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Universal Service and State Aid in the European Union in the Era of NGN

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This paper was authored with a Japanese audience in mind to explain recent developments in universal service policy and State aid rules for Next Generation Networks in the European Union. Universal service policy is intended to ensure that all members of society should be able to obtain a minimum level access to communications networks at fair and reasonable prices without regard to where they live, their income level, or other disadvantages. Countries typically pursue universal service policies for communications networks because their benefit in terms stimulating broader economic growth outweighs the possible economic inefficiencies these policies can introduce. The on-going migration of communication networks to multi-service NGNs holds challenges for universal service policy. Heretofore, these universal service policies have been applied to traditional voice telecommunications networks. Given the decreasing importance of traditional voice telecommunications networks and growing adoption NGNs, industrialized nations are considering whether and how to apply universal service policies to broadband networks.

Within the European Union, efforts are under way to address these questions such as the necessary and appropriate role for governments in funding universal service for NGNs. The rules governing State aid prohibits any form of aid which distorts or threatens to distort competition by favoring certain firms or certain goods. State aid includes, under certain circumstances, the public ownership of firms. The European Union recognizes that State aid can advance common interests and can remedy market failures. However, this approach also limits the way in which State aid can be used so as to not crowd out private investment. In September 2009, the European Commission published guidelines which established distinction between what it calls white, black and grey NGA areas to guide the granting of State aid for NGA deployment. In so-called 'white NGA' areas, aid supporting broadband network is generally permissible. In so-called 'NGA grey' and 'NGA black' areas, State aid is permissible only where the deployment where unsatisfactory or if there is market failure.

These efforts may hold valuable lessons for regulators in other countries, particularly those where the incumbent

carrier is partly publicly owned. The European Union approach is intended to present the least intrusive means, and as such it embodies the principle that desired outcome should be achieved with the least amount of effort possible and at the least possible economic cost.

Keywords

universal service policy, state aid rules, NGN, European Union

I. Introduction

Universal service is a fixture of telecommunications policy in countries around the world. The policy is intended to ensure that all members of society should be able to obtain a minimum level access to communications networks at fair and reasonable prices without regard to where they live, their income level, or other disadvantages. The concept of universal service originated in the postal system United Kingdom in the mid-Nineteenth Century. The term was coined and was first applied to communications networks by the then-president of the Bell System, Theodore Vail in 1908.

The on-going migration of communication networks to multi-service Next Generation Networks (NGN) holds challenges for universal service policy. The general question of how to handle universal service for “broadband” is likely to receive increasing attention in the political arena in the coming years. As countries move to support and accelerate broadband access for all, it will call into question the necessary and appropriate role for governments in funding universal service for NGNs.

This paper was authored with a Japanese audience in

mind to explain universal service policy, State aid rules, and recent developments in the European Union.

II. Universal Service Objectives and Instruments

A. What is Universal Service?

Like so many concepts in telecommunications policy, there is no fixed, standard definition of what constitutes universal service. The generally agreed principle is that all members of society should be able to obtain a minimum level access to communications networks at fair and reasonable prices without regard to where they live, their income level, or other disadvantages.¹⁾ The core principals of universal service include:

- Availability – the level, price, and quality of communications services are the same in a high cost rural or remote areas as they are in urban areas.
- Affordability – obtaining and using communications services does not place an unreasonable burden on or is inaccessible to consumers, particularly on low-income, vulnerable, or disadvantaged individuals.
- Accessibility – individuals with disabilities can obtain

access communications services.

- Continuity of Service – individuals can obtain a certain level of service at given price and can expect to continue to obtain that service at that price into the future.

These aspects of universal service are in practice applied to specified communications services or basket of services. To achieve universal service goals, governments impose Universal Service Obligations ("USOs") and offer incentives to network providers to offer a defined minimum level of service services in high cost areas; in low income areas; to persons with disabilities; and to schools, hospitals and libraries.

B. Economics

1. Network Economics

USOs are necessary because it is not economically efficient to provide communications services to all members of society; however, doing so is desirable as a matter of public policy. Since fixed costs are high and marginal costs are low in networks, the average cost of provision of the network is highly sensitive to the number of participants who are served by the network.²⁾ The cost of deployment is highly dependent on teledensity, geography and topography, and regulatory constraints such as access to ducts.³⁾ The average cost of serving persons living in remote, low density, or low income areas is likely to exceed the benefit of serving those persons, making to it being uneconomical for carriers to deploy networks and services in these area. Therefore, individuals in these areas and communities would not be able to participate in the network. This can be seen in Figure 1. Where network participation is below critical mass (n_1), subsidies are required to support the network. Universal service policies are required to grow the network beyond the private optimum (n_2), where marginal cost equals

marginal utility. Similarly, beyond a certain exit point (n_3), subsidies are again required to support the network.⁴⁾ In order to provide universal service, it is necessary to provide subsidies from the profitable areas and communities to the unprofitable ones.

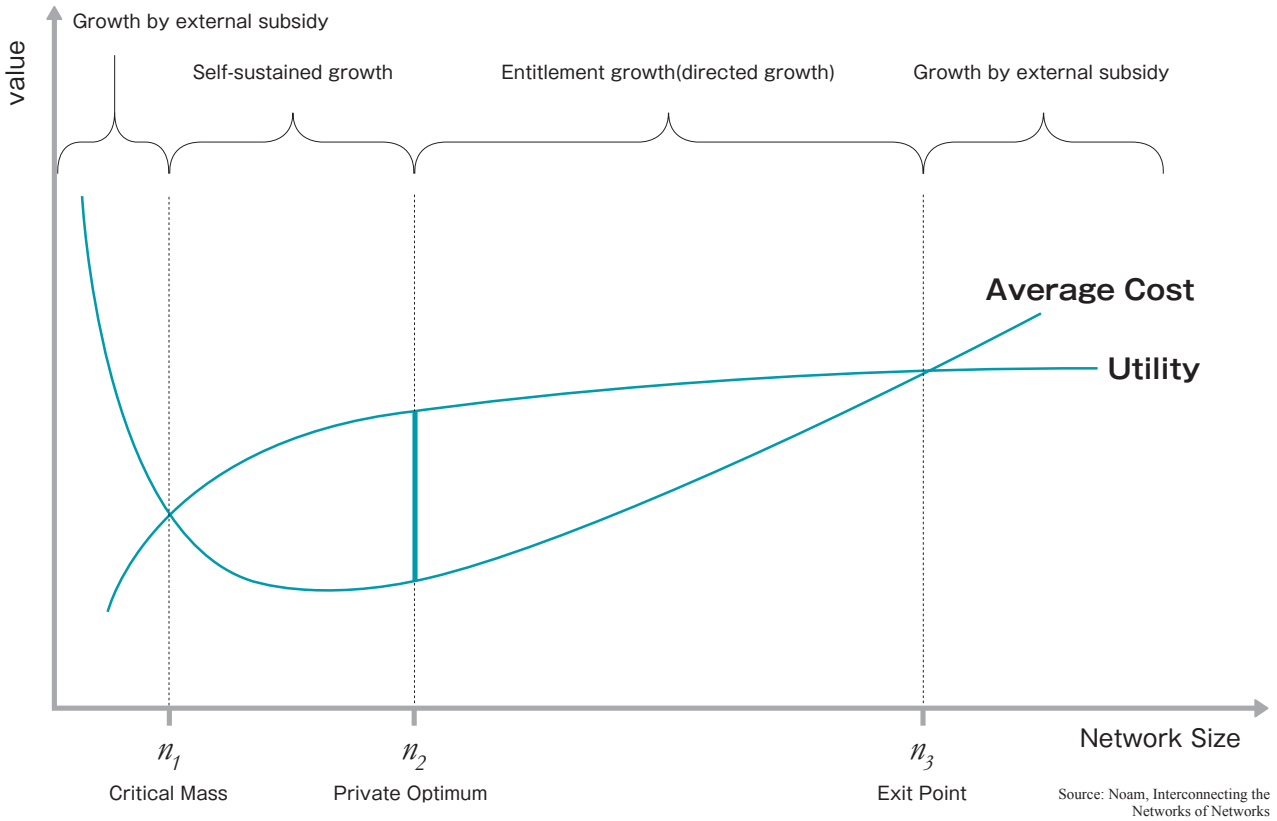
In addition, providing universal service can negatively impact economic efficiency to the extent that it runs exactly counter to Ramsey-Boiteux pricing principles. Ramsey-Boiteux pricing is based on the principle that it is optimal to take the highest mark-up on the services with the lowest price elasticity of demand, and vice versa. Conventional universal service, by contrast, takes the service with presumably lowest demand elasticity (the basic voice service) and puts downward pressure on the price, thus lowering the mark-up.

2. Cost Recovery and Transfer Payments

Since, by definition, USOs are not supported by traditional market mechanisms, external funding sources to provide the necessary subsidies must be found. Any of a number of funding mechanisms can be used, including:

- A direct levy – on all consumers of electronic communications services (for example, a fixed amount that appears directly on the bill).
- An indirect levy – on consumers of electronic communications services. An indirect levy could be imposed on electronic communications service providers, who then pass the cost on to their customers. This is done in the US and France.
- Indirect recovery – of costs of universal service by the incumbent carrier through regulated access and interconnection charges where the cost of providing universal service is treated as a part of the incumbent's cost of providing service. This is common Europe.

Figure 1 Model of Network Expansion and Breakdown



Source: Noam, *Interconnecting the Networks of Networks*

- Funding – from the proceeds of privatization and spectrum license fees.
- Government funding – via general taxation revenue.

Universal services are not necessarily provided free of charge. If explicit funding is appropriate, it should cover only the net cost of providing the service, i.e., the cost net of whatever revenues the service provider derives as a direct or indirect result of providing the service.⁹

3. Implications of Competitive Entry

To the extent that USOs require cross-subsidies from

regions where the supply of access is profitable to less profitable regions, it implies the geographic averaging of subscriber line prices. New entrants are largely attracted to providing services in places where prices are well above costs. Conversely, incumbents attempt to rebalance prices so as to reduce the gap between prices and costs that would make them vulnerable to competitive entry. As competition and regulation have driven prices closer to costs, these cross-subsidies have become more difficult to maintain. The provision of universal service can (depending on implementation) negatively impact competitive entry.

Subsidies to the incumbent, especially in areas of low teledensity, can make it even harder for competitors to enter there. Retail price caps on the incumbent can lower the competitive 'umbrella' within which an entering competitor seeks to become profitable. These factors can have the two-fold effect of focusing the incumbents' energies on the most profitable areas and reducing the available internal subsidies to less profitable areas.

C. Policy Objectives

1. Civic participation

Despite the economic inefficiency arguments, most industrialized nations pursue universal service policies because they produce socially desirable results. The disparity of access to communications services is often poetically referred to as the "digital divide." Being connected to communications network is necessary to avoid "social exclusion" and for individuals to participate fully in society. Participation goes beyond accessing public and emergency services to include networking with affinity groups, recreation, education, and professional advancement.⁶⁾ Communication services (and increasingly Internet-based communications) are an important component of maintaining and creating democratic institutions, media pluralism, and political participation. These factors are particularly important for people on low incomes, those living in remote rural areas, disabled people, and other vulnerable groups in order to ensure that they are still able to obtain the advantages of communications services. Such access is seen to go some way towards equalizing conditions between rich and poor, rural and urban communities.

The inclusion of these social groups, many of whom are already reliant on other public services, may reduce their need for such public services. This factor strengthens the

case for funding universal services.

2. Economic Growth

Similar to improving civic participation, governments pursue universal service policies for their indirect benefit on the broader economy. When an additional person joins a communications network, existing members benefit because 1) they can contact a new person (a so-called network externality) and 2) they can receive calls from the new customer (a call externality). New prospective customers may not take these effects into account, and hence may stay off the network or not make calls, even though it would be efficient for them to join the network.

Given the presence of externalities, the use of communications services can have broader effects throughout the economy. These effects include boosting productivity, enhancing economic growth, promoting regional development, increasing a country's ability to compete globally, and raising standards of living. Low-cost communications can also encourage teleworking and reduce greenhouse gas emissions and congestion costs from commuting to work. They may also enhance economic resilience through better supply chain management, by increasing competition and innovation, and by providing adaptability to external shocks (e.g., teleworking in the case of a flu pandemic).⁷⁾ These types of effects are more difficult to quantify and value, but they might be substantial.⁸⁾

Universal service is critically important to achieving the benefits of communications infrastructure to the broader economy. There is a significant, positive causal link between investment in telecommunications infrastructure and macroeconomic output; however, additive effect of communications is only present once a critical mass of infrastructure has been reached.⁹⁾

III. Universal Service in the European Union

Current regulation for electronic communications policy for the European Union is embodied in a set of five Directives promulgated by the European Parliament and the European Council in 2002. The Directives provide for a harmonized approach, but allow for subsidiary where legitimate differences in national markets make it appropriate. The Directives had to be transposed into national law and put into effect by July 2003; however, the process took a bit longer in some countries.

A. Universal Directive

The Universal Service Directive (*USD*) specifies USOs at the European level.¹⁰ The relevant sections of the USD require that each Member State ensure that at least one entity is responsible for satisfying all reasonable requests for “access to publicly available telephone services at a fixed location” in each geographic portion of the national territory.¹¹ The term “fixed location” is noteworthy in that there is no right to mobile telephone service, but nothing prevents a Member State from using a mobile service to satisfy the obligation.¹²

Under the definition of universal service, connection to the public telephone network must enable “... data communications, at data rates that are sufficient to permit functional Internet access, taking into account prevailing technologies used by the majority of subscribers and technological feasibility.” This obligation was conceived in terms of a single narrowband voice channel with a nominal capacity of 56 kbps.¹³ Broadband Internet access was clearly not included within the scope of the USD; however, it provides for periodic review of the scope of universal

service.¹⁴ The Directive requires the European Commission to consider relevant social, market and technological developments, and provides criteria for changes to the scope of universal service. When specific services are available to and used by a majority of consumers and the lack of availability or non-use by a minority of consumers could result in social exclusion, it might be permissible to include those services within the definition. Similarly, when the availability and use of specific services convey a general net benefit to all consumers and when the specific services are not provided to the public under normal commercial circumstances, public intervention might be warranted.¹⁵

Member States may subsidize entities that are providing universal service at prices that are effectively below their costs.¹⁶ The subsidies can come from general tax revenues or from a pool collected from all service providers. Only a few Member States provide such subsidies today, with the notable exceptions being France, Spain and Italy. Finally, new language enacted into the USD in 2009 empowers National Regulatory Authorities (NRAs) to establish minimum levels for Quality of Service, thus preventing unreasonable degradation. These changes to the USD also seek to ensure that consumers are adequately informed of any restrictions, and give consumers the right to change providers without penalty if a network operator imposes new restrictions on access to content, services or applications.

B. Authorisation Directive

The *Authorisation Directive* recognizes that licensing can serve as a barrier to entry.¹⁷ It, therefore, establishes the maximum amount of information that can be required in a authorization. Under the Directive, Member State NRAs must respond promptly to requests for authorizations. If

the NRA does not, the authorization seeker can offer the service as if a license had been granted. Furthermore, the Directive also establishes the maximum obligations which can be imposed on carriers when: 1) numbers are requested; 2) spectrum is requested; or 3) neither is requested. It also establishes a maximum time frame for the NRA to respond to requests for numbers; however, this is often unenforceable.

The Directive enables any provider of an Electronic Communications Service or network to apply to become a provider of a universal service.¹⁸⁾ This right is rarely invoked, inasmuch as provision of universal service entails various costs and few benefits since universal service is not explicitly funded. In conjunction with the principle of technological neutrality, the Directive could conceivably enable a provider of a VoIP-based service to become a universal service provider of voice.

C. Universal Service and NGN

The on-going migration of communication networks to multi-service, IP-based NGNs holds challenges for universal service policy. One central characteristic of this migration has been the decoupling of the service from the network. An implication of this decoupling is that any service (voice, data, or video) can be delivered over any network by a service provider other than network operator. This fact raises the question of whether universal service should be focused on the voice service, as distinct from the underlying broadband network access. It also raises questions as to what exact services should be mandated. Universal service obligations have historically centered on the telephone voice service (and also on related capabilities such as for instance pay telephones, as noted in the USD). In an IP-based world, it is the network access that is expensive to deliver; once the

access is in place, the voice service is inexpensive to deliver.

Similarly, the difference in cost structures and substitutability between wired and wireless networks places further strains on the cross-subsidies inherent in universal service obligations. Mobile broadband raises several questions as well in regard to universal service. First, there is the question of whether mobile broadband is fast enough, or cheap enough at comparable speeds, to meaningfully substitute for fixed broadband. This is further complicated by the fact that the speed of mobile broadband is significantly dependent on contention between users, which is one of several reasons why it tends to be more suitable for areas of low teledensity. The cost of delivering broadband access can differ greatly from one part of the national territory to another, based not only on teledensity, but also on topography. The presence or absence of an already existing wired infrastructure (whether telephony or cable) in remote regions can have an enormous impact on the cost of wired broadband. This is a major consideration in many of the twelve Member States which were admitted to the European Union in 2004 and 2007.

Another challenge of the migration to NGNs to universal service policy is the fact that it is possible that any universal service policy could “lock in” today’s copper-based broadband technologies, and might hinder the migration to fibre-based access technologies that are likely to be superior in the long run. Nonetheless, Finland, the UK, and Switzerland¹⁹⁾ are planning to incorporate “broadband” services into their respective universal service obligations. These countries have defined a specific minimum bandwidth which is currently equal to or less than 2 Mbps.

Universal service and broadband is also on the agenda of the European Commission. In 2008, the Commission adopted a European Economic Recovery Plan, one of the

central aims of which is achieving 100% high speed Internet coverage for all citizens by 2010.²⁰⁾ The Commission decided part of the €1.02 billion allocated to the European Agricultural Fund for Rural Development (EAFRD) be used for deploying broadband infrastructures in rural areas to help rural areas get online.²¹⁾ Further, at the time of writing, the European Commission launched a consultation to be completed by May 2010 on what is the best approach to ensure that basic telecommunications services are available for all EU citizens. The consultation seeks information on: 1) the adequacy of the current definition of universal service; 2) the question whether universal service should include broadband for all; 3) the right balance between a coordinated European Union-wide response and the need for national flexibility; and 4) the appropriate mechanisms for funding universal service.²²⁾

IV. State Aid Rules in the European Union

A. State Aid Rules Generally

The Treaty establishing the European Community provides rules governing State aid. It states "any aid granted by a Member State or through State resources in any form whatsoever which distorts or threatens to distort competition by favoring certain undertakings or the production of certain goods shall, in so far as it affects trade between Member States, be incompatible with the common market."²³⁾

Specifically, State aid is defined as measures which:

- is granted out of State resources;
 - confers an economic advantage to enterprises;
 - is selective and distort or threatens to distort competition;
- and
- affects intra-Community trade.

State aid includes subsidies, tax rebates, or other types

of preferential financing conditions. State ownership of an enterprise does not by itself constitute State aid; accept when equity participation or capital injection by a public investor does not have sufficient prospects of profitability.²⁴⁾

The European Commission recognizes that State aid can advance common interests and can remedy market failures.²⁵⁾ The Commission prefers the efficient outcomes generated by markets, and therefore, its rules require that State aid not crowd-out market initiatives.²⁶⁾

B. State Aid and Broadband

In September 2009, the European Commission published "Guidelines for the application of state aid rules in relation to a rapid deployment of broadband networks"²⁷⁾ In the Guidelines, the Commission examined State aid supporting broadband deployment including building, operating, and enabling access to broadband infrastructure. When State aid is granted directly to investors the network it should be done through the means of an open tender in order to ensure that any aid is limited to the minimum amount necessary for the particular project.

Further, the Commission's Guidelines establish distinction between what it calls white, black and grey NGA areas to guide the granting of State aid for NGA deployment. (See Figure 2). A so-called 'white NGA' area is an area where NGA networks do not exist and where they are not likely to be built in the near future by private investors. An 'NGA grey' area is one where only one NGA network is in place or is being deployed in the coming three years. An 'NGA black' area has more than one NGA network or will be deployed in three years.

In NGA white areas, the Commission believes that State aid supporting broadband network is generally

Figure 2 Categories of State Aid

NGA Area	Presence of NGA	State Aid
White	No NGA by private firms	State aid permissible, consistent with law
Grey	Only 1 private NGA within 3 years	State aid permissible, only if NGA network is insufficient
Black	More than 1 private NGA within 3 years	State aid impermissible, absent market failure

Source: K. Carter

permissible in accordance with European Union law. By contrast, in NGA black areas, the Commission expects that State support for an additional publicly-funded, competing NGA network would be incompatible with the State aid rules since it is likely to distort competition. The exception to this case is if there is serious market failure. In NGA grey areas, the Commission's Guidelines require: "Member States should be able to demonstrate firstly, that the existing or planned NGA network is not or would not be sufficient to satisfy the needs of citizens and business users in the areas in question and, secondly, that there are no less distortive means (including ex ante regulation) to reach the stated goals."²⁸⁾

V. Conclusion

Many countries pursue universal service policies for communications networks because their benefit in terms of advancing public policy goals and helping to stimulate broader economic growth outweighs the possible economic inefficiencies these policies can introduce.

Heretofore, these universal service policies have been applied to traditional voice telecommunications networks.

Given the decreasing importance of traditional voice telecommunications networks and growing adoption NGNs, industrialized nations are considering whether and how to apply universal service policies to broadband networks. Granted, broadband is not synonymous with NGN; however the same questions of extending the definition of universal service apply to both.

Within the European Union, efforts are under way to address these questions. Many Member States are considering how to apply and to fund broadband universal service. These efforts may hold valuable lessons for regulators in other countries, particularly those where the incumbent carrier is partly publicly owned. The approach within the European Union also limits the way in which State aid can be used to advance these social goals while not crowding out private investment. Given that State aid requires a detailed analysis as to when it is permissible, some attention must be paid to the targeting of the aid. When the State aid comes in the form of public ownership of the enterprise, it might be desirable to focus that ownership in the parts of the network which will provide the most benefit. For example, if public ownership of civil infrastructure were sufficient to enable private investment in NGN sufficient to provide broadband to the underserved area, it might be

desirable for the State aid to end there.

The European Union approach is intended to present the least intrusive means, and as such it embodies the principle that desired outcome should be achieved with the least amount of effort possible and at the least possible economic cost.



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Footnotes

†) The analyses and conclusions are those of the author and do not necessarily reflect the views of others. The author is grateful to KDDI Research which supported the publication of this article. I alone am responsible for any errors or omissions contained herein.

1) See Xavier P. "What rules for Universal Service in an IP-enabled NGN environment". Paper commissioned by ITU HYPERLINK "<http://www.itu.int/osg/spu/ngn/documents/Papers/Xavier-060323-Fin-v1.pdf>" (2006) (2006) and Xavier, P. "Rethinking Universal Service for a Next Generation Network environment", Report commissioned by OECD (2006).

2) Noam, E., *Interconnecting the Network of Networks*, at p. 8, MIT Press (2001).

3) See Elixmann, D., Ilic, D., Neumann, K-H., Plückebaum, T. *The Economics of Next Generation Access*, Study for ECTA, Bad Honnef (2008).

4) See, Noam, E., *Interconnecting the Network of Networks*, at p. 8-9, MIT Press (2001).

5) See Article 13 of the Universal Service Directive. In the European context, funding is appropriate only where a provider of universal service is found by the NRA to be "subject to an unfair burden".

6) Botterman, M, Kahan, JP, van Deelen, M., et al., *Towards Public Value: A Vision of Public Value Governance in 2020*. E-government Vision Study, prepared for DG INFSO (2008).

7) See Plum Consulting, *A Framework for Evaluating the Value of Next Generation Broadband*, Report for the Broadband Stakeholder Group (June 2008).

Footnotes

- 8) Fornefeld, M., Delaunay, G., and Elixmann, D., The Impact of Broadband on Growth and Productivity, Study for the European Commission (2008).
- 9) Röller, L-H. and Waverman, L., Telecommunications Infrastructure and Economic Development: A Simultaneous Approach, American Economic Review (analyzing data from a 20 year period for 21 OECD countries) (2001).
- 10) Directive 2002/22/EC.
- 11) Article 4. The USD requires a range of other services as well, including pay telephones.
- 12) See Recital 8: "...There should be no constraints on the technical means by which the connection is provided, allowing for wired or wireless technologies, nor any constraints on which operators provide part or all of universal service obligations."
- 13) USD, Recital 8.
- 14) USD, Article 15.
- 15) USD, Annex V.
- 16) See Article 13: "Where ...national regulatory authorities find that an undertaking is subject to an unfair burden, Member States shall, upon request from a designated undertaking, decide: (a) to introduce a mechanism to compensate that undertaking for the determined net costs under transparent conditions from public funds; and/or (b) to share the net cost of universal service obligations between providers of electronic communications networks and services."
- 17) Directive 2002/20/EC.
- 18) Article 4.2(b).
- 19) Switzerland is not a European Union Member State.
- 20) Communication from the Commission to the European Council, COM(2008) 800.
- 21) See Regulation (EC) No 473/2009 of 25 May 2009 amending Regulation (EC) No 1698/2005 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) and Regulation (EC) No 1290/2005 on the financing of the common agricultural policy (OJ L 144, 9.6.2009, p. 3).
- 22) Press release, Consultation on future universal service in the digital era (IP/10/218).
- 23) Article 87(1).
- 24) Case C-303/88, Italy v Commission, [1991] ECR I-1433, at paragraphs 20-22.
- 25) State aid Action Plan - Less and better targeted State aid: a roadmap for State aid reform 2005-2009, COM(2005) 107 final.
- 26) Communication from the Commission Community Guidelines for the application of State aid rules in relation to rapid deployment of broadband networks (2009/C 235/04).
- 27) European Commission, Community Guidelines for the application of State aid rules in relation to rapid deployment of broadband networks, (2009/C 235/04).
- 28) Guideline, No. 75.

