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**DIRECTORATE FOR SCIENCE, TECHNOLOGY AND INDUSTRY
COMMITTEE FOR INFORMATION, COMPUTER AND COMMUNICATIONS POLICY**

Working Party on Telecommunication and Information Services Policies

INTERCONNECTION AND LOCAL COMPETITION

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FOREWORD

This report was discussed by the Working Party on Telecommunications and Information Services Policy (TISP) in May 2000 and subsequently declassified by the Committee for Information, Computer and Communications Policy (ICCP).

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INTERCONNECTION AND LOCAL COMPETITION

Main Points

Since the introduction of competition in the telecommunication sector, there have been significant changes in the structure of the telecommunications market. In addition to the significant development of competition in the telecommunications market, the astonishing development of new digital technology and innovative applications of this technology, such as Internet telephony, are shaking the foundation of the traditional regulatory framework which has long been applied to the telecommunications sector.

In spite of these structural and technological developments in the telecommunications industry, the incumbent still enjoys a dominant position in the local market. Considering the huge investment required in constructing the local loop and the delay in implementation of new technologies, the incumbent can be expected to maintain its dominant position in the local market in the near future while cable television operators and other carriers may provide some limited competition in the local loop. Thus, it has become fairly clear that further regulatory initiatives are needed in the local fixed telecommunications market in order to stimulate competition.

While recent technological and regulatory developments have increased opportunities for new entrants to enter the local market, there still remains a fundamental issue, that is the economic profitability of the local telephony market, which is critical to promote competition. Except for a few Member countries, such as the United Kingdom and Germany, the local call market does not provide sufficient margins for many new entrants. In particular, in many countries, a new entrant cannot recover its marginal costs if it provides local call services through interconnection with the incumbent's local loop for both call origination and call termination due to a so called 'price-squeeze' situation, caused by retail tariffs that are not fully rebalanced and interconnection charges that are not cost-oriented.

The level of interconnection charges determines the structure of the telecommunications market. If interconnection charges are too high, it will discourage companies to enter into the telecommunications market. On the contrary, if interconnection charges are too low and below real cost, the incumbent cannot recover its investment on networks and both the incumbent and new entrants will be discouraged to make future investments on infrastructure. Therefore it is critical to ensure cost-oriented interconnection charges in order to ensure effective competition.

In this context, it is essential that interconnection charges should be calculated on the basis of the forward-looking incremental costs, which are incurred for interconnection services. The data show that interconnection charges of Member countries applying a long run incremental cost methodology (LRIC) are much lower than those of Member countries using a fully distributed cost (FDC) methodology. At the same time, interconnection charges should not include an access deficit contribution or universal service contribution. If there is any economic loss due to the provision of universal service (including the provision of subscriber lines), this should be compensated separately through, for example, a competitively neutral funding mechanism.

There is a consensus that in the longer term facility based competition brings more benefits to consumers since it enables competition in the wholesale market which, in return, increases the rate of reduction in retail prices and diffuses new innovative services through competition between infrastructure providers. In this regard, the difference in interconnection charges between facility based operators and service operators can be justified to the extent that it is necessary to promote competition in the marketplace. In countries where retail prices and interconnection charges are regulated by the regulator, it is very important to ensure regulatory symmetry between price regulation and interconnection regulation. In particular, the regulator needs to ensure that there exists corresponding charging systems in the retail market and the wholesale market in order to prevent market distortions.

1. Introduction

Significant changes in the structure of the telecommunication market have occurred since the introduction of competition in the sector. Now, companies are competing in all market segments and more importantly, competition is developing between companies, which use different network platforms such as fixed telecommunications networks, cable television networks and mobile networks. In terms of regulatory models, the development of inter-modal competition in the telecommunications sector requires the regulator to move forward to technology neutral regulation that is essential to maximise the welfare of consumers through innovative competition between different technology platforms.

In addition to the significant development of competition in the telecommunications market, the rapid development of new digital technology and innovative applications of this technology, such as Internet telephony, are providing new alternatives to customers to enjoy traditional voice telephony services over the Internet. For example, Dialpad.com, a Silicon Valley based next generation Internet telecommunications company, is providing free web to phone domestic voice telephony service to US customers and has acquired 2 million customers in the 12 weeks after it launched service in October 1999. Dialpad.com does not charge its customers, instead it generates revenue through mainly advertising¹. This voice over IP network (VoIP) services is expected to have a significant impact on price and access regulation in the telecommunications sector in that it is based on the assumption that telecommunications service providers are generating revenues only from their subscribers and other telecommunications service providers. With regard to the development of Internet based services, it is very important that the policy reaction to these developments must not be to try and encompass the Internet into regulatory frameworks, but rather to examine the existing regulatory base in order to ensure that there are no biases in terms of market entry, or by way of asymmetric market signals to a particular technology.

Together with the introduction of VoIP services in the retail market, there is a new development in the wholesale market of the telecommunications sector. While bilateral commercial negotiations between operators is still the most popular way to buy switching capacity in the wholesale market, a number of companies are emerging as brokers trading in switching capacity for call or data transmission. For a long time, this market segment has been characterised by a single seller, the incumbent, and many buyers, new entrants. However, the proliferation of Internet traffic has enabled the rapid growth of network providers such as Global Crossing and Teleglobe, which are dedicated to providing network capacity to telecommunications operators and Internet service providers (ISPs). Taking advantage of the dramatic increase in the number of network providers and the number of communications service providers both in the traditional telephony market and the Internet access market, companies like Arbinet Global Clearing Network, Enron, Rate-X, and Band-X are trading switching capacity through their web sites². Although this trend is mostly limited to the transaction of call or data transmission on trunk lines due to the incumbent's dominant position in the local loop, an increasing amount of switching capacity is traded in the wholesale market.

The rapid development of competition, the introduction of new innovative VoIP services, and the emergence of brokerage firms for switching capacity are changing the telecommunications market so as to become similar to other commodity markets. However, in spite of these unprecedented changes in the structure of the telecommunications market, competition in the local market³ has not developed much and the local market remains as the main market segment in which the incumbent has a dominant position. This requires a continuation of regulatory supervision in this market segment in order to prevent the incumbent from engaging in anti-competitive behaviour. In particular, considering the huge amount of investment required to build a local loop, it seems that the incumbent's dominance in the local loop will remain in the near future unless there is a technological breakthrough in wireless technology. Because of its dominance in the local loop market the incumbent, in the majority of Member countries, is required to

provide non-discriminatory, fair, transparent and cost-oriented interconnection services to new entrants in order to ensure fair competition in the marketplace.

These interconnection requirements on the incumbent are critical to ensure fair competition, but arguably the requirement for cost-orientation of interconnection charges is the most important factor in determining the degree of competition in the local market and the telecommunications market as a whole.

In fact, the policy on interconnection charges determines the structure of competition since it determines wholesale prices, which are the largest part of a new entrant's cost.

Although there is a very close relationship between retail prices and interconnection charges, there is an important difference between the local call market and the local interconnection market. While the local call market is determined by geographical distance, local interconnection is determined by elements, *i.e.* the use of a local switch. For example, if a new entrant's customer makes a telephone call to the incumbent's customer within the local call area, there is a possibility that a new entrant needs to interconnect at a single tandem switch, if it does not have a local switch in a local switching area where a called party is located. Therefore, there is no one-to-one relationship between interconnection charges and retail prices.

In the meantime, in spite of the fundamental structural changes underway in the telecommunications market, which is changing the sector from a utility market to a commodity-like market, the concept of universal service still constitutes an integral part of telecommunications regulation. In theory, social policy goals should be achieved through separate policy measures, which would not affect economic policy objectives such as the promotion of competition in the local market. However, a number of countries still use interconnection charges as a means to achieve social policy objectives. This can have a negative impact on the promotion of competition in the local market.

There are four different ways for new entrants to enter the local market: direct investment in the local loop, unbundling of the local loop, resale, and interconnection. Since it is not economically possible, at least in the short-to-medium term, for new entrants to construct local loops providing access to all consumers unless they already have direct access paths like cable television operators, there are three viable options for new entrants to compete in the local market. This paper aims to analyse the relationship between local competition and interconnection (including resale) in the light of ensuring effective competition in the local market and examining what impact this may have for regulatory arrangements. In order to have a comprehensive understanding on the issue, the paper briefly examines the development of the local market and then examines the general regulatory framework on interconnection in Member countries. Finally, the paper analyses the inter-relationship between the structure of retail prices and interconnection charges and its implication for local competition.

2. Competition in the local telecommunications market

In the telecommunications market, there has generally been a clear demarcation between local, long distance and international services. This demarcation has also been used in telecommunication regulations in many Member countries. In particular, there were line-of-business restrictions based on this demarcation in the United States and Japan. In the United States, before the 1996 Telecommunications Act, local exchange carriers were not allowed to enter the national long distance and international markets, the so-called inter-exchange market. While Bell Atlantic recently received permission to enter the national long distance and international markets, under section 251 and 271 of the 1996 Telecommunications Act, RBOCs can only enter the long distance and international markets after opening their local networks to competition. In Japan, until 1998, NTT could not enter the international market and KDD was limited to

providing international telecommunications services. Although in principle there is no more line-of-business restrictions based on market demarcation, in many Member countries, the regulatory framework still distinguishes local, long distance and international services. For example, many Member countries have issued licences on the basis of this market demarcation⁴.

When competition was introduced in the telecommunications sector, new entrants first entered the long distance and international markets. Two reasons facilitated such market entry: prices were well above cost and investment in long distance networks was relatively cheap. With aggressive price competition and regulatory support, new entrants have gained a healthy market share in long distance and international markets. At the same time, most consumers in OECD countries can choose their carriers for long distance and international voice telephony services through either carrier pre-selection or call by call carrier selection. However, competition in the local market has not developed to a significant degree and a significant number of consumers in OECD countries do not have any choice but to use the incumbent's local voice telephony services. This is one of the reasons why local call services still need to be considered as a part of the local competition issue even where there is no more separation between local calls and national long distance calls in countries such as Sweden, Norway, Luxembourg and Iceland.⁵

Furthermore, except in the case of United Kingdom where new entrants have an 18% market share in the local market⁶, it seems that even the long history of competition has not helped to facilitate local competition. In spite of the early introduction of competition in the mid 1980s, the market shares of new entrants in the local market in the United States and Japan are not very impressive. In the United States competitive local exchange carriers' (CLECs) market share is 4%⁷ and new entrants have a 6.3% market share in Japan⁸. Accordingly, in other Member countries, the incumbent enjoys more than a 97% market share in the local market except Australia⁹, Belgium, Denmark, and Austria where new entrants have more than a 3% market share.

Why has competition not developed in the local market as fast as it has in the long distance and international markets? To get a clear understanding of this issue it is necessary to separate the access market from the local call market. In the access market, the huge up-front investment for subscriber lines together with the great difficulty in obtaining rights-of-way to install local networks discouraged new entrants from constructing subscriber lines. Indeed, the subscriber lines, the so-called last mile, are the most expensive part of the telecommunication network, and it is not possible in the short to medium term for new entrants to have a ubiquitous network such as those of the incumbent. In addition, relative to long distance backbone networks and trunk networks, which could be easily deployed through arrangements with utility companies or national highway authorities, the construction of subscriber lines are subject to very strict local regulation and lengthy discussions with local authorities and private property owners to attain rights-of-way. Considering the huge up-front investment to deploy local networks and the difficulties to get rights-of-way, the most probable candidates for local loop competition were cable operators. However, up until recently there were line-of-business restrictions which prevented telephone companies and cable operators from entering each other's market and, in addition, in a number of countries CATV infrastructures were owned by the incumbent PSTN operator.

However, this cannot explain the lack of competition in the local call market since long distance and international operators do not have seamless networks to connect them with end users. They rely on the incumbent's local loop to terminate or originate long distance and international calls. While there is a certain advantage for cable operators, who have a direct access to end users, there is no reason for new entrants in the local market to have direct access to end customers. For instance, in Japan, TNet, a utility based new entrant in the local market, obtained 1.4 million subscribers in just six months after launching its local telecommunications business in the Tokyo area in January 1998 using interconnections at both ends with NTT's local loop.

Perhaps one of the most important reasons for the lack of competition in the local call market has been that, on the basis of existing price levels, the local market is not sufficiently profitable. In order to compete in the local market regardless of a presence in the long distance and international markets, new entrants at least need to generate revenue which can cover marginal cost to provide local call services. However, high interconnection charges and limited points of interconnection due to high up front investment to make a presence in local switching areas, which do not allow new entrants to make interconnection at a local switch make it impossible for new entrants to recover marginal costs to provide local call services. Furthermore, traditionally, the incumbents have claimed that local access and voice services were cross-subsidised by revenues from national long distance and international services. Although there are likely to be inefficiencies in the operation of the incumbent due to its former monopoly, the local market has not been an attractive market for new entrants compared with the long distance and international markets where they have reduced the excessive profits once earned by the incumbent without much effort.

In addition, essential regulatory safeguards such as number portability, carrier pre-selection and facility sharing were not introduced in line with the market liberalisation. It is notable that in many Member countries, carrier pre-selection is required for long distance and international fixed voice telephony services but not yet required for local services.

The local telephone market has thus remained a *de facto* monopoly in spite of the liberalisation of the telecommunications market. However, recent technological and regulatory developments have changed the situation and have expanded opportunities to enter the local market. In particular, several factors have occurred to make local competition increasingly attractive for new entrants.

First, pro-competitive regulatory approaches, which have lowered barriers to new entry, have played a key role in opening local markets. The implementation of local loop unbundling, the inclusion of local services into carrier pre-selection and the implementation of geographical number portability are good examples of pro-competitive regulatory measures which are attracting new entrants into the local market. In addition, the requirement to provide interconnection at the local switch allows new entrants to use interconnection to provide local call service. These regulatory measures were not always in place when telecommunication markets were liberalised due to a number of reasons including technical difficulties and resistance by the incumbent.

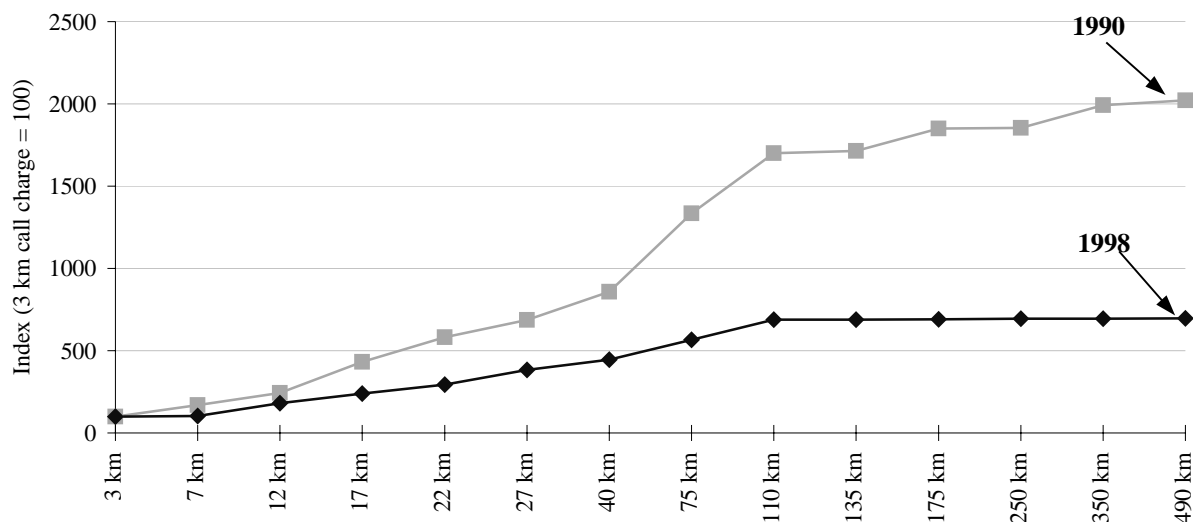
Second, the introduction of new technologies, such as fixed and mobile wireless technologies¹⁰ or cable telephony, is enabling new entrants to obtain direct access to end customers without using the incumbent's local loop. However, the pace of implementation of these technologies is much slower than expected.

Third, the importance of providing one stop shopping to end customers is an incentive for new entrants to include local voice telephony services as an integral part of the services they offer to end customers in order to compete with incumbents. In particular, this is more evident in countries such as the United States and Japan where the incumbent was subject to line-of-business regulation.

Fourth, the trend in tariff rebalancing and the increased postalisation¹¹ of telecommunication prices have enlarged the size of the local market which is already the largest segment of the fixed telecommunications market. The increase of monthly subscription charges and local call charges makes the local market more attractive to both facility based new entrants and service operators. Figure 2 shows the rebalancing of local call charges which had been undertaken between 1990 to 1992, however recently the EC released data that shows the process of tariff rebalancing is continuing in a number of EU member countries¹². In terms of monthly subscription charges, between 1995 and 1996 charges increased significantly both in residential and business markets. Although subscription charges in the residential market have not changed much due to price controls imposed in the context of universal service obligations, the charges in the business market have increased continuously. In addition, as we can see in Figure 1 the trend in postalisation reduced

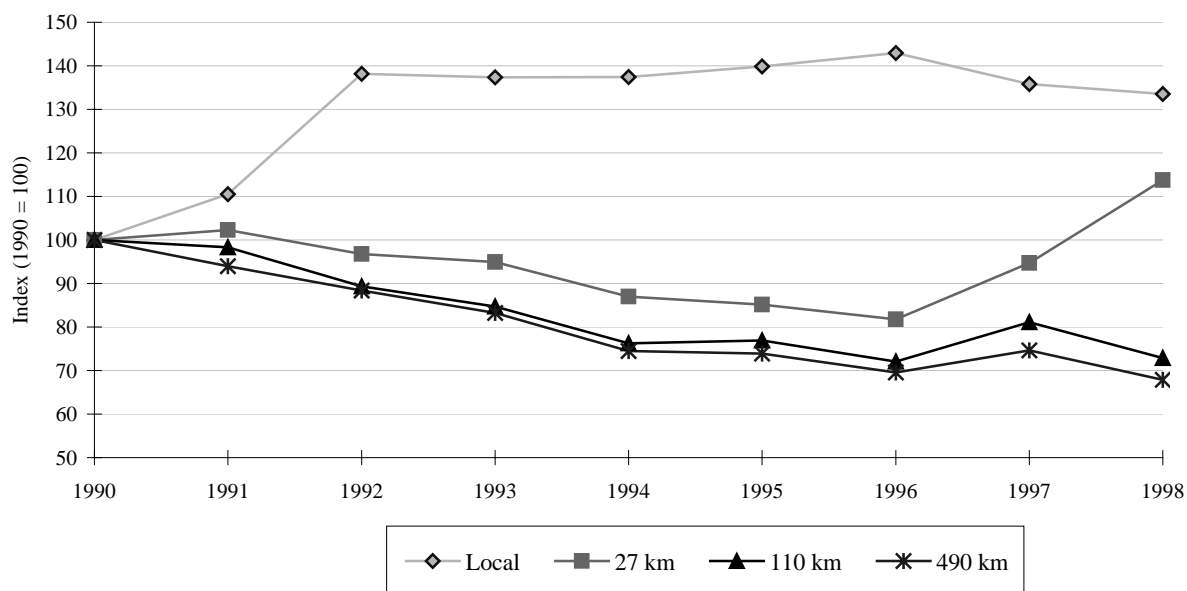
significantly the gap between long distance call charges and local call charges. More importantly, when some PTOs rebalance their rates, they raise short distance prices while bringing down the prices for longer distances.

Figure 1. Postalisation of tariffs in OECD Member countries



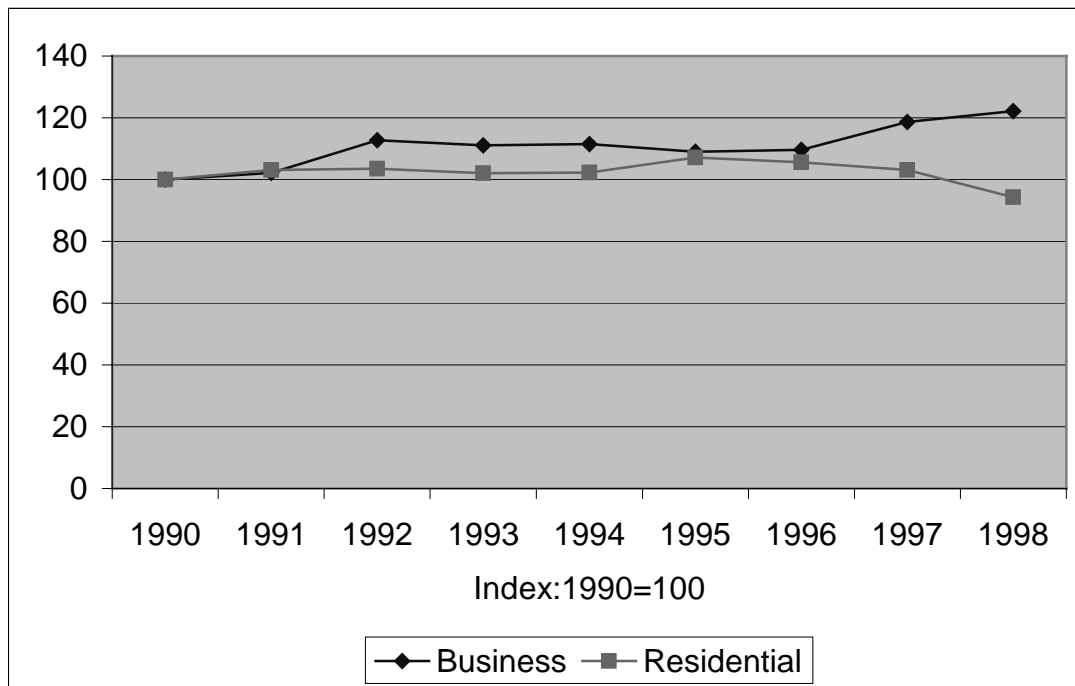
Source: OECD.

Figure 2. OECD tariff rebalancing by distance



Notes: The average of index (1990 = 0) in each country weighted by the number of mainlines. Calculation is based on PPPs expressed in USD. Luxembourg and New Zealand are not included.

Source: OECD.

Figure 3. Changes in the monthly subscription charge

Note: The average of index (1990 = 0). Calculation is based on PPPs expressed in USD.

Source: OECD.

Fifth, the abolition of line-of-business restrictions between telecommunications operators and cable operators has enabled cable operators, which already have direct access to end customers, to provide telecommunications services to their customers. In 1996, there were only eight Member countries in the OECD area, which allowed cable television operators to provide full PSTN services including voice telephony, *i.e.* Canada, Finland, Japan, Korea, New Zealand, Sweden, the United Kingdom and the United States. However, since then, 13 more OECD countries have allowed cable operators to provide full PSTN services: Australia, Austria, Belgium, Denmark, France, Germany, Italy, Luxembourg, Mexico, the Netherlands, Norway, Spain, Switzerland. In the EU, the Commission issued the Full Competition Directive that required member countries to allow cable operators to provide voice telephony from 1 January 1998.

These technological and regulatory developments clearly change the nature of the local market and expand the opportunity for new entrants to enter the local market. In fact, the number of operators who provide local telecommunications service and infrastructure has dramatically increased¹³. Nevertheless, it is also true that the incumbent still controls essential facilities in most market segments and also has a dominant position in the local call market. In particular, in residential markets, the level of competition is very limited due to high up-front costs to build infrastructure and low profit in the local residential market. As mentioned earlier, there have been many impediments for new entrants to compete with the incumbent in the local market.

As a result, until there is effective competition in the local loop, regulatory measures such as the requirement for cost-orientation of interconnection charges are critical to ensure effective competition in the local market.

3. Regulatory framework for interconnection charges

Since the liberalisation of the telecommunications market, the interconnection framework has been regarded as a cornerstone of regulatory safeguards, which aim to ensure fair competition between the incumbent and new entrants. In fact, network interconnectivity is essential for new entrants to allow them to provide seamless telecommunication services to their customers since they do not have ubiquitous networks. At the same time, interconnection between operators allows customers to choose among operators. Interconnection also allows subscribers with different telecommunications operators to benefit from network externalities, thus increasing their welfare through reaching customers whom they could not reach without interconnection.

In most Member countries, interconnection rules are laid down in the telecommunications law¹⁴, which usually requires that all telecommunications operators are required to negotiate with parties who request interconnection to their networks. In most countries, interconnection agreements between operators without significant market power are regarded as a commercial matter in which the telecommunication regulator may intervene only in the case of dispute between the two parties. However, interconnection charges of operators with 'significant market power' are subject to the authorisation of the regulator (see Table 2).

In the majority of Member countries, a sector specific regulator is responsible for interconnection regulation, except in Australia and New Zealand. There is no sector specific interconnection regulation in New Zealand so general competition rules are applied to resolve matters related to interconnection. In Australia, the competition authority (ACCC) has exclusive authority on the access regime in telecommunications in spite of the presence of the sector specific regulator (ACA).

The United States is the only country where the regulatory supervision on interconnection is shared by a federal agency (FCC) and State public utility commissions (PUCs). While Section 251 of the Telecommunications Act requires all carriers to provide for interconnection, the jurisdiction on local exchange carriers (LECs) belongs to the PUCs. As a result, in the United States, whereas LECs' inter-LATA interstate access charges are subject to the jurisdiction of the FCC and are determined by tariffs filed with the FCC, LEC's inter-LATA intrastate access charges are set by the PUCs. In addition, local interconnection charges are set through commercial negotiation under pricing guidelines established by the PUCs.

While there are institutional differences, all Member countries have given regulatory power for interconnection to the same institution which is responsible for price regulation¹⁵ (see "Telecommunications Regulations: Institutional Structures and Responsibilities" DSTI/ICCP/TISP(99)15/FINAL). In terms of the nature of regulation, price regulation is more related with social regulation in the context of universal services, and interconnection regulation is economic regulation, tackling the problem of bottleneck facilities. In spite of this difference, the two types of regulation are strongly interrelated and have impacted on each other. This issue will be discussed later.

Table 1. Regulatory institutions responsible for interconnection regulation

Country	Authorisation of Interconnection charges of operators with 'significant market power'	Dispute resolution	Notes
Australia	ACCC	ACCC	ACCC is the competition authority.
Austria	Telekom-Control-Kommission	Telecom-Control-Kommission	The Telekom-Control-Kommission is an authority with powers equivalent to a court. It has been set up alongside Telekom-Control. Telekom-Control GmbH assists the Telekom-Control-Kommission.
Belgium	Ministry of Telecommunications (BIPT)	BIPT	Operators with a strong market position need authorisation for interconnection charges from the Minister. The authorisation has been made by the regulator's public advice.
Canada	CRTC	CRTC	
Czech Republic	CTO	CTO	
Denmark	NTA	NTA	
Finland	TAC	TAC	
France	ART	ART	
Germany	Reg TP	Reg TP	
Greece	EETT	EETT	
Hungary	Ministry of Transport, Communications and Water Management	Communication Authority	Charges for interconnection are set by the Minister of Transport, Telecommunications and Water Management in agreement with the Minister of Finance.
Iceland	No authorisation	PTA	
Ireland	ODTR	ODTR	
Italy	AGC	AGC	
Japan	Ministry of Posts and Telecommunications	Ministry of Posts and Telecommunications	
Korea	Ministry of Information and Communication	KCC	
Luxembourg	ILT	ILT	ILT is not able to make binding decisions on interconnection disputes but only make proposals for conciliation.
Mexico	COFETEL	COFETEL	
Netherlands	OPTA	OPTA	
New Zealand	No authorisation	Court	All agreements have provision for independent arbitration. Parties have recourse to the court system to adjudicate breaches of competition law.
Norway	No authorisation	NPT	SMP operators do not require authorisation from the regulator to set up their interconnection charges, but NPT supervises to ensure that interconnection charges are cost-based.
Poland	Ministry of Posts and Telecommunications	Ministry of Posts and Telecommunications	The incumbent is required to obtain the Minister's opinion before publishing the standard offer.
Portugal	ICP	ICP	.
Spain	CMT	CMT	

Table 1. Regulatory institutions responsible for interconnection regulation (cont'd)

Country	Authorisation of Interconnection charges of operators with 'significant market power'	Dispute resolution	Notes
Sweden	NPTA	NPTA	
Switzerland	No authorisation	OFCOM, ComCom	Interconnection rules are stipulated by the Federal Council. If there is a dispute, OFCOM assists in the negotiations. If no agreement can be reached, ComCom takes a decision.
Turkey	No authorisation	Ministry of Transport and Communications	
United Kingdom	OFTEL	OFTEL	
United States	FCC, State Public Utility Commissions (PUCs)	F, PUCs	FCC is responsible for Inter-state access charge regulation and PUCs are responsible for interconnection charge regulation between LECs.

Source: OECD.

The importance of interconnection has been well understood by Member countries and at the same time there have been several international and regional initiatives such as the Reference Paper of the WTO agreement on basic telecommunications, and the European Commission's Interconnection Directive. In addition, the 1993 North American Free Trade Agreement and a "Framework for Interconnection" developed by the Asia-Pacific Economic Co-ordination (APEC) also laid down general interconnection principles.

The reference paper of the WTO basic telecommunications agreement states: "Interconnection with a major supplier will be ensured at any technically feasible point in the network. Such interconnection is provided:

- a) Under non-discriminatory terms, conditions (including technical standards and specifications) and rates and a quality no less favourable than that provided for its own like services or for like services of non-affiliated service suppliers or for its subsidiaries or other affiliates.
- b) In a timely fashion, on terms, conditions (including technical standards and specifications) and cost-oriented rates that are transparent, reasonable, having regard to economic feasibility, and sufficiently unbundled so that the supplier need not pay for network components or facilities that it does not require for the service to be provided.
- c) Upon request, at points in addition to the network termination points offered to the majority of users, subject to charges that reflect the cost of construction of necessary additional facilities."

The principles are relatively general and as a result their implementation differs across Member countries. Despite this, they have helped in paving the road toward harmonising regulatory practice over interconnection.

Probably the most common feature of interconnection regulations is two-tier regulation, which is often called asymmetric regulation. In most Member countries, all telecommunications operators are required to negotiate with other operators, which request interconnection with their telecommunications networks. In most cases, when there is a failure to make an agreement on interconnection, each party has a right to ask

for arbitration by the regulator. However, no other obligations are imposed on operators in relation with interconnections if they do not have significant market power. On the contrary, many specific *ex-ante* obligations are imposed on operators with significant market power (SMP operators)¹⁶ based on the understanding that the incumbent may abuse its dominant position in its negotiations with other carriers.

While the majority of Member countries apply asymmetric regulation to interconnection, there are a few countries, such as New Zealand and Australia, which do not have asymmetric regulation. In New Zealand, there is no *ex-ante* regulation on interconnection as a result of no sector specific regulation. Instead, all interconnection agreements have provision for independent arbitration, and carriers have recourse to the court system to adjudicate breach of competition law. In Australia, the services subject to mandatory access requirements are determined by declaration following industry self-regulatory processes or an ACCC inquiry. So, there is no specific interconnection regulation on the basis of market power.

Table 2. Regulatory framework on interconnection

Country	Services subject to special regulations	Regulations on Interconnection service charges which are subject to special regulations	Disclosure of standard interconnection offer
Australia	Mandatory access requirements on services through declaration following industry self-regulatory processes or an ACCC inquiry	In case of arbitration, the ACCC has foreshadowed the use of TSLRIC, however, the ACCC reserves the right not to apply TSLRIC.	No. Approved (by ACCC) interconnection agreements are publicly available.
Austria	Telekom Austria AG and Mobilkom Austria AG interconnection services	Need to be cost oriented. LRIC accounting methodology is applied.	Yes
Belgium	Belgacom's fixed interconnection services	Need to be cost oriented.	Yes
Canada	Interconnection rates are approved by the CRTC	Need to be cost oriented. Interconnection charges are generally based on long run incremental costs plus 25% mark-up. Within exchange local traffic is inter-exchanged on a bill and keep basis. (In terms of local interconnection, CLECs have co-carrier status in relation to the ILECs.)	Yes
Czech Republic	Ceský Telecom's fixed interconnection services	Need to be cost oriented.	Yes
Denmark	Tele Denmark's fixed interconnection services	Need to be cost oriented. Currently FDC accounting methodology is used with consideration of a best practice assessment. LRAIC accounting methodology will be introduced by the end of 2002.	Yes
Finland	Sonera's and the Finnet Group's fixed interconnection services	Need to be cost oriented. Interconnection charges are basically determined by commercial negotiation between the interested parties. Only when the interested parties fail to reach an agreement, the operators with significant market power have to prove cost orientation of their interconnection charges.	Yes

Table 2. Regulatory framework on interconnection (continued)

Country	Services subject to special regulations	Regulations on Interconnection service charges which are subject to special regulations	Disclosure of standard interconnection offer
France	France Telecom's fixed and France Telecom's and SFR's mobile interconnection services	Need to be cost oriented. Currently a FDC accounting methodology is used.	Yes
Germany	Deutsche Telecom's fixed interconnection services	Need to be cost-oriented. Distance sensitive interconnection charges.	Yes
Greece	OTE's fixed interconnection services	Need to be cost-oriented.	Yes
Hungary	Matav's fixed interconnection services	No cost-orientation is required. Interconnection charges are determined by agreement between the Minister of Transport, Telecommunications and Water Management and the Minister of Finance.	No
Ireland	Eircom's fixed interconnection services	Need to be cost-oriented. The interconnection charges for 2000 will be calculated on the basis of Eircom's network costs using a bottom-up LRIC model.	Yes
Italy	Telecom Italia's fixed interconnection services	Need to be cost-oriented.	Yes
Japan	NTT's fixed interconnection services	Need to be cost-oriented. Currently a FDC accounting methodology is used. MPT had a plan to submit a bill in 2000 to introduce a LRIC accounting methodology.	Yes
Korea	Korea Telecom's fixed interconnection services SK Telecom's mobile interconnection services	Needs to be cost-oriented. Currently a FDC accounting methodology is used.	No
Luxembourg	P&T Luxembourg's fixed interconnection services	Need to be cost-oriented.	Yes
Mexico	Telmex's fixed interconnection services	Need to be cost-oriented. The bill and keep methodology is applied to interconnection between Telmex and other local network providers.	
Netherlands	KPN's fixed interconnection services	Need to be cost-oriented. A modified EDC (Embedded Direct Cost) accounting system, mainly based on historical cost but including forward looking cost elements, is used.	Yes
New Zealand	No service	No sector specific requirement.	No
Norway	Telenor's fixed voice interconnection services	Need to be cost oriented. A FDC model is used.	Yes
Poland	TPSA's fixed interconnection services	Need to be cost oriented. The incumbent is obliged to justify the proposed accounting rates and the calculation methodology.	TPSA's standard offer is published after the Ministry's assessment.
Portugal	PT's fixed interconnection services, and TMN's and Telecel's mobile interconnection services	Need to be cost-oriented.	Yes (PT)

Table 2. Regulatory framework on interconnection (cont'd)

Country	Services subject to special regulations	Regulations on Interconnection service charges which are subject to special regulations	Disclosure of standard interconnection offer
Spain	Telefonica's fixed interconnection services	Needs to be cost oriented. CMT uses LRAIC to determine interconnection charges.	Yes
Sweden	Telia's fixed interconnection services	Needs to be cost oriented.	Yes
Switzerland	All operators (fixed and mobile) with a dominant position in the interconnection market are required to adhere to principles of cost-orientation, transparency and non-discrimination.	Needs to be cost oriented. LRIC is used to the calculation of the interconnection tariffs.	Yes
Turkey	No	-	No
United Kingdom	British Telecom's interconnection services which are deemed not competitive in the marketplace. Vodafone's and BT Cellnet's mobile interconnection services	Needs to be cost oriented. Price-caps are imposed on BT's non competitive interconnection services.	Yes
United States	LEC's inter-LATA interstate access charges are subject to the jurisdiction of the FCC and are set forth in tariffs filed with the FCC. LEC's inter-LAT intrastate access charges are set by the state commission. Local interconnection charges are set through commercial negotiation under pricing guidelines established by state commissions.	Needs to be cost based. Inter-LATA interstate access charges are subject to a price cap regime. Inter-LATA intrastate access charges are subject to price caps or rate-of-return regulation. Local interconnection charges are, in most cases, set by TSLRIC.	Yes

Note: The second column ("Services subject to special regulations") presents services which are currently subject to special interconnection regulations. Thus, the list of regulated services can be increased or decreased by regulators' designation of SMP operators.

Source: OECD.

Where there is *ex-ante* interconnection regulation, in general, other obligations are often imposed on SMP operators:

- Interconnection charges should be transparent and cost-oriented.
- Interconnection is available on the same terms and conditions for competing operators as SMP operators providing for their own services¹⁷.

- Reference Interconnection Offers (RIO) need to be published¹⁸.
- Interconnection should be offered at any technically feasible points¹⁹.

While all of these interconnection principles are indispensable for ensuring fair competition between the incumbent and new entrants, arguably the most important and controversial issue is the requirement for cost-oriented interconnection charges in the context of ensuring effective competition. In fact, the level of interconnection charges determines the form of market structure. If interconnection charges are too high, it will discourage companies to enter the telecommunications market. On the contrary, if interconnection charges are too low and below real cost, the incumbent cannot recover its investment on networks and both the incumbent and new entrants will be discouraged to make future investments in infrastructure. Therefore, ensuring cost-oriented interconnection charges, which compensate incumbent's investments as well as providing incentives to new entrants, is a key element to have effective competition in the marketplace.

Below, the issues related with cost-orientation of interconnection charges are discussed in consideration of their impacts on competition in the local market.

Box 1. Interconnection charges as a trade issue

The level of interconnection charges, and to some extent the methodology used to determine these charges are becoming a trade issue among Member countries.

The EC introduced a benchmarking approach to assess the level of interconnection charges. While this benchmarking approach is an interim measure until the introduction of cost oriented interconnection charges, it has imposed strong pressure on the incumbents in EU member countries, which have interconnection charges above the EC benchmarking upper limit.

Since the WTO agreement on basic telecommunications, the level of interconnection charges has become an important trade issue between Japan and its trade partners. In bilateral trade discussions with Japan, the United States and the EC have complained about NTT's high interconnection charges. Although there has been no discrimination against foreign operators, the United States and the EC pointed out that the high level of NTT's interconnection charges has been stifling competition, and therefore market entry, in Japan's telecommunications market. To ease trade tensions, Japan has decided to submit a bill to amend the Telecommunications Business Law (TBL) to the Diet in the spring of 2000 in order to implement LRIC as early as possible. Nevertheless, the United States asked for more aggressive and drastic measures to reduce NTT's interconnection charges, which are more than three times higher than those of BT's and almost twice as high as those of Bell Atlantic (New York)²⁰. During bilateral talks in January and March 2000, the United States asked Japan to slash NTT's interconnection charges by about 40% by the end of 2000. Japan offered to reduce NTT's interconnection charges by about 22.5% over four years. There has been no agreement yet with respect to the level of NTT's interconnection charges.

Assessment of interconnection accounting methodologies

Probably the most contentious issue concerning the principle of cost orientation is the methodology used to determine interconnection prices. A number of methodologies are available to determine interconnection charges. For example, the Efficient Component Price Rule (ECPR)²¹, the Long Run Incremental Cost accounting methodology (LRIC)²², the Fully Distributed Cost accounting methodology (FDC)²³, 'bill and keep' systems, 'revenue sharing' schemes, and 'retail-minus' schemes have been used to determine interconnection payments between operators (including mobile) in Member countries. Among these accounting schemes, the LRIC, the FDC, the 'bill and keep' and the 'retail-minus' schemes are currently used to calculate interconnection charges for access to the incumbent's network in Member countries. The 'bill and keep' method is only adopted for local interconnection in order to promote local loop competition

in countries such as Canada and Mexico where local call charges are either unmeasured or flat. (See Section 4.)

While the LRIC methodology is in principle applied to calculate the base cost of the incumbent's interconnection charges, in the United Kingdom charge caps, comparable to price caps for retail service charges, are implemented to control the incumbent's interconnection charges. Similarly, in the United States, the largest LECs such as RBOCs and GTE are subject to charge caps for setting their interstate access charges. In the United Kingdom, interconnection services are subject to different regulations based on the competition in specific services. There is no regulation on competitive services such as operator assistance and new services. Services, considered to be prospectively competitive, are subject to safeguard caps of RPI+0%²⁴. Unlike competitive and prospectively competitive services, BT's non-competitive interconnection charges are subject to charge caps (RPI – 8%). There are three separate baskets²⁵ of services such as the call termination, the general network and the interconnection specific baskets. The merit of this charge cap system is similar to that of price cap. It provides an incentive to the incumbent to increase the efficiency of its operations while it enables new entrants to make future business decisions on the basis of pre-determined interconnection charges.

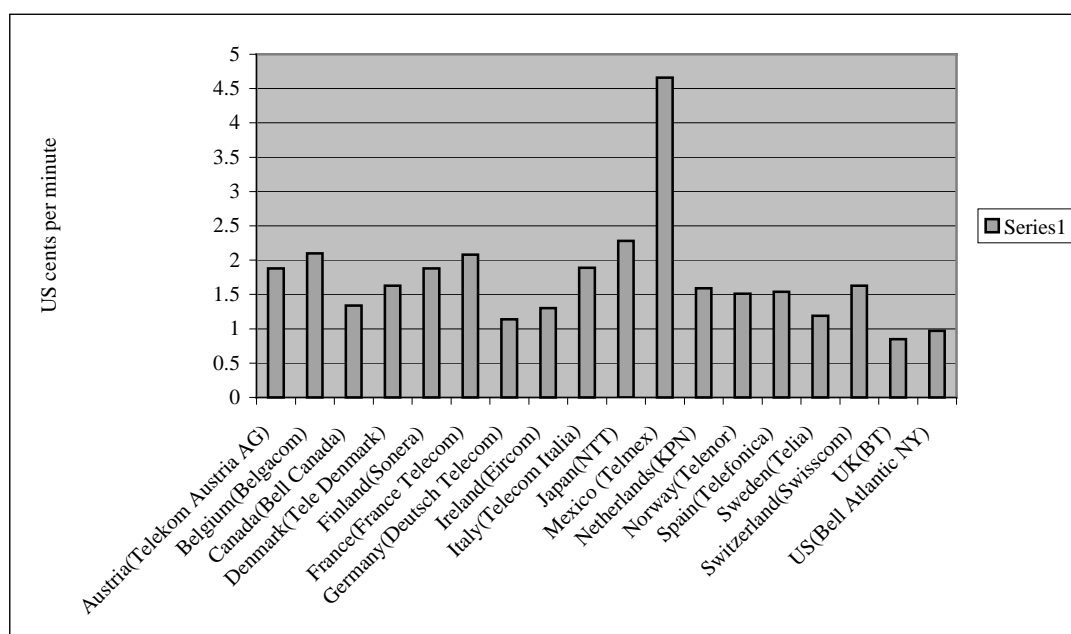
While a general consensus has emerged on the theoretical superiority of the LRIC accounting methodology²⁶, many countries are still using the FDC accounting methodology because of the complexity and time-consuming process required for the establishment of LRIC²⁷. In addition, in some cases, the regulator is hesitant to impose LRIC in that this may have a significant negative financial impact on the incumbent. However, as mentioned earlier, it is vital to ensure cost-oriented interconnection charges for access to the incumbent's network in order to promote effective competition in the market place. Unless interconnection charges are determined by the underlying cost to provide interconnection services, market distortions can arise. In particular, the application of the FDC methodology tends to over-compensate the incumbent through subsidising inefficient historical costs incurred by the incumbent. As a result high interconnection charges based on the FDC methodology can distort the new entrant's ability to compete with the incumbent.

In many Member countries, the 'retail minus' scheme is applied to service providers when they access the incumbent networks. This issue will be discussed below.

In addition to the above-mentioned accounting methodologies, the 'best practice' approach (*i.e.* benchmarking) is used by Denmark as an interim measure to determine Tele Denmark's interconnection charges until the introduction of the LRIC methodology before the end of 2002. Under 'best practice' regulation, the regulator has the mandate to reduce the price of a specific interconnection service if it is proved by the requesting party that similar interconnection services in Denmark or other foreign countries are provided at a lower price level.²⁸

In the EU, the Commission has taken a benchmarking approach as an interim measure to assure interconnection would be more cost oriented before the introduction of LRIC in EU member countries. The Commission published best practice guidelines for per minutes interconnection charges for fixed call termination on a fixed network, based on a 3-minute call duration at peak rate²⁹.

In summary, while many Member countries are moving forward to introduce the LRIC, many different accounting methods are still being used to calculate interconnection charges. Figure 4 shows that countries such as the United Kingdom and the United States that implement the LRIC have lower interconnection charges compared to other countries. Without cost-oriented interconnection charges, effective competition cannot develop in the local market. Where a LRIC methodology is not in place, there is a risk of market distortion, which can prevent the development of effective competition.

Figure 4. Comparison of fixed interconnection charges for call termination

Source: Ovum, Interconnect "Quarterly Update October 1999".

Access deficit charges and universal service obligations

Interconnection regulation is economic regulation aimed at rectifying market inefficiencies and distortions resulting from the historical monopoly of the incumbent's local loop. On the contrary, universal service obligations is social regulation aimed at ensuring that all users have access to a basic range of telecommunication services at affordable prices. In principle, interconnection charges should be set to reflect real costs incurred by interconnection in order to stimulate effective competition in the market place, and universal service obligations should not penalise specific operators or specific customers regardless of their location and call patterns. These two regulations should have separate regulatory measures, which do not influence other policy objectives, to achieve their respective policy goals.

To ensure efficient entry it is essential to have a fully rebalanced tariff structure, which reflects the cost structure of an efficient operator's telecommunications services both in the retail and wholesale markets. Thus, fixed costs arising from the provision of subscriber lines need to be fully recovered by fixed line rental charges and connection charges, and variable costs caused by the conveyance of calls should be recovered by per usage charges. In addition, common and joint costs need to be allocated to fixed line rental charges and per usage charges. When fixed costs, so called non-traffic sensitive costs, are not fully recovered through fixed line rental charges and connection charges, an access deficit results. In particular, this can be happen when a monthly line rental charge is subject to special price regulation in the context of universal service provision. At the same time, the regulation of local call charges can prevent an incumbent from rebalancing its usage charges. It is essential for the regulator to allow full rebalancing of the incumbent's prices in order to ensure effective competition in the local market. If the incumbent's tariff structure is not fully rebalanced to reflect true relative costs, the local market will remain less attractive to new entrants than the long distance and international markets.

If there is economic loss due to the lack of rebalancing or other universal service provision in services such as emergency services and public phone services, this should be compensated through a competitively

neutral funding mechanism, which does not distort competition or does not penalise specific user groups. If a competitively neutral funding mechanism is in place, there is no reason to recover deficits incurred by the incumbent to provide access services through interconnection charges. In an ideal situation, the provision of universal service obligations, including access deficits, need to be financed by the government budget (*e.g.* as in Chile) since it is the government that has imposed universal service obligations in order to achieve social policy goals. At minimum, it is necessary to have a competitively neutral funding mechanism, which does not impose any unfair economic burden on any specific operator or class of operators. While Member countries are moving forward to exclude contributions on access deficit or USO provision, in the interconnection charging system³⁰, in a number of countries such as Australia, Canada, the United States³¹ and Mexico interconnection charges still include a contribution to the incumbent's access deficit.

In sum, interconnection policies should be separated from universal service regulation in order to ensure cost-oriented interconnection charges. The compensation of universal service provision through interconnection charges would make it impossible to achieve cost-oriented interconnection charges. Since there are different policy objectives in interconnection regulation and universal service provision, they need to be attained by different policy measures. In particular, the separation enables the regulator to achieve policy goals without weakening other policy objectives.

Cost oriented interconnection charges and 'retail minus' schemes: facility based competition versus service competition

There is a consensus that in the longer term facility-based competition brings more benefits to consumers while service competition has merits in that it allows for a rapid introduction of competition, reduction of prices, and an increase in consumer choice. In particular, facility-based competition enables competition in the wholesale market which in return increases the rate of reduction in retail prices and brings new innovative services through competition between infrastructure providers.

To promote infrastructure competition, some countries have allowed for favourable interconnection conditions to facility-based operators or impose specific interconnection requirements to new licensees. For example, in the United Kingdom, 'Annex II' operators, which require 'significant investment in infrastructure' including Indirect Access operators have enjoyed a cost oriented interconnection rate while service providers (resellers) have been subject to 'retail minus' schemes. A similar approach has been taken also by the United States³², France³³, Denmark³⁴ and Spain.³⁵ In the United States, the FCC, on the basis of the 1996 Telecommunications Act, began to regulate local resale rates, and state regulators have since then maintained a positive difference between wholesale rates, which are set at a discount from retail rates, and interconnection rates which are cost based. As a result, local resale of telephone services is considered a low margin business in the United States.³⁶ Nevertheless, it needs to be mentioned that the 'retail minus' scheme can be a more effective short-term regulatory measure than the LRIC in countries where access deficits are existing because in these countries there is a possibility that a LRIC analysis could yield a wholesale price higher than the retail price.

Under cost-orientation principles, there should be no difference in interconnection charges between facility-based operators and service operators since interconnection costs would be the same for the incumbent. However, if this were the case this would create a disincentive to the incumbent and to new entrants to invest in infrastructure. Therefore, in assessing the lack of competition in the local loop, some regulators have argued that the different interconnection charges between facility based operators and service operators may be necessary to promote facility-based competition.

Other issues related with cost-orientation of interconnection charges

In order to ensure cost-oriented interconnection charges, fixed interconnection costs, *i.e.* non-traffic sensitive (NTS) costs need to be recovered by fixed charges and traffic sensitive variable costs should be recovered by usage charges. Under the simple usage (usually per minute charges) based interconnection charging system, fixed costs are recovered by usage charges, so interconnecting operators are over paying when the duration of a call is longer than the average call. Considering the fact that the rapid growth of the use of Internet drastically increases the average duration of calls, it is very critical to distinguish fixed charges and usage charges in order to ensure cost-oriented interconnection charges. In this regard, the incumbent operator in Belgium, Denmark, Finland, Japan, the Netherlands, Norway, Sweden, and Switzerland separates for each call, fixed call set-up charges and per-minute usage charges for call conveyance. In addition, the United Kingdom is considering the introduction of a two-part interconnection charging system for successful calls. If the principle of cost-orientation is strictly applied, call set-up charges should be imposed on unsuccessful calls under the two-part interconnection charging system. However, since operators are not collecting call charges on unsuccessful calls from subscribers, the interconnecting operator should not be penalised as a result of unsuccessful calls. Furthermore, unsuccessful calls can result from a number of reasons: quality problems, absence of the subscriber, occupation of the line by the subscriber, etc. The rate of unsuccessful calls can be reduced by appropriate signalling in the network. If such signalling is not provided at cost-based prices, then, arguably, the incumbent is to blame for incomplete calls due to a busy signal. It is therefore unfair to impose a burden on new entrants by making them responsible for unsuccessful calls. Thus, only a few countries impose call set-up charges on unsuccessful calls with a safeguard not to penalise new entrants³⁷.

In relation to cost-orientation principles, new entrants are arguing that the current per-minute based interconnection charges should be replaced by capacity based interconnection charges related to the capacity of the facilities used to provide terminating service. According to the capacity based interconnection charging system, new entrants are charged by their contribution to peak demand in the network which really determines the capacity of networks. Up until now, there is no Member country which uses a capacity based interconnection charging system.

4. The implication of the level of interconnection charges in the local market

When a new entrant is entering into facility-based competition in the local market, it can provide local call service either with its own access path to customers or without it. When it has no access path, a new entrant needs interconnection with the incumbent for both call origination and call termination. When it has its own access path, there are three ways to provide local services (these do not account for the case of unbundling). First, if both a calling party and a called party are connected with its network, it can provide local services without interconnection with the incumbent. Second, if a calling party is connected with a new entrant and a called party is connected with the incumbent, it needs to interconnect with the incumbent for call termination. So it needs single interconnection for the provision of local call services. Third, if a calling party, who is connected with the incumbent, chooses a new entrant for its carrier through carrier pre-selection or call by call carrier selection, for reaching a called party, who is also connected with the incumbent, it needs interconnection with the incumbent for both call origination and call termination. Since the majority of customers are still connected with the incumbent's local loop, there are not many calls which belong to the first case. Therefore, in most cases, a new entrant needs a single or double interconnection with the incumbent. This implies that the level of interconnection charge determines the degree of competition in the local market regardless of a new entrant's direct access to its customers since the majority of its calls need interconnection with the incumbent's local loop.

This is also true for competition in the long distance and international markets. However, the level of interconnection charges has a much more significant meaning at the local market. In a new entrant's cost structure, interconnection charges comprise a significant percentage of the total cost of new entrants to provide telecommunications services. The percentage of interconnection charges in a new entrant's total cost structure is determined by the level of retail price, the level of interconnection charges and other cost elements of a new entrant.

In terms of the level of retail price, except in countries such as Norway, Sweden, Iceland and Luxembourg where there is only one domestic tariff, long distance charges are much more expensive than local call charges. Since it is necessary for new entrants to charge lower tariffs than the incumbent in order to attract customers who are currently using the incumbent's telecommunications services, the level of the incumbent's call charges works as the ceiling for the new entrant's price for telecommunication services.

In terms of interconnection charges, most Member countries have element-based interconnection charges in which interconnection charges are determined by the use of a number of elements³⁸. For example, in a case of local interconnection for call termination, the incumbent provides one local switching and one local transmission service to access a subscriber's line. So, the local call termination charge is the sum of one local transmission charge and one local switching charge which includes a reasonable return on capital. In the case of a single tandem interconnection for call termination, the incumbent provides one local switching, one tandem switching, one transmission service between a local switch and a single tandem switch, and one local transmission service to access to subscriber lines. Under the element-based interconnection charging system, new entrants can significantly reduce the percentage of interconnection charges through the expansion of their networks. For example, if we pick up the upper limits of EC's "1999 best practice recommendation on interconnection charges", new entrants can reduce their interconnection charges by about 70% through changing the interconnection point from a double tandem switch to a single tandem switch and by 60% from a single tandem switch to a local switch. Obviously, new entrants are required to make significant investment to have a presence in the local switching points. Consequently, the percentage of interconnection costs in the total cost structure can be significantly affected by a new entrant's investment in network infrastructure. Therefore, long distance and international carriers are able to make a local interconnection to terminate a telephone call if they have a presence at local switching points. On the contrary, if a local carrier does not have a presence at local switching points, it needs to interconnect at a single tandem switch. In practice, long distance and international carriers are making significant investment to reduce the payment of interconnection charges.

Figure 5 clearly shows why the level of interconnection charges has a more significant impact on the structure of the local market.

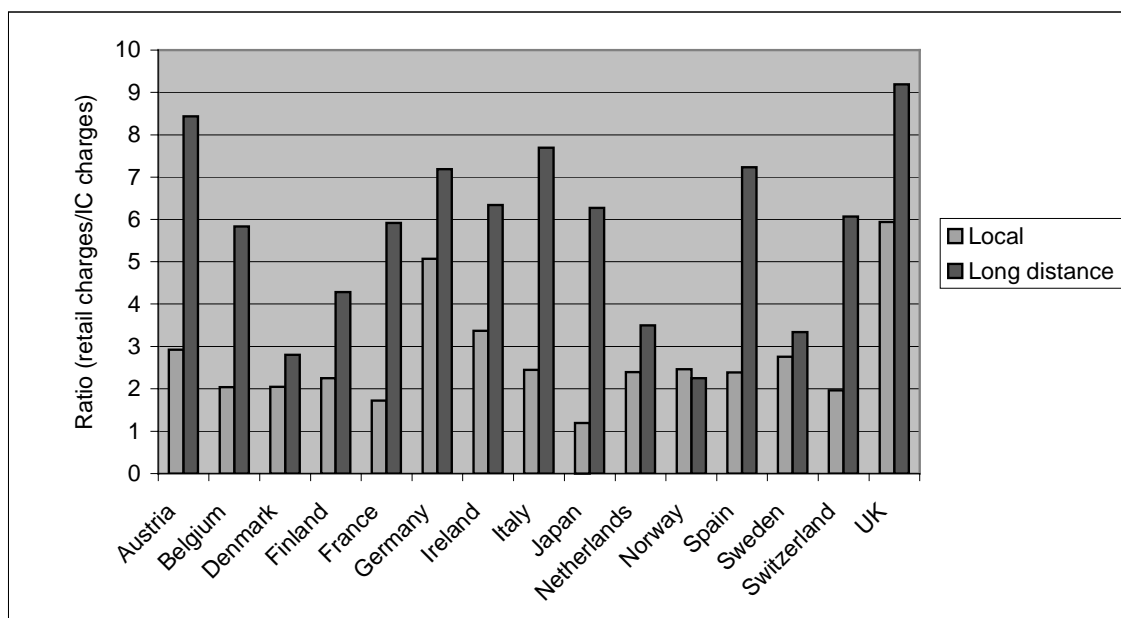
Figure 5 shows the comparison of the ratio between retail prices and interconnection charges of the incumbent in the local market and the long distance market at peak time in selected OECD countries that have time measured retail tariffs and interconnection charging systems. Figure 5 indicates, first, that there is a huge gap between the local market and the long distance market in terms of the ratio between retail prices and interconnection charges except in Norway, Sweden, Denmark and the Netherlands. Among these four countries, Norway and Sweden have introduced a single domestic tariff so we can see the ratio in the local market is higher than the ratio in the long distance market in Denmark. (When this survey was done, Sweden had not introduced a single domestic tariff.) Therefore, for a new entrant, the long distance market is much more profitable than the local market.

Second, according to OVUM data, it is technically impossible except in the United Kingdom and Germany for new entrants to enter the local call market through both ends interconnection with the incumbent local loop. If the ratio is below 2, a new entrant's marginal revenue does not cover its marginal cost because payments on interconnection charges are greater than revenues to provide local call services. So, new

entrants will lose money when they provide local voice telephony services using their switches and transmission links. Even with the ratio between 2 and 3, companies need to be extremely efficient to be profitable in the local market if they only provide local call services so that their overhead costs should be covered by the revenues coming from local call services. The EC's "Fifth Report on the Implementation of the Telecommunications Regulatory Package" stated that price squeezes resulting from high interconnection tariffs and low end-user tariffs have the effect in a number of Member States of foreclosing entry in various market segments. This statement is particularly relevant to the local market as we can see in Figure 5.

This 'price squeeze' in the local market calls for special attention to the level of interconnection charges and careful regulatory arrangements on retail price regulation and interconnection regulation. In particular, the regulator is required to apply an appropriate accounting methodology to ensure cost-oriented interconnection charges.

Figure 5. Comparison of ratio between retail prices and interconnection charges



Note 1. The local interconnection charges are a weighted average of using 80% of the 5-kilometre charge and 20% of the 20-kilometre charge.

Note 2. The long distance interconnection charges are a weighted average, using 10% of the 5-kilometre charge, 30% of the 20-kilometre charge and 60% of the 50% kilometre charge.

Note 3. For the long distance retail charges, using the tariff that applies to a 100-kilometre call as a proxy for long distance.

Note 4. For the retail charges, using the time of day call profiles to average the charges into peak and off peak.

Note 5. For the retail charges, including call set-up charges assuming a call duration of 2.5 minutes but no minimum call charges.

Note 6. For the retail charges, excluding tax charges.

Source: Ovum "Interconnect: Quarterly Update October 1999".

5. Regulatory arrangements to promote local competition

Promotion of facility based competition in the local loop

When a new entrant has direct access to its customers, the incumbent also needs to interconnect with a new entrant to terminate its customer's call toward a new entrant's network. In this case, both the incumbent and new entrants need to pay interconnection charges for call termination in each other's network. For a new entrant with a direct access path, what kind of method is applied for interconnection settlement in the case of reciprocal interconnection is very important. In general, there are two types of interconnection settlements for reciprocal interconnection.

One is applying the "bill and keep" accounting methodology so operators are not required to pay interconnection charges to other operators for call termination. Canada, Mexico and some States in the United States apply the "bill and keep" accounting methodology for local interconnection. In Canada, CLECs have co-carrier status in relation to the ILECs. Within an exchange local traffic is interexchanged on a bill and keep basis. In Mexico, Cofetel mandated the application of the "bill and keep" method for local exchange within a reasonable range of traffic unbalance in order to promote facility-based competition in the local market³⁹. The introduction of "bill and keep" for local interconnection makes much sense for Canada and Mexico⁴⁰ where local call charges are unmeasured or flat. In countries where local call charges are unmeasured or flat, it is not viable for a new entrant to provide local call services through interconnection with the incumbent for both call termination and call origination if interconnection charges are levied on a timed basis.

Under the cost-orientation principle of interconnection, the "bill and keep" can only be applied when there is balanced traffic between two operators. However, it is unlikely that, for the time being, there will be balanced traffic between the incumbent and a new entrant due to the incumbent's dominant position in the access market. Thus the application of the "bill and keep" for local interconnection provides regulatory protection to new entrants. In addition, this regulatory arrangement favours facility based competition in the local loop.

In other Member countries, operators are required to pay interconnection charges to other operators for call termination. The regulatory question in these countries is whether new entrants are required to set their interconnection charges corresponding to the incumbent's charges, which are subject to cost-orientation regulation. In France and the Netherlands⁴¹, reciprocity does not apply and other networks are free to offer their own charges for termination to the incumbent. On the contrary, in Austria, the United Kingdom, Germany, and the United States⁴² reciprocal interconnection charges apply for call termination. Since in most countries a new entrant does not always have a presence in the incumbent's local switching area, there are cases where a new entrant needs to interconnect at the incumbent's single tandem switch to terminate a local call which originated from its own network. In this case, a new entrant is required to pay more interconnection charges, and consequently the new entrant's margin between the revenue from call charges and expenditure on interconnection costs would be reduced. The expansions of the size of the local call market increase the percentage of these kinds of calls from a new entrant's subscribers. If the local call zone corresponds to the service area of a local switch, it may not be a problem to implement reciprocal interconnection charges. However, if there is a significant difference between a local call zone and the service area of a local switch, there could be a possibility that reciprocal interconnection charges impose significant financial pressure on a new entrant.

Table 3. Comparison of local retail tariffs to interconnection charges (US cents per minute)

Country	Operator	Local peak			Local off-peak		
		Retail	I/C	Ratio	Retail	I/C	Ratio
Austria	PTA	5.50	1.88	2.93	2.50	1.88	1.33
Belgium	Belgacom	4.40	2.15	2.04	2.20	1.37	1.61
Denmark	Tele Denmark	3.46	1.69	2.05	1.99	1.04	1.90
Finland	Helsinki Telephone Co.	3.74	1.66	2.25	3.74	1.66	2.25
France	France Telecom	3.63	2.11	1.72	1.82	1.59	1.14
Germany	Deutsche Telecom	5.31	1.05	5.07	5.31	0.66	8.09
Ireland	Eircom	4.42	1.31	3.37	0.88	0.61	1.44
Italy	Telecom Italia	5.45	2.22	2.45	4.22	1.59	2.65
Japan	NTT	2.26	1.89	1.19	2.18	1.89	1.15
Mexico	Telmex	18.52	4.41	4.20	18.52	4.41	4.20
Netherlands	KPN	4.10	1.71	2.40	2.66	1.07	2.48
Norway	Telenor	3.81	1.54	2.47	3.05	1.25	2.43
Spain	Telefonica	3.08	1.29	2.39	3.08	1.12	2.75
Sweden	Telia	3.43	1.24	2.76	2.42	0.88	2.75
Switzerland	Swisscom	3.45	1.75	1.97	1.64	0.84	1.96
UK	BT	5.23	0.88	5.94	1.75	0.46	3.77

Notes : 1. In Mexico, the local calls are unmeasured.
2. With the exception of the Helsinki Telephone Company and Telmex (which offer particular local operator interconnection charges), the local interconnection charges are a weighted average using 80% of the 5 kilometre charge and 20% of the 20 kilometre charge. For the retail charges in the table, the time of day call profiles to average the charges into peak and off-peak have been used. In addition the retail charges include call set-up charges assuming a call duration of 2.5 minutes but not minimum call charges, and exclude tax charges.

Source: Ovum Interconnect 'Quarterly Update October 1999.'

Table 4. Comparison of long distance retail tariffs to interconnection charges (US cents per minute)

Country	Operator	Long distance peak			Long distance off-peak		
		Retail	I/C	Ratio	Retail	I/C	Ratio
Austria	PTA	15.83	1.88	8.43	5.50	1.88	2.93
Belgium	Belgacom	15.40	2.64	5.84	7.70	1.66	4.65
Denmark	Tele Denmark	5.19	1.85	2.80	2.85	1.13	2.53
Finland	Sonera	8.66	2.02	4.29	5.57	2.02	2.76
France	France Telecom	12.91	2.18	5.92	6.46	1.64	3.94
Germany	Deutsche Telecom	10.62	1.48	7.19	4.57	0.89	5.11
Ireland	Eircom	11.54	1.82	6.34	5.49	0.85	6.45
Italy	Telecom Italia	18.56	2.41	7.69	11.59	1.71	6.77
Japan	NTT	18.06	2.88	6.27	12.95	2.88	4.50
Mexico	Telmex	45.46	4.66	9.76	26.43	4.66	5.68
Netherlands	KPN	6.76	1.93	3.50	3.56	1.19	3.00
Norway	Telenor	3.81	1.69	2.25	3.05	1.40	2.17
Spain	Telefonica	15.14	2.09	7.23	12.51	1.67	7.47
Sweden	Telia	4.75	1.38	3.44	3.17	1.09	2.91
Switzerland	Swisscom	12.95	2.13	6.07	6.16	1.01	6.07
UK	BT	10.47	1.14	9.19	4.96	0.60	8.28

Note: The long distance interconnection charges are a weighted average, using 10% of the 5 kilometre charge, 30% of the 20 kilometre charge and 60% of the 50 kilometre charge. For the long distance retail charges in the table, the tariff that applies to a 100-kilometre call has been used as a proxy for long distance. The retail charges use the time of day call profiles to average the charges into peak and off-peak, and include call set-up charges assuming a call duration of 2.5 minutes but not minimum call charges. Tax charges are excluded.

Source: Ovum Interconnect 'Quarterly Update October 1999.'

Promotion of competition in the local call market

Since both retail prices and interconnection charges are subject to regulation in the local market, regulatory symmetry between retail price regulation and interconnection regulation is required to ensure effective competition. When neither retail prices nor interconnection charges are cost-oriented, any reductions in retail prices may need to be accompanied by a corresponding reduction in interconnection charges. If the incumbent is allowed to reduce retail prices without any corresponding reduction in interconnection charges, new entrants face pressure to cut their retail charges by the amount of the reduction made by the incumbent in order to maintain a competitive edge in pricing. Thus, where the incumbent's interconnection charges and retail prices are subject to regulation, the regulator may need to maintain symmetry between price regulation and interconnection regulation in order to promote competition in the local call market.

In the context of regulatory symmetry, the charging mechanism should be the same between retail prices and interconnection charges in order to protect market distortion. As mentioned earlier, it is very important to separate fixed costs and variable costs to ensure cost orientation of interconnection charges. Where there is a two part interconnection charging system, it is necessary to have the corresponding retail price charging system. If call set-up charges are required for interconnection, the incumbent needs to have corresponding call set-up charges for its retail tariffs.

Furthermore, if the incumbent has peak and off-peak separation in its retail tariffs, this separation should also be applied to its interconnection charges. The reason for introducing peak and off-peak charging is to prevent congestion of traffic in peak time and as a result reduce additional investment on networks. This can only be achieved when all operators using the incumbent's switches and network have the same pattern of peak and off-peak charging system, which ensures the spread of traffic throughout the day. In addition, regulatory symmetry is required to ensure both charges use the same unit of measurement. If retail prices are charged by the second, the interconnection charges should be charged by the second, and if retail prices are charged by unit (for example charges are based on minutes), the interconnection charges need to be measured by the same units. If the retail prices are charged per second and the interconnection charges are charged per minute, the charging system penalises new entrants to pay extra charges on unused seconds. In the meantime, if the incumbent's retail tariffs are subject to a geographical uniform tariff regulation for local call services, the interconnection charges also need to be subject to the same regulation in order to prevent regulatory arbitrage in the marketplace.

6. Conclusion

The incumbent's dominance of the local loop requires special regulatory supervision with respect to the terms and conditions of access and conditions to the incumbent's local loop. Among the general regulatory principles on interconnection, arguably the most important one is the cost-orientation of interconnection charges in terms of creating effective competition in the local market.

In particular, the 'price squeeze' caused by high interconnection charges and low call charges in the local market requires special regulatory attention to ensure effective competition. In order to promote effective competition in the local market, the following points need to be reflected in local competition policy in relation with interconnection.

- Interconnection charges should be calculated on the basis of the forward-looking incremental cost that is incurred for interconnection services.

- Interconnection charges should not include access deficit contributions or universal service contributions. If there is any economic loss due to the provision of universal service (including the provision of subscriber lines), this should be compensated by a competitively neutral funding mechanism.
- Consideration of the extent to which using different interconnection charges between facility based operators and service operators, longer term facility based competition in the local market can be promoted.
- In countries where retail prices and interconnection charges are regulated by the regulator, it is very important to ensure regulatory symmetry between price regulation and interconnection regulation. In particular, the regulator needs to ensure that there is a corresponding charging system in the retail market and the wholesale market in order to prevent market distortions.

NOTES

¹ Dialpad.com's business model is based on advertising and sponsorship revenue, along with licensing fees and backend revenue sharing with e-commerce and opt-in e-mail partners.

² Teligen Limited (2000), *Outlook Spring 2000*, United Kingdom.

³ In this paper, local competition is defined as competition both in the local call market and the access market. The paper only makes a distinction between the local call market and the access market when it is necessary. While the call market and the access market are subject to different regulation, at the same time they are closely related to each other. Since the lack of competition in the local market (which also means the local call market and the access market in the paper) is a result of the combination of retail price regulation in the call market, and interconnection regulation in the access market, the issue of local competition can be more comprehensively analysed through this approach.

⁴ Except Australia, Belgium, Denmark, Ireland, Iceland, Luxembourg, the Netherlands, New Zealand, Norway, Sweden, and Switzerland, other Member countries distinguish local and long distance/international operators in their licensing regime.

⁵ In these countries, incumbents have eliminated all call zones creating in effect only one call zone -- *i.e.* all national calls are local calls regardless of the distance of calls.

⁶ As of July 1999, European Commission, "Fifth Report on the Implementation of the Telecommunications Regulatory Packages".

⁷ As of end of 1998, FCC "Local Competition: August 1999". Moreover, even within their relatively small share of the market, the revenues of local competitors come primarily from special access and local private line services rather than from switched service to end users (FCC: Local Competition: August 1999).

⁸ As of March 1999, MPT "MPT News vol. 10 No. 19"

⁹ Australian Productivity Commission, *International Benchmarking of Australian Telecommunications Services*, March 1999.

¹⁰ In the United Kingdom, Atlantic Telecom plans to cover Scotland and about 50% of the English population using wireless local loop. In addition, Tele2 is aiming to cover 60% of the UK population by 2003 using wireless local loop. (OfTel, Price Control Review: A consultative document issued by the Director General of Telecommunications on possible approaches for future retail price and network charge controls, March 2000).

¹¹ Postalisation is the term given to the trend towards flatter rates for long-distance services.

¹² According to the EC's "Fifth report on the implementation of the telecommunications regulatory package", over 1998 and 1999 there were average annual increases, in nominal terms, of 4% in the price of ten-minute local calls, while the price of regional and long-distance calls decreased by 7% and 15% respectively.

¹³ As of July 1999, in the EU market, there were more than 220 operators providing local calls and 375 companies offering local network services. In the United States, the numbering data code show that new local service providers have continued to enter the local exchange business. On a nation-wide basis, as of the end of 1998, 158 CLECs now have at least one numbering code, compared to 13 which had numbering codes in the last quarter of 1995. In Japan, as of November 1999, there are 113 type 1 regional carriers. In

Mexico, while Telmex still has an almost 100% market share, concessions have been granted to six companies to compete in local markets.

14 Unlike most other countries where the incumbent's special obligation is stipulated in telecommunications laws, in the United Kingdom, BT's special obligation is stipulated in its licence conditions.

15 In this regard, in Korea, while the Korea Communications Commission (KCC) has full authority to supervise interconnection disputes, the Ministry has regulatory power to authorise interconnection charges and regulated retail tariffs of the incumbent. In the case of France responsibilities are shared between the ART and the Ministry.

16 The definition of 'significant market power' varies according to country. In the EU, the interconnection directive stated "an organisation shall be presumed to have significant market power when it has a share of more than 25 per cent of a particular telecommunications market in the geographical area in a Member State within which it is authorised to operate. National regulatory authorities may nevertheless determine that an organisation with a market share of less than 25 per cent in the relevant market has significant market power. They may nevertheless determine that an organisation with a market share more than 25 per cent in the relevant market does not have significant market power." Thus EU member countries have considerable autonomy to designate operators with significant market power. In general, only the incumbent in the fixed voice telephony market is designated as having SMP. In the United States, *ex-ante* regulations apply to fixed network services where incumbents have significant market power. As a result, access charges and interconnection charges of ILECs are subject to federal and state *ex-ante* regulations. In Japan, on the basis of market power designated carriers are subject to *ex-ante* regulations. Currently, only NTT's local network is a "designated facility".

17 With regard to non-discriminatory treatment of other operators, it is often required for SMP operators to maintain accounting separation between interconnection services and other retail services in order to prohibit SMP operators from cross-subsidising their retail services. In the EU member countries, the interconnection directive requires SMP operators to keep separate accounts for their activities related to interconnection and other activities. Except in Canada, which has not required accounting separation from January 1998, most Member countries have a certain form of accounting separation requirements on SMP operators.

18 With regard to RIO, the EC's interconnection directive requires national regulatory authorities to ensure the publication of SMP's RIO. The RIO should include a description of the interconnection offerings broken down into components according to market needs, and the associated terms and conditions including tariffs. The real issue in RIO is the scope of RIO whether it includes facility sharing, carrier pre-selection, number portability, points of interconnection (POI), etc.

19 In the US, incumbents LECs are required to provide interconnection to any requesting telecommunications carrier at any technically feasible point according to the 1996 Telecommunications Act. Based on this, the FCC identified a minimum set of five "technically feasible points at which incumbent LECs must provide interconnection". In Japan, NTT provides six standard points of interconnection through its RIO.

20 MPT's Telecommunications Council, Feb. 9, 2000, Report policy on calculation of interconnection charges.

21 The ECPR is also known as the 'Baumol and Willig rule' and is favoured by many incumbents since it proposed to charge at least as much for interconnection to earn profits that could be earned if the facilities were used by the provider itself.

22 The LRIC is based on forward-looking costs of facilities and services provided to an interconnecting operator. Since the LRIC is based on current cost accounting, it reflects more accurate capital costs rather than the FDC, which is based on historical costs. Where LRIC has been adopted, in general LRIC is supplemented by a cost of capital and a mark-up to cover joint and common cost.

23 The FDC is based on historical costs that come from the incumbent's ledger.

24 These services are inter-tandem conveyance, inter-tandem transit, international direct dial (IDD) conveyance, value added elements of access to directory enquiries (DQ) services, operator services information system (OSIS), directory assistance systems (DAS) and ‘phonebooks’.

25 UK’s interconnection charge control baskets

The Call Termination Basket	The General Network Basket	The Interconnection Specific Basket
Call termination	Call origination	Interconnection circuits
	Local-tandem conveyance	Data management amendments for routing emergency calls for mobile networks
	Single transit	Product management, policy and planning

Source: Oftel.

26 In the EU, while the interconnection directive (97/33/EC) only requires cost orientation of interconnection charges, the EC recommended the LRIC methodology by saying that interconnection charges should be calculated on the basis of forward-looking incremental costs, since these costs closely approximate those of an efficient operators (Commission Recommendation on Interconnection in a liberalised telecommunications market). In the United States, the FCC stated that the 1996 Telecommunications Act’s requirement of cost oriented interconnection charges means that the price must be based on forward looking economic costs. In this regard, the FCC proposed the TELRIC (total element long run incremental cost) accounting methodology.

27 While the LRIC is generally accepted as best practice, which leads interconnection charges to the level of a fully competitive market, it is based on many cost assumptions. Thus it takes a long time to design the accounting model, to collect information and to verify the results.

28 Based on this “best practice” regulation, Telia requested that Tele Denmark’s interconnection charges be lowered, using the interconnection charges in the United Kingdom as “best practice”. The Telecommunications Complaints Board rejected Telia’s request on the grounds that only one country would not be sufficient enough to satisfy the term “best practice” and the requesting party would need to refer to at least three countries.

29 According to the “1999 best practice recommendation on interconnection charges”, the benchmarking guidelines of the Commission are: 0.5 -- 1.0 EUR/cents per minute for local interconnection; 1.5 – 2.3 EUR/cents per minute for double transit interconnection.

30 For example, in France, fixed network operators paid a universal service contribution through interconnection charges. Based on the proposal made by ART, the government decided not to levy additional universal service contributions on interconnection charges from January 2000.

31 In the United States, the FCC undertook an access charge reform order and a universal service reform order in which it envisioned that there will be a gradual phasing out of the existing traffic sensitive ‘common carrier line charge’ with a flat-rate ‘prescribed inter-exchange carrier charge’.

32 In the United States all incumbent LECs are required to offer for resale any telecommunications service that the carrier provides at retail to subscribers who are not telecommunications carriers. State commissions are required to identify marketing, billing, collection, and other costs that will be avoided or that are avoidable by incumbent LECs when they provide services wholesale and calculate the portion of the retail rates for those services that is attributable to the avoided and avoidable costs. If a state elects not to implement the methodology, it may elect, on an interim basis, a discount rate from within a default range of discount rates established by the FCC. The FCC established a default discount range of 17 – 25% off retail prices, leaving the states to set the specific rate within that range, at their discretion.

- 33 In France, the difference between interconnection charges for infrastructure operators and charges for service providers amounts to about 40%. (European Commission, “Fifth Report on the Implementation of the Telecommunications Regulatory Package.”)
- 34 In Denmark, the interconnection charges for service providers are determined by the ‘retail – 21%’ scheme. (European Commission, “Fifth Report on the Implementation of the Telecommunications Regulatory Package.”)
- 35 In Spain, the interconnection charges for service providers are 30% higher than those of facility based operators. (European Commission, “Fifth Report on the Implementation of the Telecommunications Regulatory Package.”)
- 36 Thomas Kiessling and Yves Blondeel “Effective competition in European telecommunications” an analysis of recent regulatory development. *Info* vol. 1 number 5, October 1999.
- 37 In Belgium and the Netherlands, if more than 50% of the calls handed over to interconnected operators are unsuccessful, the call set-up charge is applied to calls over this threshold.
- 38 Unlike most other Member countries, Germany has a distance sensitive interconnection charging system on the basis of four price zones.
- 39 In Mexico, Telmex and Axtel reached an interconnection agreement in which they will pay each other only the minutes exceeding a ratio of outgoing minutes to total interconnection minutes of 70% during the first two years on the basis of “bill and keep” accounting methodology. (OECD (1999), *Regulatory Reform in Mexico*).
- 40 In Mexico, residential customers receive their first 100 calls per month free and after 100 calls a flat rate is charged per call.
- 41 On 22 September 1999, OPTA ruled in a dispute regarding the justification of reciprocity of interconnection prices. KPN had pointed out that their prices had to be cost-oriented, whereas the interconnection prices of other operators remain higher. KPN stated that this creates a distortion in the market, because of the variation in termination rates. OPTA decided that KPN’s interconnection tariffs could not be imposed on other operators because new entrants have different cost and network structures.
- 42 In the United States, based on section 251(b)(5) and (c)(2), incumbent LECs are required to make an interconnection agreement with other carriers which have direct access to their customers on just, reasonable, and non-discriminatory terms and to transport and terminate traffic originating on another carrier’s network under reciprocal compensation arrangements. In the United States, the FCC established a default rate of 0.2 – 0.4 cents per minute for local exchange termination for states that have not conducted a TELRIC cost study.