

Please cite this paper as:

OECD (1994-06-01), "International Telecommunication Tariffs: Charging Practices and Procedures", *OECD Digital Economy Papers*, No. 6, OECD Publishing, Paris.  
<http://dx.doi.org/10.1787/237657648538>



OECD Digital Economy Papers No. 6

# International Telecommunication Tariffs

CHARGING PRACTICES AND PROCEDURES

OECD

INFORMATION COMPUTER COMMUNICATIONS  
POLICY

34

**INTERNATIONAL  
TELECOMMUNICATION  
TARIFFS:**

Charging Practices  
and Procedures

OECD



OCDE

PARIS



**INFORMATION COMPUTER COMMUNICATIONS  
POLICY**

**34**

**INTERNATIONAL  
TELECOMMUNICATION  
TARIFFS:**

Charging Practices  
and Procedures

# ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

Pursuant to Article 1 of the Convention signed in Paris on 14th December 1960, and which came into force on 30th September 1961, the Organisation for Economic Co-operation and Development (OECD) shall promote policies designed:

- to achieve the highest sustainable economic growth and employment and a rising standard of living in Member countries, while maintaining financial stability, and thus to contribute to the development of the world economy;
- to contribute to sound economic expansion in Member as well as non-member countries in the process of economic development; and
- to contribute to the expansion of world trade on a multilateral, non-discriminatory basis in accordance with international obligations.

The original Member countries of the OECD are Austria, Belgium, Canada, Denmark, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. The following countries became Members subsequently through accession at the dates indicated hereafter: Japan (28th April 1964), Finland (28th January 1969), Australia (7th June 1971), New Zealand (29th May 1973) and Mexico (18th May 1994). The Commission of the European Communities takes part in the work of the OECD (Article 13 of the OECD Convention).

Publié en français sous le titre :

TARIFS DES TÉLÉCOMMUNICATIONS INTERNATIONALES :  
PRATIQUES ET PROCÉDURES DE TAXATION

© OECD 1994

Applications for permission to reproduce or translate all or part of this  
publication should be made to:

Head of Publications Service, OECD  
2, rue André-Pascal, 75775 PARIS CEDEX 16, France

## FOREWORD

The issue of international telecommunications tariffication, and the charging and accounting practices followed by Public Telecommunications Operators, has been prominent in recent years. This report examines the economic underpinnings of the present system of charging and accounting practices and discusses normative principles on which the system should be based. The report was derestricted by the Committee on Information, Computer and Communications Policy in March 1992 and is published on the responsibility of the Secretary-General of the OECD.

The report was prepared by Professor Leonard Waverman (University of Toronto) and Dimitri Ypsilanti (OECD Secretariat). A number of adjustments have been made in international telecommunication pricing since the drafting of the report, which is correct as of March 1992.



## TABLE OF CONTENTS

Summary .....	9
I. Introduction .....	10
II. The Administrative and Legal Framework .....	12
1. The International Telecommunication Convention .....	12
2. CCITT recommendations .....	14
3. TEUREM .....	15
4. US-Canada .....	18
5. US-Mexico .....	19
6. Commonwealth schemes .....	19
7. Intra-country schemes .....	19
8. Settlement of accounts .....	20
III. Pricing Principles in Telecommunications .....	22
1. Pricing principles in general .....	22
2. Pricing principles for telecommunications .....	23
IV. International Telecommunication Pricing: Structure and trends .....	28
1. Prices and the general cost structure of international telecommunications .....	28
2. The level and differences in international prices .....	31
3. Revenue settlement balances and their trends .....	35



V.	An Assessment of the International Collection Charges and the Bilateral Accounting Rate System .....	41
1.	Principles of the bilateral accounting rate system .....	41
2.	Why are some collection rates below half the accounting rate? ..	47
3.	The impact of proportionate return .....	48
4.	Profits on outbound and inbound minutes .....	49
5.	Exports, imports and discrimination .....	50
6.	Does discrimination in international calling represent efficient pricing? .....	51
7.	Are West European-US collection rates efficient? .....	54
8.	Pricing principles for international telecommunications and the means to achieve them .....	57
9.	Competition .....	60
10.	A new rules based system: termination fees .....	64
11.	Similarity of a termination fee system to other existing systems ..	67
12.	Peak/off-peak rates .....	67
VI.	The Impact of Structural Changes on International Telecommunications Markets .....	70
1.	Network developments .....	70
2.	Satellite developments .....	72
3.	International telecommunication competition and liberalisation ..	73
VII.	Developing Country Issues .....	77
1.	Cost differentials .....	78
VIII.	Considerations for Reform .....	80
1.	The need for change .....	85
	Annex .....	87
	Notes and references .....	108
	Bibliography .....	114

## List of Tables

1.	Income from the telephone service, percentage distribution, OECD Member countries, 1989 . . . . .	88
2.	International message telephone service of the continental United States, 1989 . . . . .	89
3.	Tariff zones for international PSTN (as of end 1990) . . . . .	90
4a.	International dialled call charges, 1980-87 . . . . .	92
4b.	Time series trends in international call tariffs . . . . .	92
5.	Comparison with the change of inland charges, 1980-90 . . . . .	93
6.	Peak rate international telephone calls between OECD Member countries . . . . .	94
7.	Cheap rate international telephone calls between OECD Member countries . . . . .	95
8.	International telephone service, outgoing and terminating minutes and net settlements with the United States, 1989 . . . . .	96
9.	Growth in outgoing international traffic . . . . .	97
10.	Outgoing international telephone traffic as percentage of total traffic . . . . .	98
11a.	Swedish balance of payments deficit for international telecommunications settlements . . . . .	98
11b.	OTC Australia: Balance in international telephone service . . . . .	99
11c.	Switzerland: Net balance of international telephone traffic . . . . .	99
11d.	British Telecom (UK) . . . . .	100
11e.	Luxembourg: Balance of international traffic . . . . .	100

11f.	Japan: International telephone traffic and the balance of payment .....	101
12.	US Net Settlements 1989: Examples of sensitivity of deficit to change in accounting rate .....	101
13.	1988 AT&T Tariffs -- Dial Service .....	102
14.	Reimbursement for some AT&T inward calls .....	102
15.	Accounting Rate Index for US/Europe Relations, February 1991	103
16.	Comparison of intra-European and AT&T/Europe accounting rate .....	103
17.	Accounting rates: United States with OECD countries .....	104
18.	Gap between collection charges and accounting rates for international telephone service between OECD countries and the US, 1990 .....	105
19.	US/Germany Collection Rates .....	106
20.	AT&T Average Revenue .....	106
21.	Planned transoceanic cable developments .....	107

## SUMMARY

This study examines the present system of charging practices and procedures for international telecommunication services using the public switched network, the economic underpinnings of this system, and normative pricing principles on which the system should be based. The report recognises that the accounting rate system has facilitated the international payments procedure through simplification and uniformity, but does not view the system as being appropriate to a period of rapid technological and cost changes, and increasing service competition.

There is a wide range of systems for charging and settling for inter-country telecommunications services. The most common is the bilaterally negotiated accounting rate system, which is the least flexible system, and most in need of reform. However, Europe and the Mediterranean Basin countries, Canada-USA and USA-Mexico use different systems.

The bilateral accounting rate system results in discriminatory rates and can restrict the ability of efficient carriers to lower collection charges. Analyses of demand elasticities, at least between the United States and Europe suggest that existing rates are not optimal, European rates being relatively too high. Over the last year a positive trend has emerged towards both implementing changes in existing international recommendations, and lowering collection charges and accounting rates; this has recently occurred, for example, in intra-European rates.

The study concludes that the present system is inefficient and results in consumer welfare losses, is discriminatory, introduces economic distortions, and is not conducive to the introduction of international competition in telecommunication services where cost-related pricing is a requirement. It is recommended that the existing system of international accounting rates and settlement procedures for public switched telecommunication services be reformed. It is recognised that reform is conditioned on the requirement in many countries to rebalance telecommunication pricing structures, and that the level of maturity of the telecommunication infrastructure may limit the rate at which some economies, especially developing economies, are able to implement reform.

## I. INTRODUCTION

Traditionally, telecommunication administrations have been monopolies with the responsibility for delivering and switching domestic telecommunications traffic. In most cases these administrations (or other monopoly carriers) have had responsibility for handling international communications. The provision of an international telephone call requires the interconnection of the domestic network of the country where the call originates, through an international exchange to an international line and, through another international exchange, to the domestic network of the country where the call is terminating. In effect, existing regulatory structures have excluded foreign carriers from carrying traffic directly to end users.

As a result it has been necessary for carriers of international traffic to reach agreement with carriers in call-terminating countries in order to ensure end-to-end connectivity, resulting in a structure where there is joint provision of international telecommunication services and transmission of traffic. Such agreements have had necessarily to include tariffication and revenue distribution issues. In many cases, as international transmission facilities were constructed, there was joint ownership, operation and maintenance of a facility (e.g. transatlantic cable systems). In a number of cases agreements also had to be concluded with countries through which traffic transits.

The development of the system of joint provision of international telecommunication services reflected the prevailing domestic monopoly market structures. Changes in national telecommunication market structures in a number of OECD countries, the introduction of competing international operators in certain countries, and the introduction of competition in the provision of a number of services, nationally and internationally, are making it necessary to review existing international arrangements in order to reflect emerging market structures and conditions.

The aim of the present report is to provide an analysis of international telecommunication tariffs, examine issues raised by the present system of international tariffication practices and procedures and the efficiency of these, and

to provide policy recommendations on the economic principles which could form the basis of an international telecommunication tariffication system.

The existing framework is clearly important in that it is concerned with a sub-activity of telecommunication services where total revenues accounted for approximately \$35 - \$40 billion in 1991, where growth potential is high, and which has strong indirect implications for total telecommunications revenue amounting to approximately \$300 billion in the OECD area. International telecommunication pricing structures also have important implications for national telecommunication sectors given that revenues from international calls have been viewed as a means of cross-subsidising domestic calls. International telecommunication services also have longer-run structural implications for operation and management of transnational enterprises. Telecommunications have become an important factor in the production of goods and services and in their global distribution, consequently the price of telecommunications is having a relatively greater impact on enterprises carrying out their international activities, in their decisions on geographic location of their activities, and in trading of their services.

There are a number of other reasons why changes in international charging practices and procedures may be required:

- prices are important in providing the correct market signals to suppliers and users;
- price distortions can also distort the volume and pattern of trade;
- prices can impact on access to services;
- the evolution of international competition in telecommunications will depend on the existence of efficient price structures.

As OECD countries shift toward market-based telecommunication structures, price competition, and therefore pricing frameworks, will become more crucial in ensuring a fair and non-discriminatory market structure. One of the corner-stones in the liberalisation of international trade in telecommunication network-based services will be the pricing structure. Already there are indications that existing practices are penalising global efficiency in the provision of international telecommunication services and are constraining access. International telecommunications traffic is also the source of a growing invisible trade imbalance in several countries, which has also led to more focus being placed on charging and accounting practices.

A number of misconceptions have arisen in the examination of international charging and accounting practices, especially in public discussions and in more specialised debates. It is important for all involved parties that the debate on this issue is more balanced, factual and analytic.

## **II. THE ADMINISTRATIVE AND LEGAL FRAMEWORK**

The provision of international telecommunication services has resulted from co-operation between public telecommunication operators who have entered into bilateral operating agreements specifying the services to be provided and their conditions. These operating agreements have been based on the framework set down by the International Telecommunication Convention, its Regulations and the relevant Recommendations of the International Telegraph and Telephone Consultative Committee (CCITT). One of the main goals in establishing the International Telecommunication Regulations is, as noted in Article 1, to facilitate the:

"...efficient operation of technical facilities, as well as the efficiency, usefulness and availability to the public of international telecommunication services."

### **1. The International Telecommunication Convention**

The International Telecommunication Convention and the International Telecommunication Regulations set-up under this convention have the status of an international treaty binding on governments. They set down the basic framework and principles for international telecommunication pricing and payments procedures<sup>1</sup>. With 164 International Telecommunication Union (ITU) members in 1991 the principles and guidelines for pricing and settlements are necessarily general and must allow for most contingencies.

According to article 29 of the International Telecommunication Convention:

"The settlement of international accounts shall be regarded as current transactions and shall be effected with the current international obligations of the countries concerned, in those cases where their governments have concluded arrangements on this subject. Where no such arrangements have been concluded, and in the absence of special agreements made under

Article 31, these settlements shall be effected in accordance with the Administrative Regulations."

Article 30 notes that:

"In the absence of special arrangements concluded between Members, the monetary unit to be used in the composition of accounting rates for international telecommunication services and in the establishment of international accounts shall be:

- either the monetary unit of the International Monetary Fund, or
- the gold franc, both as defined in the Administrative Regulations."<sup>2</sup>

The International Telecommunication Regulations refer to charging and accounting in Article 6 and Appendix 1. With regard to collection charges, which are the charges established and collected by a national telecommunication administration by its national customers for the use of an international telecommunication service, the Regulations recognise that:

- the level of the charge is a national matter;
- in establishing charges there should not be too great a dissymmetry between the charge applicable in each direction of the same relation<sup>3</sup>;
- charges for a given relation should be the same regardless of the route chosen by the public telecommunication operator.

The collection charge is the price of an international telephone call or other international communication and concerns the originator of the call in a particular country and the telecommunication administrator. In dealing with each other, telecommunication administrations agree on an accounting rate which is the rate agreed for a given relation and used for the establishment of international accounts.

Appendix 1 of the Regulations lays down the general provisions concerning accounting procedures. Accounting rates need to be established and revised bilaterally between administrations. Accounting rates should also take into account "trends in the cost of providing the specific telecommunication service...<sup>4</sup>". Administrations also need to agree on the division of accounting rates into shares payable to the terminal countries and into transit shares. Settlement of accounts can be in the currency chosen by the creditor in consultation with the debtor country.

The difference in international telecommunication revenue settlements between the collection charge and the accounting rate is important. The collection charge is the price of an international telephone call. The accounting rate share paid to a foreign operator can be considered as being the price of access by the operator in the country originating a call to the network of the



terminating country. There is a single accounting rate between any two points, whereas the collection charge may differ between two countries.

It is possible for substantial differences to exist between the collection charge and the accounting rate, as explained in CCITT Recommendation D. 150, Annex B (see Box 1). The relationship between the accounting rate and the collection charge cannot therefore be viewed as simply a relation between a wholesale price and a retail price. It is up to national **administrations** to negotiate accounting rates on a bilateral basis, but the Regulations note that these should take into account relevant CCITT Recommendations.<sup>5</sup>

## 2. CCITT Recommendations

Charging and accounting in international telecommunication services are covered by the CCITT D Series Recommendations.<sup>6</sup> Recommendations D.1 to D.195 cover general principles for private leased telecommunication facilities, tariff principles for data communication services, charging and accounting for international public telegram, teletex, telex, facsimile, and international telephone services.

Recommendations on tariff principles include details on charging principles to ensure that countries charge for international services in a similar way. Tariffication principles are aimed primarily at reducing the risk of tariff distortion over international routes and curtailing incentives to re-route traffic through possible transiting countries (see Box 2).

According to Recommendation D.150 (2.3.1) revenue from traffic exchanged between administrations of terminal countries should be divided on the basis of an accounting revenue division procedure. Under this procedure the norm has been to divide revenue on a 50:50 basis between two terminal countries as specified in CCITT Recommendations. Carriers also need to agree on a settlement procedure to settle accounts and to determine the value and the currency in which accounts are settled between administrations.

The 1984 Plenipotentiary Conference of the ITU recognised that a departure from the 50:50 split could be warranted taking into account different costs incurred between different countries (see also Chapter V). Subsequently Recommendation D.150 was revised to allow for sharing of accounting revenues in proportions other than 50:50 where there are differences in costs of providing and operating telecommunication services.

**Box 1. Differences between collection charges and accounting rates**

- Accounting rate is expressed in international accounting units (Special Drawing Rights or gold francs or in currency agreed bilaterally);
- Accounting rate and collection charge may be based on different traffic units;
- Value of national currencies may fluctuate relative to international accounting;
- Collection charges may be influenced by government fiscal policy.

Other procedures which may be used for the remuneration of countries of destination include:

- a flat rate price procedure, whereby the destination country is paid for the facilities it makes available on a "price per circuit" basis;
- a traffic-unit price procedure, whereby the destination country is paid on the basis of a price per traffic unit;
- a no-accounting procedure, whereby the sender keeps all revenues.

**Box 2. CCITT international tariffication principles**

- the rate for a communication between two countries shall be the same irrespective of the route used, be it direct or through a transit country;
- each country shall be considered as a single unit of area in establishing communication rates;
- there should be only one transit rate for each country which is the same for all countries;
- international accounts should be settled on a bilateral basis.

The CCITT Recommendations allow, therefore, many possibilities for rate setting and settlements and in so doing impose few constraints. A number of CCITT Recommendations exist for regional application of tariffication procedures: these include relations between countries in Africa, the TAF Group (Recommendation D.200 R), those applicable in Latin America, the TAL Group, (Recommendation D.400 R), and in Asia and Oceania, the TAS Group, (D.500 R), and for Europe and the Mediterranean Basin.

### **3. TEUREM**

The Tariff Group for Europe and the Mediterranean Basin<sup>7</sup> (TEUREM) determines remuneration of administrations on the basis of traffic units as set down in CCITT Recommendation D.300R. This Recommendation sets down the

accounting rate shares. The rates, per minute of conversation time (or charged time in some cases), are divided into three basic elements:

- the transmission part of the international network -- this is charged on the basis of 100km of international circuit at a rate of 4 gold centimes (and 2 gold centimes per 100km of circuit for direct transit);
- the switching element of the international circuit -- this is subdivided into a number of components:
- the automatic international exchange in the country of origin at a rate of 18 gold centimes;
- the automatic international exchange in the country of destination at a rate of 11 gold centimes;
- the automatic international transit exchange (for switched transit where relevant) at a rate of 16 gold centimes.
- the costs of the extension of calls over the national network at a maximum rate of 40 gold centimes for outgoing traffic and 35 gold centimes for incoming traffic.

From 1 January 1992 revised TEUREM arrangements are being applied by Administrations (only the former USSR and Tunisia indicated that they will not apply the new arrangements). In addition a draft revision of Recommendation D.300R will be provided to the CCITT in 1992 for acceptance. On the basis of arrangements in place before 1992 the rates, per minute of conversation time (or charged time in some cases), are divided into three basic elements:

Share of country of origin		Share of Country of termination	
National extension:	0.131 SDR	National extension:	0.114 SDR
International exchange:	0.059	International exchange:	0.036
International transmission: (400 km)	0.024	International transmission: (500 km)	0.030
Accounting share:	0.214	Accounting share:	0.180
Accounting rate: $0.214+0.180=0.395$ SDR			

Following changes at the beginning of 1992 the accounting rate would be:  $0.1566 + 0.1620 = 0.3186$  SDR.

Source: France Telecom.

According to TEUREM national network costs need to take into consideration the number of national exchanges through which a call is routed, the length of the national circuit, cost per minute of use of a national exchange and other costs. The Recommendation states that, in principle, collection charges should be equivalent in national currency to the accounting rate, but if:

"an Administration wishes to fix a collection charge at a higher or lower amount than the direct equivalent of the accounting rate, this Administration may apply a multiplication factor K. This factor K should not be more than 1.8 when applied to the total accounting rate in the relation concerned" (3.3.1 of D.300R).

It is stressed that the factor K is a maximum which should not be applied automatically and that efforts should be made to avoid a too large dissymmetry between collection charges applicable in each direction. It is also noted that it is generally desirable that national charging zones should be reduced to a minimum and that as "a general rule in services between non-adjacent countries, each country should constitute one single zone (2.2 of D.300R). The revised draft of D.300R sets down different criteria for the determination of terminal shares for incoming traffic. It proposes rates of remuneration which correspond to three different rates of network digitalisation: 0-30 per cent; 31-60 per cent; 61-100 per cent. Digitalisation will be determined on the basis of the international link for transmission, the international exchange and the national extension for transmission. This proposal (scheduled to be implemented as of 1 January 1993) is aimed at recognising that national costs for terminating traffic can differ according to the dominant technology in use. The draft of the revised text of D.300R (which has been approved) has eliminated the notion that collection charges should be set as some factor "K" of accounting rates. As well, it is envisaged that only the share of accounting rates to terminating and transit countries will be determined, while for call originating countries this share will be covered by the collection charge. In addition a first reduction the telephone accounting rate shares of about 10 per cent is to be implemented as from 1 January 1992.

TEUREM charges are based on cost studies which are periodically reviewed. For simplicity a large amount of averaging of costs also takes place. In theory call prices should be the same irrespective of the direction of the call and all prices should be a similar proportion relative to distance. In practice, because of differences in the use of the K factor, in the amount and extent of price adjustment, and in the degree to which CCITT Recommendations are applied, price differences exist for similar relations and equivalent distances. TEUREM procedures recognise that outgoing calling is more expensive than handling incoming traffic, in contrast to the practice of using a 50:50 split in accounting revenues for intercontinental calls.

In certain cases TEUREM countries also may agree not to settle their accounts. This may occur when the balance of settlements is usually negligible, traffic is nearly the same in both directions and the national extension (the service portion taking place within a country) is approximately equal, and occurs for frontier calls where the sender keeps all revenues.

The principles used in TEUREM are quite different from the "normal" process of individual country setting of collection rates and a **bilateral** negotiated accounting rate. The salient features of the TEUREM procedure are:

- the rates are established in a multilateral bargaining framework;
- accounting rates are distance related; flat rate settlements for termination or transit are cost based;
- there is a maximum recommended differential between collection and accounting rates;

As a result of these multilateral rules in TEUREM, certain basic principles are evident:

- no country discriminates against another country in settlements, i.e. distance or cost related accounting rates do not take into account demand elasticities;
- a single country receives, in principle, the same accounting amount for terminating a call from two different countries when that call is of the same distance;
- a single country then receives the same net amount for termination costs irrespective of the direction of the incoming call;
- there is a clear attempt to base termination charges on costs;
- distinctions between the costs of incoming and outgoing calls are noted.

#### 4. United States - Canada

Collection charges between the United States and Canada are set in Canada by Telecom Canada (now Stentor) and in the United States by AT&T, MCI, US Sprint or other providers of message telephone services. Collection charges are distance related and no zones exist. Accounting rates are established by bilateral agreements. Peak and off-peak rates exist. Prior to 1986, AT&T and Telecom Canada shared revenues (51.74 per cent to the latter) based on a late 1970s costing study. Currently, Telecom Canada and US long distance carriers use a US\$0.28 peak and US\$0.24 off-peak accounting rate (see Stern, 1990).

## 5. United States - Mexico

Between the United States and Mexico, settlements are based on distance from the United States Mexico border, and are thus *not* divided 50:50. The average US call travels 2 400 km south of the border, the average, Mexican call 1 100-1 300 km north, so that settlements end up at near three times the rate south as north (see Bernard, 1990). Thus, distance sensitive settlements exist and are important.

## 6. Commonwealth schemes

Prior to 1973, various settlement schemes existed for intra-British Commonwealth traffic (see Stern, 1990). The Commonwealth Wayleave Schemes (1948-1973) attempted to allocate joint revenues in relation to expenses. The schemes were complex and designed to maximise use of the Commonwealth network at the expense of other facilities. The Commonwealth Telecommunications Facilities Arrangements (CTFA) were also a form of cost recovery requiring "detailed calculations both of usage on a stream by stream basis according to units of traffic and of incurred unit costs (such as maintenance, depreciation, rental and administrative costs of each separate segment" (Stern, 1990, p.13). The scheme was "complex ... costly to administer. It did not always give the expected results and the final settlements could not be calculated until each and every partner had submitted its reconciled and audited accounts..."

## 7. Intra-country schemes

### a) *Canada*

Within Canada ten geographically distinct telecommunications entities exist, each responsible for access, local and toll calls within their jurisdiction. The provision of inter-jurisdictional toll calls is under the planning and the Revenue Settlement Plan (RSP) of Telecom Canada. Inter-jurisdictional collection charges are set by Telecom Canada, are distance related, and symmetric between any two points. The RSP attempts to reimburse a jurisdiction's expenses and is not accounting rate based; it is multi-jurisdictional and is not discriminatory (in the sense that a jurisdiction receives the same termination costs irrespective of which jurisdiction originates the call).

Teleglobe Canada, a monopoly, is the provider of international telecommunications (outside of Canada-US calls) and pays Telecom Canada a fixed amount per minute of incoming or outgoing international message telephone service for "billing and operator services, local access and line haul to and from Teleglobe's gateways" (Stern, 1990, p.18). Teleglobe has three gateways (Toronto, Montreal, Vancouver) and, given Canada's geographic size, the fixed amount paid by Teleglobe to Telecom Canada, is likely to contain substantial price discrimination against calls made from the gateways. Teleglobe negotiates accounting rates with foreign jurisdictions on a bilateral basis and sets collection rates in Canada subject to rate of return regulation by the CRTC.

*b) United States*

Since the divestiture of AT&T and the earlier entry of competitive toll carriers, a means of "revenue settlement" in the United States had to be established. The Federal Communications Commission (FCC) response has been an attempt to set an access fee and collect all non-traffic sensitive costs in a lump sum. This has not been fully put into practice, thus toll carriers "settle" with local access firms. In 1989 long distance carriers paid 13 cents per minute for access to local companies (see FCC, 7 August 1990, footnote 24, p.4954).

**8. Settlement of accounts**

In the context of the accounting and settlement process for international traffic, depending on the relation, eight to ten months may elapse between the time that payables and receivables are first recorded and the time that accounts with foreign administrations are settled. In all instances only the net payments are exchanged. Separate settlements are conducted for each identifiable service, such as telephony, telex and telegraph. In the case of TEUREM, settlement of accounts is undertaken for all members, taking into account traffic flows throughout the area and determining the settlement of each country, so that only the net payments/receipts are distributed.

The currency for settlement may, and often does, vary from the denomination used to specify the accounting rate. The settlement process subjects international carriers to currency gains and losses from: i) revenue variations arising from the differences between actual exchange rates at the time the company records its revenue and the exchange rates used in the company's financial forecasts; ii) unrealised gains and losses resulting from the monthly revaluation of its net accounts payable to foreign administrations; and iii) gains and losses realised upon the final settlement of accounts with foreign

administrations. Currency fluctuations can be important; for example, in Australia OTCs payments to overseas operators for telex and telephone services were reduced by \$A 14.7 million during 1988/89 because of the appreciation of the Australian dollar. Procedures to reduce risks of currency fluctuations have been introduced by CEPT member countries, and a decision by the European Commission to use ecus rather than SDRs in the exchange of accounts is also aimed at eliminating dollar fluctuations. Teleglobe Canada Inc. introduced a Rate Stabilisation Account effective 1 January 1988 to smooth out income changes attributable to currency fluctuations.



### III. PRICING PRINCIPLES IN TELECOMMUNICATIONS

#### 1. Pricing principles in general

##### *a) Economic efficiency and marginal cost pricing*

In general, prices established in an industry or by a firm are evaluated according to their relationship with the underlying costs of production or service. If the industry is competitive and populated by a number of firms each with minimal scale economies in providing service, then the process of competition will lead to prices equal to the marginal costs of production.<sup>8</sup> Marginal costs should not be considered as some abstract, unmeasurable value but as the unavoidable costs to the firm of producing units of output. Numerous authors have shown that this equilibrium condition in a competitive market has a number of important properties. "Marginal cost" represents the value of the resources devoted to production and to a buyer, the "price" the valuation is at the margin of the service. Therefore, "price equals marginal cost" represents the equation of the implicit personal valuation to the costs to society of producing the service, a natural principle not only for equilibrium but for welfare. Where two different services are produced each under competitive conditions and with no scale economies, and priced at marginal cost, it is not possible to redirect resource flows from one service to another without reducing at least one person's welfare. Hence, the "pareto optimality" welfare rule of competition and the "price equals marginal cost" rule. This pricing rule provides a concise statement of an efficiency (and of a welfare or an equity) principle.

##### *b) Deviations from marginal cost pricing: price discrimination*

If the assumption of perfect competition is relaxed, but the assumption of the absence of scale economies is retained, then market prices no longer need equal marginal cost. If firms have some form of market power then deviations in price from marginal cost can occur.<sup>9</sup> In particular, such a firm need not price each consumer the same, i.e. price discrimination becomes possible. Price discrimination occurs when the difference in prices charged to two consumers,

X and Y, for the same service is not equal to the difference in costs of serving the two. It is also important to observe the corollary that charging customers identical prices when the cost of serving them differs is also price discrimination and no different from the previous case. Price discrimination cannot exist in our original competitive industry since some firm would enter and arbitrage the difference in prices away (as these are not equal to costs of producing and serving the customers).

Price discrimination involves the ability of the producer to charge more to certain customers and thus must be accompanied by the ability to separate markets and prevent arbitrage. If two sets of customers differ in their evaluation of the product, that is in their need for the product or more precisely in their elasticity of demand, a producer could take advantage of these differences to increase profits. The producer would then charge more to the set of customers whose demand was relatively inelastic. Such price discrimination is inefficient and welfare reducing.

There are thus "simple" tests<sup>10</sup> to determine whether an industry is competitive and efficient -- do prices equal marginal cost, or its antithesis; are there profits in excess of the normal return to capital? Is there evidence of price discrimination? Unfortunately these simple tests do not hold when the other assumption is relaxed -- the absence of economies of scale.

Before turning to examining pricing rules in the presence of scale economies, it is important to recognise that when price equals marginal cost:

- no customer (or group of customers) is being *subsidised* by another customer (or group of customers);
- no customer receives any benefit from *by-passing* the service and producing his own service, i.e. costs (prices) cannot be reduced by supplying one's own service;
- no customer is being *discriminated* against.

These are the three essential properties of *efficient* pricing.

## 2. Pricing principles for telecommunications

### a) *Cost based pricing in the presence of scale economies*

Figure 1 provides a simplified view of a firm where scale economies in production are large relative to market demand. In this case, pricing at marginal costs will not allow the firm to break even since marginal cost is below average cost.

There are various means for the firm to break even, it could charge an average price or charge different prices to different sets of customers. It has been shown (Ramsey, 1927)<sup>11</sup> that average cost pricing (i.e. raising the price that would be charged at price equals marginal cost equally to all customers) is not generally the best (i.e. welfare maximising) means of pricing. Instead, in the presence of scale economies such as in Figure 1, the firm would do better by *discriminating* between sets of customers, charging proportionately more to those groups whose demand is less elastic (i.e. they "value the service more"). Therefore, price discrimination of a specific type becomes a useful pricing device. Note that prices are not equal to costs but are related to cost, the relationship depending on elasticities of demand.<sup>12</sup>

### *b) Cost-based pricing in telecommunications*

The general discussion above must be made more specific for the industry being discussed -- telecommunications. Here, the service can be disaggregated into several components -- access, incoming calls and outgoing calls -- local, domestic long distance message telephone service (MTS),<sup>13</sup> and international message telephone service (IMTS). Access refers to the cost of the individual subscriber's connection to the network. In many jurisdictions, calls within a local geographic zone are not charged by distance but the call's duration.<sup>14</sup> MTS calls are charged according to distance zones and length of time connected.

There has been much academic discussion of the degree of economies of scale in telephone networks, generally, and within the local exchange versus toll plant (see Waverman, 1989; Röller, 1990; Evans and Heckman, 1989; Charnes, *et. al*, 1988). Most observers agree that economies of scale are prevalent in the local exchange (access) but there is wide disagreement as to the degree of scale economies in toll networks or in overall telecommunications.<sup>15</sup> There is substantial agreement that costs for much of telecommunications plant, especially for access, is non-traffic sensitive (NTS). Therefore the question arises as to how to price for telecommunications services given plant that is NTS (and plant that may be used in common for a number of services), and where scale economies exist.

One solution to these problems is to utilise *Ramsey-type pricing* rules or value of service pricing, raising prices in less elastic markets so as to cover the NTS costs (or the difference between marginal and average costs in the presence of scale economies). Thus, some jurisdictions make a distinction between residential and business access charges and between toll and local calls as elasticities of demand vary between these services.

Other solutions (less popular with academic economists) are to use Fully Distributed Cost methodology (FDC) apportioning the NTS costs among services according to some FDC arbitrary rule.<sup>16</sup>

Another form of efficient pricing would be to price services at their attributable cost (or marginal cost) and price NTS costs, the costs of access, by some monthly fixed fee, independent of usage. This system of pricing will be called "cost-based".

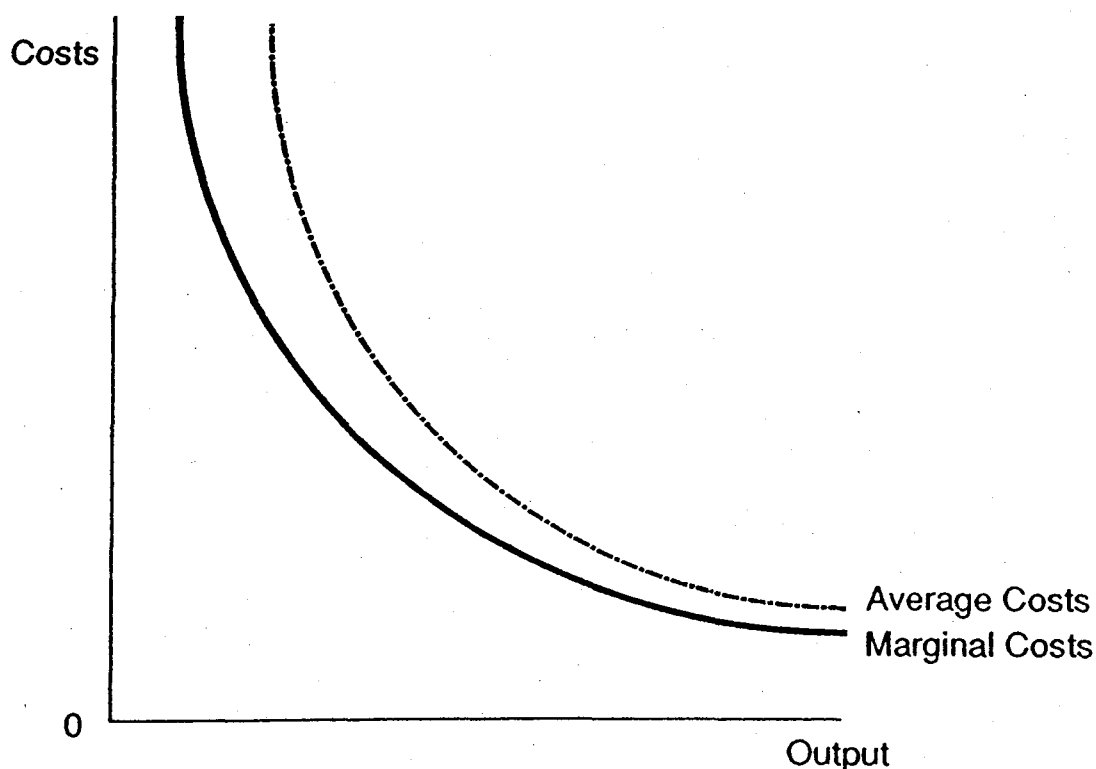
There can obviously be a distinction between the price discrimination envisioned in the Ramsey rule and the actual price discrimination in telecommunication markets. If it is observed that prices do not bear the relationship to each other that the Ramsey rule suggests (say prices are not related to demand elasticities) or if two customers with similar demand elasticities pay prices out of proportion to costs, then it can be suggested that "undue" discrimination exists.

Returning to the three principles of efficient pricing cited above, it becomes important to determine whether:

- some customers are being subsidised;
- some customers would like to bypass the system;
- some customers are being unduly discriminated against,

when a pricing mechanism is being used (Ramsey rule) which utilises price discrimination as one of its bases.

Figure 1



*c) Subsidies and cross-subsidies*

Economists have identified two pricing principles which should hold if market prices are to be "subsidy free". First, no customer should pay any less than his directly attributable costs; second, no customer or group of customers should be charged more than their stand alone costs, i.e. the costs of independently supplying their own service. When prices are subsidy free according to these two criteria, then no customer or group of customers would find it beneficial (lower cost) to bypass the system since the prices charged them are no greater than the costs if they engaged in bypass. Thus correct pricing eliminates the incentives for inefficient by-pass.

The differential contributions made by customers under a Ramsey-type rule should not be considered as cross-subsidies. A cross-subsidy exists when a customer group or service does not pay its attributable costs. The fact that NTS costs are shared in different ways does not by itself imply that one service is cross-subsidising another. If prices are set by a Ramsey-type rule, then some customers do make greater contributions, however, they are not cross-subsidising other customers. Therefore, there is no "undue" discrimination under Ramsey pricing.

*d) Charging for access*

There are significant differences in charging for the NTS costs of access between countries. The United States has moved to a system of explicitly charging for access as a separate service (the cost-based system). The Federal Communications Commission ideally would like to see access paid for in a fixed monthly subscriber fee. However, intervention in the courts and legislation has limited this approach so that some portion of the access charge is still contained in the prices of calls. Thus, a domestic long distance call within the United States contains a 13 cent payment for access to the local network.<sup>17</sup>

Other countries have different means of charging for access, preferring higher per minute charges for long distance calls and charging less for access. While this has traditionally been called a "subsidy" to local service, it is preferable to consider the practice as a means of charging for NTS costs. It is simple to show that charging for NTS via a per minute surcharge on calls is inefficient. NTS charges by definition do not vary with the number or length of calls. Therefore, charging for NTS via fees which are unrelated to the number of calls or the time length of calls is a more efficient pricing system than charging for these fixed costs in calls. Charging for NTS in calls drives a wedge between marginal costs and price and decreases demand.<sup>18</sup>

Of central focus in the latter sectors of the paper will be the issue of the pricing of international telephone calls (IMTS) when the country at each end of the call has a different domestic system for pricing for NTS costs.

*e) Externalities*

Telecommunications have another peculiarity (besides the large amount of NTS costs and the presence of scale economies at the local exchange) -- the presence of externalities in demand. An externality involves a benefit to a consumer from another consumer's consumption; this value is external to the price charged by the telecommunications suppliers. Two such externalities have been addressed in the literature -- network and call externalities.

A network externality exists when additional subscribers increase the value of an individual subscriber's access to the system. Simply put, the value of a telecommunications system consisting of one customer is zero; two customers make the value positive but a third adds much more value, etc. Thus while the penetration rate of telephones was increasing, there were clear *network externalities* by adding other subscribers.

A call externality is said to exist because in making an out-bound call a subscriber creates the potential for receiving an in-bound call, which has a zero price to that subscriber. This is similar to saying that access provides externalities because of the ability to receive zero priced incoming calls.

Other externalities of telecommunications systems are sometimes referred to as social values: an ability to call for help, contact emergency services, etc. These types of externalities are not analysed further, but network and call externalities are discussed at some length as they could prove important for the pricing of international services.

*f) Peak and off-peak pricing*

Much of the costs of a telephone system are fixed, and not variable, and are related to the level of capacity (and quality, blockage, wait-time, etc.). In addition, at a uniform price throughout the day, telephone service usage shows wide load-factor differences. Therefore, it is of interest to examine how price differentiation during the day can assist in smoothing out the load-factor and thus lower capacity needs.

It has been suggested (Acton and Mitchell, 1989) that in the North American situation peak load pricing for local calls may be uneconomic given the costs of metering and the relatively small volume of traffic which may be shifted. For domestic toll calls peak load pricing has proved to be a useful tool. Peak load pricing has been used relatively less for IMTS calls. The issue of whether differentiating IMTS prices by time of day is also efficient is discussed below.

#### **IV. INTERNATIONAL TELECOMMUNICATION PRICING: STRUCTURE AND TRENDS**

This chapter will examine international telecommunication pricing, the structure of prices, and payment trends. The issues raised here relate to the present conditions in the telecommunication industry, technologies and trends in market structures. Few, for example, would question the fact that the International Telecommunication Regulations have had considerable success in achieving a major objective of the International Telecommunication Union, that of facilitating global interconnection and interoperability of telecommunication facilities. It also needs to be stressed that in a number of cases the economic environment in which public telecommunication operators (PTOs) operate is an important factor in constraining their efficiency. This environment, for example, is one where prices are often regulated, where constraints have existed on operators in terms of their procurement of equipment, their flexibility in employment conditions and wages, the cost of capital and its rationing, the degree of integration in the provision of telecommunication services, etc. These economic environmental factors will lead to differences in the relative efficiency of providers of international telecommunication services, and in their flexibility to adjust to changing market conditions.

##### **1. Prices and the general cost structure of international telecommunications**

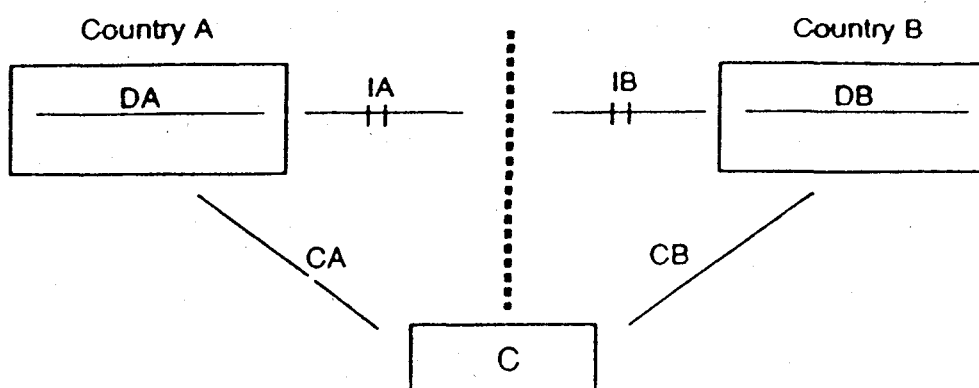
On the cost side there are several components involved in setting up and completing an international call for a public telecommunications operator. There is first the cost of the national portion of the call from the customer's terminal to the international gateway; the second cost component calls is the international transmission portion of the call; and the third cost component for international calls is the cost of access to the network of the terminating country.

Telecom facilities within country A (DA) (see Figure 2) are connected to those telecom facilities within country B (DB) by an international link (IA + IB)

owned jointly so that half the link, IA, can be said to be owned by country A (or its firm) and one half, IB, can be said to be owned by country B. There is also an indirect path between countries A and B through C, with C having similar relationships with both A and B, i.e. the line CA is jointly owned as is CB. The situation is not different, schematically, than the early stages of telephone development in many countries where independent local companies existed (A, B and C could be cities) or the situation now within the United States or within Canada. Some means must be arrived at to ensure that:

- B will allow A's calls and vice versa;
- compatibility between equipment exists;
- the jointly owned interconnecting transmission line is planned, and constructed;
- and the revenues from the ensuing calls are shared.

Figure 2



**a) Pricing structures**

The cost incurred in switching and transmitting an international call from the originating terminal to the international gateway can be considered as the major cost element for such calls; these costs include capacity costs and operating costs. The reflection of these costs in tariff schedules will vary from country to country depending on how they structure telecommunication tariffs. For some, access to the network is levied mainly through subscription charges, therefore usage charges tend to be low. In other countries the pricing philosophy favours low subscription charges (access) and higher usage charges. In this case access can be viewed as being pro-rated on the basis of use of the network. In certain cases subscription charges include a number of units of usage or subscription may also cover use of the local loop. Differences in telecommunication charging structures will have



implications for international telecommunication prices. Where subscription is high, international call charges may be lower compared to where subscription is low. This difference will be more obvious where the international operator is separated from the national operator. In such a situation the international operator needs to pay the national operator in its own country the equivalent of the usage charge for an originating call since the call originator has already paid for access through the subscription charge. The international operator can maintain lower international prices since the national portion of the international call will be cheaper than in countries where subscription is included in call prices.

Earlier work by the OECD showed that dependence on call charges (usage) for PTO income varies from 66 per cent (Denmark) to 90 per cent (Turkey). A number of PTOs obtain 40 per cent or more of income from subscription charges (the Netherlands, New Zealand, Spain, the United Kingdom). The differences among Member countries as to their relative share of income from installation charges, subscription and income from calls is evident from Table 1 (see Annex).

In terms of technological developments it should be noted that bandwidth is being increasingly viewed as a relatively low-priced commodity and that the distance factor in costs of telecommunications is being viewed by some analysts as becoming relatively minor. There is also an increasing tendency for operators to provide customised services and to price these services differently in order to meet customer requirements. It is therefore possible to envisage an evolution in pricing structures where there is a range of different prices making comparison extremely difficult.

There are a number of components in the demand for international telephony (see Box 3). These factors all play a role in determining the structure of prices, and their relative role varies by country. Different customers generate different calling patterns. Business customers tend to create a peak period demand for international services during their national business hours. Residential customers are less active in their use of international telephony than business customers. These differences mean that network utilisation tends to be uneven. Network capacity is usually put into place to meet peak demand, resulting in higher marginal costs for peak period service provision than off-peak periods for provision. Pricing on a marginal cost basis would imply that peak demand callers should pay higher prices for the marginal cost of capacity and marginal operating costs. During off-peak periods marginal cost of service provision is considered as being close to zero, implying significant price discounting relative to peak period prices. Peak periods may differ from country to country depending on their working hours, number of days worked in a week, etc.

On the basis of marginal cost pricing principles the structure of international telecommunication prices should be based on peak/off-peak pricing. It can be argued further that even during the off-peak period there is scope for further fine-tuning of prices to take into account relative differences in marginal costs,

and the introduction of three tier pricing structures. In that a large proportion of costs incurred for international telephone service are fixed, it is also in the interest of the operator to stimulate traffic during periods of low network utilisation.

**Box 3. Components of demand for international telephony**

- Type of customer
  - business
  - residential
- Type of service-- telephony
  - facsimile
  - other
- Time of day
  - time of day in originating country
  - time of day in terminating country
- Price
  - access component
  - duration charge

With the introduction of a number of new technologies and services the ability of peak period users to take advantage of off-peak prices will improve. With the more general introduction of voice messaging services, international E-mail, delayed fax transmission, delayed file transmission, etc., which can take advantage of lower prices and differences in time-zones, there will be some smoothing in capacity utilisation. By implication price structures may need ultimately to change.

## **2. The level and differences in international prices**

International communications are undertaken for a number of reasons. The direction of calls, their frequency and duration are a function of a variety of factors. These include the degree and pattern of internationalisation of manufacturing and service activities, international trade in these activities, and the pattern of international location of subsidiaries. It also reflects the pattern of international migration, the development of domestic telecommunication infrastructures, and national levels of disposable income. The price of

international calls, although important, is not the sole factor in determining direction, frequency and duration of calls.

Some operators with low prices claim that call duration patterns indicate that a large number of incoming business and residential calls from high price countries are the "call me back" type. This evidence is premised on a large percentage of international calls being between parties which are linked (intra-corporate, intra-family). The data based on an examination of the average number of minutes per call for calls originating in the United States with OECD countries, and the average number of minutes per call terminating in the United States from those countries is mixed (Table 2). The average number of minutes per call terminating in the United States from some high-priced countries is higher than for calls in the other direction. In terms of the number of messages, the United States originates more messages with most OECD countries; the exceptions are the Netherlands, Sweden, the United States and New Zealand. Price is not the only criteria in the demand equation: general business considerations are important -- the United States originated 85 million messages with the United Kingdom in 1989 and 27 million with France. Business relations are obviously the primary factor. Other considerations are also important: speed in business relations accounts for the success of facsimile messaging despite the relatively high cost of sending some documentation by fax or using fax as a substitute for telephony.

The ultimate aim of a pricing regime should be to lead to an efficient resource allocation so that administrations should set prices which yield the maximum benefit to consumers, as argued in Chapter III. In view of this, the present system involves a welfare loss to OECD economies by its perverse pricing pattern which places the largest mark-up on international long-distance calls, probably the most price elastic of calls.

In the past, international charges have been high in most countries and with domestic long-distance services, have provided a revenue source to cross-subsidise local telephone services.<sup>19</sup> It is not surprising therefore that prices for international switched telephone services have exceeded costs, at times by considerable margins, since this has often been the stated aim of government policy. In that in a number of countries' national call charges, especially local call charges have been kept low because of cross-subsidies from international call revenues, it is not entirely correct to view high international prices as generating "profits". Nevertheless, by distorting market signals, the call charging practices lead to inefficient resource allocation within the telecommunications service sector, create inefficiencies among firms in manufacturing and service sectors using telecommunications, and disturb calling patterns and practices.

Discussions on costs have not resolved in a satisfactory way how to allocate costs of local calls and long-distance calls on the local loop. Nevertheless, it must be recognised that long-distance does impose some costs on the local loop and as

such some costs must be assigned to these calls. It is then not acceptable to view long-distance charges, and especially international charges, as including only gateway costs and national transmission charges. They need to take into account their share of local network costs. Different national perceptions in cost-allocation may create a problem in that once differences in cost-allocation methodologies arise then differences in prices will also occur.

Although telephony can be viewed as being a homogeneous product,<sup>20</sup> there are variations in production functions (resulting for example from the use of different technologies) and differences in other economic factors resulting in dissimilar cost functions in production between public telecommunication operators. On this basis an assumption can be made that prices for a given relation may not be the same because of the distinctions in the respective economic environments. The question is to determine the extent to which differences are justifiable.

#### *a) Call zones*

An important factor affecting the structure of prices is the use of international rate-averaging. This is in two forms: prices are usually set for international call zones. European carriers identify a minimum of two call zones in Europe (see Table 3) with countries such as Denmark at the extreme having identified six zones. A number of European countries have also identified special zones in foreign countries bordering their own where lower tariff rates apply. These zones often have a close affinity, either because of language, immigrant population or political considerations. In certain cases for frontier relations a "sender keeps all procedure" is used. On the basis of TEUREM Recommendations there should in practice be a similar number of zones across Europe. Also, the CEPT agreed several years ago that intra-CEPT zones should be limited to three. In relations with non-European countries all European countries treat Canada and the United States as a special zone with lower charges than the rest of the world. There is considerable variance among European countries on how many zones the rest of the world is divided into.

In contrast to European carriers, the North American international carriers have divided Europe into a large number of pricing zones (seven in the case of Teleglobe and nine for AT&T). The trend being followed by a number of international carriers is toward eliminating zoning so that each country will be ultimately treated as a separate zone.

#### *b) National developments*

In examining international telecommunication prices a distinction needs to be drawn between the level of prices relative to costs and the structure of prices

because of cross-subsidisation. In a number of countries restructuring of telecommunication charges has taken place over the last decade, and some of these changes have been significant. Some trends in the restructuring of international tariffs are shown in Table 4.<sup>21</sup> The table shows the highest or lowest increase (decrease) in per minute charges from a given country to one of the other 17 countries. Thus for France the largest per minute increase in current prices was 9.2 per cent (for calls from France to Belgium, Denmark, Germany, Ireland, Italy, Luxembourg, the Netherlands, Spain, Switzerland and the United Kingdom), and the largest decrease was 41.2 per cent (for calls to the United States). In real terms charges for calls from Finland, France, Germany, Italy, the Netherlands, Sweden, Switzerland, and the United Kingdom to the United States experienced relatively large decreases. In some of these cases the price reductions did not alter the fact that collection charges remained relatively high. The time series trends in bilateral international call charges for a number of relations are shown in Table 4b. For certain relations the real reductions have been significant. Similar data comparing the nominal changes in the price for inland trunk calls to international calls within Europe for the period 1980 to 1990 are shown in Table 5. Users pay more, in a number of cases, for an intra-European call than the equivalent distance for a domestic long-distance call. The reduction in prices for transatlantic calls is, on average, quite significant, whereas in many cases price increases for calls to the nearest European country have been significant.

National policies and plans differ, and they consequently affect international prices in different ways: in Austria international and long-distance calls subsidise the local service and there are no plans at present to rebalance tariffs; in Spain tariffs need government approval and this process tends to be lengthy -- changes in tariffs are also set below the rate of inflation. The Government and Telefonica have put into effect a policy of rebalancing tariffs which will reduce local call subsidies by long distance tariffs and in 1991 reduce intercontinental charges by 11 per cent; Switzerland has also adopted a policy of rebalancing tariffs and reducing tariffs for international destinations. In the United Kingdom recent policy changes have resulted in international charges being included in the "price-cap" formula regulating telephone service prices. Belgium, which has had relatively high charges to North America, reduced these by 20 per cent in 1991 and introduced off-peak charges for intra-European relations. Italy, also with high-priced intercontinental charges, reduced international call charges by 20 per cent in 1991. Greece also reduced intercontinental charges by 15 per cent in 1991.

Despite the downward rate adjustments for international dialled call charges there still remains a significant imbalance in charges for calls originating in one country relative to charges for calls terminating in that country. Tables 6 and 7 indicate such imbalances for OECD countries for 1990.<sup>22</sup> Of the total bilateral collection charges between OECD countries 5 per cent are more than twice the cost of a call in the opposite direction. Another 10 per cent are 50 per cent more

than the cost of a call in the opposite direction. The discrepancies are sufficiently large so as not to be due to exchange rate differences. Despite the fact that for a number of bilateral relations there were already divergencies in collection charges, a number of countries, such as Australia, Denmark, New Zealand, Sweden and the United States, have over the last few years unilaterally reduced their international call charges. These countries have a number of bilateral partners who charge fifty per cent or more for outgoing calls into the afore-mentioned countries than the latter charge for outgoing calls.

In terms of off-peak international charges, a number of countries had not introduced such a practice by the end of 1991 (Denmark, Greece,<sup>23</sup> New Zealand<sup>24</sup>); and a number of European countries do not have off-peak charges for transcontinental calls (Austria, Belgium, Germany; and Ireland, Luxembourg, Norway, Sweden, and Switzerland with North America only). In general the lack of time of day charging practices is viewed as being inefficient in terms of maximising network utilisation and tends to militate against call stimulation.

Differences in the prices of calls are important since they will have an influence both on the volume of calls originating in a particular market and can also influence the direction of calls. For example, a business may request its overseas branches to reverse charges if that business is located in a country with low international charges. Large immigrant populations in countries such as Australia originate calls to their country of origin (e.g. Italy, Greece) because of favourable tariff rates, whereas charges from these countries to Australia tend to be extremely high -- especially in view of relative income differences. Non-price factors can also be important in international calling. These include, for example, the availability of international direct dialling, call quality, and awareness campaigns to stimulate the use of international telephony.

Partly in response to problems created by the above-mentioned factors the CEPT have held a number of discussions to establish guidelines regarding the harmonization of tariffs for telephone services. A 1989 CEPT recommendation suggests that tariffs should reflect the structure of costs and administrations should endeavour to rebalance local, trunk and international tariffs and should vary tariffs according to time of day. The CEPT have also examined harmonization of international accounting rates but decided that it would be inadvisable to do so for telephone and telex services.

### **3. Revenue settlement balances and their trends**

An international call generates a number of revenue and payments flows from the perspective of the operators. These are best summarised as follows:

- [1] Revenue from collection charges
- less [2] Settlements owed to foreign operators for outgoing calls (or half accounting rate x minutes of outgoing calls)
- equals [3] Net revenue retained from outgoing calls
- plus [4] Settlements received for incoming calls (or half accounting rate x minutes of incoming calls)
- equals [5] Total revenue from international calls

The difference between settlements owed to foreign operators [2] and settlements received from them [4] measures to what extent the country's net financial claim on non-residents changes as a result of international telecommunication activity.<sup>25</sup> The net settlements for international calls can be viewed as a balance on current account in terms of balance of payments transactions.

The net settlements balance for international calls is a function of accounting rates, collection charges, minutes of calling and exchange rates. A change in accounting rates (e.g. a reduction), holding other variables constant, would change the absolute level of net settlements but not the direction of flow (negative or positive balance). The net retained earnings from outgoing calls [3] and total revenue [5] of an operator making net outpayments would also increase with a reduction in accounting rates. If collection charges were linked directly to accounting rates a downward revision in the accounting rate would lead to a reduction in collection charges (at both ends of a relation) which would influence outgoing and incoming minutes depending on the relative price elasticities of demand in the two corresponding countries.

In view of the fact that at present accounting rates and collection charges are not highly linked, efforts to improve deficits on current account in international settlements should emphasise reductions in collection charges or link the two rates closer together. As a strategy the latter is preferable in that the collection charge is viewed as a national concern. Since 1973 when floating exchange rates were generalised there has been an increasing divergence between accounting rates and collection charges. Further divergence has resulted from increased competition in a number of markets where unilateral reduction of collection charges has taken place while accounting rates have remained more stable. The pattern and volume of traffic essentially depend on collection charges (and indirectly on accounting rates), while the value of bilateral settlements between two countries is determined by accounting rates.

A difficulty is therefore created for one country if it reduces the one-way price charged to the customer for an international call without a compensating reduction in the accounting rate. The effect, if international calls are price elastic, would be to stimulate outgoing calling and subsequently outpayments, although

total revenues would also increase. Other countries would tend to earn increased surpluses and consequently their incentive to maintain high charges and existing accounting rates could be reinforced. For these and other reasons creditor countries have not favoured reductions in accounting rates. The accounting rate also places a floor on the extent to which reductions in collection charges can be implemented. To this extent operators who attempt to operate in a low-cost and efficient manner may be penalised, and attempts to stimulate growth in international traffic are also restricted.

As a result high international telecommunication rates in one country discourage demand and have a direct impact on the revenue flow of recipient countries. Differences in rate levels and the structure of rates between countries also influence the direction of calling and the time-pattern of calls. Thus rate structures in certain countries are more conducive to growth in the international telephone service with economic benefits which go beyond national borders, while in other countries rate structures can have negative spillovers both internally and transborder.

With regard to international charging practices and procedures, the concern should not be that there are traffic imbalances *per se*. There are good socio-economic reasons why traffic imbalances should arise: for example, the structural and trade characteristics of the economy, the level of foreign direct investment, the distribution of immigrant populations, time zone differences, the relative use of new services such as facsimile, relative income levels and income elasticities of demand for telephone usage, and national characteristics in telephone usage. Relative levels of network development can also play a role. For example, quality differences may make it difficult to complete calls in one direction.

There are two important issues that need examination in the context of net settlements for international calls. The first is whether traffic imbalances are a function of differential call charges, and if so, are these differentials justified on the basis of economic and technical criteria. The second concerns the financial implications of traffic imbalances. Existing accounting rates in that they may be too high imply that deficit countries are transferring more than would occur under a system where the price of international access was cost-based.

#### **a) *Traffic and payments***

Analysis by the United States Federal Communications Commission has provided extensive data on traffic and revenue for international telephone message services. In terms of traffic, outgoing minutes from the United States increased from 791 million in 1980 to 4 463 million by 1989, and incoming minutes from 470 million to 2 249 million; a positive balance of outgoing minutes which



increased from 321 million to 2 213 million. Data on outgoing and terminating minutes between the United States and OECD countries are shown in Table 8.

For most public telecommunication operators national telephone traffic accounts for the bulk of the total traffic carried. Although in relative volume terms the share of international telephone traffic is small, its share has been growing quite rapidly for a number of countries, often surpassing that of national traffic by a significant margin (Table 9) when as measured in terms of outgoing traffic as a percentage of total traffic. Expectations are that growth will continue to be rapid. Forecast growth in outgoing telephone traffic for OECD countries is estimated to average about 5.6 percent between 1987 to 1992<sup>26</sup> (also see Table 10), and in a number of countries where new services using the public switched network are expanding (e.g. facsimile), this growth is likely to be much higher.

The relative value share of international telecommunications traffic is in many cases much greater than its share of traffic (this shows the extent of price distortions). A number of examples can be given:<sup>27</sup> international communications account for about 22 per cent of RTT telecommunication revenue in Belgium (1988), for Telefonica (Spain) the percentage was 14.3 per cent, and in Switzerland 36.3 per cent (1987). Revenue from the international telephone service grew in the United States from \$576 million in 1975 to \$3.5 billion by 1989 (approximately 2.5 per cent of total telecommunication service revenues). INTELSAT's international voice service revenue amounted to \$400 million in 1988.

The financial implications of these imbalances mean that growth in US outgoing minutes, relative to incoming, had resulted in a net settlements deficit of \$1.9 billion by 1989, up from \$263 million in 1980 (compared to a current account balance for the economy as a whole of -\$99.3 billion in 1989). Approximately 30 per cent of this deficit is with OECD countries (see Table 8), and Germany, Japan, Italy, the United Kingdom, France, Greece and Spain account for about 80 per cent of the total. OECD settlements deficit with the United States. The international net settlements deficit has also grown rapidly in other countries but not in the same magnitude as in the United States given the high traffic volume in that country. The international telephone service deficit in Sweden grew from SEK 47.5 in 1981 to SEK 184.1 in 1988 (Table 11a). Other countries also have important imbalances: in Australia the net deficit in paid outgoing minutes doubled in six years (Table 11b), Canadians make approximately 50 per cent more outgoing calls than they receive from abroad<sup>28</sup> and, for 1988, Teleglobe estimated that C\$ 126 million would be paid to foreign jurisdictions (representing 40 per cent of \$309 million revenues). Swiss data indicate that the net deficit in the balance of outgoing traffic has changed to a surplus (Table 11c), and the United Kingdom has a relatively small deficit on international telecommunication service payments (Table 11d), a situation which can be attributed to important revenue increases from transit traffic. Luxembourg

has also experienced a rapidly growing deficit in the net balance of international traffic (Table 11e) resulting in a Bfr 685 million deficit. In Japan the surplus in incoming minutes has, as prices dropped, turned into a deficit resulting in net outpayments of ¥9 978 million (Table 11f) by 1989.

The high and rapidly increasing net balance in US outgoing minutes can be attributed to a number of factors. First and foremost it is due to the important economic role US manufacturing and service enterprises and their subsidiaries play in the international economy. Business calls, linked with time differences, often imply that calls originate in the United States. In addition, the United States has a large immigrant population with, on average, higher per capita incomes than in their country of origin. This factor, linked with greater social acceptance and ease in making long-distance calls, tends to imply more outgoing than incoming residential customer calls. A third and important factor which has stimulated calling is that AT&T introduced off-peak rates in 1982 (a two-tier system with a discount and an economy period) which, along with falling international telephone service prices, has also served to stimulate calls.

There are two issues involved in reducing the deficit in net settlement payments resulting from net outgoing minutes, and the level of this deficit. First, there is the issue of whether lower international telephone charges in different countries will stimulate more outgoing calls from them to the United States on a net basis.<sup>29</sup> A lowering of the differential between the price of outgoing international telephone calls relative to incoming may alter somewhat the ratio between incoming and outgoing calls.<sup>30</sup> Lower price differentials would mean that the "call me back" type calls into the United States would no longer be necessary, resulting in an increase in the number of minutes of terminating calls into the United States. The second issue involves impacts of changes in accounting rates.

In certain cases stimulation of international traffic results directly in the net outflow of payments. For example, a number of PTOs have introduced international services which allow nationals when outside their country to call home direct. This service effectively by-passes the switched telephone network in the call originating country by linking the customer directly to an operator in the call terminating country. For settlements purposes such calls, which are treated as international reverse charge calls, are subject to an agreement between operators and to an agreed accounting rate. Although such calls are of benefit to customers in that they allow them to benefit from lower charges they tend to alter the pattern of calls. Tourists or business travellers who call home using this service are effectively creating an outgoing call whereas if they used the normal international telephone service in the country they are visiting there would be an incoming call to their country of origin. The result of the call home service would result in an outpayment from the country receiving the call. Changes in relative price differentials may reduce the attractiveness of such calls.

The second issue is the reduction of the net settlement deficit which would occur mainly through the reduction in accounting rates. Maintaining constant traffic flows for the 1989 period for the major deficit countries with the United States in Europe, and using lower accounting rates provides the result shown in Table 12. This calculation, admittedly simple, nevertheless shows that lower accounting rates alone would have resulted in an approximately \$100 million reduction in net outpayments for settlements by United States carriers for the six countries, and would have increased total revenues of United States carriers (payouts to foreign administrations would be reduced increasing the amount of revenue kept by United States carriers, although their revenue from traffic terminating in the United States would also be reduced).

Reduction in the level of the deficit is not directly associated with the issue of eliminating traffic imbalances which are likely to remain. These imbalances may well increase as services take a larger share in international economic activity, and as there is increasing interconnection of enterprise networks. A compensatory force with possibilities for reducing the United States deficit will be the increasing use of international leased circuits to carry business traffic, including voice and facsimile. Changes in traffic volume would not have an impact if these circuits are priced on a flat-rate, volume insensitive basis.

#### ***b) Traffic allocation***

The collection charge in one country and the accounting rates impact on the volume of traffic received by an operator in another country. But factors other than price play a role. In the present context of international telecommunications competition an international carrier X from country A competing with another carrier Y from the same country will need to generate traffic to send to a monopoly carrier in country B in order to ensure return (incoming) traffic. This problem of allocation of traffic, the concept of a "proportionate return" arrangement by which a foreign monopoly operator will send traffic to each of the existing carriers operating internationally in proportion to incoming traffic received from them, forces competing carriers from the same country to try and stimulate outgoing traffic to country B through price reductions. There is no pressure on the monopoly carrier in country B to make similar price reductions. A dominant carrier in country A could, if inadequate regulatory safeguards were in place, reduce prices to a level where profits are only earned on incoming traffic.

## V. AN ASSESSMENT OF THE INTERNATIONAL COLLECTION CHARGES AND THE BILATERAL ACCOUNTING RATE SYSTEM

In this chapter the essential elements and principles of the international charging and settlements mechanism are assessed.<sup>31</sup> The main facets of this system are:

- Accounting rates are generally divided 50:50.
- Accounting rates for each country differ, i.e. the nominal charge for terminating or originating a call -- half the accounting rate -- differs, thus a country's receipts for terminating an incoming call may differ according to the country where the call originated. In addition, a country in which a call originates may receive different net revenues according to where the call terminates.
- Collection rates are not generally symmetric along a two-way flow.
- Collection rates are postalised; all calls from country *i* to *j* bear the same price. Moreover, for most countries, international charges are postalised i.e. differ but only by broad zones.
- Charges are not distance related, except in that broad zonal bands exist.

Note that these stylised facts would not describe the Europe and Mediterranean Basin scheme. It is therefore important to examine the principles inherent in the international bilateral system and assess whether these principles are identical to or consistent with the principles of efficient pricing discussed earlier -- mainly the absence of undue discrimination.

### 1. Principles of the bilateral accounting rate system

The present system contains rampant systematic and non-systematic price discrimination. As is shown below (but which is obvious given the nature of

bilateral bargaining), this price discrimination is not generally consistent with efficient pricing principles such as Ramsey pricing.

- a) Prices are not distance related. While it could be argued that telecommunications costs are becoming independent of distance, this fact is at odds with the ways in which domestic message toll service or contiguous country international message toll service (IMTS) (TEUREM, Canada-United States; United States-Mexico) is charged. These price differentials are price discrimination.
- b) The net termination charge that a country receives for terminating an inward IMTS call is discriminatory because:
  - The net termination charge differs according to the originating country of the call.
  - The termination charge is generally higher for IMTS than either domestic termination charges or termination charges in region specific settlement plans (such as the TEUREM plan). The termination charge might be twice as high for some European countries under the international accounting rate system.
  - These differences in termination charges are far greater than the costs of the additional facilities needed for the longer distance IMTS calls.
- c) Dividing the accounting rate 50:50 is discriminatory since the costs of sending outward calls exceed the costs of terminating inbound calls, as recognised in TEUREM charging practices. These incremental costs are the costs of billing and collection and the higher costs of blockage at the outgoing end. The differential in costs can be estimated from AT&T collection charges which contain set-up costs in the initial calling minute. These charges are shown in Table 13, note how they vary from \$0.59 (or 36 per cent of first minute charge) to \$2.48 (63 per cent).<sup>32</sup>

**a) *Prices are not distance related***

The role of distance in international telecommunication cost functions has changed dramatically. In the past transmission was a major cost component in international relations, it is now a relatively less important component. The changing role of distance implies that short-haul calls will, in proportion to the distance covered, be relatively more expensive than longer-haul calls especially since switching costs are invariant to distance. The role of distance in costs is also blurred because of the use of a considerable degree of cost-averaging between routes, as well as because of call zoning; again this often implies that differences in charges between high and low cost destinations are less than the differences in route distance.

For intra-European calls the ratio of the prices of calls for closer countries compared to countries further away has increased for most countries, indicating some restructuring of tariffs to reflect the change in the role of distance in the cost equation. In looking at the ratio of international telephone charges to highest national call charges (Table 5) there is evidence that prices to North America in particular are proportionately less expensive relative to the distance covered. One reason is the price competition on this route, including geographic competition between operators of different countries, a second reason is that this route has a large capacity and the newest (cheapest) technology, and finally it handles a large volume of traffic, which is probably more important than distance in pricing.

The other form of rate averaging is that calls to a particular country are usually priced the same irrespective of where that call terminates in that country. This absorption of national trunk charges in the international call component (postalised charges) implies a high degree of cost-averaging in price structures, and consequently some cross-subsidisation within the pricing structure (either the user of short-haul international telephony is cross-subsidising long-haul calling and/or domestic long-distance users are cross-subsidising international users). As tariffs move toward a cost-based pricing regime operators may need to re-evaluate to what extent differentials need to be re-introduced for international calls made to different geographical locations in foreign countries. It may be that with the rapid decline in transmission costs relative to switching, in particular as fibre is deployed in domestic networks, the national leg of international calls may only incur minor costs.

As an example, a call from California to Corsica costs the same as one from Boston to Bordeaux; the distance of the former call being much greater than the latter. Two issues of price discrimination exist. First, within the United States, for any call to Europe, any caller to the west of the east coast is receiving a benefit. The benefit is measured by the cost of an intra-United States toll call. Thus, a caller in San Francisco who would normally pay for a call to Boston, is "being subsidised" this amount when calling Bordeaux. Now consider two callers in Boston, one calling Corsica, the other Bordeaux, both pay the same price but a call in France from Bordeaux to Corsica costs 1.83 FF per minute. Therefore, the US caller with the most distant call within continental Europe is being subsidised.

It could be argued that were these calls to go by satellite, then indeed there should be no difference in their prices since if one satellite has a footprint over California -- Corsica, costs within that area would not be related to distance. These are two rejoinders to this point. First, within the United States or within Europe, calls are priced according to distance even though there are satellites (Comsat, Eutelsat and others) with footprints over the United States or over Europe. Second, fibre optic cable across the Atlantic is taking market share away from Intelsat. Satellites do not set prices.

The United States is not the only example of this practice. The same pattern holds for most countries.

What explains this pattern?<sup>33</sup> The usual response is the need to minimise transaction and accounting costs. Customers in the United States face one tariff for calls to the United Kingdom, and one for the rest of Europe -- simple. Yet, callers resident in San Francisco face a myriad of prices for telephone calls to the rest of the United States, Canada and Mexico. There has been no desire to make one zone; for these calls customers do not seem particularly troubled. Why then not have separate IMTS rates to the United Kingdom, one from California, a second from Kansas, a third from Boston. Clearly all these calls are already metered and charged so metering and collecting costs would be unchanged were IMTS rates to be distance related.

A possible hypothesis to explain the phenomenon is that, initially, the costs of international circuits were a large multiple of the costs of calling within a country. Therefore, between North America and Europe the costs of the international circuit dominated costs with the United States or costs within the European network. Thus, postalised rates arose. Costs on international circuits are now low. The FCC suggests a per minute cost on TAT-9 of some 4 cents between the United States and the United Kingdom. Therefore, prices of IMTS calls could be comparable to prices of two domestic MTS calls. Why has the system of postalised rates not changed? The reason could be the lack of pressure of costs on prices. Margins are so large, and competitive pressures so minimal that the postalised system has survived. It is unlikely to survive true costing in IMTS.<sup>34</sup> In addition, the postalised rate structure may act as a pricing umbrella for new entrants, permitting cream skimming (see Bernard, 1990). There are also socio-economic considerations at play. These may be based on national policy considerations, such as universal service policies based on national postalised or zone-based prices, regional policy considerations, etc.

#### *b) The cost of access*

A major cost component of international calls is the termination costs associated with a call, that is access to the network of the terminating country. In the context of the present international charging and pricing system this cost is half the accounting rate, or the marginal cost of the originating carrier for using the terminating country's network.<sup>35</sup> It is crucial to understand that termination costs actually consist of two components -- the costs of (one-half) the international circuit, and the costs of the call in the terminating country from the international gateway to the actual destination, including the costs of terminating the call at the telephone itself.

Consider three calls to Hamburg, one from the United States, a second from France and a third from Japan. If a country had only one international gateway

then this second cost component would be identical for all incoming calls. Thus, in the example of three international calls to Hamburg, the differences in costs in Germany consists of any differences in the implicit toll costs to a gateway and the costs of the international circuits.

One could compare these reimbursement charges for all countries if one knew accounting rates as well as the gateways for different incoming calls. As the United States publishes accounting rates, the exercise is not possible. However, several simple calculations suggest the presence of very different reimbursements and thus price discrimination.

The 1991 accounting rate for United States-Canada is US\$0.24, AT&T's share is US\$0.12. The 1991 accounting rate for United States-United Kingdom is US\$1.06, for United States-France US\$1.31 and for United States-Germany \$1.71. Thus the reimbursement of AT&T for terminating an inward IMTS call is as shown in Table 14.

The difference between the US-UK and US-France international circuit costs (TAT-9) would be in the order of 2 cents, 4 cents for TAT-8. These cost differences cannot explain the 12.5 cent greater US charge for terminating French traffic. Given fixed costs of negotiations, accounting settlement, etc. some differences between the US charge for terminating UK and French traffic could be accounted for by different volumes of traffic. Why the 20 cent differential in US charges for terminating German versus French traffic? The likely explanation is price discrimination. Germany charges US\$0.855 to terminate one minute of US outgoing traffic. If TEUREM accounting rates are half US/Europe rates, Germany would then receive some US\$0.43 to terminate French traffic. Can the difference of US\$0.43 be accounted for by the higher costs of a longer implicit intra-German MTS call on United States originating calls and the incremental costs of transatlantic international circuits? The latter, cannot explain this differential, nor can differences in gateways and average length (within Germany) of intra-European or transatlantic calls explain the difference.

One can compare the terminating charges with call charges within that country. In the United States, the average revenue of an interstate toll call is 21 cents that includes the 13 cent payment for access to the local network. Compare that 21 cents with the net to the US from terminating European originating traffic. The differences are enormous.

Within France a one minute MTS call of over 100 kilometres costs FF1.83 or US\$0.31 (at FF.5.9 to the dollar).<sup>36</sup> France receives US\$0.655 to terminate a US call. France, as most countries in Europe, does not have an explicit policy to price NTS costs via explicit access fees. As a result the US\$0.31 charge includes some unknown contribution to NTS access. France then earns US\$0.345 above the costs of a domestic *originating* MTS call within France from terminating each US call.



These differences become more evident in examining an index of accounting rates for US-Europe relations (Table 15). The higher cost of access to a number of European networks relative to France and Finland which have the same accounting rate with the United States, cannot be justified by differences in network development or cost structures alone. In the case of Finland, for example, higher transit charges exist than for Germany or Sweden on fixed-link routes.

Although differentials between countries on the same routes are important (e.g. US-Europe relations), there is more severe price discrimination if termination costs for intra-European relations are compared to termination costs for US-Europe relations. The data in Table 16, estimated by AT&T, contrast the estimated accounting rate share (based on TEUREM principles) for incoming calls by a number of European countries with their accounting rate share for relations. On the basis of these data the cost of access to networks in European Member countries by US originating calls is from two to three and a half times higher (ranging from 27 cents to 76 cents per minute higher) than for calls originating in Europe. Deducting imputed intercontinental transmission charges would still lead to the conclusion that there is significant discrimination against US originating calls. This conclusion can probably be generalised for all intercontinental calls on the assumption that accounting rates between European countries and their intercontinental relations are closer to US-Europe accounting rate levels than Europe-Europe rates.

This situation is exacerbated in a number of instances because accounting rates have remained fairly static for a number of countries in their relations with the United States (see Table 17). This is the case for Austria, Germany, Greece, New Zealand, Turkey and the United Kingdom. In the latter case accounting rates were already at a low level in 1985. However, in a number of cases there has been some improvement with the introduction of peak/off-peak accounting rates. For a number of relations, exchange rate fluctuations have increased the dollar value of accounting rates.

The difference between prices charged to customers (collection charges) less the accounting rate share paid to foreign administrations can be seen in Table 18 for relations with the United States. The average price mark-up by administrations on their share of the accounting rate is just over twice. The net revenue retained from a minute of outgoing calls varies significantly and is indicative of gross misalignment in international call charges. Contrast the net retained revenue of \$1.92 in Italy for a US terminating call compared to \$0.68 for Australia or \$0.77 for France. In terms of off-peak calls the ability of some operators to discount prices is evident, as is the unwillingness of a number of operators to do so.

In a large number of bilateral relations with OECD countries, operators from the United States have much lower net retained earnings for outgoing calls. Only

in relations with Australia, France, Japan, New Zealand, Norway and Sweden are net retained earnings per call minute less than their counterparts. In all cases (except Australia, Canada, New Zealand) for off-peak calls US operators have significantly lower net retained earnings than their bilateral partner. In a number of relations US international operators have very low net retained earnings per call minute during peak periods because of high accounting rates, and the fact that US call charges are much lower than call charges in the other direction. This is the case for calls with Greece, Italy, Spain and Turkey.

*c) 50:50 division of the accounting rate is discriminatory*

As noted, originating a call costs more (some US\$0.59 to US\$2.40 -- data from Table 13 for AT&T) than terminating a call. A 50:50 division of accounting rates does not distinguish between these unequal costs and unless the traffic flows are equivalent in both directions, the country originating more calls bears more costs.

**2. Why are some collection rates below half the accounting rate?**

AT&T sets some off-peak collection rates at a level below one-half of the accounting rate (AR2). In addition, as noted US carriers have introduced "call-home" plans from Europe which replace an in-bound US call with an out-bound US call, and where again not only are some collection rates possibly below half the accounting rate, but the costs of originating the call must be borne. Thus prices may be below actual revenue for some routes and some time periods.

There are several reasons for this. First, AT&T and the PTTs have market power. Thus, it is the package of collection rates and accounting rates which may be important (see Kwerel, 1987, p.45). It is then not a simple case of the competitive price being below marginal cost. In the FCC 1986 notice initiating an inquiry "to determine whether the public interest requires that we (FCC) consider the telecommunications policies of foreign governments in the formulation of US regulatory policies",<sup>37</sup> AT&T is quoted as stating that it supports the need for lower accounting rates not because existing levels are "above-cost", but because downward movement in the level of accounting rates is necessary to meet the demands of the market"<sup>38</sup> and that "AT&T argues that government-to-government discussions would pose a significant risk of changing the fundamental nature of international services from one of co-operation and collaboration into one of delay and confrontation".<sup>39</sup>

Stanley (1988) shows US collection rates to have the pattern shown in Table 19 (using Germany as the example).

The FCC liberalised entry into international record carriage in 1981 and into IMTS in 1984. The FCC imposed significant IMTS rate reductions in 1981. Prior to 1981, AT&T and the Bundespost were charging very high prices. Why did US collection rates fall so quickly? A zealous FCC is part of the answer. It was also a natural response by AT&T given the clear indication, even in 1981, of competition in international IMTS. AT&T could lower the price/profit umbrella for competitors and with a high accounting rate earn very high rates of return on incoming calls. Two hypotheses can be put forward. First, there is a call externality, an outgoing call generates the probability of an incoming call. Second, when carriers in other jurisdictions use a rule of proportionate return, price can be below cost on outgoing calls if price is well above cost on incoming calls.

### 3. The impact of proportionate return

To examine the issue of competition under a policy of proportionate return, assume simply that two firms provide outgoing calls, where the proportion of incoming calls depends on the number of outgoing calls (a policy of proportionate return in the foreign country). Firm A's revenue is not simply the revenue minus the cash of an outgoing call but include the revenue, minus costs, of the proportionate minutes returned. Thus where:

$P_o$  = price of an outgoing call, per minute

$AR/2$  = half the accounting rate, per minute

$C_o$  = cost of an outgoing call, per minute

$C_1$  = cost of an incoming call, per minute

[note:  $C_o > C_1$ ]

$r$  = number of incoming minutes, per outgoing call

Then if Firm A loses one minute of outgoing calls to Firm B, the loss in profits to Firm A are:

$$(P_o - AR/2 - C_o) + (AR/2 - C_1) r$$

(profits on an outgoing call) (profits on an incoming call)

or

$$P_o - C_o + C_1 r - AR/2 (1+r),$$

if  $r$  is unity, then this loss in profits is

$$[1] P_o - (C_o - C_1) - AR$$

The first term in [1] is the price of an outgoing call; the second term is the incremental cost of an outgoing compared to an incoming call; the third term is the *entire* accounting rate. When traffic is balanced in the two directions, competition between firms could drive the price of an outgoing call *below* half the accounting rate [as long as  $AR/2 > (C_o - C_i)$ ].

The high incremental profits on the lost incoming call create an incentive to price "below marginal costs" ( $P_o$  could be below  $C_o + AR/2$ ).

When  $r < 1$ , less incoming calls are received than flow out, the losses from losing one outgoing call are lower since the incremental profits of the call returned (proportionate return) falls.

Thus, in a world of high accounting rates, a rule of proportionate return can generate odd pricing signals.

#### 4. Profits on outbound and inbound minutes

Kwerel (1987) provides information on the average inbound and outbound revenues to AT&T over the 1980 to 1985 period (Table 20). The inbound rate is the weighted average of one-half the accounting rate for the United States. In 1984, AT&T earned 20.9 per cent on its international telephone services. Outgoing minutes were 80 per cent as numerous as incoming minutes (1.8 billion versus 1 billion) (see Stanley, 1988, Appendix A, p.28).

Therefore in 1984:

$$20.9\% = \frac{1.8 (.33 - CO) + 1.0 (.82 - CI)}{K}$$

where CO is the cost of an outgoing call and CI, cost of an incoming call and K, the amount of capital invested.  $CO > CI$  as noted, because of the initial set-up costs. If the average length of an outgoing call is nine minutes and if the set-up costs of the first minute are equal to the first minute charge, then the costs of outgoing calls would be 11 per cent greater than incoming calls. Incoming calls are of shorter duration, so it is safe to assume at a minimum:  $CI = 0.85 CO$

Therefore:  $K \times 20.9\% = 1.8 (0.33 - CO) + 1.0 (0.82 - 0.85 CO)$

If  $CO = 33$  cents, then *all* the profits are made from incoming calls.

If  $CO = 21$  cents (13 cent access fee + 8 cent profit) then 2/3 of AT&T's profits come from incoming calls. A fall in the accounting rate of 1 per cent however increases AT&T profits by 0.8 per cent.

## 5. Exports, imports and discrimination

At this point, it is instructive to consider the issues in terms of domestic-foreign, exporters and importers and to determine the flows of export and import services. An outgoing call from the United States is an import into the United States of a foreign service -- the foreign termination. The wholesale price for these termination services is set by bilateral negotiations between the United States carrier and the exporter (foreign PTT) and is one-half the accounting rate. An incoming call to the United States is an export from the United States (United States termination) and an import to the foreign country. The price of the export is established by the foreign PTT in its country just as the United States sets the price of the outgoing calls. For telephone calls, the service is the connection of exporter and importer.<sup>40</sup>

Outgoing calls are imports (for the originating country) and incoming calls, exports (again for the receiving country) in terms of the flows of reimbursement for facilities used. In addition, an import (outgoing call) to the originating country equals an export (incoming call) in the same transaction for the receiving country. Therefore we can utilise traditional views of the rules for export and import transactions (e.g. GATT rules) in examining the pricing of IMTS.

A table assists in remembering which is an export or an import.

United States -- AT&T		Foreign -- PTT
Incoming call	=	Outgoing call
(Export, UF)	=	(Import, FU)
Outgoing call	=	Incoming call
(Import, UF)	=	(Export, FU)

The retail price for the export (UF) or for the import (FU) is established by a foreign retailer (PE,UF = PI,FU). Retail price for the import UF (or export FU) is established by the US retailer (PM,UF).

This international service does not compete with or substitute for other goods and services within the United States. The exporter is the only one who can offer service in that country. That service, access to the local system plus a domestic interurban call, plus the use of international facilities -- is itself equivalent to other services offered to domestic consumers (except for the cost of the international facilities). Domestic users pay for access and domestic interurban calls. Therefore if a foreign provider does not discriminate in his export policy, he would charge foreigners the same price as an equivalent distance domestic interurban call plus the cost of international facilities. Note that since all billing, blockage, fees, etc. are paid by the importer, the export fee should be less than that billed for a domestic interurban call.

Previous sections have demonstrated that substantial discrimination exists in the pricing and settlements for international calling. Next, the issue of whether these differentials are consistent with efficient pricing is examined. Then the principles of National Treatment and Non-Discrimination (MFN) are considered for this trade in services.

## 6. Does discrimination in international calling represent efficient pricing?

As stressed earlier, if there are scale economies in telecommunications, then pricing at marginal costs will lead to losses. One potential efficient way of pricing so as to cover full costs is to "price discriminate" using a Ramsey-type formula.<sup>41</sup>

Is the fact that discrimination exists in international telecommunications then consistent with efficient pricing? To answer this question requires information on elasticities of demand for international calls between countries, but existing information is sparse. However, several recent studies provide some useful guidance.

Bewley and Fiebig (1988) examine the demand for outgoing calls from Australia over the 1976 (third quarter) to 1983 (first quarter) period. Calls are distinguished between subscriber dialed -- (ISD), person-to-person and station-to-station. Call externalities and the substitutability/complementarity between incoming and outgoing calls, important issues for pricing principles, are not considered. The process is considered to be an individual deciding how many calls to make, how to apportion these calls between the three types and finally deciding on the length of the call.

The real prices of the three calls, GNP, and the number of subscribers connected by ISD are exogenous variables. In addition, the price of access is explicitly ignored.

The main results are as follows:

- P1 = ISD tariff
- P2 = operator connected tariff
- S = surcharge on P2 for person-to-person calls
- U = price for a minimum length call

The results reported here are for ISD calls, excess minutes and for all calls; only long-run (equilibrium) elasticities are shown.<sup>42</sup>

### Elasticities of Demand -- Australia Outgoing Calls

Price	ISD Calls	ISD Excess Mins.	All Calls	All Paid Minutes
P1	-1.62	-3.01	-0.01	-0.41
P2	0.84	-0.35	-0.36	-1.13
S	0.78	--	-0.10	-0.06
U	--	--	-0.37	-1.54

A decrease of 1 per cent in the price of ISD calls:

- increases the number of ISD calls by more than 1 per cent, but has no effect on "all calls" showing a substitution between types of calls;
- increases the number of excess ISD minutes by 3 per cent, but the number of paid minutes by only 0.4 per cent.

A decrease in the operator connected tariff (P2):

- increases all paid minutes by 1.13 per cent;
- decreases the number of ISD calls by 0.8 per cent (ISD calls and operator dialled calls are substitutes);
- increases the number of all calls by 0.36 per cent.

*In all, the number of calls is highly inelastic to prices, but the number of minutes can be influenced strongly by prices. Note, that whether the response in price is "elastic" or "inelastic" depends on the particular price being changed.*

In the context of price elasticity it is important to note that the demand response to a price change may depend upon price expectations: an unanticipated price reduction may lead to little response, but a more sustained and anticipated decline in charges is likely to have a more substantial effect.

Acton and Vogelsang (1990) (A&V) use a very different approach to that of Bewley and Fiebig (1988). They are primarily interested in modelling the interconnection (if any) between inbound and outbound calls and the call externality.

A&V divide calls into consumption pleasure (talking to a friend), information (for example, receiving a flight schedule) and action (for example, purchasing a ticket). They consider international calls as residential (pleasure) and business (other). Pleasure calls could be initiated in either direction and will be initiated by the one with a higher income, or the one facing the lower price (since the price in the two directions differs) or the one who is more action orientated. Note that within a country's borders, the price in the two directions is identical and therefore one could not determine any price effect on the direction of domestic calling. Therefore, studies do not measure the elasticity of demand





## Elasticities of Demand -- US International Calls

	Own price	Reverse direction price
Minutes of outgoing calls from United States	-0.98	-0.07
	(-8.75)	(-1.78)
Minutes of incoming calls to United States	-0.31	-0.62
	(-5.19)	(-2.54)

(Figures in brackets are t-statistics)

Thus a 1 per cent decrease in the US per minute collection rate leads to a near 1 per cent increase in the number of outgoing minutes and a 0.07 per cent increase in the number of incoming minutes. A 1 per cent decrease in the per minute price of a West European collection rate increases the number of incoming minutes to the USA by 0.62 per cent and increases the number of US outgoing minutes by 0.07 per cent.

These results are important and imply:

- the demand for US outgoing minutes is iso-elastic;
- the demand for West European outgoing minutes is inelastic;
- that incoming and outgoing minutes indicate complementarity: the call externality overwhelms arbitrage.

At first glance, if the elasticities estimated by A&V were valid over large ranges of data, they would appear to indicate that utilising Ramsey-type criteria,<sup>43</sup> incoming calls to the United States would be higher priced than outgoing calls (West European outgoing calls have lower price elasticities than US outgoing calls). In fact such a quick judgement is false. These data are consistent with a conclusion that West European outgoing prices are too high.<sup>44</sup>

### 7. Are West European-US collection rates efficient?

Cross-price elasticities must be taken into account in determining "optimal" pricing. A decrease in US outgoing prices has large impacts on the amount of US outgoing minutes (0.98) and on the number of incoming minutes (0.62). Changes in Western European outgoing prices have smaller effects on the number of West European outgoing minutes (0.31) and small effects on US outgoing minutes (0.07). Thus a 1 per cent decrease in US outgoing prices increases the total volume of minutes by well over 1 per cent (1.6 per cent).

The impact of the cross-price elasticity can be seen in two ways -- one intuitive and one explicitly utilising a more complex Ramsey rule which incorporates cross-price effects.

The intuitive approach is as follows. A 1 per cent decrease in the collection price set in the US increases outgoing calls by near 1 per cent and increases incoming calls by 0.62 per cent.

As a result of a 1 per cent decrease in United States collection rates, revenue in the United States increases by:

$$1.0 (PU - A2) + 0.62 (A2) = PU - 0.38 (A2)$$

(where PU is the US collection rate and A2 is half the accounting rate).

This is positive or negative depending on the relationship between PU and A2, but is clearly positive if the collection charge is above 20 per cent of the accounting rate (A2 is one-half the accounting rate).

A 1 per cent decrease in the West European collection rate for outgoing calls increases the number of outgoing minutes by 0.3 per cent and increases the number of incoming minutes by 0.07 per cent. The revenue change to a West European PTT from decreasing collection rates by 1 per cent is shown below:

$$0.3 (PW - A2) + 0.07(A2) = 0.3 (PW) - 0.23(A2)$$

The explicit Ramsey rule in the presence of non-zero cross-price elasticities of demand utilised along with the data in A&V demonstrates that, at present price and revenue levels, US collection rates, should be raised relative to West European Collection rates or conversely West European collection rates relative to US collection rates, should be lowered given their own and cross-price elasticities estimated by A&V and the existence of call externalities.<sup>45</sup>

The Bewley and Fiebig results cannot be used to examine Ramsey prices or optimal pricing on two-way flows as the authors only considered outgoing calls. However, their results are consistent with the fact that calls from the United States generally have a longer duration than calls to the United States. Their results are also consistent with substantial arbitrage. The A&V cross-price results are net of the call externality and arbitrage.

Thus, one can conclude that existing price discrimination (higher collection rates out of Western Europe than out of North America) is *not* consistent with optimal pricing given the published findings of demand elasticities for international calls.

Another use of Ramsey pricing is to determine prices for a range of services in one country using the price elasticities of demand. Here, the demand for residential access, interstate and outgoing international calls for the US is examined. As described earlier, the Ramsey rule "marks-up" the relatively least elastic demand the most, and the relatively highest elastic demand the least (this

general statement has to be modified in the case where cross-elasticity of demand is important). For the United States, price elasticities of demand are as follows:

Service	Own-price elasticity of demand (long-run)
Residential Access	-0.01 <sup>a</sup>
Business Access	-0.05 <sup>a</sup>
Local Usage	-0.27 to -0.38 <sup>b</sup>
Interstate Toll	-0.7 to -1.06 <sup>b</sup>
Intrastate Toll	-0.67 <sup>b</sup>
Outgoing International Calls	-0.98 <sup>c</sup>

- Sources:
- a) Robert W. Crandall (1991), *US Telecommunications in a More Competitive Era*, Washington, Brookings.
  - b) John T. Wenders, *The Economics of Telecommunications Theory and Policy*, Boston (1987), Ballinger.
  - c) A&V, op. cit.

These own-price elasticities of demand for telephone calling in the US suggest that the *lowest* mark-ups should occur for international outgoing calls closely followed by domestic interstate calls. Thus, Ramsey-type pricing would lower the present collection rates on United States international outgoing calls.

It can therefore, be suggested that existing price discrimination within a country (likely higher mark-ups for outgoing international calls than for other services in the United States) is *not* consistent with optimal pricing.

In addition, many forms and degrees of price discrimination are likely to exist given the multitude of bilateral negotiations. If any one country (or operator) negotiates 140 separate agreements it is unlikely that some overall principle can be at work. The very existence of bilateral negotiations for accounting rates suggests that the resulting level of collection rates (as they are affected by accounting rates) cannot be optimal or consistent with welfare maximisation.

Other forms of price discrimination have been pointed out earlier -- postalised rates, zone rates and the lack of differentiation in the pricing of international calls for distances in the domestic (outgoing) country. This discrimination is also not consistent with welfare maximisation.

Another form of discrimination is the 50:50 split of accounting rates where outgoing calls are more expensive than incoming calls.

Thus, the present system contains substantial price discrimination -- any country earns very different net termination fees depending on the other country

involved in the relationship. This is evidence of market power not welfare maximisation. There are several potential solutions to these pricing problems:

- multilateral setting of accounting rates utilising the principles of GATT;
- competition;
- the abandonment of the accounting rates system in which a country sets a single/access rate available to all other jurisdictions.

## 8. Pricing principles for international telecommunications and the means to achieve them

### a) *Efficient principles*

For IMTS prices to be economically efficient they should be cost-based; or cost-related (using Ramsey-type criteria) -- and discriminatory only where related to demand elasticities (as discussed in the previous sections).

IMTS prices should be no lower than their attributable costs and no greater than stand-alone costs.

What "contribution" should IMTS prices then make to NTS costs? To this point, they have made substantial contributions; profit rates on IMTS are clearly very high (see Stanley, 1988 and Johnson, 1989). Unless the demand elasticity for IMTS minutes is lower<sup>46</sup> than for domestic minutes (and there is no evidence of this), IMTS calls should make no greater contribution to NTS than domestic calls.

One principle of **non-discrimination** could be that after paying its attributable costs an IMTS minute should make no more than the same contribution to NTS costs as domestic MTS calls.

### b) *Non-discrimination*

The principle of non-discrimination is essential, efficient (unless price elasticities are sharply lower on IMTS) and consistent with principles of international trade. An outgoing call, as noted earlier, is an import of foreign services (termination) with the price for the service negotiated bilaterally. However, aside from the incremental attributable costs of IMTS calls (handling costs, the gateway and international facilities), an IMTS call is identical to a domestic service-access and a domestic MTS call. Therefore, the principle of non-discrimination suggests that a country should charge the same for the export as it does for domestic service.

Where countries charge more for this export than for domestic services they are engaging in discrimination or "reverse-dumping". The situation is worse than in the usual case of discrimination because of the possible two-way flow of calls, externalities, inefficient arbitration and the operation of the accounting rate/collection rate system. Many authors have pointed to these issues. Here, the export/import component of IMTS calls is emphasised. There are no other internationally traded goods which have the following characteristics of IMTS calls. A service traded from W to U is identical for many consumers to a service from U to W. However, the service from W to U is an export for W and an import for U; reversing the flow reverses the import/export context -- U then has the import and W the export. That countries can determine trade flows by setting prices for imports and exports is not surprising. What is unique for IMTS is the correspondence and transferability of imports for exports. Thus high domestic collection rates for IMTS, *ceteris paribus*, create exports (incoming calls), tied to high accounting rates which generate high prices for exports. As these high prices (high contributions to NTS costs) are paid by foreigners, domestic welfare rises. Thus the welfare implications of high collection and high accounting rates can result in increased *domestic* welfare, as incremental IMTS calls are originated abroad. This welfare gain is at the expense of foreigners.

In addition, any resulting bypass and the impact of high collection rates which become inputs to domestic producers have welfare decreasing effects. Bypass, the use of lower priced transit facilities, decreases utilisation of domestically-owned international facilities and can be clearly welfare reducing by adding greater length and more switching to IMTS calls. High collection rates are taxes on domestic users of IMTS services. To the extent that they cannot be arbitrated, these taxes restrict consumer choice and raise costs of production for businesses.

**c) *A multilateral accounting rate system***

Many of the present problems of the accounting rate system can be traced to two issues:

- bilateral bargaining in secret;
- bilateral bargaining not incorporating GATT-type rules.

Therefore, a possible reform of the present system would be to have multilateral bargaining under GATT-type rules.

What GATT rules are relevant? National treatment is clearly of importance. National treatment in the GATT context implies that once goods have entered a country (i.e. after customs duties, quotas, etc.) they are treated in the same manner as local goods. National treatment is a statement that foreigners and nationals are treated equally. This principle is normally one to be applied to foreign goods,

where the state agrees not to discriminate against foreign goods once they have accessed the domestic markets. Here, national treatment would apply to exports (the export of domestic access), and these should not be priced above the price of domestic access. Another rule would be non-discrimination.

Why multilateral bargaining? The present bilateral bargaining system within the overall recommendations of the CCITT has resulted in numerous inefficiencies, high collection rates, accounting rates not equal to collection rates and neither collection nor accounting rates being cost-based. Therefore, the system results in substantial price discrimination and inefficiencies. The multilateral negotiations at CCITT have not resulted in pricing principles for international telecommunications that prevent discriminatory practices, since the Recommendations do not place tight enough constraints either on the bilateral negotiations which actually determine accounting rates, or on the unilateral setting of collection rates. Therefore, for the present system to move towards efficient pricing, some changes to placing constraints on the setting of these rates have to be made. A multilateral establishment of accounting rates, in open discussions using GATT principles, would probably lead to lower accounting rates and substantially reduced discrimination.

The suggestions here revolve around several issues. First, is the public disclosure of accounting rates. In a truly competitive system prices are well-known. Here we have bilateral settlement rates, not prices. Were there competition in international calling, and were uniform settlements not a policy, then there would be competitive advantage in keeping accounting rates secret. However, in the present system with clear market power and bilateral monopoly negotiations, there is little social welfare gain from keeping accounting rates secret. What is happening is of course, lower accounting rates for those who are better bargainers. This is neither efficient nor equitable. Moreover, many of the players are publicly owned. Why should public monopolies maintain secrecy from the public?

Second, is the multilateral, not bilateral, negotiating of accounting rates, such as the multilateral system used for setting settlement rates for TEUREM. Individual countries or companies would not bargain, one-on-one, with others, but establish a multilateral accounting rate system. Of course, the ability to establish a true multilateral accounting rate process for many countries is not self-evident.

CCITT is a multilateral forum. The changes in the process which emerge from the previous discussion are twofold. One is tighter constraints on rate setting through the use of well accepted principles of fair trade. The second is a multilateral not bilateral setting of accounting rates so as to end gross discrimination.

## 9. Competition

A number of authors have discussed the role of competition in revising IMTS prices (see Kwerel, 1987; Johnson, 1989). Competition can take one of several forms:

- competition by country PTTs for transit and leased lines;
- competition by resellers of "country PTT" facilities;
- new facilities entrants into:
  - data services;
  - IMTS.

Each of these is discussed in turn.

### *a) Competition for transit traffic*

It is clear that IMTS calls are highly profitable for all major participants. The system of bilateral negotiated accounting rates and high collection rates means that at the margin, more traffic adds profits. In addition, since accounting rates and collection rates are not set multilaterally or with a common design, discontinuities in rates exist. Johnson (1989) shows that in 1987 a five-minute call from Germany (the former Federal Republic) to the United States cost between US\$1.23 to US\$3.22 less when indirectly routed through the United Kingdom rather than on a direct path (the savings were greatest on off-peak calls since Germany (the former Federal Republic) has only one charge over the entire day). Competition for transit services arises.<sup>47</sup> The lower accounting and collection rates for most continental Europe to United States calls switched indirectly through the United Kingdom rather than on direct routes help to explain why the United Kingdom accounts for half the transatlantic traffic between the United States and Europe.<sup>48</sup>

Thus route bypass is an important ingredient of competition. Note that bypass can be inefficient if the indirect path is more costly than the direct path. In the present world of bilateral negotiation and secret accounting rates which are neither equivalent to collection rates nor costs, inefficient bypass could result. The present bilateral system then generates incentives to alter the system.

Another form of bypass is leased lines. Individuals can lease international circuits paying a negotiated rate to each party at each end. There is no accounting rate for leased lines. Thus individuals can negotiate rates close to costs -- why would monopoly providers negotiate rates close to costs? The answer is that monopoly providers have only (short-term) monopolies over access in the country.<sup>49</sup> Because there are alternative transit paths between countries, the

fees for international leased circuits can be competed down. However, most countries would tend to prohibit the use of international leased lines for voice traffic.

Therefore, both transit (bypass) and leased circuits provide pressures to lower IMTS accounting and collection rates. This is not new, it is the pattern observed for domestic MTS rates. However, two reasons make it unlikely that these competitive pressures are sufficient to force rates down. Transit potential has existed for a long time; and private circuits represent only 1 per cent of international telecommunications revenues.

#### ***b) Resellers***

In principle resale can arbitrage price differentials and lower the degree of price discrimination. If there is more competition for private circuits than for IMTS, allowing simple resale of private circuits, can lead to lower prices. Two problems exist. The first is that if deviations are required from marginal cost pricing to cover NTS costs, some price discrimination is necessary. The argument in this study is that it is the existing system of IMTS prices and underlying accounting rates resulting from bilateral bargaining which is discriminatory against countries, and which is *inconsistent* with efficient pricing. Some form of efficient pricing however, may require customer specific price discrimination (as in the Ramsey rule). Allowing simple resale prevents specific price discrimination against some types of customer, thus resale may be (it may not be) inefficient.

A specific reason against simple resale is that it increases competition without the construction of competing facilities. In international calling, a public operator from another country could lease private circuits into a country and use them for sending its international traffic into that country. This would enable it to bypass the international gateways in that country and hence avoid paying the international accounting rates to the operators in that country. How many countries will follow suit? It is obvious that the present accounting rate system is an obstacle to the adoption of resale, especially if countries which allow international simple resale demand reciprocity from other countries.

#### ***c) Facilities competition***

##### ***i) Data/business services***

As over half of IMTS calls are for business, and as prices for IMTS are well above costs, pressures exist for new facilities entrants to provide unswitched data/business services. Thus, private domestic satellites have been allowed by the United States and in Europe (ASTRA): private international satellites have been launched (PANAMSAT) and larger new systems are being planned; private



fibre-optic international cables have been constructed and others are planned. These facilities add large amounts to capacity, are not under the control of the traditional IMTS providers and thus can provide substantial competition for more traditional IMTS traffic. The potential revenue stream for these facilities is not simply the present IMTS business revenue but the substantial growth in international business traffic with new facilities, new services and innovative pricing. The network response of the traditional suppliers is to provide new services and new prices distinct from IMTS in order to retain traffic and generate new revenues. Thus INTELSAT has announced new digital and data services such as IDR, IBS and INTELNET [a digital data service designed for very small aperture terminals (VSATs)]. However, the dividing line between non-switched data services and IMTS is not at all distinct. Thus a firm with a "non-switched" business line between two countries and a "leaky" PBX in each, is substituting its own IMTS service for traditional IMTS. The history of liberalised entry into domestic private line facilities in the US shows that facilities competition in "non-MTS" services can lead to MTS bypass. Thus, new international facilities provide inherent competition for IMTS. One important caveat, the ability to obtain landing rights in a country to provide international business services is not given. Therefore, an important issue is *market access*, a traditional GATT and OECD concept.

The principle of *market access* has been discussed in a number of OECD documents related to liberalisation of trade in services in general and in telecommunications services in particular (see OECD, 1987 and OECD, 1990).

The market access discussed to this point assumes that the provider of new international facilities has no facilities in the country in question. As this new service provider (the entrant) will be competing with the existing domestic monopoly provider of access in offering certain international services, it is essential that the monopoly is not allowed to discriminate. This then requires that the right of market access include:

- the right of interconnection at a gateway;
- the provision of non-proprietary "Open Network Standards" for interconnection;
- the right of equal access;
- the right of non-discrimination -- both technical and tariff;
- the right of establishment (retail office, advertising, etc.).

For this paper, emphasis is placed on the "right of non-discrimination in tariffs", a central issue. The "entrant" will have to pay for access; non-discriminatory payment requires a payment equivalent to what the monopoly implicitly pays itself for access. This then requires an *unbundling* of monopoly provided rates, and a determination of the costs of termination.

A number of observers have examined facilities competition and suggest that the emergence of end-to-end facility service providers will make the current artificially high level of accounting rates unstable, since such end-to-end facility owners bypass the entire international accounting rate/settlements process. However, insofar as these "end-to-end" firms offer only business services, they are no different in the principle of settlements than existing leased lines which also bypass the accounting rate system. Therefore "end-to-end" firms put direct pressure on the accounting rate system (as opposed to indirect by creating business service bypass) only to the extent that they become providers of IMTS services.

ii) *MTS services*

New international entrants can provide IMTS services by obtaining a termination agreement with a foreign monopoly. The entrant can be a reseller or facilities owner. Entry is possible but not likely to be profitable without such an agreement. For example, the entrant could advertise a reverse charge phone number in its home country, as is now the practice of a number of North American IMTS providers. AT&T, MCI, US Sprint and Bell Canada all provide a service where the caller in the foreign country, say France, obtains a US (or Canadian) operator. These calls are incoming to France, often carrying a surcharge per call and earn France one-half the accounting rate. A new entrant could then offer such a service, but without an agreement from France receives no return traffic. Since this entrant faces competition in collection rates from carriers with return traffic, such entry is unlikely to be profitable.

Thus effective competition in IMTS service requires an agreement on access to the public switched system and an agreement on return traffic. It appears that many countries (country Y) which have monopolies on outgoing IMTS calls are not opposed to competition on incoming IMTS calls, assuming that competition will lower collection rates in the other country and stimulate traffic which with *given* accounting rates, is additional profit for Y country.

The country hosting the competitive IMTS providers for outgoing messages (call H) often imposes a uniform settlements plan on the H IMTS competitors to prevent Y's "whipsawing", playing off the several H firms in order to gain a greater share of the bilateral pie.<sup>50</sup>

A number of arguments have been made that "uniform settlements" policy in general, discourages price competition, reduces the incentive to bargain for reduced accounting rates (since these are then automatically passed on to rivals) and deters innovation in achieving new settlements procedures. The FCC has reasoned recently that allowing competition to *lower* accounting rates is efficient and that imposing total uniformity would not allow price reductions. However, given unequal access between the United States, Britain, New Zealand and Japan,

on the one hand and other countries on the other, regulatory rules such as uniform settlements prevent monopoly providers from taking advantage of the lack of competition entailed by unequal access.

## 10. A new rules based system: termination fees

Several changes in the present accounting rate system have been discussed. Here an alternative system is proposed, which revolves around the notion that each country establishes a non-discriminatory termination fee for the use of its domestic system. This termination fee must be commensurate with taking into account gateway and other costs, to the charge for a domestic long distance call which incorporates both the cost of a trunk call and a fee for the use of the local network.

As noted, a new rules-based system should be founded, at least, on the GATT and OECD principles of *non-discrimination in trade in services* and *national treatment*. Also discussed earlier, an outgoing call from country H to country Y is an export of termination services from country Y to H. This outgoing call HY is *not* an import of originating services by country Y from country H because the price for the entire service of an outgoing call is set by country H and is collected from the resident in H. Thus GATT/OECD principles are most useful in determining termination fees, i.e. accounting rates.

### a) *National treatment*

Applying the concept of national treatment to international trade in services implies that:

"laws, regulations, requirements and advantages affecting the sale, provision or distribution of telecommunication network-based services shall apply identically to national and foreign services of providers alike, and therefore allow foreign service providers (established and non-established) to compete on an equivalent basis with national providers. In view of requirements for market access based on establishment, as discussed above, national treatment for this sector should encompass the GATT and OECD concept. National treatment is relevant to the competitive situation which exists in the provision of telecommunication network-based services (see OECD, 1990, p.35-36).

For the specific issue of termination charges for IMTS calls, it can be argued that national treatment as a principle would involve the country, PTT, or firm charging the same for terminating an incoming call as it charges domestic users

of the domestic telecommunications system. A domestic MTS call wholly within the country provides for cost reimbursement for domestic long distance and for some reimbursement for the use of the local system. Thus, national treatment would require that foreign users of domestic telecom facilities pay no more than domestic users for equivalent service. In addition to this termination fee, the costs of the international gateway and the costs of the international link would be charged for.

National treatment, in the sense applied here, argues that whatever the domestic system for pricing internal long distance calls, and thus the contributions to NTS costs or the local system implicitly (or explicitly in the United States) contained therein, the same system be applied to the domestic portion of an international call.

***b) Non-discrimination (Most Favoured Nation - MFN)***

The principle of non-discrimination, requires that a country offering a concession to another country (or group of countries) offers the same concession in a non-discriminatory manner to all countries. Many exceptions to the MFN principle exist -- customs unions, free trade areas and general restrictions when "disparities on market access between countries are large" (OECD, 1990, p.30).

It may appear odd to suggest the use of a principle of non-discrimination in a paper on pricing principles where it is suggested that price discrimination may be an efficient means of pricing telecommunications! However, as has been pointed out, the *actual* discrimination in IMTS is inconsistent with efficiency principles. In particular, the bilateral setting of accounting rates conceivably leads to accounting rate differentials between countries based solely on bargaining strength. For example, country X may have 140 different bilateral negotiations and 70 different accounting rates. Thus the charge for terminating a call varies enormously. It is this pattern of price discrimination which is singled out here.

A solution to this discriminatory and inefficient pricing system would be to abandon the present accounting rate system and move to a system where a fee is determined under the principles of national treatment and MFN.

While economists argue for cost-based pricing with NTS costs charged for in lump sum amounts, not all countries agree. Therefore, if country X wishes to charge for access by imposing a per minute surcharge on all calls, that is country X's prerogative. Economists can work to make country X's prices more efficient. However, in deciding on pricing principles for international calling, it is reasonable to begin by borrowing principles for international trade. Those principles -- national treatment and MFN -- suggest that a country (a PTT) charge foreigners termination fees equivalent to those charged to domestic consumers of purely domestic telecommunications. This principle does not seem unreasonable.

It would be implemented by each country (PTT) publishing a termination fee for international calls no higher than the price of an equivalent distance domestic call (for within country costs) and a fee for the costs of the international facilities.

What of the Ramsey rule -- why should a concept of treating IMTS and domestic long distance calls the same be adapted? Given the present state of knowledge on relative elasticities of demand for IMTS, MTS and access, IMTS calls should probably face a *lower* mark-up than domestic message tolls. However, this present state of knowledge is based on a few studies. Therefore, it seems plausible to argue that all long distance calls, IMTS and MTS be treated similarly.

How could such a system be implemented? Several possibilities exist. First, the TEUREM mechanism leads to cost-based termination charges within Europe and the Mediterranean Basin. These countries could then apply the TEUREM rates on an MFN basis to all countries. Second, other countries could utilise the TEUREM methodology to measure the costs of the international circuit, switching and domestic termination. Third, a simple rule could be applied to *begin* the process. Each country would establish the prices from gateways to several locations *based on equivalent domestic MTS tariffs*, announce these prices (they are publicly available in any case), and add the costs of international circuits (it needs to be recognized that in a number of cases domestic MTS tariffs are not cost-oriented). Handling charges would be differentiated for outgoing calls.

Some countries, notably the United States, place less of a mark-up on domestic MTS calling, preferring larger lump sum access fees. Are these countries "discriminated against" by this proposed system since their MTS rates will be relatively lower than other countries' rates? The answer is no. Assume there is a country (H) which levies no mark-up on MTS above its attributable costs; all access fees are lump sum. Then the termination fee for a foreign incoming call bears no mark-up either. Foreigners, however, are not getting a "free-ride"; their "ride" is priced the same as for any long distance call. To charge foreigners more is to discriminate against them. But, domestic MTS users pay for NTS costs through domestic access fees. Here, the proposal appears to require foreign "users" not to pay for NTS costs. The comparison however, is between the two traded services. The citizens of H are able to terminate calls in all foreign countries at prices equivalent to what domestic callers in those countries pay. Callers into H receive the same privileges. This is the basis of non-discriminatory trade in services. Were H to argue that incoming IMTS calls should bear some proportion of NTS access fees even though domestic MTS calls do not bear those fees, then this would be discriminatory and based on the same arguments to would allow foreign countries to levy mark-ups on IMTS calls. In addition, as A&V indicate, there are substantial externalities for calls. Thus, an incoming call to H generates welfare for the domestic recipient, as that person pays nothing for the call.

This proposal would also make collection rates on two-way flows symmetric. A call from Y to H would involve the domestic price in Y, the costs of the international circuit, and the domestic price in H. A call from H to Y would involve the domestic price in H, the costs of the international circuit, and the domestic price in Y.

Under this system, postalised rates could also be replaced by more distance sensitive pricing.

## **11. Similarity of a termination fee system to other existing systems**

The above system is not dissimilar to existing mechanisms for telecommunications settlements. The TEUREM plan discussed earlier uses cost-based mechanisms to ensure a minimum of arbitrary discrimination within the TEUREM region for any country's charges in terminating other countries' outgoing calls. These settlement procedures are cost-oriented and distance sensitive. Explicit account is taken of the higher costs in originating than terminating calls. Explicit costs of the international circuit, switching, the domestic link and termination are included. However, when a member of TEUREM deals with a country not part of TEUREM, then all this information is discarded; instead bilateral negotiation of an accounting rate is undertaken. Similarly, other contiguous arrangements such as United States-Mexico do not rely on a 50:50 split of accounting rates. There is then international acceptance of alternative means of charging and settling international calls.

## **12. Peak/off-peak rates**

The daily time pattern of IMTS calls show highly peaked patterns. These peaks can exacerbate peaks in domestic call patterns and impose demands on capacity patterns for international circuits. Yet, many operators do not utilise peak/off-peak rates for IMTS, or have only two divisions of rates. For AT&T in 1982, (see Figure 3 taken from Johnson, 1989) the peak for two-way traffic with Europe between 8.00 am and noon US (CST) time accounted for 50 per cent of the busy hour offered load.

The important issues for the viability of off-peak pricing are:

- the potential savings in costs;
- the ability to shift load.

Since AT&T has a postalsised rate within the United States, calls at 10.00 am CST originating or terminating in California are not peak for the California telecommunications plant. This is another reason why postalsised rates are not efficient. However, a discount rate in California at 6.00 am California time would hit New York at the peak. IMTS minutes are not a substantial percentage of all minutes, thus their addition to the load is not as important as Figure 3 indicates. However, the IMTS load is very peaked, so it is costly, in the capacity sense. Note that a call from New York at the peak is likely to be at the peak in France, but a call off-peak in New York (say 7.00 am) is also peak in France (and *vice versa*), thus, recognising peak/off-peak costs in IMTS is complex.

Four impediments to rational rate design exist:<sup>51</sup>

- the use of uniform rate periods across a country;
- variations in network segment usage;
- unco-ordinated rate structures among countries; and
- high and inflexible accounting rates.

The arguments are cogent.

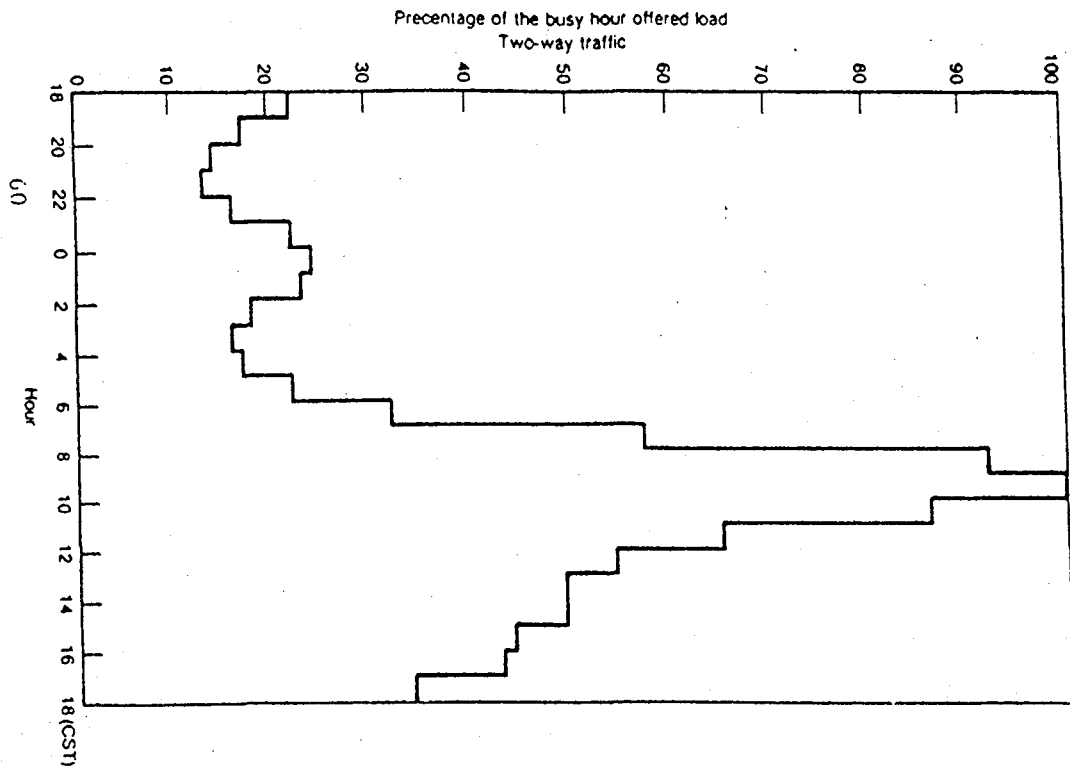
The accounting rate system prepared here can be adjusted to have peak/off-peak rates. The termination fee system could easily cope with this issue.

It is unknown what costs of IMTS are moveable. Given the substantial peak/off-peak structures for domestic MTS in many countries and the cogent arguments for these, it would be curious if similar savings were not available on IMTS. As noted above, the problem is one of co-ordinating many time zones. For example, between the United States and Europe the following *minimal* pattern holds:

USA	Europe	Connecting Plant
Off-Peak	Off-Peak	Off-Peak
Peak	Off-Peak	?
Off-Peak	Peak	?
Peak	Peak	Peak

Thus, for only a two part distinction (peak/off-peak) at least four divisions of costs could occur. This distinction and this type of charging could be introduced under a termination fee system.

Figure 3: Twenty-four traffic profile, United States and Europe



Source: Johnson (1989) taken from AT&T (1982), Vol. 2, p.3-7.



## VI. THE IMPACT OF STRUCTURAL CHANGES ON INTERNATIONAL TELECOMMUNICATIONS MARKETS

International telecommunications are in a transition phase. Market entry is allowed in some countries, a large number of competing infrastructures are being developed, many traditional telecommunications operators are entering into a number of joint-ventures for the provision of value-added networks services, which will have implications as well for their traditional revenue source -- voice telephony. Where market entry has been allowed new firms are entering those areas where prices have been high, such as international telecommunications, leading to rapid downward price adjustment. In turn this is inducing price restructuring internationally, but is also leading to an increasing price gap between countries where change has been rapid and those where it is slower. There are a number of developments which will affect the degree of competition in the international provision of public telecommunications and their prices. These include developments in the infrastructure, both fixed link and satellite, traffic growth and emerging competitive developments and liberalisation of market structures.

### 1. Network developments

Telecommunication networks have grown rapidly in OECD countries. Growth in main lines in the OECD area grew at a compound rate of 4.2 per cent between 1978 and 1988 attaining a level of 341 million lines. International satellite and transoceanic cable capacity has also grown rapidly over the last decade.<sup>52</sup> New investment is adding significant capacity to the major international traffic routes which are between Europe and North America, and between North America and South East Asia (about 60 per cent and 20 per cent of world traffic respectively).<sup>53</sup> TAT-8, for example, which began operation across the Atlantic in 1988 has more than twice the capacity of the existing copper-wire cables (TAT 5,

6, and 7). The rapid build-up of international telecommunications capacity can be seen from Table 21.

A fundamental change has occurred in the cost structure of international telecommunications. The percentage of trunk and international circuits connected to automatic switching is 100 per cent in most OECD Member countries, reducing operator costs. In addition, while 15-20 years ago transmission costs were a major factor in the total cost structure, they now play a relatively small part in total costs. This change in cost structures means that costs are now concentrated in the national termination and origination segments of international calls. Technological factors have played a primary role in this regard: technological developments have been reducing costs, for example, TAT-9 is expected to double the capacity of TAT-8 across the North Atlantic, but it will cost only 20 per cent more resulting in lower average costs per circuit. Calculations of the investment cost per minute of use of transatlantic cables are \$2.53 for TAT-1 (1956), \$0.22 for TAT-5 (1970), and \$0.04 for TAT-8 (1988).<sup>54</sup> Similarly, the annual cost of an INTELSAT half circuit fell from \$32,000 in 1965 to \$4,680 in 1981.<sup>55</sup> These changes are continuing and will therefore maintain downward pressure on prices. There will also be downward pressure on prices if investment increases international capacity faster than traffic growth.<sup>56</sup>

Another important factor which could influence international prices and charging practices is that, unlike in the past where ownership of underwater cables was strictly in the hands of public telecommunications operators, now a number of enterprises from banking, insurance, and financial services own shares in these systems. Spare capacity is leased so that these owners could also become carriers for IMTS. The possibility that separate satellite systems may also be allowed easier entry to provide international non-switched services may also have trickle-down effects on prices of switched international services.

Technological changes, increased capacity and the increase in volume of international telecommunications traffic have already led to significant decreases in the average cost per minute of use for international telephone transmission. Only to some extent have these falling costs of transmission been reflected in falling international prices. In conjunction with falling international transmission costs, developments in switching, direct distance dialling, as well as improvements in domestic networks have all played a role in reducing costs for international telephony. The productivity improvements which have taken place have not been fully passed on to customers, mainly because of insufficient international competition and lack of any national regulatory control (in the 1970s and 1980s) on international charging.

## 2. Satellite developments

An important way to stimulate competition in international telecommunications is to allow inter-modal competition. At present PTOs usually control international cable transmission and satellite facilities through share ownership. International competition through, for example, specialised satellite facilities or private international cables can help in breaking this bottleneck.

There has not been an active attempt by countries to promote international inter-modal competition. In the United States, for example, the balanced loading requirements imposed on AT&T in 1962 (to be phased-out in 1994) required that transatlantic traffic be shared between satellite and cable systems and guaranteed fairly stable market shares for each of these systems.

The development of international satellite communication links have been mainly the responsibility of the International Telecommunication Satellite Organisation (INTELSAT), which is a non-profit co-operative. The approximately 112 Member states invest in the organisation in proportion to their use of the system.

INTELSAT's costs, and prices are averaged globally.<sup>57</sup> The revenue sources of INTELSAT are unbalanced geographically in that approximately 10 per cent of its revenues derive from half its earth station pathways, while 50 per cent of revenues derive from 10 per cent of pathways. Approximately 65 per cent of its revenue derives from international voice services. Just as is the case currently for cable transmission, INTELSAT charges are usually a fairly small percentage of the total price of an international call. Normally the charge for an international call using satellite communications is allocated between INTELSAT, the national signatory of the INTELSAT operating agreement,<sup>58</sup> and domestic carriers.

It has been argued that for telecommunication administrations the difference between the real cost of INTELSAT satellite circuits and the lease price is not an issue:

"..because almost all [the telecommunication administrations] are members or co-owners of the INTELSAT consortium and most of the differences in cost and price (after deducting operational costs) are returned to them in the form of compensation for use of their capital. In the last decade compensation for use of members' capital had averaged 14 per cent per year, representing a very good return on their investment."<sup>59</sup>

INTELSAT's owners (the Signatories) are also to a large extent owners and users of international cable infrastructure. In addition to the owners, the parties to the INTELSAT Agreement are governments. It is usually the parties who will decide if competing private satellite systems will obtain landing rights in a particular country. Article XIV(d) of the INTELSAT Agreement requires that

there should be consultation with INTELSAT signatories "to avoid significant economic harm" before these signatories provide permission for separate international satellite systems.<sup>60</sup> Competitive pressure on INTELSAT has led it to seek new niche markets in the provision of competitive services.<sup>61</sup>

There are certain signs of reform in international satellite service structures. Recent elimination of the balanced loading requirement in the United States to be phased out by the end of 1994 when the AT&T-COMSAT agreement expires, and acceptance of independent satellite services has begun a process of encouraging more active competition between different transmission modes. The FCC in the United States has authorised separate satellite systems to function internationally, but has not however allowed them to carry switched telephone traffic which constitutes the bulk of international telecommunications service traffic. The separate satellite providers which have been approved by the FCC have had difficulty in reaching operating agreements with foreign countries. In the United States the specialised satellite service operators are able to provide satellite-based services throughout the European Community. The Commission of the European Communities' Green Paper on a common approach in the field of satellite communications in the European Community also has a number of proposals which would liberalise the use of satellite communications in Europe, as well as having spillover effects on the rest of the OECD area.

The process of reform in satellite communications has been too slow. There is a need to rapidly establish direct access to INTELSAT and to allow multiple-entry through "neutral" signatories, as has occurred in the United Kingdom with the creation of a separate Signatory Affairs Office. There is also a need for countries, which have already introduced competition in their telecommunication structures, to be less inconsistent in their policies *vis-a-vis* international satellite services. It is, for example, difficult for countries which have liberalised their domestic market structures and which allow the provision of international value-added network services to continue to justify their support of international monopoly structures and their refusal to allow for the provision of international satellite competition for non-reserved services. For this reason, a case can be made for allowing end users direct access to INTELSAT satellites by-passing middlemen. This should ensure lower prices for satellite circuits and a move toward more cost-oriented pricing for circuits. These changes would have a beneficial impact on international telecommunication prices.

### **3. International telecommunication competition and liberalisation**

It is recognised that the most effective way to reduce prices and move towards a cost-based pricing structure is through competition. In the case of

international telecommunication services the introduction of competition has been slow. A preliminary step in this process would be to allow the international resale of capacity. The liberalisation of national telecommunication market structures has spilled-over in a number of cases to affect international telecommunications competition and charging. The emergence of MCI in the United States as a competitor to AT&T, and the duopoly policy in the United Kingdom, put downward pressure on transatlantic charges, and these reductions were subsequently followed by other major European countries on their transatlantic routes. In Japan the effects of introducing competition in international services in 1989 became evident, with a significant reduction in prices by KDD, the incumbent former monopoly, and the rapid increase in market share by ITJ and IDC, the new entrants. The fact that there is both some direct and geographic competition on transatlantic routes is noticeable from the relative price levels for these routes compared to other relations (see Tables 6 and 7).

In the present structure for international telecommunications certain safeguards are required. Such safeguards are needed when operators from one country which allows international competition are faced with monopoly service providers from other countries. Precedents for safeguards exist in terms of FCC (United States) Uniform Settlements Policy preventing "whipsawing". The requirements underlying the Uniform Settlements policy is that all operating agreements between US carriers and a foreign telecommunication administration maintain an equal division of the accounting rate between the United States and the foreign operator, and that they specify the same accounting rate and settlement procedures on similar routes for similar services. Other precedents exist in the United Kingdom in an Oftel Determination.<sup>62</sup> The US and UK safeguards are similar in that they require domestic operators to accept the same financial and other terms with foreign operators. The result of dissymmetry in international market structures implies that it is difficult to stimulate effective international competition by placing limits on accounting rate negotiations. The 1986 FCC revision of the Uniform Settlements Policy allows for non-uniform agreements between US international carriers and another carrier on a single international route. But the FCC needs to be notified and the other US carriers can protest against an arrangement. Similarly OFTEL now allows BT and Mercury to negotiate their own accounting rates.<sup>63</sup>

A difficulty faced by new entrants in the international telephone service market is gaining access to domestic outgoing international traffic, and more importantly, getting foreign operators to send them traffic. If the financial conditions between two competing international service providers from country A and a monopoly service provider from country B are the same, then the country B operator has no incentive to switch traffic from the established operator in country A to the new entrant in country A. On the contrary, the new entrant in country A may impose some costs on the operator in country B, and therefore there may be an incentive by the operator in B not to service A. It is therefore

important that such initial disadvantages, faced by new entrants in international telecommunication service markets, are reduced. One such safeguard proposed in the United Kingdom, and which depends on a certain amount of co-operation and goodwill between competing companies, is that of a proportionate return arrangement which would require foreign operators to send traffic to each UK operator in proportion to the incoming traffic received from them. However, this places pressure on new entrants to reduce prices as far as possible in order to stimulate outgoing traffic and, in return, obtain incoming traffic.

Proportionate return requirements can also lead to predatory behaviour by carriers in a dominant position in the country where competition for international services is allowed. This may occur, for example, by charging low rates for outgoing calls in that high net revenues will be made from incoming calls. Low collection charges on outgoing calls will attract customers, stimulate outgoing calls, and ensure, through proportionate return agreements, that the carrier will obtain incoming traffic.

In the longer term if there is a shift to international competitive market structures for telecommunications there will still be a requirement for a number of safeguards in particular to ensure open access, as well as non-discrimination and fair pricing conditions.

In the context of the TEUREM area the implementation of the Green Paper on the Development of the Common Market for Telecommunication Services and Equipment should eventually lead to a significant restructuring of tariffs; the Green Paper notes the need for intra-European telecommunication tariffs to follow cost trends and a need for greater convergence between accounting rates and K-values.<sup>64</sup> The Green Paper also raises the possibility for a European tariff zone. To ensure that cross-border calling is not discriminated against *vis-a-vis* national trunk calls there will be a need in the Community context to examine zoning structures, and this will impact on intra-European call charges.

More international competition could also emerge through the simple resale of capacity on international leased circuits. In the context of CCITT Recommendation D.1, its new revision is favourable to the subleasing of international channels, providing an international private leased telecommunication circuit network and international telecommunication services. The Recommendation does recognise that any Member can maintain special or exclusive provisions for entities. The revision of the Recommendation also allows for the interconnection of international private leased telecommunication circuits with public networks at both ends if allowed by both parties. These circuits should normally be charged on a flat-rate basis and should be cost-oriented. In the United Kingdom simple resale of capacity on international circuits is allowed. The issue of whether there should be two-way resale is important. Without two-way resale there is a possibility of one-way bypass of the accounting rate mechanism by a foreign operator leasing channels to send traffic

directly into a country. In effect this has been the AT&T's complaint concerning United States-Canada relations where it was claimed that there is "accounting-rate" by-pass by resellers offering one-way access to the United States PSTN via leased lines. The beneficial effects of resale need to be weighed against any negative effects which could arise from by-pass. Simple resale within Europe would probably place significant pressure on intra-European tariffs. Simple resale across the Atlantic would have the same effect.

## VII. DEVELOPING COUNTRY ISSUES

The gap between developing and developed countries in terms of telecommunication infrastructure and services remains wide and the data indicate that it has in fact widened for a number of developing countries. On the other hand, some industrialising countries have made significant progress in closing this gap. A number are also making significant policy changes in order to allow more competition and foreign investment in telecommunications infrastructure in order to obtain the required funds for development. Developing countries, like their OECD counterparts, obtain an important percentage of their revenue from international telecommunications. In terms of the balance of telecommunication payments for the developing countries, it is difficult to make generalisations as to whether they tend to be in deficit or surplus. An ITU study<sup>65</sup>, which provided summary traffic data for 1985, showed seven out of 11 developing countries had more incoming than outgoing traffic.<sup>66</sup>

Many developing countries believe that their share of accounting should be higher. This idea was initially launched in the 1984 report "The Missing Link" issued by the Independent Commission for Worldwide Telecommunications Development which suggested that consideration should be given to setting aside a small portion of revenues from calls between developing and industrialised countries for the development of telecommunications in the developing countries. This was promoted as a means of reducing the development gap in telecommunications between industrialised and former countries. The accounting rate mechanism was viewed as a useful means of subsidising telecommunications development. This recommendation, made on the basis of the imbalance of world telecommunications traffic, was aimed at trying to generate a transfer of funds from the developed to the developing countries.

In 1984 CCITT Recommendation D.150 was also amended to allow for the division of accounting revenue other than on a 50:50 basis. The justification was based on the assumption that the provision of international telecommunication services by developing countries was likely to have higher costs. In Resolution PL/3 of the Final Acts of the World Administrative Telegraph and Telephone Conference in 1988 (WATTC-88) a proposal was also made to give consideration



to assigning a portion of revenues from calls from developed and developing countries for telecommunications development in the latter countries.

## 1. Cost differentials

The ITU, as a follow-up to the recommendation of the "Missing Link" report examined the costs of providing telecommunication services between developing and developed countries. The study indicated the existence of disparities, but did not draw definitive conclusions. The IXth Plenary Assembly of the CCITT confirmed the need for a detailed study of the costs of providing and operating telecommunication services between these countries. The 1988 ITU study had insufficient data to assess whether developing countries incurred higher unit costs in the provision of international telecommunication services.

It is relevant to try and ascertain why there are cost differences. If these are due to the inefficiencies of the network and its operation, then divergence from a 50:50 settlement rate would only serve to continue inefficient operation and provide no incentive for change. If they are due to fundamental conditions which create different operating conditions and costs, then these would need to be identified. In a number of cases developing economies need to stimulate traffic, and therefore revenue, by decreasing their call charges. The Report of the Advisory Group on Telecommunication Policy stated:

"Appropriate pricing and rate structures are important to the financial viability of the telecommunication carriers ensuring the efficient use of different telecommunication services."<sup>67</sup>

The use of the accounting rate system as a means of assisting developmental goals would not be efficient. OECD countries have, in the main, adopted economic principles based on the notion that indirect subsidisation results in structural distortions and should be avoided in favour of direct means of financing. This would argue for direct funding from appropriate organisations for the development of telecommunications infrastructure in developing countries. There has also been a tendency by many developing countries (as occurs or has occurred in OECD countries) to use income generated from telecommunications to augment general government revenues, rather than to re-invest in the telecommunications sector. In itself this is an argument against using accounting procedures as a source of investment funding which would in effect become a source of general government revenue. On the contrary the argument needs to be made that lowering prices to stimulate traffic can help increase revenues for all operators, and this should form the basis of strategy for developing as well as developed economies.

In order to assist developing economies to adjust to lower accounting rates and to avoid a too abrupt fall in revenue it could be envisaged that lower rates could be introduced on a growth-based basis. That is, the rates are reduced once a pre-set volume of traffic has been attained.

## VIII. CONSIDERATIONS FOR REFORM

The main question underlying this study has been whether the present system of charging for international telecommunications is consistent with a changing international telecommunications framework which is seeing the emergence of more competition. It needs to be recognised at the outset that reform of international telecommunication charging practices and procedures is to a certain degree linked with the reform of domestic telecommunications service structures, in particular the rebalancing of domestic telecommunication charges. In the 1980s, rebalancing of tariffs in most countries took place slowly or not at all. At present, a positive trend in rebalancing has emerged. However, the substantial differences which still exist among countries in the implementation of rate rebalancing affects the extent to which cost considerations are reflected in prices. In certain countries this is linked with direct government involvement in price levels and telecommunication charges.

A number of telecommunication tariff principles have been accepted by most OECD countries. These include:

- tariffs should not be used as a barrier to restrict the provision of services;
- tariffs should not discriminate between national and foreign service providers;
- tariffs and tariffication practices should be transparent;
- tariffs should be cost-oriented;

Applied to international accounting and charging practices these principles lead to the following conclusions:

- international telephone service prices are in many cases excessively high diverging to a large degree from the cost of provision;
- these prices discriminate against international calling relative to calls of a similar distance made nationally;

- these prices discriminate against some countries in terms of their cost of access to markets of other countries;
- these prices impose a penalty on domestic users in international commerce;
- inflexibility in pricing structures reduces efficient utilisation of infrastructure resources;
- accounting rates have not in general followed changes in costs of providing services;
- the divergence between collection charges and accounting rates are increasingly making it difficult for operators wishing to follow cost-based pricing and efficient pricing techniques to do so;
- there are in some cases significant differences in traffic flow which cannot be attributed only to socio-economic structures, but also to price structures.

Although the accounting rate system has facilitated the international payments procedure through simplification and uniformity, it is more appropriate to a period of more stable technological change and less service competition. The present system of international pricing is being viewed increasingly as inefficient and leading to a misallocation of resources, in particular because of the levels of accounting rates and collection charges, and the divergence between them. Over the last few years significant adjustments have been made in collection charges and in accounting rates, but there is a need for continued adjustments. With progressive rebalancing of tariffs, national and international, a more cost-oriented tariffication system could emerge in the medium term.

High accounting rates maintain upward pressure on collection charges in that countries need to cover their share of the accounting rate owed to terminal countries. High accounting rates also penalise new entrants who at the initial phase of operation need to attract new customers and therefore want to set cost-based prices. Such new entrants, although offering lower collection charges, need to pay similar accounting rates as existing entrants and this is blunting their ability to compete. High charges can also act as a disincentive to the emergence of new telecommunication network-based services. Such high charges may also tend to lead to the inefficient use of public switched telecommunication networks by encouraging migration to leased lines, a policy which, in the long run, is detrimental to the interests of telecommunication administrations and users. International charges which are out of line with costs will tend to stimulate traffic by-pass and arbitrage.

The present system makes it difficult for one country to reduce the prices charged to a customer for an international call without a compensating reduction in accounting rates. The effect, if international calls are price elastic, would be

to stimulate outgoing calling and consequently net outpayments to other countries. Other countries would tend to earn surplus profits and their incentive to maintain high charges and accounting rates would be reinforced. As a result of the emergence of international telecommunications competition in some countries a transfer of profits from competitive suppliers in one country to monopoly suppliers in another country is taking place. This is arising because competition in country A with two or more nationally-based international carriers is reducing collection charges for calls from country A to other countries. If the accounting rate between carriers in country A and country B is not reduced, then effectively the reduction in prices in A have reduced profits in A and stimulated calls in that country, increasing revenue and profits in B.

A key problem in the adjustment of prices and accounting rates is the bilateral nature of the process and the lack of power to induce changes by one partner on the other. Regulators need to pay more attention to accounting rates and should make these rates public.

The present accounting system also raises the question of whether conditions of fair and equivalent access and national treatment and non-discrimination are being frustrated where tariffication creates dissymmetry between resident or non-resident suppliers. The issue of appropriate behaviour by a monopoly service provider needs to be examined in this context. This applies in particular to terminal countries, but in some rare cases transit countries also maintain high rates. The issue of appropriate national regulatory objectives may also be relevant in this regard, in particular if international services are used to cross-subsidise domestic services.

Greater transparency in terms of existing accounting rates would in itself assist in the process of reducing the existing rates. There is no provision in the CCITT Recommendations indicating that the accounting rate should not be transparent except in that it is explicitly recognised that this is a bilateral matter. In a competitive environment it would be expected that inter-firm transactions would remain confidential in that they disclose information pertinent to the competitive process. In transactions between two international monopoly carriers there is no reason for this information to be maintained as confidential, except that in recent years there has been competition on a geographical basis which has been an important factor in lowering international prices. It could be argued that transparency could reduce the bargaining power of operators. However, the ultimate objective of negotiations is to obtain the lowest prices for users at both ends of a relation. Transparency would help in this regard because it would provide users in countries where the monopoly operator is slow to change with relevant information to pressure the operator to change prices. In the context of separation of regulatory and operational functions in telecommunications transparency would enable policy makers to operate more openly. Transparency is also important as a means of assessing the reason for the continual large dissymmetries in charges applicable in each direction. One can question why such

dissymmetries continue to exist in view of the treaty binding nature of the ITC and its Regulations.

One of the characteristics of the emergence of international telecommunication service competition is that it is not taking place in the context of an agreed international framework. Many of the issues raised above would be included within a framework of principles covering the international provision of telecommunication services.

An initial step in reforming the present practices would require in fact *more strict adherence* to the relevant CCITT Recommendations which call for *cost-orientation* and *avoidance of dissymmetry* in bilateral charges and between charges and accounting rates. This would involve the adjustment of collection charges in those countries where such charges are not in line with costs. In addition this would require that accounting rates are cost-based reflecting costs of access to the network of terminating countries.

Ongoing discussions at the CCITT to revise the specific Recommendations related to accounting principles are aimed at strengthening the relation between costs, the changes in these, and the level and changes in accounting rates. These proposed changes, if implemented by administrations over a fairly rapid period, may be sufficient to stimulate a momentum of change, especially among the developed economies. For the developing economies the time period required to move to accounting rates which are cost-related is necessarily longer, but they also need to make a commitment to move in this direction.

The move to cost-oriented pricing (and cost-oriented accounting rates) could, if justified by costs, lead to more widespread use of non-uniform settlement procedures (that is other than a 50/50 share of international revenues). One problem in this context is that non-uniform settlement shares imply a knowledge of relative costs for international services between countries. With increased international competition and privatisation there is a growing reluctance by operators to reveal costs.

It is difficult for international operations to avoid losses from exchange rate fluctuations, but as in other international commercial transactions, they can be considered as a cost which may be borne partly by operators and partly by users. In this context more rapid exchange of accounts should be encouraged and various schemes can be adopted which help iron out significant exchange rate fluctuations.

A number of other concepts for changing the existing accounting system have been proposed. One of them is "sender-keeps-all". This concept, it has been argued, depends on there being a consistent balance of traffic between two countries and an assumption that costs are very similar between the two corresponding countries. A variant of the "sender-keeps-all" principle would allow for all outgoing call revenues to be kept by the sender, who would have to

pay transit charges, an access charge to terminating countries, and international transmission. Such a variant would in fact resemble the existing system if it were adjusted to be cost-oriented. A "pure" sender-keeps-all system would be valid in a competitive regime where international carriers provide end-to-end services. Another modification of the existing payments system would be to take into consideration relative volumes of traffic, for example, by giving countries generating high traffic volumes discounts on termination charges to the national network. In that incoming traffic tends to be more profitable such volume discounts should be possible.

It is important to stress that although the CCITT has provided a framework, it is the individual telecommunication administrations which are responsible for the setting of their national collection charges and, on a bilateral basis, negotiating accounting rates. Any initiatives for change in the framework must come from these administrations.

The bilateral nature of negotiations of accounting rates is possibly the main reason for the lack of transparency in these rates. It is also a reason why there is not sufficient international pressure for more regular reviews of the accounting rate system in itself and in the level of international charges and accounting rates. There is clearly a need for such reviews to take place, not only on a bilateral basis, but within regions and between different regions. There is a need to recognise that procedures such as TEUREM set price ceilings in terms of accounting shares, and there will be a tendency for operators to set rates at the level of the ceiling.

Although there is joint provision of international services, there is no evidence to suggest that any two joint providers of international telecommunication services have collaborated in order to maximise their joint profits, in other words there is no evidence of cartel behaviour. On the contrary there is evidence that a number of operators have taken advantage of their monopoly position as a gateway to national markets to maintain high accounting rates in spite of pressure from bilateral partners to reduce these rates. In addition, the existing settlement procedure involves a form of competition between carriers over the balance of international calls between them.

When two or more carriers operating in a competitive environment in their home country deal with a monopoly carrier from another country there is a need to ensure that the monopoly operator treats the competing foreign carriers in a non-discriminatory way. This has not always been the case in the past and the burden to ensure such non-discrimination has usually been on countries which allow competition. It is for this reason that the Federal Communication Commission in the United States and Oftel in the United Kingdom have required carriers entering into operating agreements with foreign carriers to use operating agreements which are standardised at the national level.

Similarity for similarity of operating agreements has been required when carriers from countries allowing national and international competition in telecommunications are dealing with countries where there is a monopoly carrier. However, it is not clear how such a requirement would work between countries where competition in telecommunications is the norm. Would it act to stifle competition and penalise the more efficient firms?

## **1. The need for change**

There is sufficient evidence to conclude that the existing framework for international telecommunication charging and settlements is not conducive to open and competitive telecommunication markets and leads to distortions and inefficiencies. High collection charges and high accounting rates, which may be partially responsible for high collection charges, act to restrict the flow of international traffic. In effect they play the same role as customs tariffs in constraining the flow of goods. The emphasis of this paper has been on charges for the use of the public switched telecommunications network for international calls. But the restrictive effects apply to all international relations (such as telex and data networks) where the charges diverge from costs.

In assessing the existing system for international charging practices and procedures it is evident that prices diverge from costs to a considerable extent, that important divergencies exist between customer charges and accounting rates, and because of these factors distortions in traffic patterns occur. The existing system is not conducive to a competitive environment which may emerge rapidly at the international level. For these reasons there is a strong case for contemplating reforms of the system itself to increase its efficiency, introduce more transparency and non-discrimination, and make it more compatible with a more liberalised trading environment.

In assessing the potential to reform the system certain criteria need to be maintained. These include:

- simplicity in administration;
- predictability to allow forward planning;
- maintaining confidential company information;
- non-discrimination;
- cost-related prices;
- flexibility.



Should there be reform or evolutionary change? There are a number of countries which believe that the existing system should be maintained and that the pace of change is sufficient. They view the required changes in international pricing frameworks as being an evolutionary process. But there are many countries which view evolution as too slow and seek an acceleration in the rate of change. Evolutionary change would be sufficient, if an international pricing system which is non-discriminatory, fair, cost-related, and flexible, allowing end-users to share in the benefits of technical and productivity gains if public telecommunications operators, can emerge. The history of the international pricing system for telecommunications has certainly shown that there are insufficient incentives for this to take place. A precondition for change would be for operators to adjust their national telecommunication tariff systems and for operators to become more aware of their operating costs and their allocation. Thus it is likely that the implementation of a cost-oriented international telecommunication pricing system will be accompanied by an increase in charges for other services. The imbalances in revenue outflows are largely due to basic telephony services, nevertheless the tariffication procedures affect all telecommunication network-based services which use the international public switched telephone network. In that the current accounting system provides little incentive for public telecommunication operators to improve their efficiency, and could in fact militate against unilateral moves to improve efficiency, lower tariffs, and the adoption of innovations, this may result in a negative spillover effect across all telecommunication network-based services. The success of any proposals to introduce more efficiency in international charging would be most effective in the longer term if competition in the international provision of telecommunication services was introduced.

## **Annex**

Table 1. Income from the telephone service, percentage distribution,  
OECD Member countries, 1989

	Income from Installation charges	Income from subscription	Income from calls
Australia	5.45	29.78	64.77
Austria	2.25	25.13	72.62
Belgium	2.23	24.08	73.69
Canada	n.a.	n.a.	n.a.
Denmark	3.70	29.67	66.63
Finland	6.65	19.13	79.22
France	_____19.89_____		80.11
Germany (1988)	0.94	30.23	68.83
Greece	1.32	10.22	88.46
Iceland	4.31	26.24	69.45
Ireland	1.89	20.99	77.12
Italy	3.06	25.05	71.89
Japan	9.93	25.27	64.80
Luxembourg (1988)	2.06	16.25	81.68
Netherlands (1986)	9.36	43.55	47.09
New Zealand	1.98	44.43	53.59
Norway	1.79	21.96	76.25
Portugal	2.75	21.18	76.11
Spain	5.19	29.01	65.81
Sweden	n.a.	n.a.	n.a.
Switzerland	_____30.83_____		69.17
Turkey	7.15	2.15	90.70
UK (1987)	_____38.11_____		61.89
US	4.16	n.a.	n.a.
OECD Average*		27.38	68.45

Notes: \* In calculating OECD average, three countries (Canada, Sweden and US) are excluded.

n.a. no data available.

Source: OECD, adapted from ITU.

**Table 2. International message telephone service of the  
continental United States, 1989**

Country	Calls originating in US		Calls terminating in US	
	Average number of minutes per call	US Carrier revenue per minute (\$)(1)	Average No. of minutes per call	US Carrier revenue per minute call (\$)(2)
Austria	6.6	0.31	8.0	0.77
Belgium	6.0	0.28	4.2	0.86
Denmark	6.7	0.40	9.3	0.68
Finland	6.4	0.51	9.1	0.67
France	8.7	0.37	8.5	0.73
Germany	8.1	0.32	4.8	0.74
Greece	10.1	0.17	7.2	0.96
Iceland	9.4	0.45	10.0	0.77
Ireland	6.9	0.35	10.0	0.70
Italy	5.3	0.14	4.2	0.96
Luxembourg	6.3	0.47	6.6	0.79
Netherlands	7.0	0.48	4.6	0.72
Norway	8.8	0.38	6.9	0.69
Portugal	7.4	0.26	4.0	0.93
Spain	6.6	0.14	8.8	0.98
Sweden	8.1	0.44	5.7	0.62
Turkey	6.4	0.14	3.7	1.00
UK	6.8	0.47	4.9	0.47
Japan	6.3	0.59	4.6	0.84
Australia	6.3	0.82	4.9	0.62
New Zealand	6.2	0.40	4.5	1.10

Notes: 1. is revenue retained by US carriers *after* deducting settlements to foreign carriers.

2. is revenue from US carriers from settlements by foreign correspondents.

Source: FCC, International Communications Traffic Data Report for 1989 and 1990.

Table 3. Tariff zones for international PSTN (as of end 1990)  
(Number of call zones)

Country	Peak	Off-Peak	Off-Peak Charge % of Peak
Australia	Europe -- 3 zones	2	70.0; 74.4
	North America	1	74.4
	Rest of World	-	100.0
Austria*	Europe -- 3 zones	2	76.9; 65.0
	North America	-	100
	Rest World	-	100
Belgium*	Europe -- 4 zones	3	64.3; 73.7; 74.1
	North America	-	100
	Rest of World	-	100
Canada(2)	Europe(1) -- 7 zones	7	70.4; 70.1; 69.9; 70.2;
	North America		69.9; 69.9; 70.1
	Rest of World	3	69.9; 69.9; 70.2
Denmark*	Europe -- 6 zones	-	100
	North America	-	100
	Rest of World	-	100
Finland*	Europe -- 3 zones	2	74.3; 73.7
	North America and Australia	1	75.7;
	Rest of World	-	100
France*	Europe -- 2 zones	2	67.0; 66.7
	North America	2	75.8; 61.0
	Rest of World -- 2 zones	1	67.0
Germany*	Europe -- 2 zones	1	74.8
	Rest of World	-	100
Greece	Europe -- 3 zones	-	100
	North American and Australia	-	100
	Rest of World	-	100
Ireland*	Europe -- 2 zones	1	75.4
	North America	1	56.4
	Rest of World	-	100
Italy*	Europe -- 3 zones	3	80.1; 80.2; 79.9
	North America	1	80.8
	Rest of World -- 3 zones	1	80.8

Table 3 to be continued on next page

Table 3 (continued)

Japan(1)	Europe(2) -- 3 zones	2	80.0; 60.0
	Canada/Australia	2	80.0; 60.0
	US	2	78.3; 73.3; 75.0
	Rest of World -- 7 zones	2	80.0; 60.0; 79.1 60.1; 78.9; 60.5
Luxembourg*	Europe -- 5 zones	2	85.7; 80.0
	North America	1	66.7
	Rest of World	-	100
Netherlands	Europe -- 3 zones	2	82.8; 81.8
	North America	1	88.5
	Rest of World -- 2 zones	1	83.3
Norway*	Europe -- 2 zones	1	79.9
	North America	-	100
	Rest of World	-	100
Portugal	Europe -- 3 zones	-	100
	North America	1	83.2
	Rest of World -- 3 zones	3	81.4; 78.4; 91.0
Spain	Europe -- 2 zones	2	68.7; 69.3
	North America and Brazil	1	68.9
	Rest of World		70.6
Sweden*	Europe -- 4 zones	1	70.2
	North America	1	77.5
	Rest of World -- 2 zones	-	100
Switzerland	Europe -- 2 zones	2	70.8; 71.4
	North America	1	80.0
	Rest of World	-	100.0
Turkey	Europe -- 2 zones	2	68.0; 64.7
	North America, Australia		
	Saudi Arabia, Singapore	1	68.0
	Rest of World	1	66.7
United Kingdom	Europe -- 3 zones		82.0; 79.8; 94.4; 76.8
	North America(2)	1	76.8
	Rest of World -- 9 zones	4	80.3; 84.9; 95.1; 81.8
United States(1) (AT&T)	Europe -- 9 zones	9	64.9; 65.1; 59.6; 59.8
	Rest of World -- 2 zones	2	65.1; 65.3; 65.0; 59.9; 64.7 65.1; 59.9

Notes:\* These countries also have lower rates for neighbouring countries or zones in neighbouring countries where there are close affinities because of language, etc.

1. 3 time charges: standard rate, discount rate and economy rate.
2. Additional minute charges are lower than first minute.

Source: OECD Tariff Comparison Model.

Table 4a. International dialled call charges, 1980-87

Country	Range - Highest		Range-Lowest	
	Current Prices Percentage Change	1980 Prices Percentage Change	Current Prices Percentage Change	1980 Prices Percentage Change
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	125.0	91.8	-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
United Kingdom	38.3	-8.1	-21.9	-48.1
United States	-31.3	-48.8	-44.0	-9.1

Source: OECD (1991), *ICCP Series Publications*, No. 23.

Table 4b. Time series trends in international call tariffs

[Cost of 3 minute call, peak time, local currency,  
June 1989 as a percentage of cost in June 1979 (adjusted for inflation)]

FROM	TO:	USA	Germany	France	UK
USA		--	33.55	37.74	45.71
Japan		31.82	43.44	43.44	43.44
Germany		33.36	--	78.37	69.86
France		30.63	73.31	--	88.86
UK		50.04	64.87	90.82	--

Table 5. Comparison with the change of inland charges, 1980-90

(Peak rate call, 1980=100)

Country	International				Reference about inland call
	Inland call	Nearest OECD foreign country	Furthest OECD Europe country	Furthest OECD Member country <sup>1</sup>	
Austria	86.2	81.1	103.3	50.3	Over 100 km
Belgium	104.3	86.9	86.9	47.8	<sup>2</sup>
Denmark	109.3	122.3	122.3	--	<sup>3</sup>
Finland	93.5	114.9	114.9	48.4	--
France	79.4	106.5	106.5	50.5	Over 100 km
Germany	74.5	111.7	111.7	47.5	Over 100 km
Ireland	224.5	159.9	136.8	116.8	Over 80 km
Netherlands	108.4	149.1	106.8	38.5	Trunk zone
Norway	48.9	88.5	70.8	--	Over 50 km
Portugal	127.6	160.3	81.9	84.6	Over 50 km Outside Lisbon&Porto
Spain	73.1	196.8	127.7	117.1	Over 400 km Trunk call charges
Sweden	87.2	92.0	83.6	45.4	Over 270 km
Switzerland	93.2	84.6	69.9	34.2	Over 100 km
UK	51.3	--	111.2	72.4	Over 56 km

- Notes: 1. USA data Pacific country data for 1980 unavailable.  
 2. Excluding calls between two adjacent zones and in some other relations.  
 3. 1980=Trunk calls only, 1990=KTAS Trunk.
- Source: OECD Tariff comparison model, LOGICA.



Table 6. Peak rate international calls between OECD Member countries, December 1990

To:	AUS	AUT	BELG	CAN	DEN	FIN	FRA	GER	GRE	ICE	IRE	ITA	JAP	LUX	NETH	NZ	NOR	PORT	SPA	SWE	SWI	TUR	UK	US
From:																								
AUS		4.22	4.22	3.75	3.75	3.75	3.75	3.75	4.92	4.92	3.75	3.75	4.92	4.92	3.75	3.05	3.05	4.92	4.92	3.75	4.22	4.92	3.75	3.75
AUT	7.34		2.27	4.72	2.27	3.49	2.27	2.27	3.49	3.49	3.49	2.27	7.34	2.27	2.27	7.34	3.49	3.49	3.49	3.49	2.27	3.49	3.49	4.72
BELG	9.91	2.97		4.46	2.67	2.97	1.91	1.91	2.67	2.97	1.91	2.67	9.91	1.34	1.57	9.91	2.97	2.67	2.67	2.97	1.91	2.97	1.91	4.46
CAN	3.53	4.48	4.48		3.79	3.79	3.53	4.48	4.75	4.75	3.96	4.77	4.77	3.96	3.79	3.53	3.79	5.38	5.03	3.53	3.96	5.38	3.53	1.46
DEN	5.13	1.66	1.38	3.95		1.18	1.66	1.38	1.66	0.99	1.66	1.66	6.32	1.38	1.38	5.13	1.18	1.66	1.66	1.18	1.66	1.66	1.66	3.95
FIN	4.04	2.49	2.49	4.04	1.28		2.49	2.49	2.89	1.28	2.49	2.89	6.70	2.49	2.49	4.04	1.28	2.89	2.89	1.28	2.49	2.89	2.49	4.04
FRA	8.79	3.02	2.06	4.30	2.06	3.02		2.06	2.06	3.02	2.06	2.06	8.79	2.06	2.06	8.79	3.02	2.06	2.06	3.02	2.06	2.06	2.06	4.30
GER	5.75	2.12	2.12	5.75	2.12	2.38	2.12		2.12	2.38	2.12	2.12	5.75	2.12	2.12	5.75	2.38	2.12	2.12	2.38	2.12	2.12	2.12	5.75
GRE	6.96	2.15	2.78	6.96	2.78	3.04	2.78	2.78		3.04	2.78	2.78	8.86	2.78	2.78	6.96	3.04	2.78	2.78	3.04	2.15	2.15	2.78	6.96
ICE	6.95	4.05	4.05	4.52	2.86	2.98	4.05	3.31	4.52		4.05	4.52	10.45	4.05	2.98	9.38	2.86	4.05	3.31	4.39	3.01	4.52	3.31	4.52
IRE	12.17	4.39	3.01	7.34	3.01	4.39	3.01	3.01	4.39	4.39		3.01	12.17	3.01	3.01	12.17	4.39	3.01	3.01	4.39	3.01	4.39	3.01	7.34
ITA	12.14	3.01	3.45	8.96	3.45	3.96	3.01	3.01	3.01	3.96	3.96		12.54	3.01	3.45	12.14	3.96	3.96	3.45	2.86	4.05	3.96	3.45	8.96
JAP	5.61	9.77	7.10	5.61	9.77	9.77	6.94	6.94	9.77	9.77	9.77	7.10		7.10	7.10	5.61	9.77	9.77	9.77	9.77	6.94	9.77	7.10	4.37
LUX	11.15	1.86	1.30	6.69	1.86	2.97	1.86	1.86	1.86	2.97	1.86	1.86	11.15		1.30	11.15	2.41	1.86	1.86	2.41	1.86	2.97	1.86	6.69
NETH	6.87	2.37	1.80	4.25	1.80	2.95	1.80	1.80	2.37	2.95	2.37	2.37	6.87	1.80		6.87	2.37	2.37	2.37	2.37	1.80	2.95	1.80	4.25
NZ	2.51	4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93
NOR	7.44	2.30	2.30	3.84	1.15	1.15	2.30	2.30	2.30	2.30	2.30	2.30	7.44	2.30	2.30	7.44		2.30	2.30	1.15	2.30	2.30	2.30	3.84
PORT	7.59	2.83	2.83	6.58	2.83	3.29	2.83	2.83	2.83	3.29	2.83	2.83	8.98	2.83	2.83	7.59	3.29	2.83	2.67	3.29	2.83	3.29	2.83	6.58
SPA	12.93	3.92	3.34	10.71	3.34	3.92	3.34	3.34	3.92	3.92	3.34	3.34	12.93	3.34	3.34	12.93	3.92	3.34		3.92	3.92	3.92	3.34	10.71
SWE	7.74	2.50	2.07	3.48	1.14	1.14	2.50	2.07	3.20	3.20	2.50	2.50	7.74	2.50	2.07	7.74	1.14	3.20	3.20	2.50	2.50	3.20	2.50	3.48
SWI	6.86	2.42	2.42	4.29	3.00	3.00	2.42	2.42	3.00	4.29	3.00	2.42	6.86	2.42	2.42	6.86	3.00	3.00	3.00	3.00	3.00	3.00	3.00	4.29
TUR	9.27	4.64	4.64	9.27	4.64	4.64	4.64	4.64	4.64	4.64	4.64	4.64	9.27	4.64	4.64	9.27	4.64	4.64	4.64	4.64	4.64	4.64	4.64	9.27
UK	4.58	2.56	1.94	3.53	1.94	2.56	1.94	1.94	1.94	2.56	1.75	1.94	4.58	1.94	1.94	4.58	2.56	1.94	1.94	2.56	1.94	2.56	1.94	3.53
US	5.75	3.91	3.91	0.84	3.91	3.91	3.91	3.91	3.91	3.91	3.47	3.91	5.75	3.91	3.91	5.75	3.91	3.91	3.91	3.91	3.91	3.91	3.91	3.47

Note: Figures record the average cost (without tax), in 1990 US\$, of a peak rate three minute call.

Key: bold italics.  
More than twice the cost of a call in the opposite direction.

Source: OECD Tariff comparison model, LOGICA.

Table 7. Cheap rate international calls between OECD Member countries, December 1990

From:	To:	AUS	AUT	BELG	CAN	DEN	FIN	FRA	GER	GRE	ICE	IRE	ITA	JAP	LUX	NETH	NZ	NOR	PORT	SPA	SWE	SWI	TUR	UK	US
AUS			4.22	2.95	2.79	2.79	2.79	2.79	2.79	4.92	3.99	2.79	2.79	4.92	4.92	2.79	2.11	2.79	4.92	4.92	2.79	4.22	4.92	2.79	2.79
AUT	7.34			1.75	4.72	1.75	2.27	1.75	1.75	2.27	2.27	2.27	1.75	7.34	1.75	1.75	7.34	2.27	2.27	2.27	2.27	1.75	2.27	2.27	4.72
BELG	9.91	2.97			4.46	1.91	2.97	1.41	1.91	1.91	2.97	1.41	1.91	9.91	0.99	1.16	9.91	2.97	1.91	1.91	2.97	1.41	2.97	1.41	4.46
CAN	2.46	3.15	3.15			2.66	2.66	2.46	3.15	3.55	3.35	2.78	3.35	3.35	2.78	2.66	2.46	2.66	3.76	3.53	2.46	2.78	3.76	2.46	0.59
DEN	5.13	1.66	1.38	3.95			1.18	1.66	1.38	1.66	0.99	1.66	1.66	6.32	1.38	5.13	1.18	1.18	1.66	1.66	1.18	1.66	1.66	1.66	3.95
FIN	3.03	1.85	1.85	3.03	0.94			1.85	1.85	2.89	0.94	1.85	2.89	6.70	1.85	3.03	0.94	0.94	2.89	2.89	0.94	1.85	2.89	1.85	3.03
FRA	5.95	2.02	1.37	3.26	1.37	2.02			1.37	1.37	2.02	1.37	1.37	5.95	1.37	5.95	2.02	2.02	1.37	1.37	2.02	1.37	1.37	1.37	3.26
GER	5.75	1.59	1.59	5.75	1.59	2.38	1.59	1.59	1.59	1.59	2.38	1.59	1.59	5.75	1.59	5.75	2.38	2.38	1.59	1.59	2.38	1.59	1.59	1.59	5.75
GRE	6.96	2.15	2.78	6.96	2.78	3.04	2.78	2.78	2.78	3.04	3.04	2.78	2.78	6.96	2.78	6.96	3.04	3.04	2.78	2.78	3.04	2.78	2.78	2.78	6.96
ICE	4.85	2.84	2.84	3.17	2.08	2.08	2.08	2.84	2.32	3.17	3.17	2.84	3.17	4.85	2.84	2.08	2.08	2.08	2.84	2.32	2.08	2.84	3.17	2.32	3.17
IRE	12.17	4.39	2.27	4.14	2.27	4.39	2.27	2.27	2.27	2.27	4.39		2.27	12.17	2.27	2.27	12.17	4.39	2.27	2.27	4.39	2.27	2.27	2.27	4.14
ITA	10.17	2.41	2.77	7.24	2.77	3.16	2.77	2.41	2.41	2.41	3.16	3.16		12.54	2.41	2.77	10.17	3.16	3.16	2.77	3.16	2.41	3.16	2.77	7.24
JAP	3.39	5.86	4.32	3.39	5.86	5.86	5.86	4.17	4.17	5.86	5.86	5.86	4.32		4.32	4.32	3.39	5.86	5.86	5.86	5.86	4.17	5.86	4.32	2.73
LUX	11.15	1.86	1.11	4.46	1.49	2.97	1.49	1.49	1.49	1.49	2.97	1.49	1.49	11.15		1.11	11.15	2.41	1.49	1.49	2.41	1.86	2.97	1.49	4.46
NETH	5.73	1.96	1.47	3.76	1.47	2.95	1.47	1.47	1.96	1.96	2.95	1.96	1.96	5.73	1.47	5.73	1.96	1.96	1.96	1.96	1.96	1.47	2.95	1.47	3.76
NZ	1.61	4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93	1.61	4.93	4.93	1.61	4.93	4.93	4.93	4.93	4.93	4.93	4.93	4.93
NOR	7.44	2.30	2.30	3.03	0.92	0.92	0.92	2.30	2.30	2.30	2.30	2.30	2.30	7.44	2.30	2.30	7.44	2.30	2.30	2.30	2.30	2.30	2.30	2.30	3.03
PORT	6.18	2.83	2.83	5.48	2.83	3.29	2.83	2.83	2.83	2.83	3.29	2.83	2.83	6.18	2.83	2.83	6.18	3.29	2.83	2.67	3.29	2.83	3.29	2.83	5.48
SPA	9.13	2.69	2.31	7.37	2.31	2.69	2.31	2.31	2.31	2.69	2.31	2.31	2.31	9.13	2.31	9.13	2.69	2.69	2.31	2.69	2.69	2.69	3.19	2.31	7.37
SWE	7.74	2.50	2.07	2.70	0.80	0.80	0.80	2.50	2.07	3.20	3.20	2.50	2.50	7.74	2.50	7.74	0.80	0.80	3.20	3.20	2.50	2.50	3.20	2.50	2.70
SWI	6.86	1.72	1.72	3.43	2.14	2.14	2.14	1.72	1.72	2.14	3.43	2.14	1.72	6.86	1.72	6.86	2.14	2.14	2.14	2.14	2.14	1.72	2.14	2.14	3.43
TUR	6.31	3.15	3.15	6.31	3.15	3.15	3.15	3.15	3.15	3.15	3.15	3.15	3.15	6.31	3.15	6.31	3.15	3.15	3.15	3.15	3.15	3.15	3.15	3.15	6.31
UK	3.68	2.10	1.55	2.71	1.55	2.10	1.55	1.55	1.55	1.55	2.10	1.29	1.55	3.68	1.55	3.68	2.10	2.10	1.55	1.55	2.10	1.55	2.10	1.55	2.71
US	3.45	2.33	2.33	0.72	2.33	2.33	2.33	2.33	2.33	2.33	2.33	2.09	2.33	3.45	2.33	3.45	2.33	2.33	2.69	2.33	2.33	2.33	2.33	2.33	2.06

Note: Figures record the average cost (without tax), in 1990 US\$, of a peak rate three minute call.

Key: bold italics.  
More than twice the cost of a call in the opposite direction.

Source: OECD Tariff comparison model, LOGICA.

**Table 8. International telephone service, outgoing and terminating  
minutes and net settlements with the United States<sup>1</sup>, 1989**  
(millions of minutes)

	Outgoing	Incoming	Net settlements (million US\$)
Austria	22.2	13.6	-6.2
Belgium	38.2	23.4	-11.9
Denmark	23.4	16.7	-3.6
Finland	12.1	8.0	-2.5
France	166.2	122.2	-32.9
Germany	416.8	191.9	-167.2
Greece	52.4	19.4	-30.2
Iceland	5.7	3.6	-1.6
Ireland	49.0	22.2	-16.5
Italy	145.9	70.7	-69.5
Luxembourg	3.4	2.8	-0.7
Netherlands	62.1	47.9	-7.0
Norway	22.5	17.2	-3.0
Portugal	25.4	7.3	-17.2
Spain	57.3	31.2	-22.9
Sweden	41.9	40.9	1.1
Switzerland	69.9	51.0	-10.5
Turkey	23.2	8.0	-14.3
UK	543.9	440.4	-46.2
Japan	272.9	171.9	-78.5
Australia	82.2	78.3	-0.7
New Zealand	15.5	12.0	-3.9
Canada			-4.7
Total OECD	2 158.0	1 400.6	-551.0
Total World	4 462.9	2 249.2	-2 398.1

1. Data for continental US.

Source: Federal Communications Commission (FCC).

Table 9. Growth in outgoing international traffic

	Compound Annual Growth Rate: 1978-87	Growth in National Traffic
Germany	12.3%	6.1
Australia	31.5	7.9
Austria (1978-86)	10.0	2.6
Belgium	9.9	n.a.
Denmark	4.5	4.4
Spain	13.3	n.a.
US	16.9	4.8
Finland	11.8	10.3(1979-87)
Greece	9.3	10.0
Iceland	18.1	4.6(pulses)
Italy	15.8	6.1
Norway	13.0	10.0(pulses)
New Zealand	29.8	31.1
UK (1979-85)	14.8	4.7
Sweden	14.9	4.4
Switzerland	10.4	4.4
Saudi Arabia	43.8	
Argentina	12.2	
Bahamas	12.7	
Cyprus	74.8	
Hungary	21.1	
Mexico (1978-86)	16.2	

Source: Adapted from ITU Yearbook.

**Table 10. Outgoing international telephone traffic  
as percentage of total traffic**

	1978	1987		Forecast growth in outgoing traffic 1987-1992
Austria (minutes)	3.3	8.1	(1985)	6.0
Canada (calls)*	0.3	0.1		5.4
Denmark (calls)	0.7	1.7		6.2
Finland (calls)	0.7	0.7		5.4
Germany (calls)	3.2	1.6		5.7
Greece (calls)	0.5	0.5		5.1
Italy (calls)	0.4	0.9		5.4
New Zealand (minutes)	10.1	9.3		9.6
Spain (calls)	--	0.7		6.4
Switzerland (minutes)	4.3	6.5		9.3
United States (calls)*	0.05	0.1		4.8

\* Telecommunication traffic between Canada and the U.S. is interchanged on the basis of agreements reached by the domestic carriers in the two countries and are not included in the data.

Source: ITU Yearbook and ITU General Plan for the Development of the Inter-regional Telecommunication Network (Geneva, 1988).

**Table 11a. Swedish balance of payments deficit for  
international telecommunications settlements**

(millions of Skr)

Year	Telephone service	Telex telegraph	Data communication	Total deficit	Percent telephone
1981	47.5	19.7	0	67.2	70.7
1982	94.0	0.8	0	94.8	99.2
1983	152.2	8.7	0	160.9	94.6
1984	163.0	0.2	0	163.2	99.9
1985	164.9	15.8	0	180.7	91.3
1986	170.2	-2.2	00.3	168.3	101.1
1987	178.7	9	-2.5	185.2	96.5
1988	184.1	-1.1	-0.3	182.7	100.8

Source: Ministry of Transport and Communications.

**Table 11b. OTC Australia: Balance in international telephone service**  
(thousand paid minutes)

	1983	1989
USA	-440	4 303
UK	-4 612	-13 062
New Zealand	-4 376	-3 794
Hong Kong	-1 412	153
Japan	-1 181	-4 628
Singapore	-373	283
Canada	-341	378
Germany	-2 227	-2 627
Papua New Guinea	5 159	4 692
Italy	-3 677	-5 696
Other	-26 545	-63 759
Total	-40 025	-83 757

Source: OTC Annual Reports.

**Table 11c. Switzerland: Net balance of international telephone traffic**

	Millions of charged minutes
1977	-46.3
1978	-40.9
1979	-42.8
1980	-53.3
1981	-59.2
1982	-63.4
1983	-67.0
1984	-93.6
1985	-99.1
1986	-115.3
1987	108.8

Source: PTT Annuaire Statistique, 1987.

Table 11d. **British Telecom (UK)**

(£million)

	Receipts from Overseas Telecommunication Operators	Payments to Telecommunication	Net Balance
1985	581	598	-17
1986	575	606	-31
1987	607	655	-48
1988	630	655	-25
1989	642	684	-42

Source: BT Supplementary Report 1989

Table 11e. **Luxembourg: Balance of international traffic**

	Tariffed minutes				
	1984	1985	1986	1987	1988
Outgoing ('000)	74 290	80 865	90 254	101 742	113 824
Incoming ('000)	46 800	52 000	58 300	64 800	65 800
NET	27 490	28 865	31 954	36 942	48 024

	Millions Belgian francs				
	1984	1985	1986	1987	1988
International Call Revenue	1 301.5	1 411.6	1 470.0	1 916.2	2 129.3
Receipts from Foreign Administrations	267.2	214.6	215.6	252.5	357.1
Payments to Foreign Administrations	n/a	n/a	719.2	853.8	1 042.7
NET			-503.6	-601.3	-685.6

**Table 11f. Japan: International telephone traffic and the balance of payment**

	1986	1987	1988	1989
<b>Outgoing Japan</b>				
(millions in minutes)	309.7	402.4	521.0	686.5
<b>Incoming Japan</b>				
(millions in minutes)	332.8	437.5	559.3	669.0
<b>Difference</b>				
(millions in minutes)	-23.1	-35.1	-38.3	17.5
<b>Amount received</b>				
by Japan (millions ¥)	3 860	5 013	882	-9 078

**Table 12. US Net Settlements 1989:**

**Examples of sensitivity of deficit to change in accounting rate**

(million US\$)

Country	Actual Net Settlement	New Net Settlement	Change in Total US Carriers' Revenues
France	31.1	26.2	5.6
Germany	164.7	118.1	46.3
Greece	29.5	17.3	20.6
Italy	68.4	39.5	28.9
Spain	21.8	13.7	8.2
UK	46.2	54.4	-8.2
<b>TOTAL</b>	<b>361.7</b>	<b>269.2</b>	<b>101.4</b>

*Note:* Based on 1989 data. Assuming unchanged traffic and using Swedish accounting rate with the US (0.8 SDR = \$1.05). Assuming all peak calls.



Table 13. 1988 AT&T Tariffs -- Dial Service

	Initial	Additional	Difference	
	Minute	Minute	\$	%
United Kingdom	1.65	1.06	0.59	36
Ireland	1.89	1.14	0.75	40
France, Germany, Italy, Spain, Netherlands, Portugal, Switzerland	1.96	1.09	0.87	44
Denmark, Finland, Sweden	2.17	1.22	0.95	44
Venezuela	2.16	0.92	1.24	57
Brazil, Columbia	2.60	1.11	1.49	57
Saudi Arabia	2.19	1.15	1.04	47
Israel	3.46	1.25	2.21	64
Japan	3.66	1.35	2.31	63
Hong Kong, Indonesia, South Korea, Philippines, Tawain	3.96	1.48	2.48	63

Source: Stanley (1988).

Table 14. Reimbursement for some AT&T inward calls

Originating call	Half accounting rate (US\$)
Canada	0.12
UK	0.53
France	0.655
Germany	0.855

Table 15. Accounting Rate Index for US/Europe Relations, February 1991

France = 100		Finland = 100			
Belgium	120	Austria	110	Germany	120
Greece	163	Ireland	105	Italy	105
Netherlands	100	Norway	100	Portugal	131
Spain	160	Sweden	112	Switzerland	112
UK	74	Turkey	140		

Table 16. Comparison of intra-European and AT&T/Europe accounting rate  
Shares in SDR

	(A)	(B)	Ratio
	Intra-Europe	Accounting Share	
	Accounting Rate Share	with US	B/A
Austria	0.220	0.550	2.5
Belgium	0.165	0.600	3.6
Denmark	0.185	0.500	2.7
Finland	0.220	0.500	2.3
France	0.170	0.555	3.3
Germany	0.185	0.600	3.2
Greece	0.275	0.865	3.1
Italy	0.210	0.740	3.5
Netherlands	0.165	0.550	3.3
Spain	0.210	0.750	3.6
Sweden	0.205	0.400	1.9
Switzerland	0.175	0.560	3.2

Source: Federal Communications Commission (US), Docket No. 90-337, Comments of American Telephone and Telegraph Company, October 12, 1990.

Table 17. Accounting rates: United States with OECD countries

(as of July 1991)

	1985	1988	1990	1991	Accounting rate 1991 as % of 1985 rate
Australia	1.5 SDR	1.2/0.6 SDR	0.8 SDR	0.68 SDR	45.3
Austria	1.3 SDR	1.3 SDR	1.1 SDR	1.0 SDR	76.9
Belgium	1.6 SDR	1.4 SDR	1.2 SDR	1.2 SDR	75.0
Canada	\$0.42	\$0.42/0.38	\$0.28/0.24	\$0.28/0.24	66.6/57.1
Denmark	1.6 SDR	1.2 SDR	1.0 SDR	1.0 SDR	62.5
Finland	1.6 SDR	1.2 SDR	1.0 SDR	1.0 SDR	62.5
France	1.6 SDR	1.4 SDR	1.2/1.0 SDR	1.0/0.8 SDR	62.5/50.0
Germany	1.2 SDR	1.2 SDR	1.2 SDR	1.0 SDR	83.3
Greece	5.0 GF	5.0 GF	5.0 GF	1.53 SDR	93.8
Iceland	1.6 SDR	1.2 SDR	1.2 SDR	1.2 SDR	75.0
Ireland	\$1.80/1.35	\$1.50/1.25	\$1.50/1.25	\$1.27/1.06	78.5/78.5
Italy	5.0 GF	5.0/3.67	4.6/3.67 GF	4.38/3.67 GF	87.6/73.4
Japan	\$2.35	1.34 SDR	1.34 SDR	1.13 SDR	68.5
Luxembourg	1.4 SDR	1.4 SDR	1.2 SDR	1.0 SDR	71.4
Netherlands	1.2 SDR	1.2 SDR	1.1 SDR	0.9 SDR	83.3
New Zealand	1.8 SDR	1.8 SDR	1.8/1.0 SDR	1.4 SDR	77.7
Norway	1.6 SDR	1.2 SDR	1.0 SDR	1.0 SDR	62.5
Portugal	5.0 GF	1.63 SDR	1.31 SDR	1.31 SDR	
Spain	5.3 GF	1.7/1.2 SDR	1.6/1.2 SDR	1.5/1.0 SDR	31.2
Sweden	1.6 SDR	1.25 SDR	0.18 SDR	0.5 SDR	62.5
Switzerland	1.6 SDR	1.25 SDR	1.12 SDR	1.0 SDR	88.8
Turkey	\$2.25	\$2.00	\$2.00	\$2.00	
UK (BT)	\$1.06/0.76	\$1.06/0.76	\$1.06/0.76	\$0.68/0.48SDR	
Mercury				0.53 SDR	

Note: Exchange Rate for Special Drawing Rights (SDRs) to US\$:

1985: 1 SDR = \$1.09842

1988: 1 SDR = \$1.34570

1990: 1 SDR = \$1.42266

1991: 1 SDR = \$1.42266

\* Growth-based accounting ratio.

Source: Federal Communications Commission.

**Table 18. Gap between collection charges and accounting rates for  
international telephone service between OECD countries and the US, 1990**  
(dollars)

	Peak Minute Price Minus Half Accounting Rate	Off-Peak Minute Price Minus Half Accounting Rate	Ratio Peak Minute Price to Half Accounting Rate
Australia	0.68	0.36	2.2
Austria	0.79	0.79	2.0
Belgium	0.63	0.63	1.7
Canada	0.36	0.08	3.7
Denmark	0.60	0.60	1.8
Finland	0.64	0.30	1.9
France	0.77	0.43	2.2
Germany	1.06	1.06	2.0
Greece	1.16	1.16	2.0
Iceland	0.65	0.20	1.8
Ireland	1.25	0.33	2.0
Italy	1.92	1.55	2.8
Japan	0.50	0.00	1.5
Luxembourg	1.52	0.78	3.1
Netherlands	0.71	0.54	2.0
New Zealand	0.36	0.36	1.3
Norway	0.57	0.30	1.8
Portugal	1.26	0.90	2.4
Spain	2.43	1.60	3.1
Sweden	0.59	0.33	2.0
Switzerland	0.64	0.35	1.5
Turkey	2.09	1.10	3.1
UK	0.65	0.52	2.2
OECD Average	0.90	0.60	2.2

Source: OECD.

**Table 19. US/Germany Collection Rates**

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
US to Germany (US\$)	6.00	6.30	4.05	2.37	2.37	2.33	2.17	1.96	1.96	1.96
Germany to US (US\$)	n.a.	n.a.	n.a.	7.33	7.33	4.65	4.65	4.65	3.67	3.67
Accounting Rates SDR's	1.65	1.65	1.65	1.3	1.2	1.2	1.2	1.2	1.2	1.2

**Table 20. AT&T Average Revenue**  
(dollars)

	1980	1981	1982	1983	1984	1985
Outbound	0.97	0.64	0.37	0.35	0.33	0.36
Inbound	1.20	0.94	0.95	0.93	0.82	0.82
\$O/I	0.81	0.68	0.39	0.38	0.40	0.44

Table 21. Planned transoceanic cable developments

Name	Capacity	Service data
<b>Atlantic</b>		
TAT-8	280-Mb/s (37 800 voice circuits)	In service (1988)
TAT-9	565-Mb/s on each working fibre	In service (1991)
PTAT-1	420-Mb/s on 4 links (85 000 voice circuits)	In service (1989)
TAT-X	240 Mb/s (150 000 voice circuits)	1993
TAT-10	565 Mb/s	1995
PTAT-2	420 Mb/s	1992
<b>Pacific</b>		
MPC	60 000 voice circuits	1990
HAW-5	15 120 64-kbps circuits \$199 mn. estimated cost	1993
PACRIM EAST	7560 64-kbps circuits \$279.6 mn. estimated cost	1993
PACRIM WEST	7560 64-kbps circuits \$282.0 mn. estimated cost	1994
TPC-3/HAW-4	75 600 64-kbps circuits	In service (1988)
TPC-4	75 600 voice circuits	1992
TASMAN 2	57 000 voice circuits	1991
H-K-J	37 800 voice circuits	1990
G-P-T	38 800 voice circuits	1989
TPC-5	120 960 64-kbps circuits \$1.2 bn estimated cost	1998
<b>Indian</b>		
SEA-ME-WE-2	565 Mb/s (20 000 voice circuits)	1994

Source: Compiled from various sources.

## Notes and References

1. The establishment of international charging and accounting principles is one of the reasons which led to the creation of the ITU in 1865.
2. For intra-EEC calling the European Commission has recommended that the ECU be used as the accounting standard.
3. The term "relation" connotes an exchange of traffic between two terminal countries either over direct circuits or via a point of transit.
4. *Final Acts of the World Administrative Telegraph and Telephone Conference (WATTC-88)*, Appendix 1, 1.1.
5. CCITT's Study Group III is responsible for issues regarding international accounting rates.
6. CCITT Blue Book, Volume II - Fascicle II.1, General Tariff Principles, Charging and Accounting in International Telecommunications Services, recommendations of the D Series, IXth Plenary Assembly, Melbourne, 14-25 November 1988.
7. These are countries not included in Europe but bordering on the Mediterranean Sea.
8. Marginal costs include a normal return on capital invested.
9. These "deviations" can also occur in real world or dynamic competitive industries where competitors have superior skills or assets (tangible or intangible) which are only competed away in the long run.
10. These "simple" tests may not be simple to administer. In addition producers of differentiated goods or services have some degree of market power because of consumer preference. Moreover, price discrimination can often *increase* welfare if the point of comparison is a firm with market power maintaining a single price (see Philips, 1985).
11. The Ramsey rule for two sets of customers  $i$  and  $j$  whose demands are independent of each other is:

where  $p = \text{price}$

$$\frac{P_i - M_c}{P_j - M_c} = \frac{e_j}{e_i} \quad \text{where } M_c = \text{marginal cost}$$

$$P_i \quad P_j \quad e_i \quad \text{where } e_j = \text{elasticity in the } j\text{th market}$$

This principle does better than average cost since there is less alteration in the outputs (that would be supplied if  $P_i = M_{ci}$ ) by raising prices more in less elastic markets than by raising all prices proportionately.

12. CCITT Recommendation D.5(2) states that "... rates for certain services may be so arranged that they do not cover all the costs involved ..." and that in determining rates "... the value of the service rendered to the user should be taken into consideration".
13. The distinction between local and long distance does not hold in all countries.
14. In some jurisdictions, the "local" call has a zero marginal price.
15. This last discussion concerns the network monopoly properties of telecommunications systems (see Waverman, 1989).
16. One can define the FDC of a service  $i$  as
$$FDC_i = \text{Attributable cost of } i + F_i \times F \text{ where } F \text{ is the NTS common cost. For example, } F_i \text{ could be equal to}$$
$$\frac{\text{Attributable cost of } i}{\text{Total attributable cost}} = \frac{ATC_i}{ATC} \times F$$
(See Brown and Sibley, 1986, chapter 3).
17. See FCC (1990), p.9, footnote 24.
18. Note that the Ramsey rule drives a wedge between marginal costs and price as well. However, means of capturing NTS costs in call prices are not efficient while Ramsey type prices are.
19. For example, in France in 1987 long-distance (national) calls were estimated as being priced at four times their cost and local calls one-quarter their cost: Statement by the Minister of Posts and Telecommunications.
20. There are differences in quality which can be viewed as a form of product differentiation.
21. See also OECD (1991), *Universal Service and Telecommunications Rate Restructuring in Telecommunications*.
22. The prices are for the average cost per minute for a three minute call. This is used to compensate for different national charging practices, e.g. a higher initial minute price and lower additional minute prices versus an equal charge per minute irrespective of the length of the call.



23. Except with Turkey.
24. Except with Australia.
25. From a savings point of view the measure shows the extent an economy exports domestic savings or draws on foreign savings.
26. Average annual growth rate for 20 OECD countries estimated on the basis of busy-hour erlangs from the International Telecommunication Union, General Plan for the Development of the Interregional Telecommunication Network, Geneva 1988.
27. These data include revenues from outgoing and incoming calls. It should also be noted that for some countries transit traffic can be important.
28. Canadian Radio-television and Telecommunications Commission, Telecom Decision CRTC 89-1, 31 January 1989.
29. Incoming traffic into a country often acts to stimulate return traffic.
30. For every incoming call into the US (excluding Canada and Mexico) there are two outgoing -- this ratio was 1.3 in 1975.
31. Much has been written about this mechanism [see Ergas and Patterson (1989), (1990), Stern (1990) Johnson (1990) Acton and Vogelsang (1990)].
32. These set-up charges are themselves odd. Consider the difference between the UK and the rest of Europe. The difference is US\$0.31, what costs incurred in the US could themselves account for this difference?
33. USA-Europe costs in the 1950s-60s were differentiated according to the geographic origin of the call.
34. TAT-9 capital cost per voice path from the USA is estimated to be US\$4 476 to the UK, US\$5 492 to France and US\$6 095 to Spain (Stanley, 1988 Appendix N). Therefore, the international circuit costs are 23 per cent higher to France and 36 per cent higher to Spain. Cost related IMTS charges would also incorporate these cost differentials.
35. See Johnson (1989)
36. Tariff normal range 8-12.30 hours, Monday-Saturday; 13.30-18.00 hours Monday-Friday; 22.30-6.00 hours is a 65 per cent reduction, other hours, 30 per cent reduction.
37. FCC Order on Reconsideration, CC Docket No. 86-494, Adopted 12 December 1986, p.1.
38. *ibid.*, p.11.
39. *ibid.*, p.11.

40. If collection rates were equal to accounting rates, the exporter and importer would be indifferent as to who contracted the transaction. This is an odd element of telephone service since most transactions cannot reverse the flow.
41. Under this formula the socially superior means of raising some specified amount (say NTS costs) in prices is by raising prices proportionately more in less elastic markets. This "price discrimination" is socially superior to, for example, average cost pricing by creating fewer incentives to alter the quantities that would be purchased.
42. The long-run response occurred within one year, on average.
43. A Ramsey-type analysis here is a partial equilibrium analysis, examining simply the relative pricing of incoming and outgoing international calls. A more general analysis would include domestic calls as well.
44. The elasticities are not consistent with a sensible exercise of market power by western European PTTs since no firm with market power should price in the *inelastic* region of demand.
45. This discussion of welfare effects has to be tempered by the fact that measured price elasticities include the expression in overall demand and the reversion of calls. This latter element would overstate the welfare effect of price reductions since the calls reverting from the foreign country are included. Thus, price elasticities should be estimated separating-out the call stimulation effect from the call reversion effect.
46. Johnson (1989) states: "Previous econometric studies generally show that the price elasticity of demand for international service is higher than is true for domestic long distance, whose price elasticity of demand is, in turn, greater than that for local service. In terms of maximising economic efficiency, i.e. maximising the sum of consumer and producer surplus subject to the requirement that total cost be covered, the overpricing of international service goes in the wrong direction", (p.21).
47. See Stern (1990) p.11 "With the advent of competition for transit, traffic carriers began in the late 1970s to offer Transit Renumeration Plans (TRPs) whereby transit facilities are offered to terminal operators at competitive rates."
48. Bruce *et al.*, (1986).
49. See the EC Green papers on Telecommunications, June 1987, and Satellites September 1990.
50. In the USA this is called "international settlements policy"; it has been in place since 1936 and was extended to transit agreements in 1986 (see Kwerel, 1987, p.30-38).
51. Taken from Johnson (1989).

52. The total number of full-time INTELSAT channels increased from 25 293 in 1978 to 116 353 in 1988.
53. International Telecommunication Union, World Plan Committee for the Development of Telecommunications, 1985.
54. These calculations are based on the assumption that each voice path is used an average of two hours daily, that investment costs are recovered over a period of ten years and that the interest rate is 15 per cent. See International Accounting Rates and the Balance of Payments Deficit in Telecommunications Services, Report of the Common Carrier Bureau to the Federal Communications Commission, 12 December 1988.
55. INTELSAT Report 1988-89. Since 1981 the cost of a half-circuit has remained fairly stable: the 1988 cost was \$4 440.
56. A Federal Communications Commission paper has shown that combined satellite and cable use averaged below 50 per cent over the period 1970-1985. See E.R. Kwerel and J.E. McNally, Promoting Competition Between International Telecommunication Cables and Satellites, FCC, Office of Plans and Policy, Washington D.C., 1986.
57. Article V of the INTELSAT Agreement states that "The rates of space segment utilization charge for each type of utilization shall be the same for all applicants for space segment capacity for that type of utilization."
58. These signatories include COMSAT in the United States, KDD in Japan, OTC in Australia, Teleglobe Canada in Canada, BT in the UK, and national Telecommunication Administrations in other countries.
59. Yang-Soon Lee (1987), "Competition between fibre-optic cables and satellites on transatlantic routes", *Telecommunication Journal*, Vol. 54-XII.
60. This article is incompatible with the concept accepted by Member countries to have separation between operational and regulatory functions. Not only do the owners of INTELSAT decide whether competing proposals cause economic harm to INTELSAT, but these same owners are owners and operators of cable transmission facilities, which will also be impacted by separate satellite facilities.
61. INTELSAT's monopoly position in satellite communications implies that entry in competitive services without adequate regulatory safeguards is contrary to policy developments adopted in a number of countries which have introduced competition and in international policy considerations being discussed, for example, at the Group of Negotiations on Services.
62. Determination of the Code of Practice in respect of international accounting arrangements under Condition 48 of the Licence granted to British Telecommunications under section 7 of the Telecommunications Act 1984,

and Condition 44 of the licence granted to Mercury Communications under Section 7 of the Telecommunications Act 1984.

63. For example, starting 1 April 1993 BT will have a peak/off-peak structure with AT&T (0.44 SDR/0.35 SDR) and Mercury a single rate 0.40 SDR).
64. In Europe the mutually agreed accounting rates were multiplied by K-factors to reach the final charge. Their application was not consistent so that the charge collected from a call in one country to another country may differ significantly than the charge for a call in the opposite direction. Differences between Community countries for the same relation are distorting and are contrary to the notion of creating a "European space". The use of these factors was discontinued in 1992.
65. International Telecommunication Union, Study of the Costs of Providing and Operating Telecommunication Services between Industrialized and Developing Countries, Geneva, 1988.
66. *ibid.*, Appendix 4.
67. The Changing Telecommunication Environment, Policy Consideration for the Members of the ITU, ITU, February 1989, paragraph 8.1.

## Bibliography

- ACTON, J.P. and VOGELSANG, I. (1990), "Telephone Demand Over the Atlantic, Evidence from Country-Pair Data", *Rand Publication Series*, R-3715-NSF/MF, The Rand Corporation, Santa Monica CA, USA, July.
- ARONSON, J.D. and COWHEY, P.F. (1987), *When Countries Talk, International Trade in Telecommunications Services*, Ballinger Publishing Company, Cambridge, Massachusetts.
- BERNARD, K. (1990), "Address at the ICC Telecommunications Forum", Washington DC, USA, October 25.
- BEWLEY, R. and FIEBIG, D.G. (1988), "Estimation of Price Elasticities for an International Telephone Demand Model", *Journal of Industrial Economics*, XXXVI, pp. 393-409.
- BROWN, S.J. and SIBLEY, D.S. (1986), *The Theory of Public Utility Pricing*, Cambridge University Press, UK.
- BRUCE, R.R., CUNARD J.P. and M.D. DIRECTOR (1980), *From Telecommunications to Electronic Services*, Butterworth.
- CHARNES, A., COOPER W.W. and SUEYOSHI, T. (1986), "A Goal Programming Constrained Regression Review of the Bell System Breakup", *Management Science*, Vol. 34, pp.1-26.
- EVANS, D.S. and HECKMAN, J.J. (1986), "Erratum: A Test for Sub-additivity of the Cost Function with an Application to the Bell System", *AER*, Vol. 76, pp. 856-858.
- FAULHABER, G. (1975), "Cross Subsidisation: Pricing in Public Enterprises", *AER*, Vol. 65, pp.966-977.
- FCC (Federal Communications Commission (1988), "International Accounting Rates and the Balance of Payments Deficit in Telecommunications Services", Report of the Common Carrier Bureau.
- FCC (1990), "Notice of Proposed Rulemaking in the Matter of Regulation of International Accounting Rates", CC Docket No. 90-337, Washington DC, 7 August.
- JOHNSON, L.L. (1989), "Competition, Pricing and Regulatory Policy in the International Telephone Industry", *Rand Publication Series*, R-3790-NSF/MF, The Rand Corporation, Santa Monica CA, US, July.

- KWEREL, E. (1987), "Reconciling Competition and Monopoly in the Supply of International Telecommunications Services, a US Perspective", FCC, Office of Plans and Policy.
- MIRMAN, L.J., SOMET D. and TAUMAN, Y. (1983), "Axiomatic Approach to the Allocation of a Fixed Cost through Prices", *Bell Journal*, 14(1), p.517.
- NERA (1990), "International Telephone Service Imbalances, Accounting Rates and Regulatory Policy", Mimeo, United States.
- OECD (1987) "Elements of a Conceptual Framework for Trade in Services", free document.
- OECD (1990), "Trade in Information, Computer and Communication Services", *ICCP Serie*, No. 21, Paris.
- OFTEL (1990), *Advice, International Telephony: Simple Resale and Control of Prices*, October 1, United Kingdom.
- PHLIPS, L. (1985), *Price Discrimination*, Cambridge University Press, UK.
- RALPH, E. (1989), "The ITU Accounting Rate Regime - Where to From Here?", ITC Asian Regional Forum, Merrijig, Victoria, Australia.
- RAMSEY, F.P. (1927), "A Contribution to the Theory of Taxation", *Economic Journal*, 37, pp.47-61.
- RHOLFS, J. (1974), "A Theory of Interdependant Demands for a Communications Service", *Bell Journal*, 5(1), pp.16-37.
- RÖLLER, H. (1990), "Proper Quadratic Cost Functions with an Application to the Bell System", *Review of Economics and Statistics*.
- STANLEY, K.B. (1988), "The Balance of Payments Deficit in International Telecommunications Services, FCC Industry Analysis Division and Report of the Common Carrier Bureau to the Federal Communications Commission on International Accounting Rates and the Balance of Payments Deficit in Telecommunications Services", Washington DC, US, 12 December.
- STERN, P.A. (1990), "The International Telecommunications Settlement Process: What's Needed? Destroy and Replace it or Adjust it?", paper presented at the ICC Telecommunications Forum, Washington DC, US.
- WAVERMAN, L. (1989), "The Regulation of Interexchange Telecommunications Services in the US", in R. Crandall and K. Flamm (eds.), *The Future of Telecommunications and Computers*, Brookings, United States.



**MAIN SALES OUTLETS OF OECD PUBLICATIONS  
PRINCIPAUX POINTS DE VENTE DES PUBLICATIONS DE L'OCDE**

**ARGENTINA - ARGENTINE**

Carlos Hirsch S.R.L.  
Galería Güemes, Florida 165, 4° Piso  
1333 Buenos Aires Tel. (1) 331.1787 y 331.2391  
Telefax: (1) 331.1787

**AUSTRALIA - AUSTRALIE**

D.A. Information Services  
648 Whitehorse Road, P.O.B 163  
Mitcham, Victoria 3132 Tel. (03) 873.4411  
Telefax: (03) 873.5679

**AUSTRIA - AUTRICHE**

Gerold & Co.  
Graben 31  
Wien I Tel. (0222) 533.50.14

**BELGIUM - BELGIQUE**

Jean De Lannoy  
Avenue du Roi 202  
B-1060 Bruxelles Tel. (02) 538.51.69/538.08.41  
Telefax: (02) 538.08.41

**CANADA**

Renouf Publishing Company Ltd.  
1294 Algoma Road  
Ottawa, ON K1B 3W8 Tel. (613) 741.4333  
Telefax: (613) 741.5439

**Stores:**

61 Sparks Street  
Ottawa, ON K1P 5R1 Tel. (613) 238.8985  
211 Yonge Street  
Toronto, ON M5B 1M4 Tel. (416) 363.3171  
Telefax: (416)363.59.63

Les Éditions La Liberté Inc.  
3020 Chemin Sainte-Foy  
Sainte-Foy, PQ G1X 3V6 Tel. (418) 658.3763  
Telefax: (418) 658.3763

Federal Publications Inc.  
165 University Avenue, Suite 701  
Toronto, ON M5H 3B8 Tel. (416) 860.1611  
Telefax: (416) 860.1608

Les Publications Fédérales  
1185 Université  
Montréal, QC H3B 3A7 Tel. (514) 954.1633  
Telefax: (514) 954.1635

**CHINA - CHINE**

China National Publications Import  
Export Corporation (CNPIEC)  
16 Gongti E. Road, Chaoyang District  
P.O. Box 88 or 50  
Beijing 100704 PR Tel. (01) 506.6688  
Telefax: (01) 506.3101

**DENMARK - DANEMARK**

Munksgaard Book and Subscription Service  
35, Nørre Søgade, P.O. Box 2148  
DK-1016 København K Tel. (33) 12.85.70  
Telefax: (33) 12.93.87

**FINLAND - FINLANDE**

Akateeminen Kirjakauppa  
Keskuskatu 1, P.O. Box 128  
00100 Helsinki  
Subscription Services/Agence d'abonnements :  
P.O. Box 23  
00371 Helsinki Tel. (358 0) 12141  
Telefax: (358 0) 121.4450

**FRANCE**

OECD/OCDE  
Mail Orders/Commandes par correspondance:  
2, rue André-Pascal  
75775 Paris Cedex 16 Tel. (33-1) 45.24.82.00  
Telefax: (33-1) 49.10.42.76  
Telex: 640048 OCDE

**OECD Bookshop/Librairie de l'OCDE :**

33, rue Octave-Feuillet  
75016 Paris Tel. (33-1) 45.24.81.67  
(33-1) 45.24.81.81

Documentation Française  
29, quai Voltaire  
75007 Paris Tel. 40.15.70.00

Gibert Jeune (Droit-Économie)  
6, place Saint-Michel  
75006 Paris Tel. 43.25.91.19

Librairie du Commerce International  
10, avenue d'Iéna  
75016 Paris Tel. 40.73.34.60

Librairie Dunod  
Université Paris-Dauphine  
Place du Maréchal de Lattre de Tassigny  
75016 Paris Tel. (1) 44.05.40.13

Librairie Lavoisier  
11, rue Lavoisier  
75008 Paris Tel. 42.65.39.95

Librairie L.G.D.J. - Montchrestien  
20, rue Soufflot  
75005 Paris Tel. 46.33.89.85

Librairie des Sciences Politiques  
30, rue Saint-Guillaume  
75007 Paris Tel. 45.48.36.02

P.U.F.  
49, boulevard Saint-Michel  
75005 Paris Tel. 43.25.83.40

Librairie de l'Université  
12a, rue Nazareth  
13100 Aix-en-Provence Tel. (16) 42.26.18.08

Documentation Française  
165, rue Garibaldi  
69003 Lyon Tel. (16) 78.63.32.23

Librairie Decitre  
29, place Bellecour  
69002 Lyon Tel. (16) 72.40.54.54

**GERMANY - ALLEMAGNE**

OECD Publications and Information Centre  
August-Bebel-Allee 6  
D-53175 Bonn Tel. (0228) 959.120  
Telefax: (0228) 959.12.17

**GREECE - GRÈCE**

Librairie Kauffmann  
Mavrokordatou 9  
106 78 Athens Tel. (01) 32.55.321  
Telefax: (01) 36.33.967

**HONG-KONG**

Swindon Book Co. Ltd.  
13-15 Lock Road  
Kowloon, Hong Kong Tel. 366.80.31  
Telefax: 739.49.75

**HUNGARY - HONGRIE**

Euro Info Service  
Margitsziget, Európa Ház  
1138 Budapest Tel. (1) 111.62.16  
Telefax: (1) 111.60.61

**ICELAND - ISLANDE**

Mál Mog Menning  
Laugavegi 18, Pósthólf 392  
121 Reykjavík Tel. 162.35.23

**INDIA - INDE**

Oxford Book and Stationery Co.  
Scindia House  
New Delhi 110001 Tel. (11) 331.5896/5308  
Telefax: (11) 332.5993  
17 Park Street  
Calcutta 700016 Tel. 240832

**INDONESIA - INDONÉSIE**

Pdii-Lipi  
P.O. Box 269/JKSMG/88  
Jakarta 12790 Tel. 583467  
Telex: 62 875

**IRELAND - IRLANDE**

TDC Publishers - Library Suppliers  
12 North Frederick Street  
Dublin 1 Tel. (01) 874.48.35  
Telefax: (01) 874.84.16

**ISRAEL**

Praedicta  
5 Shatner Street  
P.O. Box 34030  
Jerusalem 91430 Tel. (2) 52.84.90/1/2  
Telefax: (2) 52.84.93

**ITALY - ITALIE**

Libreria Commissionaria Sansoni  
Via Duca di Calabria 1/1  
50125 Firenze Tel. (055) 64.54.15  
Telefax: (055) 64.12.57

Via Bartolini 29  
20155 Milano Tel. (02) 36.50.83

Editrice e Libreria Herder  
Piazza Montecitorio 120  
00186 Roma Tel. 679.46.28  
Telefax: 678.47.51

Libreria Hoepli  
Via Hoepli 5  
20121 Milano Tel. (02) 86.54.46  
Telefax: (02) 805.28.86

Libreria Scientifica  
Dott. Lucio de Biasio 'Aeiou'  
Via Coronelli, 6  
20146 Milano Tel. (02) 48.95.45.52  
Telefax: (02) 48.95.45.48

**JAPAN - JAPON**

OECD Publications and Information Centre  
Landic Akasaka Building  
2-3-4 Akasaka, Minato-ku  
Tokyo 107 Tel. (81.3) 3586.2016  
Telefax: (81.3) 3584.7929

**KOREA - CORÉE**

Kyobo Book Centre Co. Ltd.  
P.O. Box 1658, Kwang Hwa Moon  
Seoul Tel. 730.78.91  
Telefax: 735.00.30

**MALAYSIA - MALAISIE**

Co-operative Bookshop Ltd.  
University of Malaya  
P.O. Box 1127, Jalan Pantai Baru  
59700 Kuala Lumpur  
Malaysia Tel. 756.5000/756.5425  
Telefax: 757.3661

**MEXICO - MEXIQUE**

Revistas y Periodicos Internacionales S.A. de C.V.  
Florenxia 57 - 1004  
Mexico, D.F. 06600 Tel. 207.81.00  
Telefax: 208.39.79

**NETHERLANDS - PAYS-BAS**

SDU Uitgeverij Plantijnstraat  
Externe Fondsen  
Postbus 20014  
2500 EA's-Gravenhage Tel. (070) 37.89.880  
Voor bestellingen: Telefax: (070) 34.75.778

**NEW ZEALAND  
NOUVELLE-ZÉLANDE**

Legislation Services  
P.O. Box 12418  
Thorndon, Wellington Tel. (04) 496.5652  
Telefax: (04) 496.5698



**NORWAY - NORVÈGE**

Narvesen Info Center - NIC  
Bertrand Narvesens vei 2  
P.O. Box 6125 Etterstad  
0602 Oslo 6  
Tel. (022) 57.33.00  
Telefax: (022) 68.19.01

**PAKISTAN**

Mirza Book Agency  
65 Shahrah Quaid-E-Azam  
Lahore 54000  
Tel. (42) 353.601  
Telefax: (42) 231.730

**PHILIPPINE - PHILIPPINES**

International Book Center  
5th Floor, Filipinas Life Bldg.  
Ayala Avenue  
Metro Manila  
Tel. 81.96.76  
Telex 23312 RHP PH

**PORTUGAL**

Livraria Portugal  
Rua do Carmo 70-74  
Apart. 2681  
1200 Lisboa  
Tel.: (01) 347.49.82/5  
Telefax: (01) 347.02.64

**SINGAPORE - SINGAPOUR**

Gower Asia Pacific Pte Ltd.  
Golden Wheel Building  
41, Kallang Pudding Road, No. 04-03  
Singapore 1334  
Tel. 741.5166  
Telefax: 742.9356

**SPAIN - ESPAGNE**

Mundi-Prensa Libros S.A.  
Castelló 37, Apartado 1223  
Madrid 28001  
Tel. (91) 431.33.99  
Telefax: (91) 575.39.98

**Libreria Internacional AEDOS**

Consejo de Ciento 391  
08009 - Barcelona  
Tel. (93) 488.30.09  
Telefax: (93) 487.76.59

**Llibreria de la Generalitat**

Palau Moja  
Rambla dels Estudis, 118  
08002 - Barcelona  
(Subscriptions) Tel. (93) 318.80.12  
(Publicacions) Tel. (93) 302.67.23  
Telefax: (93) 412.18.54

**SRI LANKA**

Centre for Policy Research  
c/o Colombo Agencies Ltd.  
No. 300-304, Galle Road  
Colombo 3  
Tel. (1) 574240, 573551-2  
Telefax: (1) 575394, 510711

**SWEDEN - SUÈDE**

Fritzes Information Center  
Box 16356  
Regeringsgatan 12  
106 47 Stockholm  
Tel. (08) 690.90.90  
Telefax: (08) 20.50.21

**Subscription Agency/Agence d'abonnements :**

Wennergren-Williams Info AB  
P.O. Box 1305  
171 25 Solna  
Tel. (08) 705.97.50  
Téléfax : (08) 27.00.71

**SWITZERLAND - SUISSE**

Maditec S.A. (Books and Periodicals - Livres  
et périodiques)  
Chemin des Palettes 4  
Case postale 266  
1020 Renens  
Tel. (021) 635.08.65  
Telefax: (021) 635.07.80

**Librairie Payot S.A.**

4, place Pépinet  
CP 3212  
1002 Lausanne  
Tel. (021) 341.33.48  
Telefax: (021) 341.33.45

**Librairie Unilivres**

6, rue de Candolle  
1205 Genève  
Tel. (022) 320.26.23  
Telefax: (022) 329.73.18

**Subscription Agency/Agence d'abonnements :**

Dynapresse Marketing S.A.  
38 avenue Vibert  
1227 Carouge  
Tel.: (022) 308.07.89  
Telefax: (022) 308.07.99

**See also - Voir aussi :**

OECD Publications and Information Centre  
August-Bebel-Allee 6  
D-53175 Bonn (Germany) Tel. (0228) 959.120  
Telefax: (0228) 959.12.17

**TAIWAN - FORMOSE**

Good Faith Worldwide Int'l. Co. Ltd.  
9th Floor, No. 118, Sec. 2  
Chung Hsiao E. Road  
Taipei  
Tel. (02) 391.7396/391.7397  
Telefax: (02) 394.9176

**THAILAND - THAÏLANDE**

Suksit Siam Co. Ltd.  
113, 115 Fuang Nakhon Rd.  
Opp. Wat Rajbopith  
Bangkok 10200  
Tel. (662) 225.9531/2  
Telefax: (662) 222.5188

**TURKEY - TURQUIE**

Kültür Yayinlari Is-Türk Ltd. Sti.  
Atatürk Bulvari No. 191/Kat 13  
Kavaklidere/Ankara Tel. 428.11.40 Ext. 2458  
Dolmabahce Cad. No. 29  
Besiktas/Istanbul Tel. 260.71.88  
Telex: 43482B

**UNITED KINGDOM - ROYAUME-UNI**

HMSO  
Gen. enquiries Tel. (071) 873 0011  
Postal orders only:  
P.O. Box 276, London SW8 5DT  
Personal Callers HMSO Bookshop  
49 High Holborn, London WC1V 6HB  
Tel. (071) 873 8200  
Telefax: (071) 873 8200

Branches at: Belfast, Birmingham, Bristol, Edinburgh, Manchester

**UNITED STATES - ÉTATS-UNIS**

OECD Publications and Information Centre  
2001 L Street N.W., Suite 700  
Washington, D.C. 20036-4910 Tel. (202) 785.6323  
Telefax: (202) 785.0350

**VENEZUELA**

Libreria del Este  
Avda F. Miranda 52, Aptdo. 60337  
Edificio Galipán  
Caracas 106 Tel. 951.1705/951.2307/951.1297  
Telegram: Librestre Caracas

Subscription to OECD periodicals may also be placed through main subscription agencies.

Les abonnements aux publications périodiques de l'OCDE peuvent être souscrits auprès des principales agences d'abonnement.

Orders and inquiries from countries where Distributors have not yet been appointed should be sent to: OECD Publications Service, 2 rue André-Pascal, 75775 Paris Cedex 16, France.

Les commandes provenant de pays où l'OCDE n'a pas encore désigné de distributeur devraient être adressées à : OCDE, Service des Publications, 2, rue André-Pascal, 75775 Paris Cedex 16, France.

OECD PUBLICATIONS, 2 rue André-Pascal, 75775 PARIS CEDEX 16  
PRINTED IN FRANCE  
(93 94 07 1) ISBN 92-64-14197-9 - No. 47335 1994