

Knieps, Günter; Zenhäusern, Patrick

Working Paper

Regulatory fallacies in global telecommunications: The case of international mobile roaming

Diskussionsbeitrag, No. 144

Provided in Cooperation with:

Institute for Transport Economics and Regional Policy, University of Freiburg

Suggested Citation: Knieps, Günter; Zenhäusern, Patrick (2013) : Regulatory fallacies in global telecommunications: The case of international mobile roaming, Diskussionsbeitrag, No. 144, Albert-Ludwigs-Universität Freiburg, Institut für Verkehrswissenschaft und Regionalpolitik, Freiburg i. Br.

This Version is available at:

<https://hdl.handle.net/10419/71109>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

Regulatory fallacies in global telecommunications: The case of international mobile roaming

by Günter Knieps* and Patrick Zenhäusern**

**Discussion Paper
Institut für Verkehrswissenschaft und Regionalpolitik
No. 144 – March 2013**

Abstract:

International mobile roaming cartel agreements prompted the EU to intervene, firstly encompassing competition law measures by a cartel exemption, then initiating several competition proceedings based on the accusation of abuse of a dominant market position, and finally applying price regulations of increasing scope. The paper exposes the temporary market power regulations, including the designated local break out measures, as insufficient and misleading. The solution is to solve the cartel problem at its root, permitting visiting customers the freedom of choosing between their home operator and alternative carriers from the visited country by the implementation of carrier portability.

* Günter Knieps, Professor of Economics, Albert-Ludwigs-Universität Freiburg, Kollegiengebäude II, Platz der Alten Synagoge, D - 79085 Freiburg, guenter.knieps@vwl.uni-freiburg.de (corresponding author)

** Patrick Zenhäusern, Director, Polynomics AG, Baslerstr. 44, CH - 4600 Olten patrick.zenhausern@polynomics.ch

The electronic version of this paper is available under:
<https://portal.uni-freiburg.de/vw/files/files-publikationen/disk/disk144>

1. Introduction

International mobile roaming is a controversial topic both for competition policy and regulatory economics. “‘Community-wide roaming’ means the use of a mobile telephone or other device by a roaming customer to make or receive intra-Community calls while in a Member State other than that in which his home network is located, by means of arrangements between the operator of the home network and the operator of the visited network”.¹ Thus, international mobile roaming agreements reflect a consensus between international mobile operators differentiating between home and visiting customers. While both categories of customers request comparable mobile communications services like calling abroad, home customers take advantage of liberalised mobile markets and therefore competitive pricing schemes, whereas visiting customers are charged by their home operator, based on agreed wholesale roaming tariffs between international mobile operators. Thus, visitors are locked in within the roaming contract of their home operators. Such an artificial market split organized by the cartel of mobile operators provides the basis for artificial price discriminations and high roaming charges.

International mobile roaming cartel agreements prompted the EU to intervene in what could be termed an interventionist chain reaction. After applying competition law by a cartel exemption and proceedings based on the accusation of abuse of a dominant market position, price regulations of increasing scope were introduced. The temporary market power regulations, including the designated local break out measures, are insufficient and misleading. The solution is to solve the cartel problem at its root, permitting visiting customers the freedom of choosing between their home operator and alternative carriers from the visited country by the implementation of adequate technical regulations.

International mobile communications markets are not yet opened to competition as is the case with regard to national fixed and mobile communications markets.

¹ Regulation (EC) No 717/2007 of the European Parliament and of the Council of 27 June 2007 on roaming on public mobile telephone networks within the Community and amending Directive 2002/21/EC, OJ, 29.6.2007, L 171/32-40, Art. 2(d).

Technical regulation in the form of number portability enabling users to switch network providers is legally guaranteed in the European regulatory framework for fixed networks as well as for mobile networks. A proper extension of number portability to the concept of carrier portability is a necessary and sufficient condition for the functioning of competition on the markets for international roaming. After the concept of carrier portability has been successfully implemented by European regulators, the current price regulations as well as planned decoupling regulations should be abandoned. In addition to carrier portability, measures of consumer protection (information policies to avoid bill shock, detailed information on the amount of data volumes in e-mail attachments etc.) should be obligatory for all mobile operators.

The paper is organized as follows: Section 2 shows that with regard to international mobile roaming agreements there is no network-specific market power to be detected. International mobile roaming is a phenomenon of a not yet liberalised subsection of mobile communications. Current market power and performance-based regulations are no substitute for market opening. Section 3 describes the role of technical regulations in the liberalisation process of fixed and mobile networks. Until now, regarding international mobile communications, there are no comparable technical regulations in place. Section 4 analyses the artificial market split in international mobile communications that was established in the nineties and is the very basis of the mobile roaming cartel, which was exempted from cartel prohibition, then was subject to the accusation of abuse of a dominant market position and finally was increasingly price-regulated. Against this background, section 5 explains that visiting mobile customers can only be guaranteed the option to choose their operator at the local level by tailored technical regulations. In this context, the concept of carrier portability is developed. Section 6 concludes.

2. Is there a regulatory paradox of market power regulation?

2.1. Regulation of network-specific market power

Network-specific market power regulation is complementary to general competition law. Regulatory economics so far has developed well founded principles to establish sector-specific regulation in network sectors. The disaggregated approach is a tailor-made concept for disciplining market power in network industries (Knieps, 1997). According to the concept of the monopolistic bottleneck, stable network-specific market power exists in those areas that cannot be disciplined by active or potential competition. In a specific situation, it is possible to identify over-regulation (false positive regulatory fallacies) or a lack of regulation (false negative regulatory fallacies). Regulatory fallacies produce distorted competition and/or further regulatory fallacies. For example in a platform competition environment, sector-specific market power regulation is distortive. Therefore increasing platform competition and the increasing convergence of fixed network markets and mobile communications markets should lead to a phasing out especially of market power regulation.

The European regulatory framework for market power regulation in liberalised telecommunications markets is based on significant market power (Blankart, Knieps, Zenhäusern, 2007; Knieps, Zenhäusern, 2010). The so-called “three-criteria test” promoted by the European Commission is consistent with the network economic concept of monopolistic bottlenecks: “The first criterion is the presence of high and non-transitory entry barriers whether of structural, legal or regulatory nature. ... the second criterion admits only those markets, the structure of which does not tend towards effective competition within the relevant time horizon. ... The third criterion is that application of competition law alone would not adequately address the market failure(s) concerned.”²

² Commission Recommendation of 11 February 2003 on relevant product and service markets within the electronic communications sector susceptible to ex ante regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services (notified under document number C(2003) 497) (2003/311/EC), OJ, 8.5.2003, L 114/45-49, recital 9.

The analytical basis of the concept of significant market power (dominant position) was taken from competition policy and was applied from the very beginning and substantiated by the “three-criteria test” consistent with the network economic concept of the theory of monopolistic bottlenecks.³ Therefore, market power regulation is only required in local networks as long as, due to monopolistic bottleneck characteristics, neither active nor potential competition exists. Inasmuch as competing local infrastructure providers are active, there is a need to phase out market power regulation in fixed networks. As long as competitive infrastructure platforms do not exist, regulated access to duct infrastructures remains necessary. Regarding “Next Generation Networks” (NGA), it is only necessary to regulate the access to the duct (Blankart, Knieps, Zenhäusern, 2007). Access regulation of fiber networks instead of regulation of the access to the duct would be over-regulation. The NGA Regulation⁴ is either superfluous due to competing broadband infrastructure or implies an oversized regulatory basis, because access to the duct is a sufficient sector-specific regulatory measure.

However, the list of markets in the annex of the Commission Recommendation of 11 February 2003 is similar to the list of markets in the Framework Directive.⁵ So the list in the Recommendation is not in line with the “three-criteria test”. A phasing out of regulation in fixed networks, leaving only the remaining monopolistic bottleneck components subject to regulation, can be observed, but a new field of regulation is emerging in the context of next generation networks.⁶ The regulation of mobile termination is also based on the significant market argument. According to the European Commission the “wholesale na-

³ Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002, Annex I; Directive 2002/19/EC of the European Parliament and of the Council of 7 March 2002 on access to, and interconnection of, electronic communications networks and associated facilities (Access Directive), OJ, 24.4.2002, L 108/7-20; Commission Recommendation of 20 September 2010 on regulated access to Next Generation Access Networks (NGA), OJ, 25.9.2010, L 251/35-48.

⁴ Commission Recommendation of 20 September 2010 on regulated access to Next Generation Access Networks (NGA), OJ, 25.9.2010, L 251/35-48.

⁵ Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services (Framework Directive), OJ, 24.4.2002, L 108/33-50, Annex I.

⁶ Commission Recommendation of 20 September 2010.

tional market for international roaming” is in possible need of regulation (Framework Directive⁷ and Commission Recommendation⁸), although an explicit justification is not provided. Until 2007 there was no market power regulation with regard to mobile roaming in place.

2.2. Performance-based regulation

In 2007, the revised Commission Recommendation removed the international mobile roaming market from the list of markets in need of possible regulation. The reason for this removal was not that the Commission considered this market to be competitive. On the contrary, a Regulation on roaming on public mobile telephone networks⁹ was enacted, imposing so-called “Eurotariffs”, meaning a maximum average wholesale charge between any pair of operators (Article 3) and a maximum average retail charge (Article 4) per minute differentiating between calls made or received.

This new Regulation created a paradigm shift in the history of the EU policy on market power regulation. The basic argument was that “it has not yet been possible for a national regulatory authority to address effectively the high level of wholesale Community-wide roaming charges because of the difficulty in identifying undertakings with significant market power in view of the specific circumstances of international roaming including its cross-border nature.”¹⁰ Thus abandoning the two-tiered approach of the Framework Directive without identifying significant market power (by applying the “three-criteria test”), a rigorous set of wholesale and retail price regulations for international roaming services was introduced, although with an ex ante defined expiring date (June 2010¹¹). In the

⁷ Directive 2002/21/EC of 7 March 2002.

⁸ Commission Recommendation of 11 February 2003, Annex, Market 17.

⁹ Regulation (EC) No 717/2007 of the European Parliament and of the Council of 27 June 2007 on roaming on public mobile telephone networks within the Community and amending Directive 2002/21/EC, OJ, 29.6.2007, L 171/32-40.

¹⁰ Regulation (EC) No 717/2007, recital 6.

¹¹ Regulation (EC) No 717/2007, Art. 13.

meantime, roaming regulation has been continued and is supposed to expire (in June 2022¹²). Price regulation was expanded and is now also applied to SMS and data roaming services. The performance criterion of high prices has been applied as a justification for ex ante market power regulation without any specific network economic justification.

The question arises whether the concept of the “three criteria test” and the concomitant theory of monopolistic bottlenecks have failed to identify sector-specific market power on markets for international roaming. In the following it is shown that the answer is no, and that the problem is due to the absence of adequate technical regulation.

3. Technical regulation versus market power regulation

It is important to clearly separate the functions of technical regulations from market power regulation. Technical regulations may pursue goals of safety (e. g. tasks of the German Technical Inspection Association, TÜV) or health (e. g. guaranteed minimal drinking water quality). They may also fulfill the role of a precondition for the functioning of competition (e. g. postal code systems, telephone number administration, the definition of geographical limits of air traffic control jurisdictions, interoperability standards to allow cross border train traffic or telecommunications traffic). However, by their very nature they are different from active competition policy or regulatory interventions to discipline network-specific market power. Technical regulations precede the provision of network services, the bidding process for traffic control systems and the construction of network infrastructures. Of course, the lack of adequate technical regulation may hamper the evolution of the competition process (Knieps, 2006, 56 f.). In contrast to general consumer protection (e. g. obligation to provide transparent pricing information) the focus of technical regulation is on a long-run sector-specific regulatory task and thus a specific consumer protection for network industries.

¹² Regulation (EU) No 531/2012 of the European Parliament and of the Council of 13 June 2012 on roaming on public mobile communications networks within the Union (recast) (Text with EEA relevance), OJ, 30.6.2012, L 172/10-35, Art. 22.

3.1. Fixed networks

It is important to differentiate between technical regulation, which is required on a continuing basis for all carriers as precondition for competition, and market power regulation, which is necessary as long as infrastructure competition (in local networks) does not yet exist. Number portability is a long-run technical regulatory necessity. However, call-by-call carrier selection and carrier pre-selection is an intermediary market power regulation as long as platform competition in local access networks does not exist. If platform competition exists, consumers have free choice among alternative local carriers which may or may not provide long distance services. Incentives to offer alternative contracts with different contractual switching conditions among different providers evolve within the competition process of local and long distance telecommunications networks.

3.1.1. Number portability as technical regulation

In fixed telecommunications networks technical regulation to allow switching between different local access network providers by means of number portability is considered a necessary condition for competition on the national and international telecommunications markets. Parallel to the abolishment of legal entry barriers number portability was implemented as a technical regulation.¹³ This is a technical regulation focusing on the “access to numbering resources for all market players and the crucial significance of adequate numbering mechanisms, in particular for number portability and carrier selection, as a key facilitator of consumer choice and effective competition in a liberalised telecommunications environment”.¹⁴ This technical regulation is not conditional on significant market power criteria, but valid for all network carriers.

¹³ Directive 98/61/EC of the European Parliament and of the Council of 24 September 1998 amending Directive 97/33/EC with regard to operator number portability and carrier pre-selection, OJ, 03.10.1998, L 268/37-38.

¹⁴ Directive 98/61/EC, 37.

3.1.2. Call-by-call prescriptions and carrier pre-selection as market power regulation

In contrast, call-by-call prescriptions using a specific code designated to the new carrier each time a call is made, as well as carrier pre-selection with a facility to override any pre-selected choice on a call-by-call basis by dialling a carrier selection code – also installed in the very beginning of global market liberalisation – are based on the criteria of significant market power.¹⁵ With some exceptions, all EU Member States met this basic requirement to introduce competition among telecommunications service providers on January 1, 1998. Call-by-call carrier selection refers to the obligatory provision of a technical possibility to enter alternative long distance carrier service networks (by means of dialling a specific carrier number before the usual telephone number), if the call originates e. g. from the Deutsche Telecom local access network. Alternative local network carriers must also offer call-by-call carrier selection to alternative long distance carriers, if they are considered to possess significant market power. Based on these market power regulations competition on the markets for long distance telecommunications services (national and international) could develop, due to the symmetric non-discriminatory treatment of all long distance carriers. Market power in local networks should not be abused to disturb long distance competition.

Since 2000, operators with significant market power have in addition been forced to offer “carrier pre-selection”, where calls are automatically processed by the new carrier for long distance, and international, local and fixed-to-mobile calls.¹⁶ In most member states, these regulations were introduced by May 2001 (OECD, 2001).

¹⁵ Directive 2002/22/EC of the European Parliament and of the Council of 7 March 2002 on universal service and users' rights relating to electronic communications networks and services (Universal Service Directive), OJ, 24.4.2002, L 108/51-77, Article 19(1).

¹⁶ Directive 98/61/EC, Article 1(3).

3.2. Mobile networks

In national mobile networks technical regulations similar to the technical regulations in fixed networks became relevant to enable competition among different mobile carriers.¹⁷ After 2002 number portability was implemented as a technical regulation according to the Universal Service Directive.¹⁸ All subscribers of publicly available telephone services including mobile services can, upon request, retain their number(s) independently of the undertaking providing the service. Mobile number portability is by now a common technical regulation almost worldwide. In the member states of the EU 15, it was introduced between 1997 (the Netherlands) and 2005 (Luxembourg), most of the member states admitted later introduced it between 2004 and 2008. The technical regulation of number portability basically works in a similar manner for all fixed and mobile networks.

In contrast, obligatory call-by-call carrier selection or carrier pre-selection is only applied, if an operator is considered to have significant market power. The underlying principle is that “...national regulatory authorities may extend the obligation to provide carrier pre-selection with call-by-call override to organisations operating public telecommunications networks without significant market power, where this does not impose a disproportionate burden on such organisations or create a barrier to entry in the market for new operators”.¹⁹

¹⁷ Regarding the definitions in Art. 2c and Art. 2d of the Directive 97/33/EC (Directive 97/33/EC of the European Parliament and of the Council of 30 June 1997 on interconnection in Telecommunications with regard to ensuring universal service and interoperability through application of the principles of Open Network Provision (ONP), 26.7.1997, OJ, L 199/32–52), the notions of “telecommunications network” and “telecommunications service” are related to fixed networks as well as mobile networks. Art. 12(5) is doubtless related only to fixed networks. As the Directive was written more than fifteen years ago, it basically related to fixed networks. Mobile communications worldwide as well as within the EU was then still of relatively minor importance.

¹⁸ Directive 2002/22/EC, Article 30.

¹⁹ Directive 98/61/EC, 37.

From the perspective of the disaggregated regulatory framework, due to mobile networks being competitive (e. g. Knieps, 2000), there is no market power regulation necessary enforcing specific contracts. As long as the mobile communications markets are competitive, regulated mobile call-by-call carrier selection or mobile carrier pre-selection is superfluous and detrimental. Nevertheless, “voice call termination on individual mobile networks” has been considered to be a market in need of ex ante regulation;²⁰ however, this classification has been criticised as “termination regulation fallacy” (Knieps, Zenhäusern, 2010, 1005), because high and non-transitory entry barriers do not exist on this market.

The freedom to contract on competitive markets is important for permitting the evolutionary development of different price differentiation approaches, leaving the customers the alternatives to credibly bind themselves to a specific carrier (benefiting from cheap mobile handset tariffs) or to use the alternative of SIM-only offers. The underlying economic reasoning is that competition among fully integrated mobile operators would result in various forms of alternative contracts where customers have the free choice to not bind themselves to any provider at all (pre-paid), or accept a longer term contract (e. g. two years) with a reduced charge for the mobile handset equipment. Regulatory enforced call-by-call carrier selection options would disturb such market search for tariff differentiation. In contrast in fixed networks monopolistic bottleneck market power in local networks could be abused to disturb long distance telecommunications, if call-by-call carrier selection did not exist.

²⁰ Commission Recommendation of 11 February 2003, Annex, Market 16 or Commission Recommendation of 17 December 2007 on relevant product and service markets within the electronic communications sector susceptible to ex ante regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services, OJ, 28.12.2007, 344/65-69, Annex, Market 7.

4. The three phases of the international mobile roaming cartel

4.1. Phase 1: Unregulated international mobile roaming cartel agreements

International roaming was introduced by the so-called GSM Memorandum of Understanding (MoU) in 1987, signed by thirteen Member States of the European Union that committed to implement cellular networks based on the GSM specifications. The GSM Association defines international roaming as “a service that allows mobile users to continue to use their mobile phone to make and receive voice calls and text messages, browse the Internet, and send and receive emails, while visiting another country.” In terms of coverage and on-net customer base, early mobile market entrants (often incumbents) first using 900 MHz had a distinct market advantage. A concern was that newer entrants using 1800 MHz would end up with limited or no roaming partners (Shortall, 2010, 1). GSM operators solved the problem by providing international roaming services based on commercially negotiated roaming agreements according to the Standard Terms for International Roaming Agreement (STIRA).

The STIRA initially were formulated in 1996 based on the traditional system of Normal Network Tariffs (NNT). The basic principle of this tariff scheme has been that the visiting operator charged a domestic retail tariff as a wholesale roaming charge to which the home operator added a retail margin to have a retail roaming charge. A first letter of comfort was granted by the European Commission in 1997 granting exemption from cartel prohibition according to Art. 101 (3) (ex Art. 81 (3) TEC).²¹ After complaints from the European Commission that this roaming tariff was not cost-based, the Inter-Operator Tariff Scheme (IOT) was developed by the GSMA to replace the NNT, decoupling the roaming tariff from the domestic tariff. A second comfort letter from the Commission

²¹ Case 36.153 GSM International Roaming Agreements. Date of closure: 11.11.1997; Exemption 85(3) without publication (<http://ec.europa.eu/competition/antitrust/closed/en/comfor97.html>, downloaded in March 2013).

again granted exemption from cartel prohibition under this new tariff scheme²². As a consequence of the change of the tariff scheme, instead of declining, international roaming tariffs augmented sharply (Sutherland, 2012, 5). A basic requirement of the STIRA is the application of non-discriminatory wholesale prices, meaning that each mobile network operator is forced to apply the same set of IOTs to all foreign operators. Uniform tariffs can be set for a group of call destinations (e. g. EEA countries or EU countries). Some mobile operators set a uniform IOT for peak and off-peak calls while others use differentiated prices.

The European Commission supported the STIRA to ensure a common standard across the member states and to encourage trans-European networks (similar to ITU Interoperability standards for fixed networks, including settlement contracts among international carriers). The STIRA facilitate international roaming for GSM operators, simplifying the negotiation of roaming agreements by providing a framework and tariffing principles (Sutherland, 2001, 8).

The real problem was that pursuing the long-run goal of interoperability and contracting among mobile carriers in different member countries narrowed the view in such a way that there was a danger of these STIRA agreements being abused as a vehicle for exercising cartel market power. The problem is the double role of roaming agreements: as a framework for interoperability and contracting on the one hand and on the other as an instrument for an artificial market split between home customers and visiting customers.

Discrimination between home and visiting customers is stabilised by roaming agreements which implicitly accept this form of discrimination. Thus while price differentiation between incoming and outgoing calls based on different price elasticities may be required under competition to cover fixed network costs, different price elasticities for home and visiting customers are artificially created by implicit cartel agreements due to lacking technical regulation (missing carrier portability). In other words, cartel agreements not only focus on price

²² Case 37.034 GSM MoU Association 3, Date of closure. 30.11.1999; Individual exemption 81(3) (<http://ec.europa.eu/competition/antitrust/closed/en/comfor99.html>, downloaded in March 2013).

agreements and subsequent division of quantities, but may also deal with the production process and other market-relevant parameters. In our context, this means that roaming contracts are used as instruments for discriminating between home and visiting mobile customers. Under self-enforcing incentive compatible roaming contracts (because each carrier has a double function as home carrier and visited carrier) the division of the cartel rent between visited carrier and home carrier is the only task remaining.

A possible explanation for incentives to stabilize roaming contracts would be that roaming contracts among mobile carriers are a cartel-stabilizing, easily implementable instrument. Mobile traffic falling under the definition of Article 2(d) “community-wide roaming” transforms into normal mobile communications services to the extent that mobile services are not based on arrangements between the operator of the home network and the operator of the visited network, but rather on contractual arrangements between the visiting customer and the provider in the guest country. As a consequence price discrimination between home customers and visiting customers are easily implementable in the context of international roaming agreements. Mobile operators are using a retail-plus pricing model to set mobile roaming charges for end users. “The operator providing the roaming service charges a certain fee, usually a quite expensive tariff perhaps with a further profit margin added. The home operator then adds a mark-up to this charge by between 10 and 25 per cent. Both operators make substantial profits and neither has an incentive to reduce the prices or the profit margins” (Sutherland, 2001, 8). For an international roamer to make a call home, it can be up to 20 times more expensive than for a local mobile user, in that country, to make an international call to the roamer’s home country (OECD, 2009, 5 and 64 f.). Regarding retail data roaming, it can be 100 times more expensive “with a roaming costing as much as US\$10 for 1 MB, the same price typically charged for 100 MB of domestic wireless broadband^{FN}” (WTO, 2011, 2).

By means of two letters of comfort, roaming contracts were exempted from cartel prohibitions in order to exploit the coordination benefits of roaming contracts, in particular the coordination of technical standards. According to Art.

101(3) (ex Art. 81(3) TEC) exemptions are only justified, if the contracts do not create possibilities to eliminate competition with respect to a substantial part of the products in question significantly. In the following the cartel issue was no longer raised, in spite of increasing objections that international roaming markets would not evolve into competitive markets. Instead, abuse of dominant market power cases were opened, changing the burden of proof from the applicant of the cartel exemption to the antitrust authority. The issue of high roaming charges was the subject of several competition proceedings based on the accusation of abuse of a dominant market position according to Art. 102 (ex Art. 82 TEC). The Commission initiated formal infringement proceedings against several operators in July 2004 and February 2005 in the UK and Germany.²³ The Commission's accusation was the abuse of a dominant position in the German market and the UK market, respectively, for wholesale roaming tariffs charged to other European mobile network operators from 1997 until 2003. Finally the Commission closed these proceedings after price regulation was introduced in 2007.²⁴ The question whether the preconditions for granting cartel exemptions by means of comfort letters should be revised in order to implement the preconditions for competition on international roaming markets were never raised.

4.2. Phase 2: The international roaming cartel under price regulation

The “national market for international roaming services on public mobile telephone networks” has become part of the list of markets to be included in the Commission Recommendation on relevant product and service markets²⁵ referred to in the Framework Directive.²⁶ But since 2003 it has not been “possible for a national regulatory authority to address effectively the high level of whole-

²³ See Commission challenges UK international roaming rates, IP 04/994, Brussels, 26 July 2004, and Competition: Commission challenges international roaming rates for mobile phones in Germany, IP/05/161, Brussels, 10th February 2005.

²⁴ Antitrust: Commission closes proceedings against past roaming tariffs in the UK and Germany, IP/07/1113, Brussels, 18th July 2007.

²⁵ Commission Recommendation of 17 December 2007, Annex.

²⁶ Directive 2002/21/EC, Article 15 and Annex I.

sale Union-wide roaming charges because of the difficulty in identifying undertakings with significant market power in view of the specific circumstances of international roaming, including its cross-border nature”.²⁷ In 2005 the European Regulators Group (ERG) recommended that national regulators should only take into account “inbound traffic”, because only traffic generated by a roaming customer in the visited network attracts wholesale roaming charges in the form of Inter-Operator Tariffs (IOT) charged by the visited network operator to the customer’s home operator (ERG, 2005, 14).

Until 2007, the “wholesale national market for international roaming on public mobile networks” was listed as a market in need of possible ex ante regulation,²⁸ but was not regulated in practice. “Since the mobile industry was generally considered to be competitive, regulators assumed that market forces would tend, over time, to ensure that prices respond favorably to competition and were reluctant to intervene” (WTO, 2011, 2). In 2007 the market was removed from the revisited list of markets.²⁹ The reason for this removal was not that the Commission considered this market to be competitive. In the following price regulation measures based on an ad hoc evaluation of market performance (roaming tariffs claimed to be too high) were introduced. A Regulation on roaming on public mobile telephone networks³⁰ set a maximum average wholesale charge between any pair of operators (Article 3) and a maximum average retail charge (Article 4) per minute, differentiating between calls made or received. Following its entry into force, the “wholesale national market for international roaming on public mobile networks” was withdrawn from the revised Commission’s Recommendation’s list of markets in possible need of regulation.³¹

In 2007 regulated single price caps (so-called “Eurotariffs”) were introduced for international roaming voice calls, in 2009 for international roaming voice calls

²⁷ Regulation (EC) No 717/2007, recital 6.

²⁸ Commission Recommendation of 11 February 2003, Annex.

²⁹ Commission Recommendation of 17 December 2007, Annex.

³⁰ Regulation (EC) No 717/2007.

³¹ Regulation (EU) No 531/2012, recital 13.

and SMS messages and in 2012 for international roaming voice calls, SMS messages and data roaming. The “Eurotariffs” are maximum roaming wholesale and retail mobile tariffs for making a call and receiving a call. In 2009 a maximum wholesale and retail mobile tariff was introduced for SMS from a foreign country. Since 2007, these maximum permissible prices were decreased slightly in the subsequent periods. Since summer 2012 mobile data roaming services were price regulated as well. The maximum permissible tariff is defined in cents per megabyte for downloading data or browsing the Internet while traveling abroad.

The Regulation on mobile roaming created a paradigm shift in the history of the EU policy on market power. Instead of a network economic justification for ex ante market power regulation, a perceived performance criterion of high prices was applied.

One can observe that the average price per minute for wholesale roaming voice calls as well as the average retail price per minute for mobile roaming calls made and received within the European Economic Area (EEA³²) has fallen since introduction of the regulation in the third quarter of 2007 and is now corresponding with Eurotariff caps³³ (BEREC, 2013, 16 f., 27). The same conclusion can also be found in European Commission (2011, 10). A comparable tariff pattern can be observed with regard to the average price per retail SMS³⁴ (BEREC, 2013, 30). These price regulations have reduced the tariffs for international roaming. However, these regulations are no substitute for functioning competition. Instead, the introduction of adequate technical regulation is required.

³² The European Economic Area (EEA) consists of the countries of the EU, Iceland, Norway and Lichtenstein.

³³ EU only for Q2 2009 – Q1 2010.

³⁴ EU only for Q2 2009 – Q1 2010.

4.3. Phase 3: The uncertain future of the roaming cartel

An important barrier keeping customers from benefitting from competition among different providers in the visited country has been the lack of technical regulations. Once a mobile communications customer is traveling in a foreign country, transaction costs for immediately changing his home mobile operator are high. The identifying, clearing and settlement (custody function) for choosing a local phone operator cannot be handled easily. There is a lack of necessary technical regulations for easily switching to another mobile carrier. Therefore, only heavy users have incentives to initiate a local (total) break out by buying a separate mobile communications contract from a carrier in the visited country. Even then, due to the absence of number portability for incoming calls the roaming services of the home carrier must still be used. Other users or business customers that are only in a foreign country for a few hours will still communicate relying completely on the roaming services of their home operator. Mobile operators worldwide are aware of the situation that consumers are temporarily captured. They take the opportunity to behave like cartel based monopolists, although in each country there are several mobile communications providers. Mobile phones with an option to use Dual-SIM have existed for more than ten years,³⁵ but the technology was not used commercially to offer a local break out for outgoing roaming mobile communications. Until adequate technical regulations are in place, discrimination between visiting and home customers will continue. Mobile operators of the visited country charge the mobile operator of the home country wholesale tariffs per minute, per SMS etc. Each mobile operator takes these wholesale tariffs as given, and adds a mark-up to fix the prices of its end customers.

The current EU roaming regulation is aware of the lack of free customer choices: “Customers should be able to switch easily, within the shortest possible time depending on the technical solution, without penalty and free of charge to an alternative roaming provider or between alternative roaming providers. Customers should be informed in a clear, understandable and easily accessible form

³⁵ See for example: <http://www.telefonino.net/Benefon/Notizie/n1440/index.html>.

about this possibility.”³⁶ The regulation considers several alternative solutions for decoupling the sale of roaming services from the domestic mobile packet, focusing on contractual regulations of decoupling procedures granting separate sale of regulated retail services and local break out for data services.³⁷ The important question from the competition point of view is whether the contractual arrangements still take as given the traditional roaming cartel agreements, or whether the visiting users are offered a free choice of carriers in the visited country for all mobile communication services including voice, SMS and data services.

- A first alternative, called Single IMSI, is a pure resale option for an alternative roaming provider taking the wholesale cartel contract between the domestic and roaming provider as given. Thus the wholesale roaming cartel is not challenged.³⁸
- A second alternative, called dual IMSI, contains two independent SIM applications. The home IMSI is used in the subscribers’ home country, the international IMSI is used for choosing an alternative roaming provider instead of the domestic operator. Visited networks provide wholesale services to an alternative roaming provider and not to the domestic provider (BEREC, 2012, 12 f.). The freedom to choose among roaming providers does not lead to the possibility of directly contracting with the visited operator. Thus, as long as alternative roaming providers also belong to the roaming cartel applying the IOT tariffs, discrimination between visiting and home customers still continues.
- A third alternative, called local break out, offers customers a free choice for accessing regulated data roaming services provided directly on a visited network by alternative roaming providers. The Body of European Regulators for Electronic Communications (BEREC) states that local break out can “be used by the visited operator to act as an alternative roaming provider for Internet

³⁶ Regulation (EU) No 531/2012, recital 32.

³⁷ Regulation (EU) No 531/2012, recital 33 and Art. 4 and Art. 5

³⁸ According to BEREC (2012, Annex 3, 8) “Basic Single IMSI cannot realistically change competition at wholesale level”.

access and other data services, providing and billing them directly to consumers” (BEREC, 2012, 6). Thus, visited carriers may be under competitive pressure from other mobile carriers in their country, but only for data services. Since local break out is only provided for data services and combined with retail SMS and voice services supplied by the home operator in the same way as traditional roaming works, the bypass of the wholesale roaming cartel is only possible in a limited way.

All three alternatives for decoupling have in common that no incoming calls under the mobile user’s usual number can be received. This would only be possible if temporary number portability was provided in such a way that mobile services customers were able to switch to a freely chosen provider only for a limited period of time while travelling (Díaz-Pinés, 2010, 34-36).

Due to the absence of temporary number portability an important quality criterion of international roaming, namely to receive messages and phone calls under the home number, is not implemented by Art. 4 and 5 of the Regulation on roaming on public mobile telephone networks.³⁹ The question arises whether the “Separate sale of regulated retail roaming services” as described by Art. 4 and Art. 5 can be considered to be a version of technical regulation along the lines of number portability (as implemented in national fixed and mobile networks) or whether it is part of market power regulation along the lines of call-by-call carrier selection or carrier pre-selection within fixed networks. Whereas contractual regulations such as call-by call and carrier pre-selection were part of market power regulation in fixed networks to avoid the abuse of market power by monopolistic bottleneck owners in the local loop, all three contractual regulations of decoupling are market power regulations of the artificially stabilized wholesale roaming cartel. Obviously not only the price regulations of roaming but also these contractual regulations become superfluous after the introduction of the technical regulation of carrier portability. Unfortunately, the Regulation on international roaming⁴⁰ still accepts the International Mobile Roaming cartel on

³⁹ Regulation (EU) No 531/2012.

⁴⁰ Regulation (EU) No 531/2012.

the wholesale markets, attempting to limit its negative consequences by introducing elements of choice for visiting customers by enforcing certain contractual decoupling procedures without implementing an architecture for technical regulations which would break the roaming cartel and subsequently make any price regulation superfluous.

5. The concept of carrier portability

As a solution to avoid excessive roaming tariffs, a strengthening of market power interventions by a combination of wholesale and retail price regulations (Infante, Vallejo, 2011) or by regulatory interventions into roaming contracts by avoiding reciprocal barter trade between mobile carriers (Shortall, 2010) has been proposed. However, these regulatory interventions would only cure some symptoms of the roaming cartel without solving the market power problem of the cartel at its root, making the discrimination between home and visiting customer unstable. Therefore, in the following a solution is proposed, in the form of adequate technical regulations which allow consumers free choice between different providers in the visited country in order to avoid discrimination between visiting and home customers. As soon as consumers are free to choose any contract for mobile communications originating or received in the visited country, they are no longer forced into contractual relations with the home carrier or alternative roaming providers.

Technical regulation in the form of number portability enabling users to switch network providers is legally guaranteed in the European regulatory framework for fixed networks as well as for mobile networks. A proper extension of number portability to the concept of carrier portability is a necessary and sufficient condition for the functioning of competition on the markets for international mobile communication. After the concept of carrier portability has been successfully implemented by European regulators, the current price regulations should be abandoned. Moreover, decoupling regulations can be avoided. In addition to carrier portability, measures of consumer protection (information policies to

avoid bill shock, detailed information on the amount of data volumes in e-mail attachments etc.) should be obligatory for all mobile operators.

In each country several mobile phone operators are active. The reference point of the concept of carrier portability is that customers should have the right to switch mobile communications providers at any time. The switch should be carried out without undue delay within the shortest possible period of time. Carrier portability consists of (1) the optional provision of unlocked SIM, (2) temporary number portability, whereby the extension of number portability for calls to a customer-chosen provider in the visited country is possible, and (3) a billing and incasso function.

- (1) *Users must have the option to buy a SIM-unlocked handset enabling the use of alternative SIM cards of different providers*

One has to differentiate between the International Mobile Equipment Identity (IMEI) number which represents the identity of the handset⁴¹ and the International Mobile Subscriber Identities (IMSI) specified on a Subscriber Identity Module (SIM) card. Mobile phones can be locked to accept only a specific SIM card with well-defined user restrictions. Users may not be allowed to insert the SIM-card from another mobile operator. Also communication may be limited to a specific country. The reason for SIM-lock strategies of mobile carriers may be the possibility to apply price differentiation strategies by subsidizing handsets and bundling them with mobile network usage,⁴² and also the possibility to hamper network service competition. The option to SIM-unlock is a precondition for changing carriers for outgoing communications (voice, SMS, data services) in international roaming. The chosen visited network would pro-

⁴¹ IMEI is necessary for safety reasons (Benoît et al., 2004, Section 5.1.2), but can also be applied to “open” the mobile phone for alternative SIM cards.

⁴² Such bundling strategies are well-known from antitrust cases known as requirements tie-ins and may result in welfare-improving price differentiation strategies (Carlton, Perloff, 2005, 231 ff.).

vide the visiting customer with an identity in its network by means of a new SIM card.⁴³

(2) *Temporary number portability*

Temporary number portability is an essential precondition for competition in the international mobile communications markets. It allows mobile service customers to receive incoming voice, SMS and data roaming services on a visited network under their home mobile number when switching to a different provider only for a limited period of time and only for roaming services. In particular, it would not be necessary for incoming traffic to be handled via the SIM card of the home provider.⁴⁴ According to Díaz-Pinés (2010, 36) a cost-benefit analysis is recommended in order to evaluate the costs and benefits of temporary number portability. From the competition economics policy point of view, such an analysis is inadequate. The costs are mainly related to the implementation effort of software managing the required databases for temporary number portability (Díaz-Pinés, 2010, 35 f.). The benefits of competition in international

⁴³ In European countries SIM-lock strategies are not regulated and competitive policy also does not generally prohibit SIM-lock strategies. In Belgium a law prohibiting the bundling of a network service contract with a mobile handset has even been ruled illegal by the European Court of Justice as violating the Unfair Commercial Practices Directive 2005/29/EC. In the past handset subsidies have been successful commercial offers and a widespread practice in many countries (Díaz-Pinés, 2010, 38). However, SIM-only strategies as well as the unbundling of the mobile handset and communications tariff contracts are gaining in popularity. A law prohibiting bundling and legally enforcing unlocked SIM would result in overregulation. Instead, a regulatory obligation for network carriers to offer an optional choice between SIM-locked and SIM-unlocked mobile handsets is required. In order to combine the goal of price differentiation by offering subsidized mobile handsets on the one hand and the goal of allowing competition on the market for international roaming on the other, the mobile carrier should be obliged by technical regulation to offer an unlock option. Consumers interested in changing carriers in guest countries should have the possibility to do so, whereas consumers interested in subsidised mobile handsets with low demand for communications in foreign countries may keep with SIM-locked mobile handsets.

⁴⁴ Thus, temporary number portability is different from the approach of using the original IMSI when incoming calls are received under application of dual IMSI – allowing to buy a local SIM card while travelling in a foreign country.

mobile communications have many facets and by their very nature cannot be estimated ex ante.

(3) *Billing and incasso function*

The chosen different provider of international roaming services also has the responsibility for clearing and settlement for the roaming services offered to its customers. However, the billing function could be carried out by the home operator who is regularly billing the home services. Nevertheless the home operator should not be regulatory enforced to carry out the incasso function for international roaming services, because the visited operator also has the possibility to handle the billing for his roaming services (or delegate this billing effort to specialized billing agencies). In case the home carrier does not carry out the incasso function, it should be regulatory obliged to provide the relevant source data on the identity and creditworthiness of its home customers.

6. Conclusion

After carrier portability is implemented, price regulation should be phased out, while competition law and consumer protection will continue to be in effect. In addition to the technical regulation of carrier portability, consumer protection measures (transparence, information to avoid bill shock, etc.) should be implemented (or have already been implemented) in Europe. However, price level regulation should be phased out, because on competitive markets it is not only superfluous but detrimental. Since the technical regulation of carrier portability enables the customers to switch between different providers in the visited country easily, prices will become competitive. The continuation of the current price level regulation would provide incentives serving as implicit cartel stabilizing elements.

References

- Benoit, O., Dabbous, N., Gauteron, L., Girard, P., Handschuh, H., Naccache, D., Socié, S., Whelan, C. (2004), Mobile Terminal Security, <http://eprint.iacr.org/2004/158.pdf> (downloaded in March 2013).
- BEREC (2012), Roaming Regulation – Choice of Decoupling Method, A consultation to assist BEREC in preparing advice to the Commission on its forthcoming Implementing Act, Body of European Regulators for Electronic Communications, BoR (12), 68, June, Riga, http://berec.europa.eu/files/document_register/-2012/7/bor12_68.pdf (downloaded in March 2013).
- BEREC (2013), International Roaming BEREC Benchmark Data Report January 2012 – June 2012, Body of European Regulators for Electronic Communications, BoR (13) 05, January, Riga, http://berec.europa.eu/eng/document_register/subject_matter/berec/reports/1159-international-roaming-berec-benchmark-data-report-january-2012-8211-june-2012 (downloaded in March 2013).
- Blankart, C. B., Knieps, G., Zenhäusern, P. (2007), Regulation of New Markets in Telecommunications: Market Dynamics and Shrinking Monopolistic Bottlenecks, *European Business Organization Law Review*, 8, 413-428.
- Carlton, D. W., Perloff, J. M. (2005), *Modern Industrial Organisation*, Pearson/Addison Wesley.
- Díaz-Pinés, A. (2010), International Mobile Roaming Services: Analysis and Policy Recommendations, *OECD Digital Economy Papers*, No. 168, DSTI/ICCP/CISP(2009)12/FINAL, OECD Publishing, <http://dx.doi.org/10.1787/5kmh7b6zs5f5-en> (downloaded in March 2013).
- ERG (2005), ERG Common Position on the coordinated Analysis of the Markets for Wholesale International Roaming, ERG (05) 20Rev1, Brussels, http://www.erg.eu/streaming/erg_05_20_rev1_wir_common_position.pdf?contentId=543291&field=ATTACHED_FILE (downloaded in March 2013).
- European Commission (2011), Commission Staff Working Paper, Impact Assessment of Policy Options in Relation to the Commission's Review of the Functioning of Regulation (EC) No 544/2009 of the European Parliament and of the Council of 18 June 2009 on Roaming on Public Mobile Telephone Networks within the Community, SEC(2011) 870 final, Brussels, 6.7.2011, http://ec.europa.eu/information_society/activities/roaming/docs/impac_ass_11.pdf (downloaded in March 2013).
- Infante, J., Vallejo, I. (2011), Regulation of International Roaming in the European Union – Les-sons Learned, 39th Research Conference on Communication, Information and Internet Policy Washington, September 2011, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1986363 (downloaded in March 2013).

- Knieps, G. (1997), Phasing out Sector-Specific Regulation in Competitive Telecommunications, *Kyklos*, 50(3), 325-339.
- Knieps, G. (2000), Wettbewerb auf Mobilfunkmärkten, *MultiMedia und Recht (MMR)*, Beilage 2, 1-15.
- Knieps, G. (2006), Competition in the Post-Trade Markets: A Network Economic Analysis of the Securities Business, *Journal of Industry, Competition and Trade*, 6(1), 45-60.
- Knieps, G., Zenhäusern, P. (2010), Phasing out sector-specific regulation in European tele-communications, *Journal of Competition Law & Economics*, 6(4), 995-1006.
- OECD (2001), Working Party on Telecommunication and Information Services Policies, Developments on Carrier Selection and Pre-Selection, DSTI/ICCP/TISP(2001)4/FINAL, <http://www.oecd.org/sti/broadband/27127466.pdf> (downloaded in March 2013).
- OECD (2009), Working Party on Communication Infrastructures and Services Policy, International mobile roaming charging in the OECD area, DSTI/ICCP/CISP(2009)8/FINAL, <http://www.oecd.org/internet/broadband/44381810.pdf> (downloaded in March 2013).
- Shortall, T. (2010), A Structural Solution to Roaming in Europe, Robert Schuman Centre for Advanced Studies, European University Institute, EUI Working Papers, RSCAS 2010/62, http://cadmus.eui.eu/bitstream/handle/1814/14398/RSCAS_2010_62.pdf (downloaded in March 2013).
- Sutherland, E. (2001), International roaming charges: over-charging and competition law, *Telecommunications Policy*, 25, 5-20.
- Sutherland, E. (2012). International mobile roaming: competition, economics and regulation, http://www.wto.org/english/tratop_e/serv_e/sym_march12_e/doc_other_docs_a.pdf (downloaded in March 2013).
- WTO (2011), International Mobile Roaming: Possible Implications for GATS, World Trade Organisation (WTO), Council for Trade in Services, S/C/W/337 (11-3508), http://www.wto.org/english/tratop_e/serv_e/sym_march12_e/document_wto_en.pdf (downloaded in March 2013).

**Als Diskussionsbeiträge des
Instituts für Verkehrswissenschaft und Regionalpolitik
Albert-Ludwigs-Universität Freiburg i. Br.
sind zuletzt erschienen:**

- 91. G. Knieps:** Mehr Markt beim Zugang zu den Start- und Landerechten auf europäischen Flughäfen, erschienen in: Orientierungen zur Wirtschafts- und Gesellschaftspolitik 96, Juni 2003, S. 43-46
- 92. G. Knieps:** Versteigerungen und Ausschreibungen in Netzsektoren: Ein disaggregierter Ansatz, erschienen in: Schriftenreihe der Deutschen Verkehrswissenschaftlichen Gesellschaft: Versteigerungen und Ausschreibungen in Verkehrs- und Versorgungsnetzen: Praxiserfahrungen und Zukunftsperspektiven, Reihe B, B 272, 2004, S.11-28
- 93. G. Knieps:** Der Wettbewerb und seine Grenzen: Netzgebundene Leistungen aus ökonomischer Sicht, erschienen in: Verbraucherzentrale Bundesverband (Hrsg.), Verbraucherschutz in netzgebundenen Märkten – wieviel Staat braucht der Markt?, Dokumentation der Tagung vom 18. November 2003, Berlin, 2004, S. 11-26
- 94. G. Knieps:** Entgeltregulierung aus der Perspektive des disaggregierten Regulierungsansatzes, erschienen in: Netzwirtschaften&Recht (N&R), 1.Jg., Nr.1, 2004, S. 7-12
- 95. G. Knieps:** Neuere Entwicklungen in der Verkehrsökonomie: Der disaggregierte Ansatz, erschienen in: Nordrhein-Westfälische Akademie der Wissenschaften (Hrsg.), Symposium „Transportsysteme und Verkehrspolitik“, Vorträge 17, Schöningh-Verlag, Paderborn, 2004, S. 13-25
- 96. G. Knieps:** Telekommunikationsmärkte zwischen Regulierung und Wettbewerb, erschienen in: Nutzinger, H.G. (Hrsg.), Regulierung, Wettbewerb und Marktwirtschaft, Festschrift für Carl Christian von Weizsäcker, Verlag Vandenhoeck & Ruprecht, 2003, S. 203-220
- 97. G. Knieps:** Wettbewerb auf den europäischen Transportmärkten: Das Problem der Netzzugänge, erschienen in: Fritsch, M. (Hrsg.), Marktdynamik und Innovation – Gedächtnisschrift für Hans-Jürgen Ewers, Duncker & Humblot, Berlin, 2004, S. 221-236
- 98. G. Knieps:** Verkehrsinfrastruktur, erschienen in: Akademie für Raumforschung und Landesplanung (Hrsg.), Handwörterbuch der Raumordnung, Hannover 2005, S. 1213-1219
- 99. G. Knieps:** Limits to the (De-)Regulation of Transport Services, erschienen als: “Delimiting Regulatory Needs” in: OECD/EMCT Round Table 129, Transport Services: The Limits of (De)regulation, OECD Publishing, Paris, 2006, S.7-31
- 100. G. Knieps:** Privatisation of Network Industries in Germany: A Disaggregated Approach, erschienen in: Köthenbürger, M., Sinn, H.-W., Whalley, J. (eds.), Privatization Experiences in the European Union, MIT Press, Cambridge (MA), London, 2006, S. 199-224
- 101. G. Knieps:** Competition in the post-trade markets: A network economic analysis of the securities business, erschienen in: Journal of Industry, Competition and Trade, Vol. 6, No. 1, 2006, S. 45-60

102. **G. Knieps:** Information and communication technologies in Germany: Is there a remaining role for sector specific regulations?, erschienen in: Moerke, A., Storz, C. (Hrsg.), Competitiveness of New Industries. Institutional Framework and learning in information technology in Japan, the US and Germany, Routledge, London, New York, 2007, S. 57-73
103. **G. Knieps:** Von der Theorie angreifbarer Märkte zur Theorie monopolistischer Bottlenecks, in: Daumann, F., Okruch, S., Mantzavinos, C. (Hrsg.), Wettbewerb und Gesundheitswesen: Konzeptionen und Felder ordnungsökonomischen Wirkens, Festschrift für Peter Oberender, Andrassy Schriftenreihe, Bd. 4, Budapest 2006, S. 141-159
104. **G. Knieps:** The Different Role of Mandatory Access in German Regulation of Railroads and Telecommunications, erschienen in: Journal of Competition Law and Economics, Vol. 2/1, 2006, S. 149-158
105. **G. Knieps:** Aktuelle Vorschläge zur Preisregulierung natürlicher Monopole, erschienen in: K.-H. Hartwig, A. Knorr (Hrsg.), Neuere Entwicklungen in der Infrastrukturpolitik, Beiträge aus dem Institut für Verkehrswissenschaft an der Universität Münster, Heft 157, Vandenhoeck & Ruprecht, Göttingen, 2005, S. 305-320
106. **G. Aberle:** Zukünftige Entwicklung des Güterverkehrs: Sind Sättigungsgrenzen erkennbar? Februar 2005
107. **G. Knieps:** Versorgungssicherheit und Universaldienste in Netzen: Wettbewerb mit Nebenbedingungen? erschienen in: Schriftenreihe der Deutschen Verkehrswissenschaftlichen Gesellschaft: Versorgungssicherheit und Grundversorgung in offenen Netzen, Reihe B, B 285, 2005, S. 11-25
108. **H.-J. Weiß:** Die Potenziale des Deprival Value-Konzepts zur entscheidungsorientierten Bewertung von Kapital in liberalisierten Netzindustrien, Juni 2005
109. **G. Knieps:** Telecommunications markets in the stranglehold of EU regulation: On the need for a disaggregated regulatory contract, erschienen in: Journal of Network Industries, Vol. 6, 2005, S. 75-93
110. **H.-J. Weiß:** Die Probleme des ÖPNV aus netzökonomischer Sicht, erschienen in: Lasch, Rainer/Lemke, Arne (Hrsg.), Wege zu einem zukunftsträgigen ÖPNV: Rahmenbedingungen und Strategien im Spannungsfeld von Markt und Politik, Erich Schmidt Verlag, Berlin, 2006, S. 119-147
111. **G. Knieps:** Die LKW-Maut und die drei Grundprobleme der Verkehrsinfrastrukturpolitik, erschienen in: Schriftenreihe der Deutschen Verkehrswissenschaftlichen Gesellschaft: Die LKW-Maut als erster Schritt in eine neue Verkehrsinfrastrukturpolitik, Reihe B, B 292, 2006, S. 56-72
112. **C.B. Blankart, G. Knieps, P. Zenhäusern:** Regulation of New Markets in Telecommunications? Market dynamics and shrinking monopolistic bottlenecks, erschienen in: European Business Organization Law Review (EBOR), Vol. 8, 2007, S. 413-428
113. **G. Knieps:** Wettbewerbspotenziale im Nahverkehr: Perspektiven und institutionelle Barrieren, erschienen in: Schriftenreihe der Deutschen Verkehrswissenschaftlichen Gesellschaft: Warten auf Wettbewerb: ÖPNV in Deutschland, Reihe B, 2007, S. 11-23
114. **F. Birke:** Universaldienstregulierung in der Telekommunikation heute: Herausforderungen, Chancen und Risiken – Ein historischer Ansatz, Mai 2007

115. **G. Knieps, P. Zenhäusern:** The fallacies of network neutrality regulation, erschienen in: Competition and Regulation in Network Industries, Vol 9/2, 2008, S. 119-134
116. **G. Knieps:** Disaggregierte Regulierung in Netzsektoren: Normative und positive Theorie, erschienen in: Zeitschrift für Energiewirtschaft, 31/3, 2007, S. 229-236
117. **G. Knieps, H.-J. Weiß:** Reduction of Regulatory Risk: A Network Economic Approach, erschienen in: in: U. Blum (Hrsg.), Regulatorische Risiken – Das Ergebnis staatlicher Anmaßung oder ökonomisch notwendiger Interventionen?, Schriften des Instituts für Wirtschaftsforschung Halle, Bd. 29, Nomos Verlag, Baden-Baden, 2009, S. 99-109
118. **G. Knieps, H.-J. Weiß:** Regulatory Agencies and Regulatory Risk, Revised Version: January 2008
119. **G. Knieps:** Regulatorische Entbündelung in Netzindustrien, erschienen in: Tagungsbände der Gesellschaft für Verkehrswissenschaft und Regionalpolitik an der Universität Freiburg e.V., 40. Freiburger Verkehrsseminar 2007, Entbündelung in Netzindustrien: Chancen und Risiken, Freiburg, S. 11-25
120. **G. Knieps:** The Net Neutrality Debate and the German Communications and Competition Law, erschienen in: Journal of Law & Economic Regulation, Vol. 3/1, 2010, S. 118-126
121. **G. Knieps:** Verkehrsinfrastrukturen zwischen Wettbewerb und Regulierung, erschienen in: Wirtschaftspolitische Blätter, 56/1, 2009, S. 11-21
122. **G. Knieps:** Wettbewerb und Netzevolutorik, erschienen in: Vanberg, V.J. (Hrsg.), Evolution und freier Wettbewerb – Erich Hoppmann und die aktuelle Diskussion, Walter Eucken Institut, Untersuchungen zur Ordnungstheorie und Ordnungspolitik, Band 58, Mohr Siebeck, Tübingen, 2009, S. 193-210
123. **G. Knieps, P. Zenhäusern:** ‘Stepping stones’ and ‘access holidays’: The fallacies of regulatory micro-management, erschienen in: P. Baake, R. Borck (eds.), Public Economics and Public Choice: Contributions in Honour of Charles B. Blankart, Springer Verlag, Berlin u.a., 2007, S. 257-277
124. **G. Knieps:** Qualitäts- und Preisdifferenzierung im Internet, erschienen in: Jörn Kruse, Ralf Dewenter, Hrsg., Wettbewerbsprobleme im Internet, Nomos Verlag, Baden-Baden, 2009, S. 103-113
125. **G. Knieps:** Wettbewerb im transeuropäischen Eisenbahnverkehr, erschienen in: Zeitschrift für Verkehrswissenschaft, 81. Jg., Heft 1, 2010, S. 1-12
126. **G. Knieps:** Sektorsymmetrische Regulierung in Netzsektoren: Ein Vergleich zwischen Gas und Elektrizität, erschienen in: Netzwirtschaften & Recht (N&R), 6. Jg., Nr. 3, 2009, S. 138-143
127. **G. Knieps:** Theorie und Praxis der Price-Cap-Regulierung, in: Netzwirtschaften & Recht (N&R), 7. Jg., Nr. 2, 2010, S. 66-71
128. **G. Knieps, P. Zenhäusern:** The reform of the European regulatory framework for electronic communications: The unexploited phasing-out potentials, erschienen als: Phasing out sector-specific regulation in European telecommunications, in: Journal of Competition Law & Economics, Vol. 6/4, 2010, S. 995-1006

129. **G. Knieps:** Regulatory Reforms of European Network Industries and the Courts, February 2010 – Revised Version: May 2010
130. **G. Knieps:** Preis- und Qualitätsdifferenzierung in Verkehrsnetzen, erschienen in: DIW Vierteljahreshefte zur Wirtschaftsforschung, 79/2, 2010, S. 211-220
131. **G. Knieps:** Zur Evolutorik von Marktmechanismen für Flughafenslots, erschienen in: S. Bechthold, J. Jickeli, M. Rohe (Hrsg.), Recht, Ordnung und Wettbewerb, Festschrift zum 70. Geburtstag von Wernhard Möschel, Nomos, Baden-Baden, 2011, S. 369-379
132. **G. Knieps:** The Three Criteria Test, the Essential Facilities Doctrine and the Theory of Monopolistic Bottlenecks, erschienen in: Intereconomics, 46/1, 2011, S. 17-21
133. **G. Knieps:** Der Einfluss von Gerichtsentscheidungen auf Regulierungsreformen, erschienen in: Tagungsbände der Gesellschaft für Verkehrswissenschaft und Regionalpolitik an der Universität Freiburg e.V., 43. Freiburger Verkehrsseminar 2010, Regulierung und Wettbewerb in Netzen: Zur Rolle der Gerichte, Freiburg, 2010, S. 5-21
134. **H.-J. Weiß:** Markt und Staat in der Verkehrswirtschaft, erschienen in: Zeitschrift für Verkehrswissenschaft, 83/2, 2012, S. 110-131
135. **G. Knieps:** Network neutrality and the Evolution of the Internet, erschienen in: International Journal of Management and Network Economics, 2/1, 2011, S. 24-28
136. **G. Knieps:** Market driven network neutrality and the fallacies of Internet traffic quality regulation, erschienen in: International Telecommunications Policy Review, 18/3, 2011, S. 1-22
137. **G. Knieps:** Regulatory unbundling in telecommunications, erschienen in: Competition and Regulation in Network Industries, 12/4, 2011, S. 344-356
138. **G. Knieps:** Zur Arbeitsteilung zwischen Markt und Staat bei der Bereitstellung von Eisenbahninfrastrukturen, erschienen in: M. Hochhuth (Hrsg.), Rückzug des Staates und Freiheit des Einzelnen: Die Privatisierung existentieller Infrastrukturen, Duncker & Humblot, 2012, S. 77-92
139. **G. Knieps:** Warum und wozu Regulierung im europäischen Mehr-Ebenen-System? – Gründe für bzw. Ziele von Regulierung, erschienen in: C. Manger Nestler, L. Gramlich (Hrsg.), Europäisierte Regulierungsstrukturen und -netzwerke: Basis einer künftigen Infrastrukturvorsorge, Nomos Verlag, 2011, S. 25-35
140. **G. Knieps:** Wettbewerb und Pfadabhängigkeit in Netzen, erschienen in: H. Enke und A. Wagner (Hrsg.), Zur Zukunft des Wettbewerbs. In memoriam Karl Brandt (1923-2010) und Alfred E. Ott (1929-1994), Metropolis-Verlag, Marburg, 2012, S.171-178
141. **G. Knieps, P. Zenhäusern:** The reform process of the railway sector in Europe: A disaggregated regulatory approach, December 2011
142. **G. Knieps:** Competition and the railroads: A European perspective, erscheint in: Journal of Competition Law & Economics
143. **G. Knieps:** Europäische Telekommunikationsregulierung: Quo vadis?, Januar 2013
144. **G. Knieps, P. Zenhäusern:** Regulatory fallacies in global telecommunications: The case of international mobile roaming, March 2013