent and annual fees 11.4 per cent. By 1983, telephones per 100 inhabitants had reached 57.0 for the entire country and 61.0 in areas supplied by the local private companies. The Telecommunications Administration in Finland constructs and maintains a trunk network, some local networks, and the public data network and several mobile and radio networks. In 1987, domestic trunk calling increased by 5 per cent over the preceding year, international direct dialling by 13 per cent. In 1987 the digitisation of the trunk network reached 20 per cent and a 140 Mbit/s fibre optic system was completed. Digital exchanges in the Administration's territory reached 8 per cent of the total. Although it serves a more sparsely settled territory than the private local companies tariffs have been kept at equivalent levels for local service.. Data transmission services have been stimulated by the Datapak service which offers users access to the Administration's videotex, Telebox, Datapak and other on-line database services. Tariff reductions of 23 per cent were applied to the fixed trunk network (Datel) in March 1986 and to the public data network in May 1986.

In France in 1986 there were 42.6 main lines per 100 inhabitants, an increase from 35.6 in 1982. DGT (France Telecom) revenues from telephone traffic comprised 74 per cent of total revenues in 1986. Electronic switching equipment accounted for 65.3 per cent of all network switching in the same year, an increase from 28.8 per cent in 1982. Crossbar equipment declined from 70.6 per cent in 1982 to approximately 30 per cent in 1986. In 1985 the percentage of kilometres

served by coaxial cable was 56.8 per cent, with microwave serving 43.2 per cent. By 1986, 500 kilometres of fibre optic cable had been installed in the long distance network, and 36 000 kilometres in the local network. Digital capability in 1985 had been installed in 44 per cent of switching capacity and 48 per cent of local and long distance transmission. In 1986, 72.5 per cent of local circuits, and 55.8 per cent of long distance circuits were digital. The three main digital networks operated by France Telecom are Transfix providing permanent connections from 48 to 1920 kbit/s since 1977; Transdyn providing satellite connections since 1986; and Transcom offering 64 Kbit/s service since September 1986. In tandem with the rapid upgrading of the network infrastructure, the DGT has been implementing new tariff policies since 1981. The objective is ultimately to make non-local tariffs insensitive to distance. Since 1981 connection charges have been reduced to encourage access to the telephone network and differential tariffs have been introduced for residential and business rentals. Tariff rebalancing in 1986 resulted in a reduction from 20 minutes to 6 minutes for local call units and a change in charging for call units from 77 to 74 francs. This resulted in an approximate 4 per cent reduction in the price for long distance calls and for short local calls. Responsibility for tariff-setting rests with the Minister for Posts and Telecommunications.

The performance of the German telecommunications system in 1986 shows an increase in the volume of local calls of 5.2 per cent and of outgoing long distance calls of 4.7 per cent over 1985. Total telephones increased 3.2 per cent over the same period. Although, telex stations increased in 1986 by 2.2 per cent, national telex calls declined by 3.2 per cent while international telex calls remained stable. Teletex terminals increased by 25.5 per cent. Data stations increased by 17.7 per cent in 1986. In line with its network modernisation programme, the DBP has introduced tariff changes including: tariff reductions for push-button telephones; reductions in international direct distance dialling; expansion of the uniform tariff for telephone traffic to European Community Countries; reductions in tariffs for automatic intercontinental telex traffic; alignment of basic tariffs for telex main stations with costs; and tariff increases to improve cost/revenue relationships in terminal equipment.

In 1987 the Witte Commission recommended that tariffs should be brought into line with costs (Recommendation 11); tariff distortions in telephone service should be gradually eliminated (Recommendation 12); and leased circuit tariffs should be comparable in level and structure to those in other countries. Tariffs are set by the Ministers of Posts and Telecommunications and Finance and are ratified by the Administrative Council. In setting tariffs considerable importance is attached to maintaining rates that encourage network use by small and medium-sized companies and residential customers.

In Greece total main telephone connections at automatic exchanges increased by 6.4 per cent in 1986. Telephones per 100 inhabitants rose to 39.3 in 1986. Traffic

indicators show that local traffic units increased by 20.3 per cent and comprised 32.0 per cent of total traffic; trunk traffic units decreased by 5.6 per cent comprising 37.2 per cent of traffic and international traffic grew by 9.1 per cent representing 30.8 per cent of traffic in 1986. Overall traffic growth in 1986 was 6.1 per cent as compared to 14.3 per cent in 1985. Private telex call units grew by 7.5 per cent, with public telex units growing at 2.3 per cent in 1985. The respective figures in 1986 were 0.9 and -0.4 per cent. In 1986 automatic local telephone exchanges accounted for 61.9 per cent of total exchanges and increase from 32.5 per cent in 1980. At the end of 1986, the number of data network users had increased by 19 per cent and the number of network termination points (NTP) had increased by 18.4 per cent. Of the latter, 7.4 NTPs were connected to the public switched network.

The Hellenic Telecommunications Organisation (OTE) obtained 87 per cent of its total revenue from telephone service in 1986. Decreases in traffic in 1986 have been linked to the inability of the network to cope with trunk traffic in peak periods and, in part, to a tariff increase (15 per cent). This resulted in a reduction in local unit prices (constant prices). All new installations for the international network that OTE will install from 1987 are digital. Analogue and digital frequency carrier systems are being installed as well as PCM systems and optical fibre cables.

Tariff changes in 1986 included: a 43 per cent increase in the initial telephone connection charge and a 25 per cent increase in the monthly rental charge for the first main telephone line. For local calls, for the first 150 units per month, the price per unit increased by 13 per cent, subsequent units by 17.8 per cent. Leased telephone circuit tariffs were increased by 15 per cent. The basic monthly charge for main telex connections (automatic) increased by 78 per cent. The tariff unit for domestic units increased by 32 per cent. In Greece, tariff setting is the responsibility of the Ministry of Transport and Communications.

In Ireland, new telephone connections increased by 4.1 per cent in 1986/87 over 1985/86 resulting in an increase of 7.5 per cent in telephone customer lines. Telex customer lines decreased by 3.6 per cent, leased data circuits increased by 14.7 per cent. Telecom Eireann has experienced an increasing trend toward private and public data network combinations. Total telecommunication traffic grew by 8 per cent (international traffic, 14 per cent) over this period and the percentage of telephone lines with automatic connections reached 100 per cent. In 1986/87 approximately 40 per cent of customer lines were served by digital exchanges. This figure was expected to rise to 50 per cent in 1987/88. Telephone penetration per household rose to 54 per cent. In 1986/87 telephone income accounted for 92.8 per cent of Telecom Eireann total income. Telephone rental revenues accounted for 24.3 per cent (1985/86 24.3 per cent), telephone traffic revenues for 68.7 per cent (1985/86 67.7 per cent), and connection fees, 1.6 per cent (1985/86 2.2 per cent). The remaining 5 per cent was attributable to income from overseas telecommunications agencies.

Telecom Éireann's investment programme is directed towards the information technology requirements of the business community. Capital expenditures in 1987 for network development were distributed between switching (26.8 per cent), transmission (13 per cent) and the local network (50.7 per cent), plus miscellaneous investment. While tariffs for international telex, data and packet switching services are regarded as competitive, tariffs for international telephone service are to be reduced when the financial situation permits. In April 1984, substantial reductions in international telex charges were introduced ranging from 25.0 to 33.3 per cent. In 1985 an increase in internal and cross-channel telex call charges was implemented and the telex rental structure was rationalised by the introduction of a common national rental. In April 1986, charges for connection of a new telephone line were reduced from Irish £180 to £120. Telecommunication charges were increased by an average of 3.5 per cent from April 1986. The quarterly rental for business lines and residential lines was increased and the unit call fee was raised. International call charges to the United States, Canada and the European Community countries were reduced by 10 per cent. Telecom Eireann is subject to control by the Department of Communications.

In Italy the Ministry of Posts and Telecommunications serves as the regulatory authority; through ASST it also operates long distance telecommunication services in Italy, Europe and the Mediterranean Basis. Since 1980, after a period of three years, tariff revisions have provided an opportunity to more closely align costs and prices. From 1982, time charges for local telephone calls (depending on the period of the day) have been introduced gradually throughout the network. This change was aimed at reducing congestion during peak hours. 1982 tariff changes also unified the special business rates for rental charges by withdrawing price discounts which were unjustified in technical or usage terms.

The last changes in charges for international telephone services were made in July 1986. Since that date, international rates in constant prices have been experiencing progressive reductions. A substantial revision of the present tariff structure is foreseen as a consequence of the reductions in long distance tariffs (especially international tariffs) and counterbalancing measures that are adopted for local call tariffs and rental charges.

These actions, together with the expected positive growth of the national economy, are expected to ensure that an increase in operating profits can be used to finance the large investments needed for the further development of telephone services, for the improvement of service quality and the modernisation of the public network. The Italian Government has decided that tariff increases on public services, including telephone, should be kept below the level of inflation.

By 1987, subscribers per 100 inhabitants had reached 33.4. In the period 1980-1987, the total traffic increased on average by 5 per cent per year, with long distance calls rising by 7.6 per cent. Subscribers to specialised data networks

(ITAPAC and Fonia Dati) increased from 1500 at the end of 1985 to more than 5300 at the end of 1987. Intercontinental telephone terminal traffic handled by Italcable increased by 12 per cent in 1986 and 17.1 per cent in 1987, while telephone transit traffic increased by 33.5 per cent and 43.4 per cent in the same years respectively.

In Luxembourg the first digital switch was installed in 1985 and several more have been introduced since then. Between 1981 and 1984, telephone main stations have increased by 9 per cent. Total units of traffic increased from 1982 to 1985 by approximately 30 per cent. Regulatory and supervisory functions are exercised partly by the Ministry of Finance and partly by the Administration des Postes et des télécommunications.

In the Netherlands it has been argued that rate rebalancing has been accomplished with the introduction of timed local tariffs in January 1987. In 1986 there was a 3 per cent increase in the number of telephone connections. The residential market is close to saturation and demand is being generated by the business market. Inland traffic increased by 4 per cent in 1986, and 44 per cent of this was due to an increase in trunk calls. International traffic increased by 9 per cent. The number of connections to the public data network (Datanet) increased by 76 per cent in 1986. In this year approximately 54 per cent of connections were to electromechanical exchanges, the remaining 46 per cent to computerised electronic exchanges. Tariffs must be approved by the Director of Commercial Affairs and ratified by Parliament. In January 1987, tariff changes were introduced to remove the subsidy between long distance and local services through the introduction of timed local charges. In 1989 when the Telecommunications Administration becomes a public limited company, regulatory issues will be dealt with by a separate body in the Ministry of Transport and Civil Works.

In Norway telephone operating revenues accounted for 86.8 per cent of total revenues in 1985; telex 3.6 per cent; datel/datex 1.4 per cent; and lease of circuits and equipment 3.2 per cent. Remaining revenues were accounted for by telegram, alarm, cable, and other revenues. The Norwegian Telecommunications Administrations' total operating revenues increased by 14 per cent over 1984 in constant prices. Inland telephone traffic increased by about 14 per cent in 1985, and international traffic grew by about 17 per cent. The number of Datapak subscribers increased by 90 per cent. The last manual exchange was taken out of service at the end of 1985 and the Admintstration installed the first public digital exchanges in 1986.

In January 1982 telecommunication charges rose by an average 17 per cent. Connection charges were increased by 19.7 per cent and charges for inland calls by 22.6 per cent per unit. For international calls a uniform charge was introduced to all European countries except Sweden, Denmark and Finland. Call charges to the United States and Canada were reduced by approximately 17 per cent. At the same

time installation charges for telex subscribers were increased. In 1983, telecommunication charges were increased by an average 5.8 per cent. At this time the average rise in telephone connection charges was 10.1 per cent and tariffs were introduced to shift peak calling periods. The telex subscription charge was further increased. In 1984 telecommunication charges were raised by an average of 2.5 per cent. Average increases for telephone connection charges were 4.2 per cent with increases for inland calls per metered pulse. In 1985 the telecommunication service prices were reduced by an average 1.2 per cent. Since 1983 the charge reduction has been about 9 per cent as compared to an increase in the consumer price index. As a general principle, the Ministry of Communications has stated that tariffs should reflect costs of services and cross-subsidies should be avoided.

In Portugal in 1985 international traffic carried by CPRM increased by about 30 per cent. Automation of intercontinental links was completed. Improvements in the national network operated by the Portuguese Telecommunications Administration contributed to this high growth rate. Approximately 90 per cent of Portugal's international telephone and telex traffic is accounted for by 7 countries and the United States accounts for 35 per cent of this. CPRM's tariff policy is designed to ensure that traffic is not diverted to other country routes. In 1984 CTT traffic increased by 13 per cent and more than 90 per cent of connections were to automatic exchanges. In 1984 main telephone penetration per 100 inhabitants increased to 7.6 from 6.3 in 1982. Telex stations per 100 inhabitants increased to 18.0 in 1984 from 12.7 in 1982. The Ministry of Public Works, Transport and Communication is responsible for telecommunication policy.

In Spain total telephones per 100 inhabitants reached 37.8 per cent in 1986. Trunk and international traffic increased by 7.6 and 14.6 per cent, respectively. Telefonica is developing a network of analogue and digital multi-access systems to serve sparsely populated areas. In 1986, 3.2 per cent of subscriber lines and 10.6 per cent of trunks were digital. This figure is planned to rise to 22 and 45 per cent, respectively, by 1990. 99.7 per cent of all lines installed were connected to automatic exchanges in 1986. In 1986 data transmission circuits increased by 7.6 per cent and telephone network connections for data transmission grew by 29 per cent. IBERPAC (packet switched network) connections increased by 16 per cent. Tariff policy is the responsibility of a government delegate to Telefonica from the Ministry of Transport, Tourism and Communications.

In Sweden a process of tariff realignment is underway to bring prices in line with costs. From 1986, Televerket's tariffs for long distance services have been reduced, together with increases in local call tariffs and installation fees. Charges for leased circuits are expected to increase to recover full costs. If Televerket wishes to introduce major tariff changes it must consult with the government and obtain approval for changes in the residential telephone subscription fee. Televerket,

as well as other businesses in Sweden, is subject to scrutiny by the National Price and Cartel Office, which from time to time (depending on the general business climate) is given power to stop or even to roll back price increases.

In Switzerland, in 1984 local calls increased by 4.6 per cent, and inland minutes of use by 2.0 per cent, international minutes by 11.1 per cent. Telex minutes increased by 6.5 per cent for national use and 2.4 per cent for international use. The Swiss Telecommunications Administration has been installing digital switching equipment and fibre optic cable to support new digital services. In addition a digital transmission system capable of operating at 565 Mbit/s has been installed.

In the United Kingdom, telephone penetration per household has increased from 72.0 in 1980 to 81.0 in 1986. British Telecom's call volume has continued to grow with an increase of 7 per cent for inland and 11 per cent for international calls in 1986/87. Demand for private circuits in the City of London grew by approximately 50 per cent in 1986/87. British Telecom had installed 200 000 kilometres of optical fibre in its transmission system by 1986 and planned to introduce 60 000 kilometres into local exchanges in the City of London. In 1986/87, the percentage of total lines served by switching equipment was: Strowger 39.5; Crossbar 16.8; Electronic 40.3; and Digital 3.4. Capital expenditure in transmission equipment in 1986/87 represented 30.4 per cent of total capital expenditure (31.0 per cent in 1983) and expenditures for telephone exchanges amounted to 34.5 per cent of the total (43.0 per cent in 1983). British Telecom's prices can be changed subject to the rule that a basket of services must not exceed RPI-3 (4.5 from August 1989). The basket includes all trunk and local telephone calls, and exchange line rentals for residential and business.

Services offered by Mercury Communications were introduced in May 1986 and by 1987 the company's fibre optic trunk network reached 30 locations in the United Kingdom. Table II-1 shows a comparison of British Telecom and Mercury prices.

Prior to British Telecom's privatisation in 1984, price relationships were determined within the broad parameters of political and economic policy. The company's response to Mercury has been to reduce prices for trunk calls on competitive routes or in high density areas and to compete on the basis of quality and diversity of service offerings.

In the United States rate rebalancing has been underway for some years. The FCC report Price Comparisons for International Dial Telephone Service in 1987 shows prices for telephone calls between the United States and nine countries (France, Germany, Italy, Japan, Netherlands, Spain, Sweden, Switzerland and the United Kingdom). The FCC study also calculated the costs of calls from these countries to the United States. These are not included here as this report does not address problems in undertaking international comparisons.

In 1985, AT&T's share of the total international telephone market was 97.6 per cent, a figure which dropped to 94.6 per cent in 1986. MCI International's market share had reached 3.3 per cent in 1986, while Sprint had 0.8 per cent of the market. The three carriers have been competing on price. For example, AT&T offers International Plus which gives 10 per cent discounts on calls to 39 countries for a US$25 monthly fee. MCI offers Global Value Plus with discounts on Wide Area Telephone Service of up to 17.5 per cent. The total volume of calls (originating and terminating) handled by AT&T grew rapidly between 1975 and 1984 (See Table II-2).

* *The data and information contained in this Appendix are drawn primarily from the following reports: RTT Belgique, Rapport 1986; RTT Belgique, Les Telecommunications Belges, 1986; KTAS, Annual Report/Accounts, 1987; Association of Telephone Companies in Finland, Telephone Companies in Finland 1981, 1982, "Telephone Statistics 1983; Posts and Telecommunications of Finland, Report on Operations 1986; Direction Generale des Telecommunications, Rapport d'activite 1986, Statistiques, 1986; Hellenic Telecommunications Organisation, Telecommunication Statistics in Greece, 1986, Annual Report 1986; Deutsche Bundespost, Annual Report 1986; Telecom Éireann, Report and Accounts for the Year Ended 2nd April 1987; STET, Report and Accounts for the Year Ended 31st December 1986; Administration des Postes et Telecommunications, Rapport de Gestion 1985; Netherlands PTT, Jaarvelslag 1986; Norwegian Telecommunications Administration, Annual Report 1985; CPRM, Annual Report 1985; CTT, Relatorio e Contas 1984; Telefonica, Annual Report 1986; Entreprise des postes, téléphones et télégraphes suisses, Rapport de gestion 1984; British Telecom, Report and Accounts 1987, Supplementary Report 1987, 1986, 1985; Cable and Wireless, Report and Accounts 1987; FCC, Price Comparisons for International Dial Telephone Service, Washington DC, 1988.*

Table II-1

**British Telecom and Mercury Communications Ltd.**
**Cost of a Three Minute Call, 1988**

| Call Type | British Telecom (pence) | Mercury 2100 (pence) | Mercury 2200 (pence) |
|---|---|---|---|
| Local | | | |
| Peak | 13.1 | 9.7 | 29.2 |
| Standard | 8.8 | 7.3 | 22.4 |
| Cheap | 4.4 | 3.8 | 7.5 |
| National "a" | | | |
| Peak | 35.2 | 27.2 | 29.2 |
| Standard | 26.4 | 20.9 | 22.4 |
| Cheap | 8.8 | 7.5 | 7.5 |
| National "b" | | | |
| Peak | 44.0 | 30.5 | 33.5 |
| Standard | 35.2 | 23.2 | 25.4 |
| Cheap | 17.6 | 12.0 | 11.3 |
| National "b1" | | | |
| Peak | 35.2 | 30.5 | 33.5 |
| Standard | 26.4 | 23.2 | 25.4 |
| Cheap | 13.2 | 12.0 | 11.3 |

Source: Data supplied by the UK Office of Telecommunications, 1988.

Table II-2

**AT&T International Message Toll Service Development**
**Calls and Minutes, 1975-84**
**(Average Annual Growth)**

| Country | Calls % | Minutes % |
|---|---|---|
| Austria | 30 | 30 |
| Belgium | 19 | 17 |
| Denmark | 28 | 27 |
| Finland | 32 | 33 |
| France | 20 | 20 |
| Germany | 24 | 24 |
| Greece | 17 | 18 |
| Ireland | 27 | 26 |
| Italy | 23 | 22 |
| Luxembourg | 19 | 20 |
| Netherlands | 22 | 22 |
| Norway | 29 | 26 |
| Portugal | 32 | 33 |
| Spain | 20 | 20 |
| Sweden | 31 | 30 |
| Switzerland | 28 | 24 |
| Turkey | 48 | 46 |
| United Kingdom | 26 | 24 |

Note: Includes calls originating and terminating in the US.
Source: FCC, Statistics on Common Carriers, 1986.

## Appendix II.B

## METHODOLOGY

This appendix describes the analysis of OECD country structural changes in telecommunication service tariffs for selected services over the period 1980-87. Given the limited objectives and duration of this study, it was necessary to obtain a consistent dataset of charges for services which met the following criteria:

-- Coverage of a reasonable number of OECD countries;

-- Coverage of the 1980/87 time period;

-- Consistency in calculation of charges;

-- Calculation of elements of service costs within major service categories, e.g., local, trunk, international, and by distance.

Logica UK Ltd. provided a complete set of update and current issues of its Tarifica: Western Europe Telecommunications Information Service which covers 17 European countries and the United States (international services only). Charges for services are reported on a cost per minute/cost per month basis. In the case of cost per minute usage charges, these data cannot be used to determine costs for multiple minutes of use. The underlying tariff data were not provided by Logica and were not used in this study. In the case of costs per month, in some instances, these have been averaged by Logica.

Thus, these data can not be combined with usage data to develop profiles of charges to "typical users". However the models (described below) can be modified to accept actual tariff data and to generate results showing patterns of change for different levels and combinations of service use. These models could serve as the basis for a future study.

The telecommunication services used are:

-- Telephone: connection and rental charges, inland dialled call charges, international dialled call charges;

-- Telex: connection and rental charges, usage charges for inland calls, usage charges for international calls;

-- Voice band private circuits: charges for normal quality inland 2-wire circuits, charges for normal quality international circuits (CEPT coefficient 0.75);

-- Narrow band private circuits: charges for inland circuits (50 baud, 2-wire), charges for international circuits (50 baud, country end);

-- Wide band private circuits: charges for inland groups (48 KHz), charges for international groups (48 KHz).

Tarifica data are reported in national currencies (current prices) in each update in a country series. Although it is possible to convert these data using OECD exchange rates/PPPs, this has not been done to discourage any temptation to use this study to examine changes in the relative level of prices for services among countries. The focus of this study is on patterns of rate restructuring (direction and magnitude). Future work could develop internationally comparable data rather than static "snap-shots" of service prices.

The determination of service charges (as reported by Logica) for each of the years 1980-87 relied on several "rules of thumb". Tarifica does not provide regular updates for each service in every country throughout the period. Therefore the following procedure has been used:

> All tariff updates from November 1979 to January 1988 for each service class and country were examined to determine the charge in effect for the longest time period within any given year. A record has been kept of each of the Tarifica updates used by service, by country.

For example, in some cases the data included in the study reflect tariffs in effect for a full year (or more), in others for only several months (generally six months or longer). This method has the advantage of avoiding the need to average charges reported at different current price levels within a year. It has the disadvantage that it fails to reflect significant changes within a year. A check of the data has revealed that most increases/decreases in costs occurring within a year have been captured in the preceding/following year. As this study covers a seven year period, overall trends are captured.

In cases where anomalies in reported data have been found, they have been checked with the Tarifica update in the preceding and subsequent issue. Data on discounts (except for time of day) and/or multipliers applied to charges for use of the same service for different applications have not been included in this study. Details on additional charges and the components of charges reported by Tarifica can be made available.

Charges for services are reported in current prices and constant prices (1980=base year). OECD price indices (Gross Domestic Product) in OECD National Accounts have been used for 1980-86 to convert current to constant prices. For 1987, the price indices have been estimated using OECD indices for 1986 and growth rates drawn from the OECD Economic Outlook, May 1988. For consistency, the above method has been used. However, it should be noted that the OECD indices for some countries are based on GNP and different base years.

The results using OECD indices for private final consumption expenditure have been calculated for telephone service. The results are not reported as departures from results obtained using the GDP-based indices were consistent.

Models were constructed by country and by service to calculate percentage and actual changes in current and constant prices. The main report for this study includes the summary results. The underlying data and calculations are available and provide for each country, by service:

-- Charges by year, current prices;
-- Charges by year, constant prices;
-- Changes in charges by year, constant prices;
-- Percentage changes in charges by year, constant prices;
-- Charge details by year for different tariff categories (distance parameter);
-- Charge details by year for international services to 18 countries;
-- 1980-87 percentage changes and average annual growth rates in current and constant prices.

The country/service models are simple and could be updated with the same data source or to develop trends using actual tariff and usage data.

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40. For Norway, at the beginning of 1980 the price quoted by Tarifica per minute (Local, off peak) was 0.31 NKr. The price at the end of 1987 was 1.00 NKr with a resulting increase in current prices of 225.7 per cent. The Norwegian Delegation to OECD using alternative data sources indicates a price increase of 49.3 per cent. Similarly, the Swedish Delegation notes that if additional assumptions are introduced into the calculations, results may differ from those obtained. For example, if the average length of call is taken into consideration together with call distribution, the changes in the cost of telephone service components can be altered. Thus in Table 7, the Swedish Delegation suggests that Highest Charges for local calls, where the average call length is assumed to be 4.5 minutes and the lengths of call are exponentially distributed, the price increase is +100 per cent rather than the 111.1 per cent as reported in Table 7. Similarly calls up to 45 km experienced a change of +83.3 per cent using the Swedish methodology and +125 per cent using the methodology adopted for this report. Discrepancies of this nature are inevitable where different assumptions and data are used. The central point for the purpose of this report, is that data and assumptions used are consistent and valid as one of several possible methods of examining the direction and general magnitude of price changes. In the case of Sweden the direction of change is altered in only one case in

Table 7. Table 7 gives the change in lowest charges for calls up to 45 Km as 15.0 per cent over the period. Sweden calculates a decrease of 4.2 per cent. Differences in current price calculations would also affect calculations in constant prices.

41. For Norway, in Table 12, at the beginning of 1980 the rate for telex usage was 0.15 NKr, in 1987 it was 1.48 NKr, resulting in a current price increase of 866.6 per cent. The Norwegian Delegation to OECD using alternative data sources indicates a price increase of 54.5 per cent. Although data are not supplied by the Logica database, Table 11 changes in Telex Installation and Rental charges for Sweden are as follows: (current prices -- Installation 0.0%, Rental +25.0%); (constant prices -- Installation -40.8%, Rental -26.0%).

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