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Paul J. J. Welfens

**Toward a New Concept of Universal Services:  
The Role of Digital Mobile Services and  
Network Neutrality**

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EUROPÄISCHES INSTITUT FÜR INTERNATIONALE WIRTSCHAFTSBEZIEHUNGEN (EIIW)/  
EUROPEAN INSTITUTE FOR INTERNATIONAL ECONOMIC RELATIONS  
Bergische Universität Wuppertal, Campus Freudenberg, Rainer-Gruenter-Straße 21,  
D-42119 Wuppertal, Germany

Tel.: (0)202 – 439 13 71

Fax: (0)202 – 439 13 77

E-mail: [welfens@eiiw.uni-wuppertal.de](mailto:welfens@eiiw.uni-wuppertal.de)

[www.eiiw.eu](http://www.eiiw.eu)

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**Summary:** The rapid expansion of new digital services on the Internet and the growing use of mobile Internet services have put rising peak loads on the Internet networks, therefore congestion problems at certain times of the day have started to slow down digital traffic in OECD countries and many other countries. Congestion problems basically can be overcome by adequate investment into communication networks or by differentiated prices for low-volume users and high-volume users. It is important to consider Internet network effects – this implies that digital (Internet) universal services could have positive national and international spill-over effects. At the same time the opportunity costs of internet congestion have to be taken into account. Differentiated concepts of net neutrality therefore are adequate: User charges could differentiate with respect to volume or time.

**Zusammenfassung:** Die reiche Zunahme der Nutzung der digitalen Dienste im Internet und die zunehmende Verbreitung von Internetdiensten führen zu steigenden Spitzenlasten des Internetnetzwerks. Von daher haben Stauprobleme zu bestimmten Tageszeiten den digitalen Datenverkehr in den OECD-Ländern und anderen Ländern verlangsamt. Grundsätzlich kann man Stauprobleme durch hinreichende Investitionen in Kommunikationsnetzwerke oder differenzierte Preise für Intensiv-Nutzer und Normalnutzer angehen. Es ist wichtig, Internet-Netzwerkeffekte zu beachten – dies bedeutet, dass die Definition von Internet-Universaldiensten positive nationale und internationale „Übertragungseffekte“ haben dürfte. Zugleich ist zu bedenken, dass es Opportunitätskosten von Internetstaus gibt. Differenzierte Konzepte der Netzneutralität sind daher angebracht. Nutzergebühren sollten daher unterschiedlich sein – nämlich mit Blick auf Volumenklassen oder auch Zeitblöcke.



*Prof. Dr. Paul J.J. Welfens, Jean Monnet Chair for European Economic Integration,  
European Institute for International Economic Relations (EIIW) at the University of  
Wuppertal, Rainer-Gruenter-Str. 21, D-42119 Wuppertal, Phone: +49-202-4391371, Fax:  
+49-202-4391377*

[welfens@eiiw.uni-wuppertal.de](mailto:welfens@eiiw.uni-wuppertal.de), [www.eiiw.eu](http://www.eiiw.eu)

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## **Table of Contents**

<b>Table of Contents.....</b>	<b>I</b>
<b>List of Tables.....</b>	<b>II</b>
<b>1. Introduction .....</b>	<b>1</b>
<b>2. Basic Modeling Results .....</b>	<b>2</b>
<b>3. Network Effects, Net Neutrality .....</b>	<b>6</b>
<b>References.....</b>	<b>11</b>

## List of Tables

Tab. 1: Theoretical Time to Download Data Online at Different Connections .....	4
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# 1. Introduction

The rapid expansion of new digital services on the Internet and the growing use of mobile Internet services have put rising peak loads on the Internet networks, therefore congestion problems at certain times of the day have started to slow down digital traffic in OECD countries and many other countries. Congestion problems basically can be overcome by adequate investment into communication networks or by differentiated prices for low-volume users and high-volume users. However, this standard alternative does not take into account an important aspect of digital services, namely network effects. Network effects stand for the endogenous expansion of the demand side and the type of pricing regime applied will have an effect on network effects and hence on economic welfare effects. To the extent that governments – and the European Commission in the EU – regulate the telecommunications sector, network effects should be taken into account since otherwise there is an incomplete analysis of the welfare effects of economic policy. Moreover, there is a second specific element of the telecommunications sector, which is universal services: Parliaments and hence a majority of voters typically want that everybody has non-discriminatory access to basic communication services at affordable prices. Since the modern telecommunications sector is largely an IP-based sector the concept of universal services has to be applied to this new environment – at the same time there is no doubt that access to the Internet is a key element of modern universal services in a digitally networked society.

If a strict concept of net neutrality were to be applied, Internet service providers and telecommunication operators would not be allowed to charge different prices for low volume digital products/services and high volume digital products/services; thus the negative external effect of a slowing-down of overall data traffic on the Internet in periods of congestion would not be internalized. The slowing down of traffic in congestion periods means that millions of users have to spend more time in front of their respective PC, telephone or TV (being used for Internet services). Given the positive opportunity cost of time this implies that high-volume users are effectively imposing a kind of tax on all users of the net. However, the question must also be raised of to what extent price differentiation should be allowed. As regards the latter, the basic answer is that in a competitive environment firms are free to apply price differentiation and they will be able to do so to the extent that they offer differentiated digital products/services; in telecommunications markets there is, however, no strong competition in many countries – at least not in some sub-markets of the overall telecommunications markets (the EU in its 2009 regulatory approach has emphasized 7 markets that should be considered for regulation). Basically there are three reasons for regulation of telecommunications:

- facing problems of effective sustained competition in markets;
- problems of bundling in telecommunications markets (with at least one of the respective products not being subject to full competition in the sub-market);
- assuring universal services: everybody should have access to digital communication services at reasonable prices.

The concept of network neutrality – users face no different pricing of different contents on the Internet except the price that is charged by the producer of the content – is different from open access (openness of the conduit to service providers) which has been an element of the US telecommunications regulation.

## 2. Basic Modeling Results

In order to understand digital markets it is quite useful to look at both international dynamics and relevant models (VOGELSANG, 2010) and to carefully consider key aspects of two-sided markets within analytical frameworks related to Industrial Economics. Basically, the Internet consists of three layers, namely content providers, conduits and intermediaries which is a structure in line with the analysis of HOGENDORN (2005); he defines open access as mandating openness of conduits (e.g. DSL or cable TV) to intermediaries (e.g. AOL); by contrast, network neutrality requires openness to high-data intensity content (e.g. streaming video). In the model of HOGENDORN there is free entry and competition in all three industries: A key element in the model is the intermediary who sells subscriptions to users and also wants to sell access to content providers, therefore the intermediary is a two-sided network (ROCHET/TIROLE, 2006). The intermediary will have to decide about a price strategy or price structure, namely an approach that rather favors the users or the content side of the market. The conflicting options faced by the intermediary are:

- offering a broad selection of content in order to attract many subscribers who face a broad choice of competing contents;
- to restrict content competition and to try to exploit in a more narrow and refined market rent from the users.

The structure of industry will clearly affect the degree of preferential pre-selection of content by the intermediary. CHIPTY (2001) presents empirical evidence that in the cable TV sector vertical integration has caused foreclosure in cable TV – the cable TV company favors certain content providers and will not allow certain providers to offer their respective products at all. RUBINFELD/SINGER (2001) take a closer look at vertical integration and restrictions in the broadband market; there is an incentive to favor the content that the broadband firm has created itself. CHURCH/GANDAL (2000) present similar results in a complex hardware-software system. Interestingly, VAN SCHEWICK (2007) shows that even non-monopolist intermediaries have incentives to apply discrimination. In the model of HOGENDORN (2005) there is vertical integration between the service provider and the conduit, therefore there is partial vertical integration – the content side is independent, and restrictions are imposed via higher prices. To some extent the model is similar to the approach of GEHRIG (1998) who considers the extent to which the owner of a marketplace will gain or lose from hosting more firms. The model presented by HOGENDORN shows that vertically integrated firms endogenously choose how much content is offered. Moreover, the model shows the effect of open access and network neutrality regulation on this choice of the company.

Given the intensive discussion about network neutrality in the US, the EU and other OECD countries the analysis of two-sided digital markets is quite crucial. The results of the analysis are summarized as follows (HOGENDORN, pp.4-5):

“The principal difference between closed and open access is whether the intermediary provides several tied (closed) services to the consumer (Internet connectivity, local access infrastructure, and other services like cable television or telephone) or simply one (open) service, namely Internet connectivity. Open access clearly allows more entry of intermediaries, since they have unrestricted access to conduits. But these stand-alone intermediaries receive less revenue from subscribers since they only sell them one product, which means that they have more incentive to favor content restrictions in their profit maximization tradeoff. This means that open access does not necessarily increase the content available to consumers.” While the latter argument could be interpreted in a way that open access in combination with partial vertical integration is not welfare maximizing. Even if there is open entry into markets, the more general argument in favor of open access should not be overlooked, namely that a situation in which content providers and users have a choice between intermediaries, the number of content producers might be higher under open access than under closed access. This result in favor of open access comes from the natural perception of potential content producers that open access limits the opportunity of the intermediary to appropriately take part of the overall rents from the content markets. A counter-argument could be that in a wide oligopoly there will be a competition among intermediaries for content reputation, which implies that each intermediary will try to attract the best producers of content and with some intermediary trying to raise the market share through richer contents, other firms in the oligopoly will follow suit. However, the model’s restriction that no full integration is considered leads to overlooking an additional aspect: Intermediaries will not only try to attract content providers with interesting content but could also start to invest in the production of content themselves; however, it is clear that beyond a certain critical share of revenue from own content, the incentive of the vertically integrated intermediary to attract outside content will decline. Governments might also want to consider limits on allowed vertical integration.

A further result of HOGENDORN (2005, p.5) is:

“Network neutrality, on the other hand, works at the content end of the supply chain. It removes the possibility of intermediaries restricting content, regardless of whether the intermediaries are vertically integrated with conduits. Thus, network neutrality could reduce the profits of intermediaries and reduce the number that enter the market, but it would not allow the content restrictions that could stem from open access.” The problem with this statement is that the model – as rich and useful as it is – does not consider the option of differentiated network neutrality. Under differentiated network neutrality all users have guaranteed access to basic information and content, but premium services (premium defined by data volume) would be subject to a different regime; there could be a must-carry-provision in the sense that every user has access to the content, but at a relatively low speed unless a premium fee is paid.

From an economic perspective, it may be emphasized that the price of a good is not just the pecuniary price paid but also includes information costs and waiting time necessary to invest for getting the desired respective good. From this perspective waiting time for

Internet users is part of the effective price of Internet-based services. The concept of an open Internet points to the many options users have on the Internet: Exchange of information – including text, voice, pictures, video and data – and all kinds of digital social networking are important elements of the modern use of the Internet. The speed of access and the possible range of digital networking depend largely on the availability of data compression technologies and the bandwidth available to users – the latter in turn largely depends on the availability of mobile and fixed broadband networks. Depending on the bandwidth download time differs considerably (see Tab. 1).

**Tab. 1: Theoretical Time to Download Data Online at Different Connections**

Download	56 kbps (dial-up)	256 kbps	2 Mbps	40 Mbps
Simple web page (160 KB)	23 seconds	5 seconds	0.64 seconds	0.03 seconds
ITU home page (750 KB)	107 seconds	23 seconds	3 seconds	0.15 seconds
5 MB music track	12 minutes	3 minutes	20 seconds	1 second
20 MB video clip	48 minutes	10 minutes	1 minute	4 seconds
CD/low quality movie (700 MB)	28 hours	6 hours	47 minutes	2 minutes
DVD/high quality movie (4 GB)	1 week	1.5 days	4.5 hours	13 minutes

Source: ITU (2010)

In peak periods the Internet traffic is so big that bandwidth becomes an economic bottleneck and thus could fetch a positive price, and with high data intensity of certain applications – e.g. video streaming – it basically implies that a priority or pricing problem emerges for the network operators:

- Either they impose some priority to certain digital services and thus impose a kind of discrimination;
- or the market-mechanism is introduced in the sense that those who wish to supply premium high data intensity services would have to pay a specific user fee to the network operators that should reflect the opportunity cost of investment in additional network capacity or in higher modes of data compression;
- governments might want to consider a specific regulation according to which network operators are not allowed to introduce any discrimination for all those who only use a standard bandwidth – this obviously links the issue of net neutrality much to the concept of digital universal services. Universal services could, of course, be defined as a mobile broadband service and be given the global nature of the Internet. All governments of EU countries or even of all UN countries could agree on a concept that would basically allow all users to have access to Internet-based services worldwide, including mobile VOIP, at uniform prices; this could mean that telecom operators would have to offer a uniform flat rate for mobile data transmission in the whole EU. It would be up to telecom operators to make sure that certain high data intensity services, including updating of customers’ mobile equipment, would occur during low traffic periods (so far this is not generally organized this way and surprisingly high bills for certain prominent users who travel abroad have been reported in the press).

Given the fact that a very small minority of high data intensity users slows down the Internet traffic under full net neutrality, it is obvious that without a concept of differentiated net neutrality, broad inefficiencies will affect the large majority of users while investment incentives for expanding the networks will be insufficient.

### 3. Network Effects, Net Neutrality

A key element of the Internet concerns network effects; such effects stand for endogenous growth of demand and will generate enormous welfare effects in the presence of falling marginal and average costs that are typical for digital network expansion (provided that static and dynamic scale economies plus economies of density interact favorably). From an economic perspective, it is quite important that network effects are encouraged by the regime applied in the context of (differentiated or general) network neutrality. Two views may be considered here:

- General network neutrality is a broad form of an open Internet in which everybody can use the Internet – this includes the freedom of launching innovative products and innovative user groups. However, general network neutrality makes the Internet slower as periodic congestion problems will occur. The risk of congestion could indeed impair the incentive to create digital services with network effects and it could also reduce the optimal exploitation of existing services with network effects: If traffic on the net is slowed down due to congestion problems, certain user groups will create private networks – this in turn could undermine the innovation dynamics of the open Internet, particularly for new services with network effects.
- Differentiated network neutrality: There is a general basic freedom that makes sure that everybody enjoys basic – universal - digital services. However, those who wish to have high data intensity services will have to pay higher user fees; this could imply that a flat rate AAA, that gives the option to download movies (or other high-data intensity services) instantaneously has a higher price than a basic flat rate A that allows to download movies or other high data intensity services with a delay or a slower speed. Under differentiated network neutrality, the average capacity utilization of digital services will be higher than under general network neutrality, moreover, investment incentives will also be higher since network operators have an incentive to invest in network expansion if high powered services fetch a higher price than standard services.

From this perspective, it is clear that differentiated network neutrality should be the guiding principle of a regulatory framework that encourages innovation, investment and expansion of network effects in the digital knowledge society. Regulation of the Internet will be more complex than regulation of telecommunications since radio services and TV services are moving onto the Internet. Since special freedom of information requirements characterize democratic countries, the regulation of the Internet has to take into account both the freedom of information requirements and the logic of standard regulatory approaches to telecommunications.

As regards the key questions raised by the European Commission in its Questionnaire for the public consultation on the open Internet and net neutrality in Europe, the following answer may be given to the respective questions:

## **List of EU questions in the Questionnaire for the Public Consultation on the Open Internet and Net Neutrality in Europe:**

**Question 1:** Is there currently a problem of net neutrality and the openness of the Internet in Europe? If so, illustrate with concrete examples. Where are the bottlenecks, if any? Is the problem such that it cannot be solved by the existing degree of competition in fixed and mobile access markets?

There is a problem of net neutrality as major network operators have introduced priority rules for certain types of traffic during peak times. The bottlenecks are in the availability of broadband infrastructure. The problem cannot be solved by the existing degree of competition since current regulation imposes in principle net neutrality that may be considered as a form of non-discrimination; an alternative view argues that strict net neutrality means that the price system cannot play its role since there is a uniform price for both periods with underutilization of net capacity and periods with excess demand. In a historical perspective part of the net neutrality debate is old as it reminds of the attempts of railway freight companies around the 1900s in the US to charge different transport tariffs for different goods – railroad companies tried to charge higher prices for relatively valuable goods which, however, was not in line with the economic principle that efficient pricing requires that the owner of a resource (here transportation) should be able to fetch a price that reflects the opportunity cost of an alternative use of the respective resource.

**Question 2:** How might problems arise in the future? Could these emerge in other parts of the Internet value chain? What would the causes be?

With increasing numbers of users interested in downloading high data density services from the net – say videos or pictures – temporary congestion problems on the Internet will be reinforced.

**Question 3:** Is the regulatory framework capable of dealing with the issues identified, including in relation to monitoring/assessment and subsequent enforcement?

The existing regulatory framework cannot deal with the problems of network neutrality since there is a lack of an adequate definition of universal services and since monitoring and enforcement will be difficult vis-à-vis big network operators.

**Question 4:** To what extent is traffic management necessary from an operators' point of view? How is it carried out in practice? What technologies are used to carry out such traffic management?

Traffic management is an intelligent way of putting resources to their best use: Here the Internet and network capacities are used in an optimum way. IP-based modern technologies allow traffic management.

**Question 5:** To what extent will net neutrality concerns be allayed by the provision of transparent information to end users that distinguishes between managed services on the one hand and services offering access to the public Internet on a 'best efforts' basis, on the other?

It is useful and necessary to provide transparent information to end users, but it should also be clear what principles govern “basic network neutrality”. User groups should be allowed to make proposals to the regulatory bodies or to the ITU, therefore the dynamics of

contents and conduit technology is critically reflected in regulatory adjustment over time. At the same time, it should be clear that incentives for network operators to invest in expansion and upgrading of networks should remain strong; in the EU creation of more integrated multinational network operators is desirable.

**Question 6:** Should the principles governing traffic management be the same for fixed and mobile networks?

There is a continuing convergence of mobile markets and fixed markets and this suggests that the principles governing traffic management should be the same for fixed and mobile networks.

**Question 7:** What other forms of prioritization are taking place? Do content and application providers also try to prioritize their services? If so, how – and how does this prioritization affect other players in the value chain?

It is unclear which forms of prioritization are used by networks in various EU countries although it seems clear that users of pre-paid cards might face some discrimination on the user side; from the content side streaming is sometimes delayed – a broader investigation on the issue of network neutrality is missing in the EU.

**Question 8:** In the case of managed services, should the same quality of service conditions and parameters be available to all content/application/online service providers that are in the same situation? May exclusive agreements between network operators and content/application/online service providers create problems for achieving that objective?

Principles of non-discrimination should be applied at the basic universal services level. Exclusive agreements between network operators and content/application/online service providers should be allowed unless the agreement would create bundling-related market power: Significant market power could be leveraged from one sub-market to other markets contained in the new bundle. At the same time, the problem that the EU digital markets are less integrated than in the US should be considered – artificial barriers for market consolidation should be avoided and incentives for exploiting EU-wide network effects should be reinforced; e.g. if in country I the expansion of network operator/service provider A creates a problem of significant market power, this should be tolerated by national regulators and the EU, provided that the network operator/service provider can present evidence that its planned expansion in other national markets (II, III...) in the EU reduces significant market power in those markets – pro-competitive effects in foreign markets have to be weighted by the share of people or the GDP in the respective foreign market; in the existing oligopolistic market environment, it may be expected that conquering foreign markets will stimulate a reaction in the respective incumbent operator to also conquer foreign markets within the EU therefore the proposed contingent waiver would allow combining economies of scale and network effects with more effective competition in the EU overall. It is natural for the European Commission to not only focus on isolated competition dynamics at the level of EU member countries but to consider the overall EU market dynamics and the global position of EU firms. Moreover, the EU should establish the principles of a Digital Social Market Economy and this means to combine efficiency and innovation dynamics generated by market forces with clear elements of



universal services that make sure that opportunities of digital equality are achieved by all citizens.

**Question 9:** If the objective referred to in Question 8 is retained, are there additional measures needed to achieve it? If so, should such measures have a voluntary nature (such as, for example, an industry code of conduct) or a regulatory one?

Voluntary measures are inadequate. Firms should enjoy freedom of competition and face clear regulatory principles.

**Question 10:** Are the commercial arrangements that currently govern the provision of access to the Internet adequate in order to ensure that the Internet remains open and that infrastructure investment is maintained? If not, how should they change?

Incentives for investment in broadband infrastructure seem to be relatively modest in the EU and there is quite some risk that international competitiveness of both digital firms (firms from the New Economy) and companies in the Old Economy will suffer from insufficient expansion of networks and digital services in the EU. Moreover, all citizens of the EU should have equality of digital opportunities, therefore, full coverage of the EU with fixed/mobile Internet and telephony services is desirable. An EU-wide flat rate should be offered by every major telecommunications operator. As regards provision of digital mobile universal services in areas with low population density, it is necessary that governments provide minimal subsidies to those companies that guarantee the availability of services in such areas; competing companies should be allowed to provide joint services in such areas. Governments should not discriminate against large innovative telecommunications operators; while government funding for innovative SMEs is always popular, it is clear that innovative incumbent operators should also receive R&D support, namely to the extent that there are positive external effects. In the EU this is sometimes a complex challenge since positive external effects from R&D often stand for cross-border effects – particularly if there are international network effects. This suggests that the share of joint international R&D funding should be raised in the EU, moreover, the share of EU R&D funding for digital innovation projects should be raised (the ICT sector is considered to be the most innovative sector in the OECD).

**Question 11:** What instances could trigger intervention by national regulatory authorities in setting minimum quality of service requirements in an undertaking or undertakings providing public communications services?

Intervention is required in the case that new network neutrality rules are not obeyed by companies.

**Question 12:** How should quality of service requirements be determined, and how could they be monitored?

Quality of service requirements should be determined in a uniform way by the European Commission; monitoring should be organized through independent expert groups.

**Question 13:** In the case where NRAs find it necessary to intervene to impose minimum quality of service requirements, what form should they take, and to what extent should there be co-operation between NRAs to arrive at a common approach?

NRAs should have full autonomy in imposing minimum quality of services for an extended period. However, there should be some convergence among well-defined convergence clubs; e.g. governments from eastern European EU accession countries might decide to form a convergence club I, therefore all countries of that group will have to achieve common medium-term targets (say within five years); southern cohesion countries plus Ireland could also create such a club. In the long run – say after 10 years - there should be a uniform EU minimum quality. Both industry and network operators need long-run uniform standards within the EU.

**Question 14:** What should transparency for consumers consist of? Should the standards currently applied be further improved?

Transparency in EU countries is well established. There is, however, a serious lack of transparency when it comes to spending time on waiting lines; these indirect costs often exceed the nominal fees charged by the respective firms (cable TV is a relevant sector in some countries). Waiting time that the representative user spends on services lines should be published.

**Question 15:** Besides the traffic management issues discussed above, are there any other concerns affecting freedom of expression, media pluralism and cultural diversity on the Internet? If so, what further measures would be needed to safeguard those values?

Digital EU market integration should be reinforced and user groups should be encouraged to report their experiences. There are serious problems in Internet security – which most governments in the EU seem to ignore. Confidence is part of the immaterial capital not only in the banking sector but in the Internet sector as well. Confidence is based on an accumulation phenomenon, therefore destruction of confidence through shocks is very costly for society. Data security and payment on the web should be key issues on the digital EU agenda. Sustained competition in digital markets and high innovation dynamics will generate crucial benefits in the Digital Social Market Economy; from an EU perspective it will be important that international information costs will fall in an environment with clear competitive regulation – falling international information costs have a significant impact on intra-EU trade as was shown in recent empirical analysis based on an augmented gravity equation approach (JUNGMITTAG/WELFENS, 2009). Policymakers in the EU face crucial challenges in combining aspects of universal services and network neutrality.

## References

- CHIPTY, T. (2001), Vertical Integration, Market Foreclosure, and Consumer Welfare in the Cable Television Industry, *American Economic Review*, 91, 428-453.
- CHURCH, J.; GANDAL, N. (2000), Systems Competition, Vertical Merger and Foreclosure, *Journal of Economics and Management Strategy*, 9, 25-51.
- GEHRIG, T. (1998), Competing Markets. *European Economic Review*, 42, 277-310.
- HOGENDORN, C. (2005), Regulating Vertical Integration in Broadband: Open Access versus Common Carriage, *Review of Network Economics*, 4, 19-32.
- ITU (2010), A 2010 Leadership Imperative: The Future Built on Broadband – A Report by the Broadband Commission, ITU/UNESCO, Geneva.
- JUNGMITTAG, A.; WELFENS, P.J.J. (2009), Liberalization of EU Telecommunications and Trade: Theory, Gravity Equation Analysis and Policy Implications, *International Economics and Economic Policy*, 6, 23-39.
- ROCHET, J.-C.; TIROLE, J. (2006), Two-Sided Markets: A Progress Report, *The RAND Journal of Economics*.
- RUBINFELD, D.; SINGER, H. (2001), Vertical Foreclosure in Broadband Access, *Journal of Industrial Economics*, 49, 299-318.
- VAN SCHEWICK, B. (2007), Towards an Economic Framework for Network Neutrality Regulation, *Journal on Telecommunications and High Technology Law*, 5.
- VOGELSANG, M. (2010), Digitalization in Open Economies – Theory and Policy Implications, Heidelberg: Springer/Physica.

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