Philipp Lust*

MOBILE INTERCONNECTION

Abstract

Calling mobile phones tends to be far more expensive than calling subscribers connected to fixed lines. The reason for this discrepancy is rooted in the currently rather over-priced interconnection fees in the mobile sector. In order to find some explanations and to address this problem more carefully in the future, this paper tries to present and assess the technical, economic and legal framework of mobile telecommunications.

Since interconnection may be of rising importance in a future of multiple communication networks, this paper sets out a clear economic understanding of interconnection as well as the relevant rules of the current as well as the future legal framework on European Community level (section C.).

Thereafter, a section on pricing issues (section D.) points out the risk of collusion in mobile interconnection. Since issues of price regulation tend to be controversial in the entire communications sector but often do not distinguish between one-sided access and mutual interconnection, a general description of price regulation methods is provided before conclusions for the appropriate method for interconnection are drawn. Although this paper's focus is as far as possible on two-way interconnection, the general issues of this section sometimes draw attention to one-sided access as well, in order to provide a more complete view of the pricing problematic.

Finally, regulatory practices at national level, which contribute to continuing high price levels for calls to mobile networks, and their consequences are shown up (section E.).

* Dr. Philipp Lust, LL.M., is assistant at the University of Vienna.

Contents

Abbreviations

art.	article
CPP	Calling Party Pays
CTLR	Computer and Telecommunications Law Review
DG	Directorate General
DSL	Digital Subscriber Line
EC	European Community
ECJ	European Court of Justice
ECLR	European Competition Law Review
Ecopol	Oxford Review of Economic Policy
ECP	Efficient Component Pricing
ECR	European Court Reports
EEC	European Economic Community
e.g.	for example (exempli gratia)
f/ff	and the following page/pages
GmbH	private limited company (Gesellschaft mit beschränkter Haftung; the Austrian TKC-GmbH – now RTR-GmbH – has some competences in telecommunications and supports the TKC-Kommission at its work)
i.e.	that is to say (id est)
IJCLP	International Journal of Communications Law and Policy
ITU	International Telecommunication Union
K&R	Kommunikation und Recht
MMR	MultiMedia und Recht
MR	Medien und Recht
n.	footnote
NZZ	Neue Zürcher Zeitung
OECD	Organisation for Economic Co-operation and Development
Oftel	UK Office of Telecommunications
OJ	Official Journal
ONP	Open Network Provision
ÖZW	Österreichische Zeitschrift für Wirtschaftsrecht
p.	page
RPP	Receiving Party Pays
Telpol	Telecommunications Policy
TKC	Telekom Control (the TKC-Kommission decides on the decisive matters of telecommunications in Austria)
TKG	Austrian Telecommunications Law 1997 (Telekommunikationsgesetz)
UK	United Kingdom
UMTS	Universal Mobile Telecommunications System
USA	United States of America
WuW	Wirtschaft und Wettbewerb

A.) Introduction

Mobile telecommunications are often believed to be one of the most growing, innovative and competitive sectors of telecommunications. Parts of the current European regulatory framework on telecommunications, which basically tries to promote a rapid transition from former state monopolies to a competitive industry with multiple suppliers, are therefore not applied to mobile communications. Although regulators tended not to intervene as rigidly in the mobile sector as in the fixed-line market, administrative authorities had to recognize during the last years that some intervention might also be necessary in this sector to keep the market conditions competitive.[1]

This paper tries to assess economic differences between mobile and fixed telecommunications (section B.). On this basis the focus will be on the specific problems of mobile communications as well as on general problems of regulating industry sectors, which become more obvious when looking at the more competitive environment in mobile communications. Since current literature tends to keep the analysis of interconnection quite short and sometimes even mixes it up with access, I will try to focus on two-way interconnection as far as possible and treat one-sided access only as far as necessary to show the differences (sections C. and D.). Moreover, I believe that the interconnection obligation is the more complex and interesting matter, since – on the one hand – it is a legal obligation which was not known before the current "liberalisation" process and – on the other hand – it will persist for longer time and not only during the transitional period until sufficient competition is achieved.[2]

Since access is less of a topic in the mobile sector, I have chosen to focus on mobile telephony to make the paper more comprehensible, although the basic insights may similarly apply to fixed line telephony. This approach has also been chosen since current decisions show regulatory preferences towards mobile telephony. Section E. will therefore show that this may lead to market distortions which might impede the growing together or "convergence" of mobile and fixed telephony to one coherent market with more consumer welfare.

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1 See also UNGERER, "Access Issues under EU Regulation and Anti-Trust Law", (2000) IJCLP 5, p.10f and n.27.

2 See also CROCIONI, "Should telecoms liberalisation stop at call termination?", (2001) Telpol 25, p.39 (especially 46).

B.) Regulating network industries and mobile telephony

1.) Network industries

Telecommunications rely on networks between the participants, which are necessary to transmit calls from one network subscriber to another. There is common belief that network industries are something special. One thing for sure is that it is usually costly and incurring sunk costs to set up a network, whereas the „use“ of the network by transmitting signals from one end to the other causes quite low additional costs. This *combination of high fixed costs with low variable costs* can result in market entry barriers: on the one hand high investments are necessary to set up the network infrastructure and on the other hand the incumbent – who might have already written off large parts of his investments – could keep new entrants out of the market by selling at prices near variable costs. The other undoubted fact is the presence of *positive network externalities*: each new customer enhances the value of the network since all existing subscribers can also call the new participant.[3]

The above effects are often accompanied by economies of scale since expanding an already large network towards a new customer is often cheaper than doing so with a network which is not yet widespread. This often led to the assumption that network industries like telecommunications were characterized by constantly decreasing marginal costs: each additional participant would cause less additional costs than the last participant before him and therefore would lower the average costs of all other participants.

According to this theory the most efficient situation can be achieved by one single large network where everyone is attached to: the network would/should therefore be a natural monopoly. The latter was one of the justifications for state-owned monopolized telecommunications networks. They were commonly accepted in Europe until the 1980ies since it was believed that only the state could guarantee the efficient use and expansion of the one existing and theoretically efficiency-

3 ARMSTRONG, "Competition in Telecommunications", (1997) Ecopol 13, p.64 (67, 79ff); MASON, VALLETTI, "Competition in Communication Networks: Pricing and Regulation", (2001) Ecopol 17, 389 (391, 406f); KLIMISCH, LANGE, "Zugang zu Netzen und anderen wesentlichen Einrichtungen als Bestandteil der kartellrechtlichen Mißbrauchsaufsicht", (1998) WuW, p.15 (16f); SHY, *The Economics of Network Industries*, 2001, p.3, 17.

optimising network. At that time it became quite evident that the more competitive systems in the USA or the UK would lead to a wider and more innovative product range at lower prices. Therefore a liberalisation process started in the European Union, which was formally achieved in 1998 (see point 2.). *Liberalisation* means that any company that fulfils certain objective criteria can set up its network and offer communication services. This process is being accompanied by a so-called "*harmonisation*" process which is a re-regulating process aiming at a quick transition from monopoly to a competitive environment. This implies the use of a regulatory framework which positively discriminates new entrants against incumbents ("asymmetric regulation"). Even today the theory of the ideal unique well-administrated "natural" monopoly is not completely given up and used to justify regulatory measures by the European Commission[4] as well as by national regulatory authorities.[5]

It is true that the combination of high fixed costs, positive network effects and certain economies of scale could in theory lead to the assumption that one sole large network can be more efficient than several small networks. This theory can be substantiated by several authors who describe further typical elements of network industries.[6] Nevertheless, reality shows that monopolies tend not to be perfectly efficient due to the lack of competition, which results in a lack of cost-control and innovation. Furthermore, if parallel networks exist, the risk of a large-scale breakdown is reduced and consumers have more choice among different services. Finally, regulatory efforts (and costs) can be reduced because of the self-regulating power of supply and demand. Since mobile communication was the first sector with multiple providers relying on their proper full-scale network and harshly competing for new subscribers, the rest of the paper will focus on the mobile sector.

4 See for example §53 and §89 of the Access Notice 98/822/EC of the European Commission, OJ C 265/2, for its vagueness of the future perspective and especially the recent Regulation (EC) Number 2887/2000 of December 18, 2000, OJ L 336/4, on unbundled access to the local loop, as well as KIESSLING, BLONDEEL, "The EU regulatory framework in telecommunications – A critical analysis", (1998) Telpol, p.571 (572).

5 See for example TKC-Kommission 2.7.1999, Z1/99, p.142, and 12.3.2001, Z12/00, p.167, as well as the position paper of TKC-GmbH 15.1.1999, p.17, point 4.5, or p.7ff, point 3.3, 3.4.

6 See just as an example, WEIZSÄCKER, "Wettbewerb in Netzen", (1997) WuW, p.572.

2.) The European legal framework for mobile telephony

When the European concepts for liberalising the telecommunication markets were worked out in the late 1980ies[7], no one could have thought of the overwhelming success of the technical revolution by mobile telephony which was about to come. The Open Network Provision (ONP) framework directive 90/387/EEC[8] and the services directive 90/388/EEC[9] did not mention mobile telephony at all and focussed on alternative, value-added fixed line services which were enabled by the use of the monopoly provider's network who remained monopolist in the network as well as in the voice telephony business.

The first important step towards alternative network infrastructure was done by the cable TV directive 95/51/EC[10] which allowed the use of cable TV infrastructure for communication purposes from January 1996 onwards by changing the services directive 90/388/EEC.[11] This directive enabled competition between alternative networks: an operator in the liberalised market could not only rely on the classical monopoly phone line but had a new alternative, the modified cable TV line.

1996 was the most important year for alternative networks as well as for the extension of the liberalisation towards voice telephony since there were 2 important other directives which came into force: the *mobile communication directive 96/2/EC*[12] respected the developments in mobile telephony and amended the services directive 90/388/EEC accordingly by liberalising terrestrial mobile communication. It did not only stress the need for alternative infrastructure more than the cable TV directive 95/51/EC[13] but also set up rules

7 See for example the historical development presented by LAROUCHE, *Competition Law and Regulation in European Telecommunications*, 2000, hereinafter LAROUCHE, p.1ff.

8 Council Directive 90/387/EEC, June 28, 1990, on the establishment of the internal market for telecommunications services through the implementation of open network provision, OJ L 192/1.

9 Commission Directive 90/388/EEC, June 28, 1990, on competition in the markets for telecommunications services, OJ L 192/10.

10 Commission Directive 95/51/EC, October 18, 1995 amending Directive 90/388/EEC with regard to the abolition of the restrictions on the use of cable television networks for the provision of already liberalized telecommunications services, OJ L 256/49.

11 See art. 4 of the revised services directive.

12 Commission Directive 96/2/EC, January 16, 1996, amending Directive 90/388/EEC with regard to mobile and personal communications, OJ L 20/59.

13 See for example consideration 16 of the mobile communications directive.

for granting mobile licenses. Moreover, it liberalised voice telephony between mobile and fixed networks.[14]

The corresponding directive for fixed services was also set up in 1996: the competition directive 96/19/EC revised the services directive 90/388/EEC in a way to liberalise the network infrastructure which corresponded to the liberalised services by July 1st 1996. The full liberalisation including voice telephony in the fixed sector was proclaimed one and a half years later, on January 1st 1998 (art. 2 (2)).

Apart from the anticipated liberalisation, the rules for mobile telephony based on the EC directives are quite similar to the regulatory regime for fixed line services: apart from some access and unbundling obligations which were tailored to fit to fixed lines only – like art. 7 (2) of the interconnection directive 97/33/EC[15] and the basic scope of the ONP-voice telephony directive 98/10/EC[16] concerning "access to and use of fixed public telephone networks and fixed public telephone services" (art. 1 (1)) – the regulatory framework treats both manners of communication equally.

The same holds true for the revised set of rules of April 24th 2002 which are to be transposed into national law by July 25th 2003.[17] Since they want to establish a "technologically neutral" regulation for all kinds of electronic communication (e.g. art. 8 (1) of the framework directive 2002/21/EC), they apply similarly to fixed

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14 Read art. 3d and the 18th consideration for the narrow interpretation of art. 1 paragraph 1 of the services directive. See for example POLSTER, *Das Telekommunikationsrecht der Europäischen Gemeinschaft*, 1999, p.19 and 87; LUST, *Die Essential Facilities-Doktrin im Telekommunikationsrecht*, 2001, p.100.

15 Directive 97/33/EC, June 30, 1997, of the European Parliament and of the Council on interconnection in telecommunications with regard to ensuring universal service and interoperability through application of the principles of Open Network Provision (ONP), OJ L 199/32.

16 Directive 98/10/EC, February 26, 1998, of the European Parliament and of the Council on the application of open network provision (ONP) to voice telephony and on universal service for telecommunications in a competitive environment, OJ L 101/24.

17 Directive 2002/19/EC of the European Parliament and of the Council, March 7, 2002, on access to, and interconnection of, electronic communications networks and associated facilities (Access Directive), OJ L 108/7; Directive 2002/20/EC of the European Parliament and of the Council, March 7, 2002, on the authorisation of electronic communications networks and services (Authorisation Directive), OJ L 108/21; Directive 2002/21/EC of the European Parliament and of the Council, March 7, 2002, on a common regulatory framework for electronic communications networks and services (Framework Directive), OJ L 108/33; Directive 2002/22/EC of the European Parliament and of the Council, March 7, 2002, on universal service and users' rights relating to electronic communications networks and services (Universal Service Directive), OJ L 108/51.
The liberalisation directive 2002/77/EC, September 16, 2002, on competition in the markets for electronic communications networks and services, OJ L 249/21, replaces the amended version of the services directive 90/388/EC and thereby simplifies its content.

line telephony as to mobile telephony. This aim is underlined for example by art. 30 of the universal services directive 2002/22/EC which mentions explicitly that the rules on number portability[18] also apply to mobile services.

3.) Characteristics of mobile telecommunications

Mobile telecommunications are in two ways different from fixed telephony: on the one hand it is fascinating to be able to communicate with a wireless handset throughout the country and on the other hand the rise of mobile telecommunication fell into the time of the beginning liberalisation of telecommunications.

Mobile telecommunications were liberalised first[19] and competition between different non-state-owned networks and providers came up in this field first. The more competitive environment leads to intense marketing efforts, falling prices, choice among different tariffs and extra functions etc. Therefore regulators have often intervened less rigidly in the mobile sector, but increasing focus is put on the quite high fees charged for users of fixed networks to call mobile phones and vice versa.[20]

The evident technical difference compared to normal telephony is that the "last mile" between the handset and the first transmitter of the mobile provider's network does not rely on a cable but is bridged by wireless transmission of electromagnetic waves. Afterwards the signal can be repeated in a wireless but usually rather in a line-based way towards the following switches, which lead the signal to the other end of the line.

This technical difference has two economic implications: Since the modulation of electromagnetic waves is more sophisticated and energy-consuming than transmitting an electrical signal through a copper wire and since the location of the mobile user has to be currently updated in order to transmit calls to the right base station,[21] the *running costs* will usually be *slightly higher* than the costs of

18 Number portability does not relate to interconnection and means that one can maintain his telephone number if one changes the network provider, which makes a change of providers far easier.

19 See point 2. above.

20 See for example consultative document by Oftel, *Review of the charge control on calls to mobiles*, 26.9.2001; the decision by the TKC-Kommission 31.7.2000, Z24/99, point 4.3.2.1.1, p.52, or UNGERER, *supra* note 1, (2000) IJCLP 5, p.10f and n.27.

21 See European Commission DG Competition 13.12.2000, *Working Document On the Initial Findings of the Sector Inquiry into Mobile Roaming Charges*, Appendix 2, p.34. On the other

fixed networks. On the other hand a mobile network can be *set up far faster* than a fixed network: as soon as a base station is set up, any subscriber can use his phone in the area covered (as long as the maximum bandwidth of users is not reached) and it is not necessary to set up physical lines to each subscriber. In fixed networks the wires of the "last mile" to the customer are usually very costly since they have to be set up for each customer individually and are only "used" and therefore effectively bringing revenues (above line installation and line rental fee) during the time the individual customer's line is in use.

This basic difference results in a *lower relation of fixed to variable costs* compared to fixed telephony.[22] Nevertheless, market entry in the mobile sector is even harder due to the *scarcity of frequencies* available and licensable for mobile telecommunication. As soon as a new provider has a licence, he has to try to cover the entire landscape covered by his licence as quickly as possible in order to be attractive for his users. During this period he has multiple interests to gain as many customers as possible: as in other network industries, the value of his own network increases with the number of subscribers; at the same time the possibility of earning money on the investment in the network with prevailing fixed costs[23] is easier if there are more customers among whom these costs can be distributed.

Since, unlike fixed telephony, an additional customer does not need any hardware investment in wiring the "last mile" except the handset, the mobile operator should try to gain customers even more radically than in the fixed line sector. Since it is unlikely that the bandwidth of a base station to accept more users will be reached during the first years of extension, any new customer who contributes more than the variable costs of actively dialled calls or passively received calls will be welcome.[24] Therefore it is easily understandable that mobile providers have extensive marketing budgets, low intra-net call fees as well as

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hand, according to Oftel 26.9.2001, *supra* note 20, p.36, the incremental costs per customer are as low as 1,50 Euro per year (!), although the average network cost per customer will certainly be considerably higher and the common handset subsidies also have to be taken into account.

22 Probably the total costs are also lower in the medium or even long run which is shown by the tendency that telecommunication projects in less developed countries rather rely on wireless networks than installing complete wired networks towards each customer. See also ARMSTRONG, *supra* note 3, (1997) Ecopol 13, p.64 (64 n.4).

23 These are for example interests for the investment, standby-costs for operating the network being able to send and receive calls, marketing costs etc.

24 See note 21 as well as ARMSTRONG, "The Theory of Access Pricing and Interconnection", *in* CAVE, MAJUMDAR, VOGELSANG (ed.), *Handbook of Telecommunications Economics*, forthcoming, hereinafter Handbook, 3.1, and LAFFONT, TIROLE, *Competition in Telecommunications*, 2000, hereinafter LAFFONT, TIROLE, p.199.

many different tariffs (also without monthly subscription fees) in combination with handset subsidies[25] in order to gain customers.

These phenomena show typical results of mobile network effects and usually should not be anticompetitive. At the same time they lead to the problem that the mobile provider is unprofitable for a long time. The competition among several providers with several tariffs aimed at different user groups leads to the problem that margins in the normal and frequently advertised business segments are hard to earn. Therefore there is a quite natural tendency to use the less popular segments as "international roaming" (this is the possibility to use the mobile phone abroad)[26] or the price to call the mobile phone from another network[27] (as for example from a fixed line) to charge quite high prices and earn excessive margins in these areas, which compensate possible losses in more competitive segments.[28]

At the moment the gain of mobility through mobile phones is accompanied by the disadvantages of less reliability due to wireless transmission, less bandwidth for data transmission, longer call set-up time and usually higher fees in comparison to fixed networks. Therefore there is no complete substitutability to the latter and it is believed that mobile and fixed telephony constitute separate markets. With the coming up of 3rd generation mobile UMTS networks this might change towards a homogenous market with separations rather according to bandwidth than to fixed or mobile.

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25 Since the network infrastructure equipment is often produced by companies also manufacturing handsets, it is also no wonder that these companies tend to give rebates on the handsets in order to promote the extension of the network infrastructure.

26 In this field, the European Commission is engaged to lower the pricing level. See for example the "Working document on the initial findings of the sector inquiry into mobile roaming charges", December 13, 2000.

27 These issues, which involve the negative use of network externalities, will be discussed in the subsequent sections.

28 Of course, lobbyists for the mobile industry who seem to be not unsuccessful (see *infra* note 98) do not mention this fact and always refer to the other segments when pleading for no regulatory intervention in the mobile sector (for more references, see for example the document on "Termination of international calls to mobile networks" by the International Telecommunications User Group under www.intug.net).

C.) Interconnection

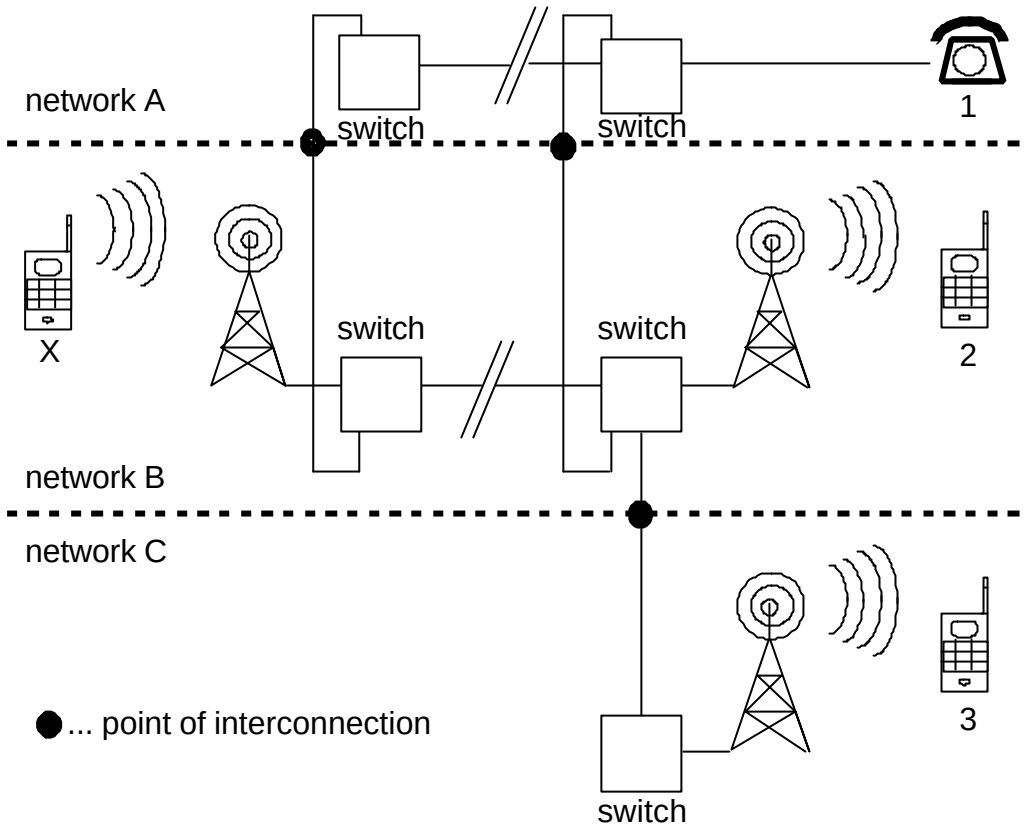
1.) Technical and economic background

As explained before, network industries are mainly characterized by positive external effects: each additional customer who buys a phone which is connected to the network makes the network more useful for the existing customers since now also this new customer can be called via the telephone network.

On the one hand, the actual cost of generating a new number and account for the customer is theoretically paid for by his line rental or subscription fee and the costs of the individual call towards him are paid by the caller. On the other hand, the effect that the network is now more useful and valuable due to the higher number of participants is an external welfare gain typical of network industries which is not directly paid for.

This effect may lead to the assumption that the larger the network the better it is. At the same time it follows that the value of separate smaller networks increases if they are connected to each other in a way that users of network A are not limited only to other participants of the same network but are also able to call people connected to network B, C,... and vice versa. Connecting different networks in such a manner is referred to as "*interconnection*".

The following illustration shows how calls can be put through from the mobile caller X in network B:



If X wants to call Mr. 2 who is subscribed to the same mobile network B, the base station next to him receives the request to set up a call ("call origination"). The call is then usually transferred through B's proper network, which is usually wired and controlled by electronic switches that decide the way of the signal through the network ("transit"). The call is then put through to the base station where Mr. 2's phone was last located and it will start to ring ("call termination").

In order to call Mr. 1 and Mr. 3 who are not within the same network, an interconnection agreement between the providers and a physical connection of the networks is necessary. In this case the signal is transferred from network B to network A or C at one of the points of interconnection and phone calls between different networks should therefore not cause any major technical problems. Since interconnection agreements are mutual, calls from network A and C to customers of network B will be possible as well. Since it will usually be cheaper to bridge most of the distance on the own network, in these cases the point of interconnection might rather be the left switch of B's network near the base station where X is located than the right-hand switch.

For reasons of better understanding, the difference to "*access*" as it is understood in this paper has to be explained: access is one-sided. Since it lacks mutuality, it is similar to renting a line from a network operator and paying money in return.

For example, the fixed operator A – who has neither a mobile frequency licence nor a mobile network – may be interested in providing mobile services. By paying money to B, B might grant A access to his network on wholesale level in order to enable A to offer services to end-users like X. For example, after an access agreement X could be directed to A's network at the first switch so that the rest of the service can be provided by A. Contrary to the interconnection example, there is no mutuality for the purpose of reaching customers of each others network but it is rather a splitting up of the value chain: B only provides the core mobile network at wholesale level, whereas A rents this service of origination from B in order to provide additional services like termination on his network and customer relations including billing on end-user level.

This effect is very different from the interconnection example mentioned before, where there were gains on network level on both sides: after the interconnection agreement, no caller of either network was restricted to speak only with customers of the same network. Contrary to access, therefore basically any network provider as well as their users should be interested in having interconnection agreements with any other network provider in order to maximize the benefits and the potential reach of each network.

On the other hand network effects may also give *incentives to abuse*: the larger one network is in comparison to another, the more the smaller network relies on being interconnected with the large network since most customers would rather choose to be part of the larger network if calls between the networks were not possible. The same holds true for the case where the calls to the other network are charged at a prohibitively high interconnection fee:[29] even if the tariffs within the new network were extremely low and it would therefore take extremely long to amortise the investment, only few customers would chose this network since all the calls to the majority of users connected to the existing network could only be established at high costs.

By either not agreeing to interconnection or by charging excessive prices for calls from one network to another, the owner of a far larger network can therefore keep the owner or future investor of a smaller network out of the profitable market by denying him to share the positive externalities of his existing network.

29 See also CROCIONI, *supra* note 2, (2001) Telpol 25, p.39 (58), and LAROUCHE, p.33.

2.) Mandatory interconnection

To *overcome the problem of positive network externalities*, which increase market power of large and existing network providers in comparison to small or future network providers, the European Community set up a *regulatory framework with interconnection obligations* which can be enforced by national telecommunications regulatory authorities. Although one could theoretically think of trying to solve the interconnection problematic with the help of general competition law,[30] it seems useful to set up special rules for this central and long-lasting problem of liberalised telecommunications, since the sector is confronted with detailed regulation on less central topics anyway.

a.) The existing rules

Since the early ONP framework directive 90/387/EEC and the services directive 90/388/EEC focus on one-sided access to the existing monopoly network rather than connecting multiple networks, they do not provide specific interconnection rules. Interconnection as a right and duty to connect different networks therefore came up with the possibility of using alternative (cable TV) infrastructure in art. 4 (2) of the services directive 90/388/EEC in the version of the cable TV directive 95/51/EC. The mobile communication directive 96/2/EC added some additional mobile interconnection rules in art. 3d of the services directive 90/388/EEC. By nature of the legal base of this *liberalisation* directive, the duties apply only to entities with special monopoly rights according to art. 86 of the EC treaty (see also the definitions in art. 1 (1) of the services directive). The directive does therefore not concern mobile operators who were granted licences on objective criteria (art. 3a and 3b of the services directive) and who therefore were not granted any special or exclusive rights according to art. 86 of the EC treaty.

With the liberalisation of infrastructure provided in the competition directive 96/19/EC, the rules for interconnection were modified and specified in art. 4a of the revised services directive 90/388/EC which again applies only to operators who were granted "special rights". Therein, more concrete rules on interconnection are given: "... *Member States shall ensure that the telecommunications organizations* [having special rights] *provide interconnection*

30 See for example LUST, *supra* note 14, p.239 ff; for market power assessment in mobile communications see BUNTE, "Marktabgrenzung und Marktbeherrschung auf Mobilfunkmärkten", (2002) MMR Beilage 1, p.1 (4ff), and MÖSCHEL, "Verbindungsnetzbetreiberauswahl und Marktbeherrschung im Mobilfunkbereich", (2002) MMR Beilage 1, p.28 (33f).

to their voice telephony service and their public switched telecommunications network to other undertakings authorized to provide such services or networks, on non-discriminatory, proportional and transparent terms, which are based on objective criteria." Although private negotiations are preferred, regulatory authorities can be called to settle disputes and impose fair terms which is – in practice – the common way. The obvious disputes on the price of interconnection will be covered in the next section.

For most mobile operators – since they are usually not granted any special rights – only duties which are part of the *harmonisation* directives based on art. 95 can be relevant. Among these, the voice telephony directive 98/10/EC is not applicable for the mobile sector except for minor details.[31] It regulates one-sided access-issues; they can be understood as the right to rent a competitor's service in order to be able to compete with him even if one does not possess the necessary network infrastructure. Competition based on access, which consists of paying a rental fee for legally enforced access on wholesale level and reselling the service at end user level, was not deemed necessary for the mobile sector.[32] Since multiple providers were setting up alternative networks to enable full-scale competition including the network level, the access rules of the voice telephony directive do not apply for mobile services.

Therefore, the European interconnection regime for mobile telecommunications is basically set up by another harmonizing directive, the *interconnection directive 97/33/EC*.[33] Although the title only mentions interconnection, a look into the text as well as the definitions shows that interconnection as well as access are regulated. Art. 2 (1) a states: "*interconnection' means the physical and logical linking of telecommunications networks used by the same or a different organization in order to allow the users of one organization to communicate with users of the same or another organization, or to access services provided by another organization*."

The basic understanding of interconnection as it is understood in this paper is equivalent to the first part of the above text, the "*linking of networks in order to allow the users of one* [network] *to communicate with the same or another* [network]". The fact that access is also included into the widely interpreted EC understanding is not necessarily useful for comprehension since the term

31 See art. 1 (2) of the ONP-Voice-Telephony-Directive 98/10/EC, February 26, 1998, OJ L 101/24.

32 Furthermore, as one can see regarding international roaming, access is also granted on a contractual level without legal obligations as long as the prices are profitably high.

33 June 30, 1997, OJ L 199/32.

interconnection is once used as the global term for one-sided access *to* as well as two-way interconnection *of* networks but another time used to address the specific issues of two-sided, mutual interconnection.[34]

The central rules for interconnection are set up in art. 4 of the interconnection directive 97/33/EC. Basically, "*organizations which provide fixed and/or mobile public switched telecommunications networks and/or publicly available telecommunications services, and in so doing control the means of access to one or more network termination points identified by one or more unique numbers in the national numbering plan*" (see Annex II) "*have a right and, when requested by organizations in that category, an obligation to negotiate interconnection with each other…*" (art. 4 (1)). Put a bit more simple, any public provider of a telecom network having attached end-users to it is entitled and obliged to mutual interconnection with similar network providers so customers of one network can also call customers of the other network and vice versa. By its nature, this right, which is combined with a mutual obligation, can only apply to companies operating a network with end-users connected to it. If necessary, the national regulatory authorities may intervene to ensure "*maximum economic efficiency and* […] *maximum benefit to end-users*" (art. 9); limitations of the interconnection obligation are only possible "*on a temporary basis*" when "*there are technically and commercially viable alternatives* […] *and* […] *the requested interconnection is inappropriate in relation to the resources available to meet the request*" (art. 4 (1)).

For providers "of major importance" (annex I) like for example public fixed or mobile networks or mobile telephone services there are additional obligations if they have "significant market power" (art. 4 (2)). According to paragraph 3, significant market power is presumed at a share of 25 % of the particular market, which is a smaller trigger than for normal competition law.[35] The assessment is performed by the national regulatory authorities who can deviate from the 25 %-rule taking "*into account the organization's ability to influence market conditions,* […] *its control of the means of access to end-users*" etc. In these cases, the interconnection right is no longer mutual but – according to the asymmetric

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34 See also LAROUCHE, p.15.

35 According to the ECJ judgment of 13.2.1979, case 85/76, *Hoffmann-La Roche/Commission*, [1979] ECR 461, §39, an "*appreciable influence on the* [market] *conditions*" is relevant for a dominant position in a case-by-case assessment. Although market shares are therefore only one among several indications for dominant market power, a general guideline is about 50 %; see ECJ judgment of 3.7.1991, case 62/86, *Akzo/Commission*, [1991] ECR I-3359, §60. See also GRILL, *in* LENZ (ed.), *EG-Vertrag*, 2nd ed. (1999), Art.82 §10ff; JUNG, *in* GRABITZ, HILF (ed.), *Das Recht der Europäischen Union*, 16th ed. (2000), Art.82 §82ff; JAUK, "The Application of EC Competition Rules to Telecommunications – Selected Aspects: The Case of Interconnection", (2000) IJCLP 4, p.24ff.

regulation approach which wants to give additional rights to small and new companies at the detriment of their larger competitors – they also have to "*meet all reasonable requests for* [one-sided] *acces*s [by smaller competitors] *to the network*" of the operator with significant market power. Put a bit more simple, smaller network operators having the right to interconnection may also request to rent parts of the lines from their larger competitor; this is not restricted to putting calls through for termination but also includes renting lines for purposes of origination: a small operator could offer preselection services (e.g. customer X of network B from the example above dials prefix 10xxx to access the network of another operator A who might offer cheaper calls to a certain destination or who might have a better network coverage or offer his services abroad). But, since this paper is only concerned with problems of interconnection in its original sense, the special access rules for operators with significant market power do not matter here.

Nevertheless, operators with significant market power also have two other obligations which do relate to interconnection: they have to obey the principle of non-discrimination which means that "*they shall apply similar conditions in similar circumstances to interconnected organizations providing similar services*" and that they "*provide interconnection* [...] *to others under the same conditions* [...] *as they provide for their own services, or those of their subsidiaries or partners*" (art. 6).[36] Furthermore, their "*charges for interconnection shall follow the principles of transparency and cost orientation.*" This means "*that charges are derived from actual costs including a reasonable rate of return on investment*" (art. 7, see also annex IV and V).[37] Although no such explicit and strict rules exist for operators with minor market power, the basic tendency of "appropriate" interconnection terms in line with "maximum benefit for end-users" (art. 4 (1) and 9 (1)) will partly correlate with the rules for the larger operators as soon as the regulator has to intervene.

b.) The new framework

The relevant rules for interconnection in the revised EC framework are set out in the access directive 2002/19/EC[38], which is a harmonisation directive based on art. 95 of the EC treaty. Again, access obligations as defined in lit. a of art. 2 can

36 For a more detailed assessment of this "new" understanding of non-discrimination in comparison to the conventional competition law approach, see LAROUCHE, p.218ff.

37 For a critique on the vagueness of the pricing rules, see LAROUCHE, p.77ff and 246ff.

38 March 7, 2002, OJ L 108/7.

only apply to operators with significant market power (art. 12 in combination with art. 8). The difference is that the term of significant market power for the new electronic communication rules is now aligned with the term of normal EC competition law; the threshold is therefore no longer 25 % market share[39] but a more individual case analysis according to general competition law.[40]

Interconnection is defined in art. 2 lit. b as "*the physical and logical linking of public communications networks* [...] *in order to allow the users of one undertaking to communicate with users of the same or another undertaking, or to access services provided by another undertaking.* [...] *Interconnection is a specific type of access implemented between public network operators*". It can not only be imposed on operators with significant market power (Art. 12 (1) lit i), but according to art. 4 (1) all "*operators of public communications networks shall have a right and* [...] *an obligation to negotiate interconnection with each other for the purpose of providing publicly available electronic communications services, in order to ensure provision and interoperability of services throughout the Community.*"

According to art. 5, the national regulatory authorities shall "*encourage and where appropriate ensure* [...] *adequate access and interconnection, and interoperability of services* [...] *in a way that promotes efficiency, sustainable competition, and gives the maximum benefit to end-users.*" Since this seems to be a crucial issue for telecommunications, "*the national regulatory authority is empowered to intervene at its own initiative*" (art. 5 (4)) and can impose "*objective, transparent, proportionate and non-discriminatory*" (art. 5 (3)) terms of interconnection also on operators without significant market power. These rules give more explicit pricing hints for operators without significant market power

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39 Although the new system enables a better case-by-case assessment, it is not quite sure whether the "harmonising" argument might have the political background that rather incumbents with former monopoly rights should have the increased obligations of the revised dominance rules, since the liberalisation article of the EC treaty, art. 86, cannot be properly applied any more in a liberalised environment (on the latter issue, see BARTOSCH, "Das neue EG-Telekommunikationsrecht", (1998) K&R, p.339 (343); LAROUCHE, p.109f, and LUST, *supra* note 14, p.91). With the 25 %-rule – which was obviously easier to apply by the regulators than a detailed assessment according to competition law – also some alternative mobile providers would have fallen under the strict asymmetric duties by now. Unfortunately, these means have not really been used by the regulators to lower excessive fixed-to-mobile interconnection fees (see chapter E.3.c.; the UK regulator Oftel seems to be the only positive exception). For some considerations on the market power test, see TARRANT, "Significant market power and dominance in the regulation of telecommunications markets", (2000) ECLR, p.320 (324), and *supra* note 30.

40 See *infra* note 35 as well as the Commission's interpretation in the Commission Guidelines on market analysis and assessment of significant market power under the Community regulatory framework for electronic communications networks and services, July 8, 2002.

than the old regulatory framework which remained silent on this issue, but still leave enough discretion in their application (see section D.).

Although the above rules on interconnection are now more explicit in regards of pricing than before, the tarification for operators with significant market power can still be derived from a different article, art. 13: in accordance with the aim of more flexibility, the national regulatory authorities may impose "*cost orientation of prices and obligations concerning cost accounting systems*", but have to "*take into account the investment made by the operator and allow him a reasonable rate of return on adequate capital employed, taking into account the risks involved*". Although cost orientation and non-discrimination are quite similar and sometimes even mixed up, I believe that cost orientation is slightly more rigid: whereas cost orientation allows no more than an adequate return on capital, non-discrimination is still fulfilled if prices include mark-ups for considerations of economic policy as long as they are applied uniformly (see chapter D.3.).

Although the new rules on interconnection are similar to the existing framework, the new rules are easier to read and give more discretion to the authorities since they want to provide a more flexible framework.[41] Moreover, they emphasize the general interconnection obligation for non-dominant operators better than before and leave no doubt that similar rules for mobile as well as fixed line interconnection apply.[42]

c.) The effects of regulation

The main economic point of the interconnection duty is that the market power due to positive network *externalities* is theoretically completely *neutralised* to the benefit of all users. This system guarantees that every participant of any network is able to call subscribers of any other network and prohibits network providers to restrict interconnection agreements. Since especially large operators might have no interest in appropriate interconnection conditions with small competitors – who depend on the possibility of putting calls through to customers of the large network much more than vice versa – operators with significant market power are obliged to provide cost-oriented interconnection tariffs and are not allowed to discriminate between themselves and their competitors. The latter means that putting through a call ("termination") which was set up ("originated") in the

41 See for example art. 8 ff of the access directive 2002/19/EC.

42 According to art. 8 of the framework directive 2002/21/EC the regulators should apply the rules "*technologically neutral*" "*ensuring that there is no distortion or restriction of competition in the electronic communications sector*".

proper network can not be treated and priced differently than a call which originated in another interconnected network. Therefore the price of calling a person in the incumbent's network should be quite the same whether the call comes from the incumbent's network itself or from the network of another provider.

Since smaller operators tend to be more interested in interconnection, the existing framework simply required them to grant "appropriate" interconnection as long as it is in line with the benefit of the users and a competitive market. Maybe due to the high interconnection prices in the mobile sector, the new framework has replaced the term "appropriate" by more stringent rules. Since they include non-discrimination, the pricing rules for interconnection are de facto equal to the rules concerning operators with significant market power.

If the above interconnection regime is properly applied, the only advantages that remain for large and existent providers can be economies of scale, good reputation, many years of experience, an extended and already quite amortized network etc. These facts might still give them a relative advantage compared to new entrants but they are basically the same in any industry; the fact that telecommunications need high investments due to the high amount of fixed costs compared to the variable costs can hardly be changed.

D.) Pricing issues

1.) Introduction

In section C. we have seen that the regulatory framework for interconnection is quite similar for fixed line telephony and the mobile sector. Nevertheless, the prices for calling mobile and fixed subscribers often diverge sharply around factor 10,[43] which cannot be easily justified by the technical differences explained in chapter B.3. Although most Member States have intense competition of several mobile providers with proper networks and much advertising for customers, practice shows that interconnection prices to mobile phones tend to stay up and show no tendency towards the far lower fixed-line interconnection tariffs. Before

43 See OECD, *Cellular Mobile Pricing Structures and Trends*, DSTI/ICCP/TISP(99)11/ FINAL, 2000, p.51.

looking at concrete decisions of regulatory authorities in this field, which will follow in section E., I want to use this section to theoretically assess how the "ideal" interconnection price may be found within the scope of the EC regulatory framework.

As seen in section C., two-sided interconnection and one-sided access are often not clearly separated and neither legislators nor academic writers tend to set up clearly different pricing models,[44] although one is a basic long-term need in an environment of alternative networks and the other is – at least in the classical field of telecommunications – rather a short-term industry-political incentive to enter the newly liberalised market.[45] During the beginning of the liberalisation process, most concerns were drawn to enabling a quick transition from monopoly to competition which was believed to be possible by intense access regulation. Therefore, most literature is rather focussing on the problems of access than of interconnection which was not as much of an issue until the establishment of wide-spread alternative networks in the mobile sector.

Because of a wide understanding of "non-discrimination"[46] and maybe also for reasons of simplicity, national regulators as well as the European Commission often tended to discard the possibility of different prices for access and interconnection. The possibility to differ prices according to the economic or political need was clearly given in the existing framework of the interconnection directive 97/33/EC, where art. 7 (3) states: *"Different tariffs, terms and conditions for interconnection may be set for different categories of organizations which are authorized to provide networks and services, where such differences can be objectively justified on the basis of the type of interconnection* [in a wide sense including access, see art. 2 (1)] *provided and/or the relevant national licensing conditions.*" In the new framework, art. 3 (2) of the access directive 2002/19/EC might make the quick reader think that the spectrum for price discrimination will be reduced in future: "*Member States shall not maintain legal or administrative measures which oblige operators, when granting access or interconnection, to offer different terms and conditions to different undertakings for equivalent services*". When reading the text carefully, one will recognise that it is not about (technically) "equal" but only about "equivalent" services – services of

44 At this place, ARMSTRONG, Handbook, *supra* note 24, has to be pointed out as a positive example of properly differentiating these terms.

45 Also LAROUCHE, p.78, stresses the possibility of politically motivated decisions in these matters.

46 See MASON, VALLETTI, *supra* note 3, (2001) Ecopol 17, p.389 (395f), and *infra* note 71.

*equ*al economic *val*ue.[47] This result which allows economically indicated price discrimination between mutual interconnection and one-sided access, can be confirmed historically as well as by interpretation of the central regulatory aims of "sustainable competition, interoperability of electronic communications services and consumer benefits" (art. 1 (1)).[48]

I will therefore start by setting out the collusion problem of interconnection which may need further attention in future (point 2.). Thereafter I will try to assess the compatibility of classical (access) price regulation models for the interconnection problematic (3.) and try to draw conclusions for how to assess interconnection prices in future (4.).

2.) No relevance at wholesale level?

Interconnection is the possibility of reaching the customers of other networks and therefore gives mutual benefits for customers of all interconnected networks. If prices for interconnection from network A to B are similar to the price for the same service from B to A and if the customers have similar preferences, the *number of calls* being originated in network A and terminated in network B will be about *equal* to the number of calls from network B to A.

This also applies to networks with different numbers of subscribers: imagine network A has twice as many subscribers as B (for example 20:10) and everyone calls six times per day (in sum (20+10)x6=180 calls): one third of the calls which are originated in network A will be terminated in network B ((20x6)x(1/3)=40). On the other hand, B's customers will have to call network A twice as often as subscribers of their own network, since two thirds of the population are connected to network A ((10x6)x(2/3)=40). Therefore, the number of calls interconnected from network A to B is equal to the number of calls interconnected from B to A independent of the network's size as long as the other conditions – especially the prices – are similar:[49] the relatively large amount of calls from the few subscribers of the small network to the incumbent's network will be equivalent to the relatively few calls from the large number of subscribers of the incumbent's network which are terminated at the small rival network.

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47 See also LAROUCHE, p.224, who argues that in the "old" framework "regulation sometimes concentrates too much on technical issues at the expense of economic considerations" and therefore may "be inconsistent with competition law."

48 See also art. 5, 8, 12 (2) lit. a and d, 13 (2). For more detail, see LUST, "Netzzugang im neuen EU-Telekomrecht", (2002) ÖZW, p.33 (37 f).

49 See also ARMSTRONG, Handbook, 4.2.1.

This basic insight shows that as a rule of thumb customers will probably be best off if the price for off-net calls is quite similar to the cost of on-net calls. Unfortunately, there is also *potential for collusion* among network providers: if the providers charge each other high interconnection fees, high prices can be easily justified towards the customers by reference to the interconnection costs.[50] At the same time high interconnection prices only raise "perceived" costs of the network operators which can be charged to the customers. The "real" costs for receiving interconnection are similar to the *occurring* costs of *providing* interconnection to the other network: on the wholesale level the money paid (or rather passed to account) for receiving the interconnection service is quite equivalent to the revenue of granting interconnection the opposite way. The real cost will be little more than an on-net call because in addition to the wiring and switching between the networks, which is similar to the wiring and switching within the own network, only a mutual billing system has to be installed.

The above considerations can lead to the conclusion that the pricing level for interconnection on the wholesale level is quite irrelevant for recovering the occurring costs and that main concern should be drawn to the protection of customers against collusive behaviour of network providers.[51]

In practice the problem is more complicated since it is arguable that different networks occur *different costs* and that therefore differences in interconnection prices can be justified.[52] For fixed networks, regulators believe that the conditions have to be equal on both sides, since otherwise a less efficient network could pass on its costs to the more efficient interconnection partners. Although regulators have a wide interpretation of non-discrimination, the above

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50 One can blame the other provider for the high price or try to justify the higher price by the requirement of additional wiring, billing systems or technical differences. See also MASON, VALLETTI, *supra* note 3, (2001) Ecopol 17, p.389 (399).

51 CROCIONI, *supra* note 2, (2001) Telpol 25, p.39 (50); ARMSTRONG, *supra* note 3, (1997) Ecopol 13, p.64 (78ff); CROCIONI, VELJANOVSKI, "Pricing calls to mobiles: analysis of the UK Monopolies & Merger Commission Reports on mobile termination charges", (1999) Telpol 23, p.539 (543ff). The latter give a good comparison of the UK regulator's and competition authority's view, although also the competition authority seems to be too optimistic about the future and seems to neglect the equilibrium with the fixed sector. LAFFONT, TIROLE, p.189ff, show up the collusion problem, but do not believe in it (196f) and seem to neglect the negative cross-subsidization effects from fixed to mobile markets, which occur in current regulated markets, in their models. See ARMSTRONG, Handbook, 4.2.3 and 4.2.4, for a more detailed and differentiated analysis and chapter E.2.

52 Another minor argument of a system of collusively high interconnection charges is that there is more competition for gaining new subscribers since every company has a high incentive to gain customers in order to gain a higher rent from the collusively high price level. This positive effect for large operators may be an incentive for smaller operators to "cheat" the collusive system by applying lower rates (which does not seem to have happened much until now in Europe).

"reciprocity"-rule is not applied to mobile telephony in Europe: it is commonly believed that mobile networks cause higher costs than fixed networks.[53] Therefore mobile providers are allowed to charge far – about 11 times[54] – higher interconnection charges than fixed network providers. This can lead to large price discrepancies whether a mobile subscriber calls a fixed partner or vice versa. If the discrepancies on end-user level are not that evident in reality, the difference between the wholesale and resale prices can be earned by the mobile provider either as an oligopoly rent or to subsidize other parts of his services like handsets, subscription fees or on-net calls.

Since the "*calling party pays-principle*" (CPP) is standard in Europe, the above problem of high interconnection charges is often not so much perceived as a problem: in contrast to the USA, the mobile user who is called does not have to pay any fee (except the subscription fee) when he accepts a call. In this scenario the mobile subscriber often has only minor interest in the price others have to pay to reach him. Moreover, he might be attracted by the subscriber's *low on-net tariffs* which are partly enabled by cross-subsidisation through high-priced interconnection charges paid by other network users. From a competition point of view this scenario *reintroduces the network externalities* which were believed to be overcome by a framework providing mandatory interconnection: by charging high interconnection charges for external callers and charging low prices for on-net customers, subscribing to large networks becomes more attractive again.[55]

At the same time each network is partly financed by non-subscribers: whereas mobile users finance each other's networks via the high interconnection charge, the cash flow is quite one-sided from fixed-net users to mobile users since fixed-net interconnection fees are pushed down with more intense administrative interaction.[56] Among mobile users this may seem as a not very useful mutual transaction of money, but among the fixed line operators and users the underlying problem becomes more obvious: they are forced to subsidize the set-up

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53 This is certainly true for short-term marginal costs but may be different when comparing the long-term investment in electromagnetic transmitters for the local loop with the investment in wiring each household individually.

54 See OECD, *supra* note 43, DSTI/ICCP/TISP(99)11/ FINAL, 2000, p.51.

55 See also LAFFONT, TIROLE, p.201.

56 This is often neglected by simplifying economic analyses which suggest that high termination fees combined with low subscription fees in the mobile sector may be an efficient outcome. See for example MASON, VALLETTI, *supra* note 3, (2001) Ecopol 17, p.389 (400ff), but also LAFFONT, TIROLE, p.196ff. On the other hand, see HEDIGER, "Spielt der Wettbewerb im Mobilfunkmarkt?", NZZ 11.12.2001, B6, or LUST, "Externe Effekte bei Zusammenschaltung – oder: Wer mobil funkt, hat's gut", (2002) MR, p.122 (125f), and chapter E.2.

of the competing mobile network by paying overcharged interconnection fees to call mobile subscribers.

Although the level of the interconnection price would not matter in theory in the wholesale business, some cost assessment will be necessary due to the above problems: on the one hand potential collusion has to be controlled to protect the customers and on the other hand some pricing differences can be justified by the fact that different network types may incur different costs. In the latter case of fixed-to-mobile interconnection, it would also be worth discussing which part of the additional costs of a wireless system has to be carried by the fixed caller and which part should rather be paid by the mobile subscriber who benefits from his mobility and "reachability" increase. Therefore, it is necessary to have some theoretical framework on how to assess interconnection charges.

3.) Pricing methods

a.) General considerations

First of all there are considerable *practical* problems in assessing the costs of networks providing a phone call. Unlike other businesses, most costs are fixed and irrelevant of the usage of the network. The physical investment in wiring and hardware is without doubt a fixed cost independent of usage. Due to modern electronic switching and accounting methods there are also negligible changes in power consumption or wear of the system whether it is only on "standby" or actively setting up a call.[57] The only real cost increase is caused if the spare capacity of the network is exceeded and if the maximum bandwidth of the network is reached. Unless some demand is left unsatisfied in these cases or reduced by higher peak time charges, a new investment in new lines or more sophisticated technology is necessary – but this is rather an additional fixed cost again.

The basic question is therefore how to distribute the huge amount of fixed costs among the users. The possibility of charging a high subscription fee covering all standard calls has usually not been considered in Europe, but seems to come up with high-bandwidth DSL internet services. Possible concerns could be that the service might be unaffordable for some customers or that it might become less

57 MITCHELL, VOGELSANG, *Telecommunications pricing – Theory and practice*, (1991) p.9ff; VOGELSANG, "Behandlung von Optionstarifen im Rahmen der Price-Cap-Regulierung", (2000) MMR, p.731 (732).

profitable for the providers who would probably need some additional bandwidth, too. Therefore the costs are usually distributed in another way.[58]

This other way consists of trying to separate fixed and variable costs of a network in a reasonable way where each customer is charged a fixed cost for the subscription or line rental and a variable cost for each call.[59] Because of the above cost structure the real costs depend largely on the number of subscribers to the network and the minutes of active use among which the fixed costs can be distributed. If regulators want to intervene in this process – as they regularly do in the current regulatory framework – they therefore need a lot of knowledge on costs and usage of the network. Unfortunately, in addition to their large discretionary powers,[60] they usually have to rely on expert witnesses who also have some influence on the decision. At the same time these decisions largely influence the customer prices of the whole communications industry even if the intervention limits itself to the wholesale level.

Besides these practical problems, there are also some *theoretical* disputes on how to assess prices in the telecommunications industry, if they are to be regulated at all. The following points show up some ways of finding a theoretical framework for assessing prices in the communications sector. Since the EC directives are rather vague on how to assess the prices,[61] most of the following methods basically seem to be in line with the binding EC rules. It has to be considered that even rather strict rules like "cost orientation" according to art. 13 of the new access directive 2002/19/EC leave certain margins on how to *"take into account the investment made* [... or the] *rate of return on* [...] *capital employed* [... or] *the risks involved*".

b.) Price discrimination

To split up fixed and variable costs among customers in a reasonable way there are certain classical methods which may be useful for customer pricing and access pricing but might not really fit for the special problems of interconnection.

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58 For sophisticated, extraordinary and non-basic services there are also good reasons for rather pricing them according to the benefit resulting from the service instead of according to the supposed costs of providing such a service. See also VELJANOVSKI, "E.C. Antitrust in the New Economy: Is the European Commission's View of the Network Economy Right?", (2001) ECLR, p.115 (119).

59 See also CROCIONI, VELJANOVSKI, *supra* note 51, (1999) Telpol 23, p.539 (546) with reference to the UK Monopolies and Mergers Commission.

60 See also HELM, JENKINSON,*supra* note 26, (1997) Ecopol 13, p.1 (10ff).

61 See the analysis of the relevant directives in section C.2. as well as LAROUCHE's comment on pricing, p.246ff: „First *of all, the ONP framework is not very precise overall*".

The *Ramsey approach*[62] is based on the consumer's net surplus and would suggest charging larger parts of the fixed costs on less price-sensitive services in order to enhance economic welfare. This method may be useful in general, but is not capable of solving the interconnection problem in a welfare-maximizing way. Since often the only alternative to make an off-net call is to make no call at all, this would imply the possibility to regain a large part of the fixed costs through the tariff for terminating calls that originate in other networks. By focussing only on the surplus of mobile users or providers, this rather seems to be the rationale of the revenue-maximizing strategies applied by mobile providers than a welfare-maximizing outcome.[63] The reason for this result is that the high price is charged to people who do not have a direct contract with the other provider. Therefore they do not have any immediate measures to negotiate lower prices and also the call-receiving customers will not be engaged that much in these matters since they will rather regard the tariffs they have to pay themselves (see point 2. above). A welfare-maximizing outcome could only result if one focussed on the entire telecommunications industry, but in this case it would be too complicated to find out real Ramsey conditions in practice.[64]

Another classical approach for end-customers is *second-degree price discrimination*[65] using a two-part tariff of fixed and variable costs where higher fixed costs lead to lower variable costs and vice versa. This approach is useful to attract end-users with different demand levels to the same network but is also not really applicable to wholesale interconnection issues: the fixed costs of a network should largely be covered by the subscribers and their subscription fees; unlike the caller from a different network, the subscribers have a longer lasting and direct contractual relationship with their provider. Therefore it would either be necessary to separate the fixed costs resulting from the connection of different networks from the total fixed costs or – if the total fixed costs are the basis – no more than average fixed costs per call should be charged for interconnection services.

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62 RAMSEY, "A Contribution to the Theory of Taxation", (1927) Economic Journal, 47; see also SAMUELSON, NORDHAUS, *Economics*, 16th ed. (1998), p.298. For a more telecommunications-oriented approach see ARMSTRONG, Handbook, 2.5 and 2.8.2; MITCHELL, VOGELSANG, *supra* note 57, p.43ff; BAUMOL, SIDAK, *Toward Competition in Local Telephony*, 1994, p.35ff; LAFFONT, TIROLE, p.61ff and 131ff; VICKERS, "Regulation, Competition, and the Structure of Prices", (1997) Ecopol 13, p.15 (16ff).

63 See also Oftel 26.9.2001, *supra* note 20, p.79ff.

64 This might have been easier in the monopoly era where only one sole provider existed and the public authorities who fixed the prices were also the owners who could have in theory known the costs as well as the influences of tariff changes on demand in the entire sector.

65 See for example VARIAN, *Intermediate Microeconomics*, 4th ed. (1996), p.427ff.

Due to the basic equilibrium of incoming and outgoing calls between different networks (as long as there are similar and "fair" pricing schemes on both sides) it is probably not worthwhile discussing too much on the price of fixed costs.[66] On the end-user level the amount of fixed costs that is calculated into each phone call is depending on the selected tariff scheme anyway so that fixed costs of interconnection could be left away at the wholesale level without any distortion at the end-user level. This would result to a system where everyone rather tries to minimize his own costs instead of charging each other with the other's costs.

c.) Price caps

Price cap regulation is a rather simple regulatory approach which tries to reduce prices while leaving a lot of discretion to the companies themselves who usually have more information on price and demand than the regulators and who may therefore rather be able to apply reasonable pricing.[67] Basically, some products are selected and put into a "basket".[68] The regulator then "caps" the price of the products in the basket by ordering the company to deliver the services in the basket at a price which is a certain percentage below the original price over time. In this way, the company can find out itself where it wants to reduce the prices and may also charge some higher prices as long as they are compensated by other lower prices and the price rises are not restricted by certain "price ceilings" for individual products in the basket. For interconnection, price caps may not be very useful because – due to the lack of direct competitive pressures – there are no direct incentives to reduce prices in this sector. On the contrary, the provider might tend to lower its customers' fees while raising the interconnection fees to the same extent in order to attract customers.

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66 It is also worth while noting that interconnection of internet-backbones was for a long time based on "bill and keep"-clauses (see for example LAFFONT, TIROLE, p.268ff.): since the mutual traffic is similar anyway, no one charges each other for interconnection and there are less accounting costs. Unfortunately, this changed with the increasing commercialisation of the internet, since large providers were able to gain competitive advantages due to network externalities as well as by raising "perceived" costs which could be passed on anyway. Of course, in case of telecommunications, the provider must nevertheless be allowed to charge the consumer at least the price of an on-net call for calls which would be interconnected in a "bill and keep"-accounting method on wholesale level.

67 See LAFFONT, TIROLE, p.86ff and 170ff; BOURREAU, DOGAN, "Regulation and innovation in the telecommunications industry", (2001) Telpol 25, p.167 (174f); VICKERS, *supra* note 62, (1997) Ecopol 13, p.15 (19ff).

68 Actually, this selection process is the most complicated and most essential part of the regulatory approach of price cap regulation.

d.) Efficient component pricing

Also this rule[69] does not fit into the special situation of interconnection. It is rather tailored to access issues where a new competitor without sufficient own infrastructure wants to compete to some extent with an incumbent while at the same time relying on parts of the incumbents' facilities. In these cases the incumbent could charge the actual costs as well as the opportunity costs that occur by reselling a part of a service to the new competitor on wholesale level instead of providing the full end-user service himself. It has the advantage that it only allows more cost-efficient providers to enter the market without setting up a complete infrastructure their selves. At the same time, innovative entrants who sell different services and therefore do not compete directly with the incumbent, have to pay a smaller opportunity cost mark-up since they cause the incumbent less opportunity costs and therefore are preferred to enter the market compared with companies who just want to copy the incumbent's service.

This situation is typically different from mutually useful interconnection where both sides have set up their infrastructure already. As discussed above, users of both networks have the advantage of reaching more partners; at the same time the only restriction of the (large) facility owner due to the interconnection obligation is that he cannot exclusively gain advantage of his network externalities, which do not directly correlate with his proper efforts anyway. Therefore, there is no need to encourage market entry or limit it to solely efficient providers by charging actual costs plus opportunity costs. Since the efficient component pricing rule is not at all made for such situations, it is also hard to find an appropriate opportunity cost.[70]

e.) Cost-based pricing

If no welfare or efficiency considerations are necessary, costs may be the best measure for pricing issues in theory, but it is especially hard in network industries, where fixed costs are predominant, to find the right costs. The

69 See BAUMOL, SIDAK, *supra* note 62, p.95ff; ARMSTRONG, Handbook, 2.3-2.4 and 2.8.3; LAFFONT, TIROLE, p.119ff and 178; MASON, VALLETTI, *supra* note 3, (2001) Ecopol 17, p.389 (394f); VICKERS, *supra* note 62, (1997) Ecopol 13, p.15 (22ff). For a good explanation of the interaction of the different methods, see ARMSTRONG, *supra* note 3, (1997) Ecopol 13, p.64 (74ff).

70 One possibility of opportunity costs would be the reduced revenue of the incumbent due to the increased attractiveness of minor networks by their capability of putting through calls to the major network. It is nearly impossible to assess this effect, whereas in the basic upstream/downstream market cases for which the ECP rule was invented for, the assessment according to this rule is quite easy compared to other methods.

approach is therefore similar to the traditional evaluation described under point b. but does not focus on welfare-maximization by (useful) discrimination: since modern EC approaches have a high appreciation of "non-discrimination", one tries to evade obvious price-discrimination issues which might be necessary to some extent and tries to use the term "cost-based".[71] It sometimes seems to be preferred to rely on an expert opinion, which sets out clear "cost-based" fixed and variable tariffs, than to think about which costs occur and about the method of how to assess what is fixed and what is variable. In practice, I believe that the only way of obtaining such numbers is to take the total occurring costs and dividing them through the number of users or minutes of usage: in this case one can assess a variable cost but one always has to take into consideration that these (average costs) are only imaginary variable costs based on the current number of users or the current frequency of usage.

One way of assessment is to try to calculate *full costs* including an appropriate revenue for the interconnection service. In this case, the part of the fixed costs, which corresponds to the interconnection service, plus the variable costs are charged to the other party.

Another way is to charge only the *incremental costs* that arise by interconnection. Incremental costs seem to be the "variable costs of network industries": since network industries are dominated by fixed costs, there is an assessment which additional fixed and variable costs occur when providing or extending a certain service. The total costs are therefore divided into "common costs" and "additional costs", the latter being the "incremental costs". To show that these costs are different from purely variable costs, it is often referred to "long run incremental costs" (LRIC).

European regulators have focussed very much on (one-sided) access issues rather than (two-sided) interconnection issues and appreciate the incremental pricing rule very much.[72] This seems to be rather due to political than due to economic

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71 See also LAFFONT, TIROLE, p.107, 111ff and 132ff, who believe that a retail tax would be a better and more open way of contributing to fixed costs (118f). For more detailed taxation and welfare considerations, see ARMSTRONG, Handbook, 2.1.1, 2.4, 2.8.2, 4.2.2 and 5. See also VELJANOVSKI, supra note 58, (2001) ECLR, p.115 (118); MITCHELL, VOGELSANG, *supra* note 57, p.43ff, 118ff; BAUMOL, SIDAK, *supra* note 62, p.39; MASON, VALLETTI, *supra* note 3, (2001) Ecopol 17, p.389 (396).

72 On EC level one can mention the Commission recommendation on interconnection 98/195/EC, January 8, 1998, OJ L 73/42, which is based on art. 7 (5) of the interconnection directive 97/33/EC and suggests forward-looking long run incremental costs as a basis (point 3). This is the lower limit of the possible margin which was left to the Member States by the directive 97/33/EC (see consideration 10 which mentions “stand-alone costs” as the upper limit). See also LAROUCHE, p.244.

considerations:[73] at the moment, they are still largely focusing on *service* competition *on* the existing incumbent's network *than* on long-term *infrastructure* competition *between* alternative networks which would require far less regulatory efforts. Service competition basically consists of renting network functions at a low price and reselling these services to customers below the incumbent's price level. This type of competition is fully dependent on the regulator's good will towards the new market entrants who might set up their own network in the long run. The cheaper the incumbent has to provide its wholesale services to them, the more "competitors" arise and the earlier customers can benefit from cheaper tariffs. The counter side is that cheap rental tariffs deter from investing into own infrastructure and therefore do not change the industry's competitiveness in the long run.

In access matters the perverse economic effect of the LRIC-method is quite obvious: if someone seeks access to the incumbent's network to compete with the incumbent via the lines rented from the incumbent, the incumbent can only charge costs which occur in addition to the costs which would occur without access. This means that spare capacity would have to be rented nearly for free, since only the additional administrative costs need to be reimbursed. If additional capacity is necessary, the new entrant basically has to pay the price for this new investment but still does not have to contribute to the large amount of fixed costs that are spent for the basic operation of the network. In fact, it will never pay off to construct own infrastructure as long as one has trust in the continued existence of such a regulatory system.[74]

European regulators also are in favour of "forward-looking long run average incremental costs" (FL-LRAIC):[75] this means that the real costs of the investment are not really put into consideration but rather the costs of establishing an imaginary new and efficient network. Since technological progress tends to make telecommunications technology more efficient over time, the price of this imaginary network is usually below the cost of constructing a real network. Therefore, the new entrants do not have much incentive to invest in their own technology but rather to rent cheaply from the incumbent.[76] Since

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73 See LUST, *supra* note 14, p.178ff; LAFFONT, TIROLE, p.7f, 80ff, 105, 148ff.

74 See also LAROUCHE, p.245.

75 See for example the reference in note 72.

76 The main argument of FL-LRAIC regulators is the overall efficiency (see also LAFFFONT, TIROLE, p.165f) which reminds a bit of Marxist theories: if it is cheaper to extend the existing network than to build an additional one, it is more efficient to use the existing network in common. Unfortunately, this view tends to natural monopoly assumption and establishment and to belief in the superior effects of regulatory intervention compared to the self-regulating market forces between different network infrastructures. See also HAUSMAN,

this situation would also deter the incumbent from investing into his existing network, some quite arbitrary mark-ups are usually added to the LRIC price,[77] which put the principle idea behind this method even more into question. Furthermore, LRIC-methods clearly give the incumbent (legitimate?) incentives to cheat the system, either by providing manipulated cost data or by delaying access requests.

It is therefore quite obvious that the current frequent use of LRIC methods has rather a political than economic reason and *wants to promote entry* into the market. It could be justified if one believes that the short-term incentives to enter the market will lead to long-term investments for infrastructure competition as soon as the LRIC method is being replaced by higher cost assessing methods that cover at least full costs. As long as this does not happen, the margins in the regulated *infrastructure* markets are held artificially low so that only few competitors will be attracted to enter these markets, although they are the basis for the communication services which rely on the network infrastructure.

Nevertheless, the *LRIC method* does *not* seem to be *that bad* suitable *for interconnection* pricing: one may argue that interconnection is one of the basic necessities of customer-friendly phone networks and therefore an inherent cost to any provider who wants to provide such services. In this case it is arguable that the costs for the interconnection facilities should be included in the general tariffs. Also if this (short-term variable cost-) theory is not fully coherent, it is at least arguable that only the incremental costs of installing interconnection facilities which occur in addition to the other basic network costs are relevant for interconnection pricing. The argument that the interconnecting network may have to provide interconnection services below its actual cost can be relieved by the fact that this also holds true for the traffic occurring in the opposite direction and therefore the sum should be about equivalent. An additional argument of this rather below than above cost pricing method is that current developments in the mobile sector show a clear tendency towards collusion which should be countered. I believe that it is more effective to have each interconnection partner cover its own fixed costs than the others fixed costs, since this would countervene the tendency of charging artificially high costs and may give incentives to increase efficiency. This *variable or incremental cost-system* for interconnection also reduces differences between on- and off-net calls and thereby neutralizes the

"Regulation by TSLRIC: Economic Effects on Investment and Innovation", (1999) MMR-Beilage 3, p.22 (25f); GERSTNER, "Preiskontrolle beim Infrastrukturzugang", (2002) WuW, p.131.

77 See also MASON, VALLETTI, *supra* note 3, (2001) Ecopol 17, p.389 (394); LAROUCHE, p.244.

positive network externalities to the overall benefit of customers and smaller network providers.

4.) Alternative cost assessment methods

The above analysis shows that all conventional price-setting methods fail in assessing the right interconnection price. Astonishingly, we had the result that the LRIC-method – an economically and dogmatically very questionable method in the fields where it is currently used – might lead to quite reasonable results to solve the two-way-interconnection problems.

In my point of view the legitimate scope for price discrimination provided by the regulatory framework (see point 1.) should be utilized to a greater extent in future: the question whether full costs or incremental costs and whether sole costs or also welfare considerations à la Ramsey should be the base for setting the price, is not answered by the EC directives (see chapter C.2.). On the one hand, one-sided access could therefore be priced at a higher level covering at least actual costs in order to encourage investments in infrastructure and respect the property rights of the facility owner; since access is not as much of a topic in the mobile sector, this rather applies to fixed line telecommunications. On the other hand, – as described above – mutual interconnection could be priced at the rather low incremental cost level in order to better achieve the central regulatory aim of "interoperability of electronic communications services and consumer benefits" (e.g. art. 1 (1) of the access directive 2002/19/EC).

To apply interconnection prices oriented at incremental costs also to smaller operators already seems to be in line with the requirement of ensuring "*maximum economic efficiency and* […] *maximum benefit to end-users*" according to art. 9 of the "old" interconnection directive 97/33/EC. Art. 5 of the new access directive 2002/19/EC seems to confirm this result for the future: it repeats the arguments of the old directive but also expressively mentions "*objective, transparent, proportionate and non-discriminatory*" (art. 5 (3)) terms for interconnection among non-dominant operators. In the "old" framework, where such terms were only found in the rules for operators with significant market power, these terms tended to be understood as implying the use of LRIC cost models.[78] Moreover, not only the mutual nature of interconnection but also the new rules of art. 5, which apply quite similarly to all types of network operators,

78 See *supra* note 72.

imply that the same pricing rules should apply for interconnection without regard to the size of the provider.

Advocates of widely interpreted non-discrimination may not agree with me on terms of economically indicated price discrimination between access and interconnection. Nevertheless, since they usually are in favour of incremental cost assessment methods due to efficiency concerns, they will have to admit that the rather low incremental cost method for all operators independent of market share is the more coherent way for interconnection issues. Unlike access – because of the economic arguments set out above as well as because of the immanent mutuality of interconnection – there also seems to be little constitutional concern regarding property rights.

If one agreed on applying cost-based or LRIC methods for interconnection pricing, one should keep to the theory and not use arbitrary mark-ups which would lead to the effects of other cost assessment methods. At the same time it has to be kept in mind that considerable discretionary power is left to expert witnesses who try to assess the costs and who usually deliver the basis of the regulatory authority's decision. In fact, expert witnesses have to decide which elements are relevant for interconnection, how fixed costs are separated from variable costs, over which period of time an investment is depreciated and which reference interest rate is taken into consideration. Since fixed costs are very high in network industries, the empirical measuring of variable costs is a minor issue and the correct interpretation of the prevailing fixed costs through expert witnesses is of decisive importance. Unfortunately, companies who are either affected by or relying on these prices may try to manipulate the cost data or exercise other influence on these evaluations.

Therefore, the practical cost assessment for matters of currently high-priced mobile interconnection might have to draw attention to one more issue which is related to benchmarking comparable prices of similar markets. The benchmarking method[79] tries to compare prices in different markets or countries and then bases the cost decision on these findings. In principle, I think that there are two drawbacks: on the one hand, the fact that most European countries have similar collusively high interconnection prices and in some way or other markets

79 The Commission recommendation on interconnection 98/195/EC, has set up such a system to align the interconnection prices of the more expensive Member States at the level of the countries with the "best practice" of the EC. Since the aim was considered to be achieved, this system was given up with the Commission recommendation 2002/175/EC, February 22, 2002, OJ L 58/56. See also LAROUCHE, p.250. Comparing price levels seems to be in line with the tendency to apply hypothetical "forward-looking" costs (see point D.3.e. for the FL-LRAIC method).

which are clearly distorted by regulatory intervention makes it hard to find reliable data on proper "competitive market prices". To compare prices from other countries that rely on the "receiving party pays"-principle (RPP instead of calling party pays CPP) would also lead to too many complications since the prices are not easily comparable. On the other hand, if the imposed prices have more in common with the tariffs in a foreign country than with the actual costs of the regulated operator, this would neither be in line with a strict interpretation of the "actual costs" of art. 7 of the interconnection directive 97/33/EC nor with cost orientation of art. 13 of the access directive 2002/19/EC. This could result in constitutional problems since the facility owner could be deprived of his property right if the reimbursement is rather oriented at prices in another country than at his own costs.

Nevertheless, due to the high and not easily justifiable price difference between fixed and mobile interconnection, regulatory authorities could perform a reasonability exam on the expert witnesses' findings by taking into consideration the following two decisive questions:

What is so special about mobile interconnection? As explained in chapter C.1., the basic difference between terminating a fixed and a mobile call is that the last mile of the latter is bridged by electromagnetic waves instead of electric current on a wire. The other difference is that the mobile user's location has to be updated and that probably not only the termination but also parts of the transmission are performed on the network of the mobile provider. Nevertheless, it seems unrealistic that these measures result in a cost difference of around factor 10.

What is different between wholesale interconnection and an end-user on-net call? Interconnection towards mobile phones on wholesale level consists of a part of the transmission as well as the termination of the call. A net-to-net call on a mobile net consists of origination, transmission and termination; this is technically about equivalent to two mobile interconnection procedures. Therefore, it is also worthwhile comparing the prices of the full end user call and the (half-) service of interconnection and termination. Whereas full mobile on-net calls including marketing and customer service often cost around 10 Eurocent, wholesale mobile interconnection is usually charged at around 15 Eurocent[80] although it is only half the service of a full call. Therefore, it is hard to justify the factor 3 difference in favour of on-net end-users only by reference to trying to use the existent

80 Recent comparisons of different countries can be found in studies like *Fixed-to-Mobile Interconnection*, 2001, by the ITU or by the OECD (see *supra* note 43).

network capacity in a good way and to aggressive marketing methods which are necessary due to network externalities (see chapter B.2.).

I therefore believe that regulatory authorities would do a good job for end-users of different networks if they tried to adapt the expert witnesses' results to a basic compliance with fixed network interconnection tariffs and on-net mobile call tariffs. This would in fact be a form of benchmarking, but the markets would more comparable than foreign countries: the alignment with fixed line interconnection may be necessary for reasons of convergence of and non-discrimination between the fixed and mobile market (see chapter E.2.). The comparison with retail prices of the more competitive tariffs for on-net mobile calls is probably the best point of reference since it reflects the costs of the regulated company quite directly.

If it is really evident that interconnecting to mobile networks is much more expensive than to fixed networks, it could also be considered to charge a certain percentage of the costs to the mobile called party.[81] This would lead to an increased cost pressure on the provider since the own customers would draw more attention to the prices of incoming calls.[82] Furthermore, it seems "fair" to partly charge the mobile user since he benefits from the mobility while being called.

E.) Fixed-to-mobile interconnection in practice

1.) Preliminary remarks

In chapter C.2. it was shown that the regulatory framework for interconnection is quite similar for fixed and mobile interconnection. Section D. showed up the collusion problem in the mobile sector (point 2.) which could partly develop because regulatory focus was more on the fixed line market in the recent years. After an analysis of different cost assessment methods (3.) a possible approach

81 See also ARMSTRONG, Handbook, 3.1.3; LAFFONT, TIROLE, p.213ff. For a comparison of CPP- and RPP-methods, see OECD, *supra* note 43, DSTI/ICCP/TISP(99)11/FINAL, p.35ff, and ITU, *supra* note 80.

82 See for example MASON, VALLETTI, *supra* note 3, (2001) Ecopol 17, p.389 (402).

for more consumer-oriented interconnection pricing in future decisions based on the EC regulatory framework was worked out (4.).

This section will show that the huge price discrepancies between mobile and fixed interconnection around factor 10 are not only due to less rigid intervention in the mobile sector. I believe that regulatory authorities do not always respect the benefit of the end-users but may rather care for profitable market conditions for mobile operators and may clearly favour mobile operators at the detriment of fixed providers and their customers. For reasons of easier understanding I will present the theoretical concerns first (point 2.); in order to provide proofs for these general assumptions, a short look at the actual decisions at national level will be necessary (3.). Moreover, EC directives leave too much discretion in the transposition of the rules as to be directly responsible for such tendencies and also Commission recommendations and guidelines do not cover problems of mobile interconnection yet.

As an example I have chosen Austria – where I have watched the developments most carefully since it is my home country – for the following reasons: Austria was neither a pioneer in telecommunications like the United Kingdom or some Nordic countries, nor was it – as some Southern Member States – exempted from the liberalisation obligation during the first time. Moreover, it has not the size to easily ignore or influence the liberalisation obligations but can simply be regarded as a state which waited with the liberalisation until it was obliged to by the EC, but then properly fulfilled its obligations. The mobile incumbent's interconnection fees are rather low in the international comparison,[83] the work of the Austrian regulator tends to be appreciated by the European Commission and mobile telephony is regarded as wide-spread and competitive. Therefore, I think that the current state of the quite liberal mobile sector in Austria can be seen as the typical outcome of the EC liberalisation/harmonisation approach which enables a representative analysis of its possible problems in the medium run. The obvious problems of the transition from monopoly to competition in the fixed line market have been tackled to a great part by now. I believe that currently priority should be given to the problem of high interconnection prices in the mobile sector since this may deter the fixed line market and it should not re-occur once similar infrastructure competition is achieved in the fixed line or other sectors of future electronic communication services.

83 This does not hold true for the other mobile providers due to the regulator's constructions described under point 3.

2.) The cross-subsidy and state-aid problem

By charging high fees for interconnection to their networks, mobile operators may earn revenues from callers connected to other networks without much competitive pressure. This can either increase the mobile operator's revenues or be partly passed on to the own subscribers via handset subsidies, low on-net fees, low subscription fees etc.

The fact that *users of one network have to pay for benefits of another network* is not in line with the aims of the regulatory framework. It clearly contradicts the regulatory aim of "maximum benefit to end-users" as well as the objectivity, transparency, proportionality and non-discrimination obligations of the ONP-rules (e.g. art. 5 of the access directive 2002/19/EC), if fixed-line users, who want to call a mobile subscriber, have to pay up to 10 times more than for a normal call and up to 3 times more than a mobile user would pay for a simlar mobile-to-mobile.

The core problem is that excessively high interconnection fees would not only constitute cross-subsidisation within one company but that transfers between companies could also be regarded as *illicit state aid* in the sense of art. 87 EC treaty under certain circumstances:

Since regulators often believe that mobile telephony is more competitive than fixed telephony, they focus far more on price regulation and cost-orientation of fixed networks than of mobile networks.[84] This results in low interconnection and access fees in the fixed-line sector, whereas regulatory intervention in the mobile sector usually restricts itself to interconnection issues. In the latter segment there tends to be only a slight pressure coming from the regulators to reduce the high interconnection fees that usually derive from the times of monopoly where the sole mobile provider was the same entity as the fixed line monopolist.

As soon as a national regulatory authority sets up fixed-to-mobile interconnection tariffs which are systematically assessed on a different basis or applied less rigidly than in the fixed line sector, this may put fixed line operators and their customers in a less favourable position since they have to contribute excessively to the financing of the rival mobile network. This can theoretically constitute an "*aid granted by a Member State* [...] *which distorts or threatens to distort competition by favouring certain undertakings*" according to art. 87 (1) of the EC

84 The mobile operators' lobbying efforts therefore seem to be successful to some extent, see *infra* note 98.

treaty; since interconnection is likely to be provided between different Member States, an effect on community level is possible.

The national regulatory authorities (art. 3 of the framework directive 2002/21/EC) clearly apply the telecommunication rules on behalf of the state so their action basically falls within the scope of the state aid rules of the EC treaty. Since the general competition rules of the EC treaty are intended to apply simultaneously with the sector-specific communications framework[85] there is no doubt about their applicability. Doubt could only arise on the following point: "*the case-law of the Court of Justice shows that only advantages granted directly or indirectly through State resources are to be considered aid within the meaning of Article 92(1)* [now art. 87 (1) EC treaty]"[86]. If resources are simply transferred from a private, new fixed-line operator and its customers to a mobile operator, the state aid rules cannot apply. In practice however, the most important incumbent fixed line operator is often still at least partly owned by the state; therefore, the financial support of the mobile sector by such fixed line operators due to regulatory intervention is to a certain extent provided by state resources. This enables an assessment in the light of the EC state aid regime and the justifications for an exemption by the Commission according to art 87 (3) of the EC treaty are unlikely to apply. Until now, no formal proceedings on this question have started yet.

Even if the above behaviour does not necessarily constitute an illicit state aid, different standards for two distinct sectors and an *obligation of cross-subsidisation* from one to the other clearly goes beyond the legitimate scope of sector-specific regulation. This holds even more true for the new framework which is intended to be technically neutral.[87] These sorts of subsidies for the few mobile operators also have little in common with the initial aim of tackling the monopoly problem in the traditional fixed-line sector. Furthermore, the inequality of highly regulated and therefore low fixed interconnection fees and quite freely arranged high mobile interconnection fees puts the fixed line into an increasingly desperate position in comparison to mobile network. The latter becomes more and more a substitute for the fixed line but not vice versa:

Due to the significantly higher interconnection prices to mobile networks, fixed providers cannot offer their customers fixed-to-mobile calls that are reasonable

85 See already the Commission guidelines for the application of the EC competition rules in the telecommunications sector, OJ C 233, September 6, 1991, p. 2-26.

86 See the recent ECJ judgment of 13.3.2001, case C-379/98, *Preussen Elektra/Schleswag*, [2001] ECR I-2099, §58 f for further references.

87 See for example art. 8 (1) of the framework directive 2002/21/EC.

compared to the on-net call of a mobile provider. On the other hand, mobile providers can earn some margin when providing calls to the fixed network since these wholesale interconnection fees are low and it is generally accepted among mobile end-users that calls to fixed lines are more expensive than on-net calls or at least more expensive than a fixed-to-fixed call.

Since even high interconnection costs to other mobile providers can usually be compensated by opposite direction interconnection at a high price level, also flat-rate tariff schemes – where calling any network causes the same quite low price of 10 Eurocent – are possible for mobile network providers.[88] At the same time these "special" tariff schemes allow charging high monthly subscription fees, which should guarantee that there is no total loss, although flat-rate-tariffs are usually still promoted as something special where subscription has to be done during a certain period of time.[89] Fixed providers could hardly offer similar tariffs since they do not have any high interconnection price markets where they could compensate potential losses. Their only competitive advantage is that the fixed line is usually more reliable which is compensated by the lack of mobility and that only fixed lines allow standard customers to get high bandwidth for data transfer at reasonable price which might also change soon with new generations of mobile telephony.

If the regulatory framework is not applied equally for all sectors of electronic communications – as it is the explicit aim of the new “technology-neutral” communication framework (art. 8 (1) of the framework directive 2002/21/EC) – an *asymmetric "convergence"* of the future market for telecommunication may be the result: the increasing substitutability of fixed and mobile communication could become more and more one-sided in a sense that mobile phones can take market share from fixed products but not vice versa. Of course, this is at the detriment of consumers, since they are pushed towards the services of the few mobile operators: the attractiveness of fixed services which are generally priced at a lower level and – due to the current EC liberalisation approach – are offered by a far higher number of providers, is artificially lowered by such unequal regulation.

The problem which is even worse than the tendency towards collusive practices to keep up interconnection tariffs – which are somehow inherent to the free

88 Mobile providers may also charge low "like-fixed-line"-tariffs within the base station of the subscriber’s residence in order to encourage a substitution of the fixed line by the mobile service and charge "normal" high mobile-to-fixed-tariffs only when he is "on the move" like "myzone" offered by the Swiss provider Sunrise, see NZZ 22.2.2002, p.53.

89 See the recent advertisements of the Austrian providers max.mobil (now T-Mobile) and one where the subscription period was limited to March 31, 2002.

market in network industries – is that the *regulators* who should try to correct these tendencies sometimes *seem to be blind* towards the dark sides of mobile telephony.[90] Due to antipathy against the fixed line incumbent, they may focus on over-regulating the fixed sector while at the same time enforcing the discrepancy between fixed and mobile networks; this results in an increasingly low priced and therefore unattractive sector for potential full-scale fixed network competitors. It should be considered that the mobile sector is limited to an oligopoly-alike situation due to the scarcity of frequency resources whereas fixed lines would theoretically allow more competitors – even for infrastructure competition as long as the infrastructure prices are not kept artificially low due to intense regulatory measures. Furthermore, a competitive fixed line sector could help to discipline the related mobile services and widen consumer choice at naturally lower, competitive prices.

In order to substantiate the above assumptions that the large discretionary power of national legislative authorities might not only be used to stay rather passive towards collusive conduct in the mobile sector (chapter D.2.) but also to actively favour mobile communications at the detriment of fixed line customers, the following look at concrete examples of decisions at a national level is necessary.

3.) Concrete examples

a.) Protection of investments

The first obvious privileges for the mobile sector compared to the fixed line became apparent in Austria[91] by the decisions of July 31, 2000 concerning mobile interconnection.[92] Therein, the Austrian Telekom Control (TKC) - Kommission recognized that each mobile provider has a monopolistic bottleneck or essential facility concerning access to its customers. Instead of applying the possibilities of the regulatory regime to lower prices in this monopolistic bottleneck as far as possible to the benefit of the customers, it decided to use this uncompetitive segment to set up a so-called “protection for investments” of new entrants in the

90 The ITU, *supra* note 80, p.12, put it like this: "In practice, operators collude to develop mechanisms, such as interconnection, to keep prices higher than they should be, and regulators are too easily blinded by the complexity of the arrangement to take much notice."

91 For an assessment of regulatory decisions contrary to end-user benefit in Germany, see MEIBOM/BUSSCHE, "Notwendigkeit einer Rückführung der TK-Regulierung", (2000) MMR, p.206 (208f).

92 TKC-Kommission Z8/99, point 4.3.2.2, and Z24/99, point 4.3.2.1.3.

mobile sector: without any explicit legal indications, mobile providers were allowed to charge between 2 and 5 Eurocent a minute – which is about the tariff of a fixed-to-fixed end user call per minute off-peak respectively on-peak – *more* than other mobile providers when granting interconnection, i.e. when they terminate calls which were set up in other networks. This additional revenue during a three-year "protective period"[93] is considered to help the new mobile provider to finance its infrastructure costs.

This decision threw overboard the applicability of the well-reasoned reciprocity rule which was established by the regulator before.[94] The reciprocity rule would have ensured that similar networks provide mutual interconnection at the same tariff in order not to reward the operator with the less efficient network at the detriment of the more efficient operator.

The legal arguments for this change are quite poor:[95] the only possible explanation was that the incumbent mobile provider was granted similar conditions during the – not really comparable – monopoly times. This problem could have probably better been solved by neutralising the aid at the level of the incumbent than by expressively granting a market-distorting aid to every new mobile provider in future. Interestingly, the regulator does not apply similar privileges to fixed line providers who invest in proper infrastructure, since he believes that not the infrastructure costs but the mere conditions for mobile frequency licences justify this benefit. The reasoning of the regulator was very short.

Unfortunately, also the economic arguments are not obvious: *First* of all, digressing from the reciprocity rule to a set of different tariffs within the mobile sector leads to increased regulatory efforts. *Second*, all other providers – and in fact their customers – have to finance the rise of a new competitor.[96] The fact that mobile interconnection already has a very high price level makes it hard to justify why fixed users should have to pay even more to reach mobile customers. After having recognized the monopoly power that can be exercised by the mobile

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93 The more recent interconnection decisions show that the interconnection tariffs of new mobile operators take longer than the intended three year period to assimilate with more established mobile providers.

94 See for example TKC-Kommission 9. 3. 1999, Z 1/97, point 4.11, 43 ff (esp. 46). See also PARSCHALK/ZUSER, "Netzzugang und Zusammenschaltung im Telekommunikationsrecht", (1999) MR, p.44 (47).

95 For more detail, see LUST, "Zusammenschaltung im Mobilfunk – Eine Analyse anhand der Bescheide der TKC vom 31.7.2000", (2000) MR p.333 (336ff).

96 See ARMSTRONG, "Regulation and Inefficient Entry", World Bank meeting 2000, p.7, with reference to Oftel's positive change of mind towards such matters.

provider, the regulatory authority did not take the natural way to reduce this power but actually enforced collusive behaviour by using this segment to levy a subsidy to the new entrant which has to be paid by the customers of other networks. *Third*, it is not clear whether the high interconnection fee is really useful for helping the new provider to set up his network: customers with respect to their callers might rather prefer the other – already settled – providers where interconnection is not that expensive; some callers might also tend to call the subscribers of the new and more expensive network less often or only for shorter talks. *Fourth*, – although the regulatory framework tries to prevent cross-subsidisation (for the new framework, see art. 8 and 13 of the framework directive 2002/21/EC) – the regulatory authority explicitly orders a cross-subsidy from the sector of fixed to that of mobile telephony.

The above decision therefore is hard to justify and should be considered as an example that regulators should rather focus on their main mandate according to the law than on inventing new protectionist rules.

b.) Charging for network externalities

Unfortunately the more recent Austrian decisions on interconnection between fixed and mobile networks from November 5, 2001[97] do not give much hope neither to a more strict focus on the legal framework nor to a change in economic reasoning. In these decisions the mobile providers were granted an *additional* 2,6 to 3,7 Eurocent charge per minute for interconnection to their network, which is about equivalent to the wholesale price of a full end-to-end fixed line call during peak time. The reasoning for this decision, which was not at all indicated by the legal framework, was a simple reference to a consultative document of the UK regulator Oftel and the existence of positive external effects.[98]

In this case, the regulator did not even try to find a legal reasoning. Instead, he explicitly admitted that he would like to increase the number of mobile users since he believes that transferring money from the fixed to the mobile sector would provide a better "callability" of the users.

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97 TKC-Kommission Z5/01, Z7/01, point 4.2.4, and Z14/01, Z15/01, point 7.2.3. For a more detailed analysis in my mother tongue, see LUST, *supra* note 56, (2002) MR, p.122.

98 See Oftel 26.9.2001, *supra* note 20. It is interesting how much theoretical effort the mobile providers and Oftel are doing to justify their system, which does not consider its implications on fixed telephony and does not reflect on the fixed providers' counter-arguments. On the other hand it clearly shows the belief that heavy-handed regulation leads to much better results than competition.

The fact that this is at the detriment of fixed-line users bothers the regulator as little as the fact that such a system may rather cause customers to switch from fixed to mobile. Since these users may cancel their fixed-line contract, the total number of "call-able" users may therefore stay similar and the market conditions for fixed-line providers are artificially lowered.

Moreover, the above network externality surtax, which is only provided for mobile operators, has negative consequences within the mobile sector: by making off-net calls more expensive, the position of large mobile providers[99] is improved against their smaller competitors, since the cheap on-net calls gain additional importance. The market-power-neutralizing effect of the non-discriminatory interconnection regime[100] is therefore perverted by the regulator.

c.) Different cost assessment

Besides the above means of obvious discrimination between fixed and mobile providers there are also some more subtle ways of raising profits in the mobile sector. The reasons may mainly be found in the reports of the expert witnesses, which – due to so-called business secrets – are usually only available to the mobile providers and the regulator. Nevertheless, it seems to be obvious[101] that the *interest rate for invested capital*[102] is supposed at a much higher rate in the mobile sector. This means that – apart from the usually shorter time of depreciation due to the assumption of more innovation and shorter economic life of investments in the mobile sector – it is taken for granted that an investment of 1 Euro in the mobile sector will bring higher profit than the same investment in the fixed sector.

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99 Interestingly, the Austrian regulator even provides the extra charge to the former monopolist mobile provider whereas the concrete decision obliged an alternative fixed line operator who sets up his proper fixed network infrastructure. This shows well that the Austrian regulator's perception, which was influenced by an Oftel consultative document, is distorted to some extent by the belief that mobile is "good" and needs to be helped whereas fixed is a natural monopoly where network competition shall be kept down and the incumbent should be the only provider. This can be the only reason why an alternative fixed provider has to pay a high mobile interconnection fee plus an externality mark-up to the ex-monopolist mobile provider where the mark-up is already twice the total revenue he would earn for providing the opposite interconnection towards his network during peak time.

100 See chapter C. as well as for example art. 5 of the new access directive 2002/19/EC.

101 See KÖCK, *TK-Recht*, 2000, p.59, and TKC-Kommission Z5/01, Z7/01, point 4.2.4, and Z14/01, Z15/01, point 7.2.3, where the interest rate for capital in the mobile sector is accepted at 13,75 % respectively 12,7 %, which is quite high in the current time of low interest rates and about 40 % above the rate for fixed telephony of 9,34 %.

102 See also MASON, VALLETTI, *supra* note 3, (2001) Ecopol 17, p.389 (393).

At the same time far *more common costs are accepted* as costs directly pertinent to a certain service and – recently – the regulator even decided to apply full costs in the mobile sector, whereas his price regulation in the fixed sector is based on incremental costs of fictitious effective networks.[103] Therefore, even marketing and customer care costs of mobile networks as well as handset subsidies can be transferred to fixed customers by assessing these costs in the fixed-to-mobile interconnection fee but not vice versa. Since this recent decision does not even try to reason – neither on a legal basis nor based on an economic assumption – why clearly *more favourable accounting methods* should be applied solely for the mobile sector, this is a clear cut aid from the fixed to the mobile sector imposed by the national regulatory authority.

Another final example is the Austrian regulator's change of view concerning *market power*: whereas he always focused on the anticompetitive relevance of bottlenecks, this has suddenly changed in the latest set of decisions. Instead of assessing both the former monopoly provider and the largest alternative mobile provider as having "significant market power" due to their market share of nearly 25 per cent and their bottleneck for putting through calls to their customers,[104] the regulator now sees no more operators with significant market power for interconnection in the mobile sector. With this clearly political decision he deprived himself of the powerful means for reducing anticompetitive behaviour according to the current regulatory framework.

All in all, the impartiality, transparency and independence – as required for example by art. 3 of the framework directive 2002/33/EC – at least of the Austrian regulatory authority will need to be looked at a bit more carefully in future.

103 E.g. TKC-Kommission Z5/01, Z7/01, point 4.2.4, and Z14/01, Z15/01, point 7.2.3.

104 Already the 25 %-share without the above elements would lead to the presumption of significant market power according to § 33 TKG and art. 4 (3) of the interconnection directive 97/33/EC, June 30, 1997, OJ L 199/32. For market power assessment in mobile interconnection, see BUNTE, *supra* note 30, (2002) MMR Beilage 1, p.1 (4ff), and MÖSCHEL, *supra* note 30, (2002) MMR Beilage 1, p.28 (33f).

F.) Conclusion

The above analysis has shown that more attention will have to be drawn to interconnection of mobile phones in order to enable a convergent communication sector to the benefit of end-users as it is the aim of the EC regulatory framework.

Since the economic problems of two-way interconnection are very specific and different from one-sided access, the general rules set up by the directives are not sufficiently precise to tackle the problem. Since the vagueness of the directives often persists in the national transposition of the directives, the national regulatory authorities often have to exercise large discretionary powers when applying the law in practice. This may lead to inhomogeneous application of the EC rules and might also lead to not sufficiently reasoned decisions among some regulators which can cause negative long-term effects for the customers and the communications industry.

Most of all, a discussion and codification of more detailed interconnection rules would be useful and increasingly important with the rise of alternative networks. I believe that the use of a uniform incremental cost assessment method for mutual interconnection between any operators no matter of the specific communications sector or their market share would be a reasonable approach in line with the current regulatory framework. Since – at the moment – cost data provided for mobile interconnection seems to be suspiciously high, also an additional reasonability exam based on a comparison with mobile on-net fees will be indicated for some time.

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