



Europe

# **REFORMING UNIVERSAL SERVICE POLICY**

**A REPORT FOR GSM EUROPE**

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## Executive summary

The European Commission has announced that it will issue a Communication on the scope and future of Universal Service policy in the EU in 2008. As a contribution to the development of the Communication, GSM Europe has requested the Competition Economists Group (CEG) undertake this study assessing the issues and policy options arising from longer term reform of Universal Service policy.

### **Current state of access to electronic communications across the EU**

Access to telephony is generally high across the EU with mobile services being a particularly important means of telephony access in the new Member States. Despite the USO being focused on subsidised fixed services, more EU households have mobile phones than have fixed phones and mobile access is growing. On the other hand, fixed access is declining as low income households in particular choose to rely on prepaid phones.

The success of mobile services reflects customer preference and strong competition across European mobile markets with almost all Member States having 3 or more mobile operators as well as additional service providers. GSM coverage is also widespread.

In many Member States, universal access to telephony has been effectively achieved and the role for an ongoing USO in those countries is questionable. Indeed, given the range of competing technologies present, USO arrangements that involve transfers between players now carry potentially significant costs in terms of distorting competition and harming overall efficiency.

In designing Universal Service policy going forward it is important to clearly identify the remaining areas where competition is not present and access gaps remain. A significant share of the population does not have telephony access in Bulgaria and Romania and in the rural areas more generally of the newer Member States. Universal Service policy appropriately designed for these areas is unlikely to be the same as the traditional USO (i.e. based on the large majority of users effectively subsidising access for a remaining small minority) given that the new Member States can have low general income levels and relatively large rural populations.

Market developments have also created the need to review obligations in relation to the provision of public payphones. Public payphones are now used regularly only by a small and declining share of the population so that the benefit of retaining obligations in particular areas may no longer justify the costs.

In relation to broadband, it remains the case that households with broadband connections remain a minority in most Member States and represent less than one fifth of households in many Member States. The main reason given for households not having broadband access are that they are not interested in the Internet or that narrowband is sufficient for their needs. Further, broadband markets in the EU are highly dynamic with an increasing range of technologies and with demand growing rapidly. Mobile broadband offers are increasingly competing with fixed offers with improving speeds and prices falling sharply.

Given the extent of the changes in the European electronic communications marketplace from the time in which the USO was first introduced, a fundamental review of the USO is timely. In this report, we consider Universal Service reform in relation to the four key areas:

- What should the objective and scope of Universal Service policy;
- Who should provide the services;
- How should service provision be funded; and
- How should the net cost of service provision be estimated.

### **Reforming the scope of Universal Service policy**

It is important to recognise at the outset that imposing an obligation on a provider is but one of a range of policy measures that can be used to meet particular access objectives. In conducting a fundamental review, policymakers should:

- identify the specific objectives underlying government intervention to promote access to electronic communications; and
- evaluate the range of policy measures that are available to meet those objectives including the extent to which market provision of services can be expected to achieve the objectives in the coming years without the need for intervention.

Given the increasing variety of services and technologies on offer, it would not make sense to aim for all consumers to access all services. Indeed, surveys as to why consumers do not use fixed, mobile or broadband services show that there is a significant share of those consumers who are choosing not to have a particular service despite the service being available and affordable to them. To the extent that universal access is put forward for reasons of social inclusion, it is important to clearly specify what particular need is met by the service, whether that need is being met by the market in the absence of government intervention and, if intervention is undertaken, that it generates benefits to justify its costs. In this regard, the costs of intervention that are taken into account should include the cost of raising funds as well as broader costs such as the risks to competition from advantaging some operators or technologies at the expense of others.

The clearest economic case for government action is where government policies are themselves acting as a barrier to service provision. In regard to mobile services, governments should first review barriers to access including ensuring the availability of spectrum at low frequency bands through refarming and access to the Digital Dividend spectrum, permitting network sharing and streamlining planning procedures.

To the extent that significant coverage gaps remain in particular Member States, then one-off government support for network investment provided on a contestable basis is likely to be more efficient than ongoing consumption subsidies. More generally, to the extent that a USO is retained in relation to particular services, the effectiveness and efficiency of the USO can be improved through greater targeting of the USO to only those areas and customers that would otherwise be uneconomic to serve.

Table 1 sets out our recommended approach to specific services.

**Table 1: Recommendations in relation to particular USO services**

Type of service	Recommended approach
Availability of telephony	<ul style="list-style-type: none"> <li>• Universal population coverage already achieved in many Member States given combination of mobile and fixed services</li> <li>• To the extent that coverage extensions are desirable, governments should first consider removing barriers to further network roll-out</li> <li>• One-off government support, provided on a contestable basis, can address remaining gaps</li> </ul>
Affordable telephony for low income households and households living in high cost areas	<ul style="list-style-type: none"> <li>• Lack of affordability of telephony services is not a problem in most Member States and low income households are increasing choosing to rely on competitively provided mobile services</li> <li>• To the extent that intervention is considered necessary, this should be targeted at low income households and potentially take the form of general income support or vouchers offering some discount off commercial prices</li> <li>• Support for households in high cost, rural, areas should also be targeted at low income households albeit that a higher subsidy may be necessary to address higher service provision costs</li> </ul>
Public payphones	<ul style="list-style-type: none"> <li>• Declining use of public payphones warrants a review to determine which current payphone requirements should be removed</li> <li>• Any ongoing obligation should be limited to public payphones that are relied upon as the main means of communication by a significant number of households</li> </ul>
Services for customers with special needs	<ul style="list-style-type: none"> <li>• Intervention to ensure accessibility of services should be designed to address the specific needs of the customer groups strictly related to difficulty in phone usage</li> <li>• Funding should be offered on a contestable basis to provide particular services and avoid wasting funding through requiring multiple operators to develop duplicate services</li> </ul>
Mobile access	<ul style="list-style-type: none"> <li>• Mobile services have made a substantial contribution to the expansion of access to electronic communications and their impact is particularly strong amongst low income households and the new Member States. Many mobile operators continue to be under coverage obligations</li> <li>• Measure to reduce the cost of supplying mobile services can support further coverage extensions and improved affordability</li> <li>• Given the success of mobile markets, there is no justification for the USO to be extended to mobile services and such regulation could seriously harm competition given the presence of multiple operators</li> </ul>
Broadband access	<ul style="list-style-type: none"> <li>• There are strong reasons as to why the USO should not be extended to broadband. The market itself is leading to rapid growth in broadband connections so that usage subsidies may be wasted on customers who would have acquired broadband anyway and that subsidies may distort market development with regard to the mix of technologies and providers. The absence of broadband does not imply social exclusion at this stage</li> <li>• Other measures can support the development of broadband markets including access to lower frequency spectrum, permitting network sharing, promoting effective competition and targeted public funding to support the extension of network coverage</li> </ul>



## **Role for contestable provision of Universal Services**

To date, the USO is predominantly provided by fixed incumbent operators across the EU. However, contestable models for Universal Service provision have a number of attractions in principle including ensuring that the services are provided by the operator that is most efficient at providing those services and in helping to reveal the actual net cost of the service provision that needs to be funded.

Contestable provision of Universal Services should not be taken to mean imposing the same obligation on multiple operators. Indeed, the experience of the USA shows that multiple USO providers can risk a large explosion in the cost of the USO for little benefit as the providers offer substitute services. Rather the aim of contestable models is to identify which operator is best placed to serve a particular area or customer. Even with only one provider, consumers can be protected by the Universal Service being clearly specified.

There are important practical constraints on introducing contestability and particular models are likely to be effective in only certain circumstances. Auctions can be an effective means to ensure that a service is provided at lowest cost where there is the potential for multiple bidders (particularly where there is not an incumbent in the area already with significant sunk costs and scale economies) and where there is the ability to define the service precisely and monitor quality. Carefully designed auctions could prove useful where subsidies are to be provided to bring coverage for the first time to new areas as well as for the provision of public payphone services.

Comparative selection approaches ('beauty contests') may also be useful in relation to subsidies for investment to cover new areas and, compared with auctions, they enable a range of criteria to be taken into account. As such, they can help the regulator understand the trade-off between different service and subsidy levels.

Vouchers represent an alternative means of introducing greater contestability and provide for consumers to choose their provider and technology. Vouchers can also allow for greater targeting of support to the customers most in need. Vouchers may be particularly useful in relation to support for low income households and for customers with special needs where the services can be offered at relatively low cost to an operator's existing services. They are unlikely to be suitable for extending coverage to new areas as the subsidies may be dispersed across multiple providers increasing the risk that no one provider will find it economical to cover the area.

Play or pay arrangements are administratively difficult (given the need to monitor the quality of service provision for multiple operators) and may lead to inefficiency (e.g. if set too high, operators will be encouraged to 'play' even when they are not the most efficient providers).

## Funding Universal Service provision

With increasing competition in electronic communications markets, the traditional approach of requiring the incumbent operator to fund the USO risks significant market distortion. Further, competition from a diverse range of providers such as fixed, mobile and cable as well as an increasing variety of services and applications is also making industry funding models more difficult to design so that they do not cause significant distortions. In dynamic markets, regulation that effectively advantages one technology over others can cause serious long-lasting harm including through inhibiting the growth of more efficient technologies and weakening overall competitive pressures as the favoured technology receives a form of protection from rivals.

In this context, there are a number of strong reasons to meet any net cost of Universal Service provision through general taxation. The welfare loss of raising a given amount of revenue is substantially reduced by collecting that revenue over as wide a base as possible. Empirical estimates suggest that the welfare loss from funding from general taxation may be as little as one third or less of the welfare loss from an industry levy. The relatively small size of USO net costs estimated in a number of EU Member States (i.e. in the range of €30 to €110 million) also suggests that general taxation is more appropriate given the administrative costs of establishing and maintaining an industry levy.<sup>1</sup> Funding the Universal Service provision through general taxation is also likely to be more equitable, competitively neutral and transparent than an industry fund.

General taxation can also avoid additional problems that can result from poorly designed industry funds particularly the risk that competition and business decisions will be distorted from efficient levels. To the extent that industry funds are retained in particular Member States, the following principles are relevant:

- The welfare cost of the levy can be minimised by recovering the levy across as wide a base as possible;
- The levy should be imposed on all competing providers so as not to distort competition;
- The levy design should not distort firms' decisions in relation to their business structure particularly by being levied in relation to a provider's value added; and
- The design should aim to minimise the administration and compliance costs of the levy.

A levy imposed as a modification to a Member State's existing Value Added Tax system is likely to be superior to existing USO industry funds that apply to only some providers and do not accurately measure a providers' value added.

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<sup>1</sup> For instance, the net cost of the USO in France is equivalent to only 0.004% of French general government revenues and thus general taxation funding of the USO would not require any material changes to the taxes applied nor involve additional administrative costs.

## Estimating the net cost of Universal Service provision

The current Universal Service Directive requires that operators should be compensated for any net cost resulting from the USO. In practice, the process of estimating net costs has proved contentious and has often resulted in drawn out legal disputes with long delays before payments are made. Adherence to a set of principles would improve the process by which net costs are determined and improve the approach to assessing whether universal service provision represents an unfair burden. Key principles include:

- Net costs should be calculated as the amount of money that would be just sufficient to leave an efficient operator no worse off from providing the service than if the operator did not provide the service. Net costs should be calculated with reference to the long run incremental costs and benefits to the operator arising from provision of the service or equivalently the costs and benefits that the operator would avoid if it did not have to provide the service.
- Net costs should be estimated with regard to particular areas or groups of customers that are consistent with operators' investment decisions.
- The level of funds to be collected from particular operators and the level of funds to be paid to particular operators should be predictable. Regulators could provide greater certainty for the industry by carrying out a detailed costing exercise and then using the estimated amount, indexed by known trends, as the Universal Service net cost for a number of years before another costing exercise is undertaken. However, such an approach would require the underlying cost of service provision to be predictable and hence should not replace costing exercises where there are significant changes in the Universal Service scope or market changes. Maintaining a stable costing methodology can also help minimise uncertainty and support the sustainable provision of Universal Service, to the extent that Universal Service schemes are maintained going forward.



## 1. Introduction

In its Communication on the review of the regulatory framework for electronic communication network and services of 29 June 2006, the Commission stated:

“Responses to the ‘Call for Input’ on the Review, together with contributions received on the Commission consultation on the scope of Universal Service, suggest a need for a fundamental reflection on the role and concept of universal service in the 21st century, and raise questions on the balance between sector specific and horizontal rules for protecting consumers, and the feasibility of a one-size-fits-all approach to universal service in a Union of 25 Member States. For these reasons, the Commission intends to publish a Green Paper on universal service in 2007, to launch a wide ranging debate.”

The Commission has now indicated that it intends to release a Communication on USO reform during 2008. To assist the Commission in the preparation of its Communication, GSM Europe has commissioned CEG to assess the issues and policy options arising from reform of Universal Service policy.

In this report, we first present an overview of the current state of access to electronic communications across Europe. We then turn to consider issues associated with Universal Service reform in relation to four key areas:

- What should the objective and scope of Universal Service policy;
- Who should provide the services;
- How should service provision be funded; and
- How should the net cost of service provision be estimated.

We note that our report has benefited from comments from operators. Nonetheless, the views expressed are those of the authors and do not necessarily coincide with those of any operator.

## 2. State of access to electronic communications across Europe

In this section, we review the current levels of access to electronic communications across the EU with particular reference to mobile, fixed, public payphone and broadband services.<sup>2</sup> The aim is to identify where there are currently gaps in access to electronic communications and to examine the reasons for those gaps.

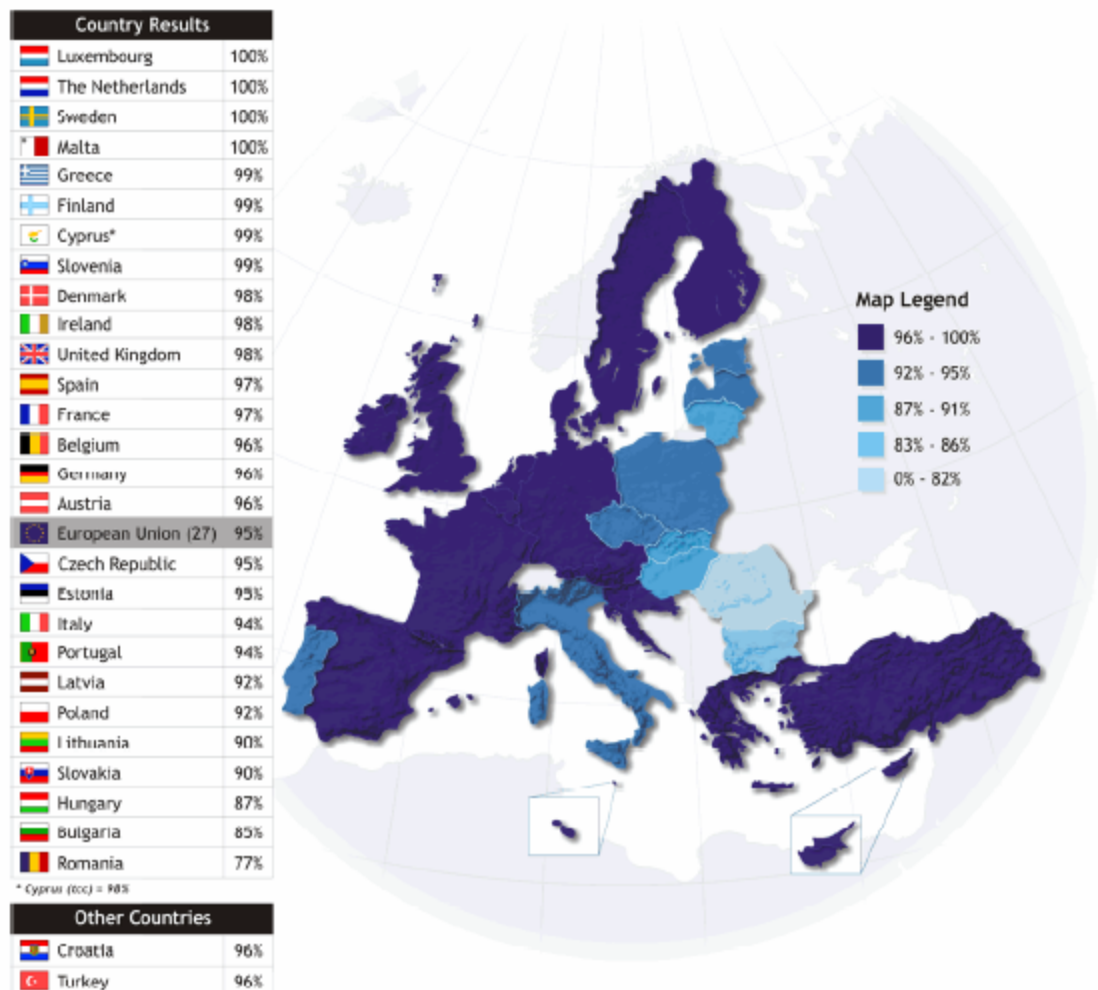
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<sup>2</sup> Unless otherwise stated, all figures in this section are from Eurobarometer, *E-communications household survey*, April 2007 (based on surveys conducted over November-December 2006).

## 2.1 High overall access to telephony but gaps remain in some areas

European electronic communications markets have generally functioned well to achieve high levels of access to telephony (i.e. households with at least one mobile and or fixed phone). On average across the EU, 95 per cent of households had telephony access at the end of 2006. As Figure 1 illustrates, the only Member States with more than 10 per cent of households having neither a mobile nor fixed phone were Bulgaria, Romania and potentially Hungary.<sup>3</sup>

Figure 1 – Household telephony access across the EU<sup>4</sup>



Looking at data for particular areas within Member States, telephony access is equally high at 97 per cent for households of the old Member States across metro (i.e. large towns), urban (i.e. small to medium sized towns) and rural areas. In the 12 new

<sup>3</sup> There are reasons to doubt the figure for Hungary as it implies a large drop in telephone access compared with one year earlier. Potentially some respondents using cable telephony may have answered that they had neither a fixed or a mobile phone.

<sup>4</sup> Percentage of households with at least one mobile and or fixed phone. Reproduced from Eurobarometer, *E-communications household survey*, April 2007, p.9.

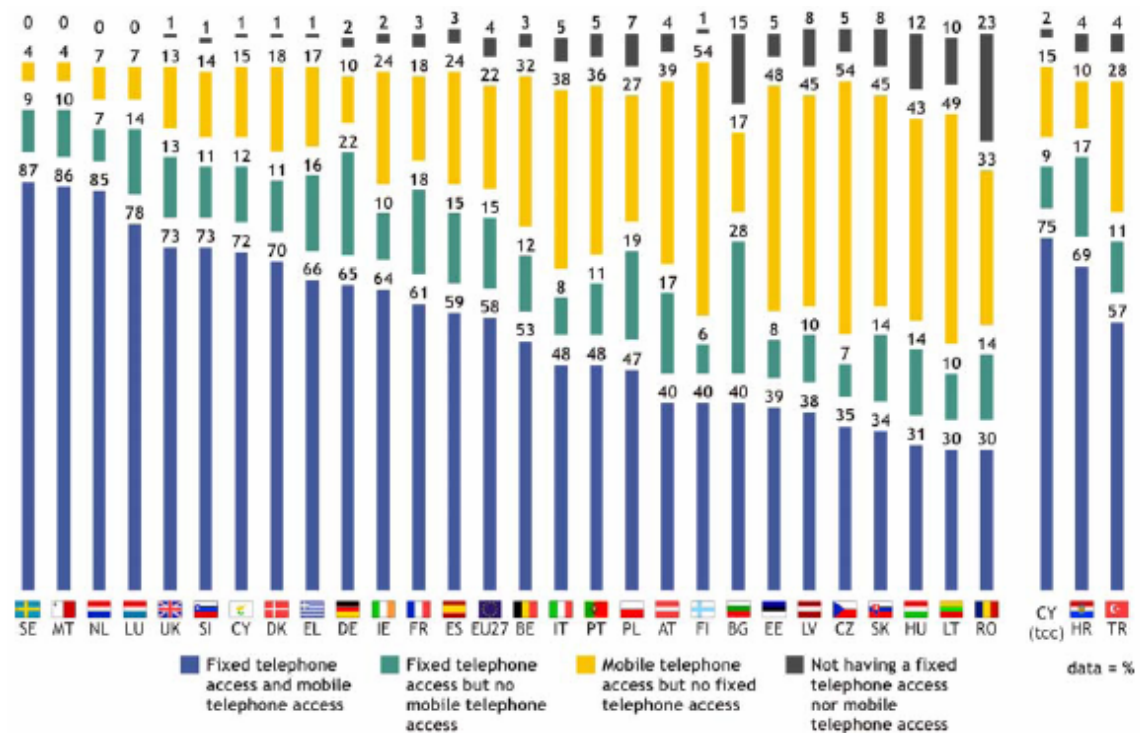
Member States, telephony access was 95 per cent in metro areas, 92 per cent in urban areas but significantly lower, at only 79 per cent, in rural areas.

## 2.2 Mobile services are now the leading means of telephony access

Mobile services have become the leading means of telephony access in the EU. 81 per cent of EU27 households had access to at least one mobile phone at the end of 2006. Mobile access was significantly higher than fixed telephony access at 72 per cent of households.

The leading role of mobile access compared with fixed access is particularly noticeable among many of new Member States as well as in Finland. Around half of all households in Finland, the Czech Republic, Lithuania and Estonia had only mobile access.

Figure 2 – Access to fixed and or mobile phones across the EU<sup>5</sup>

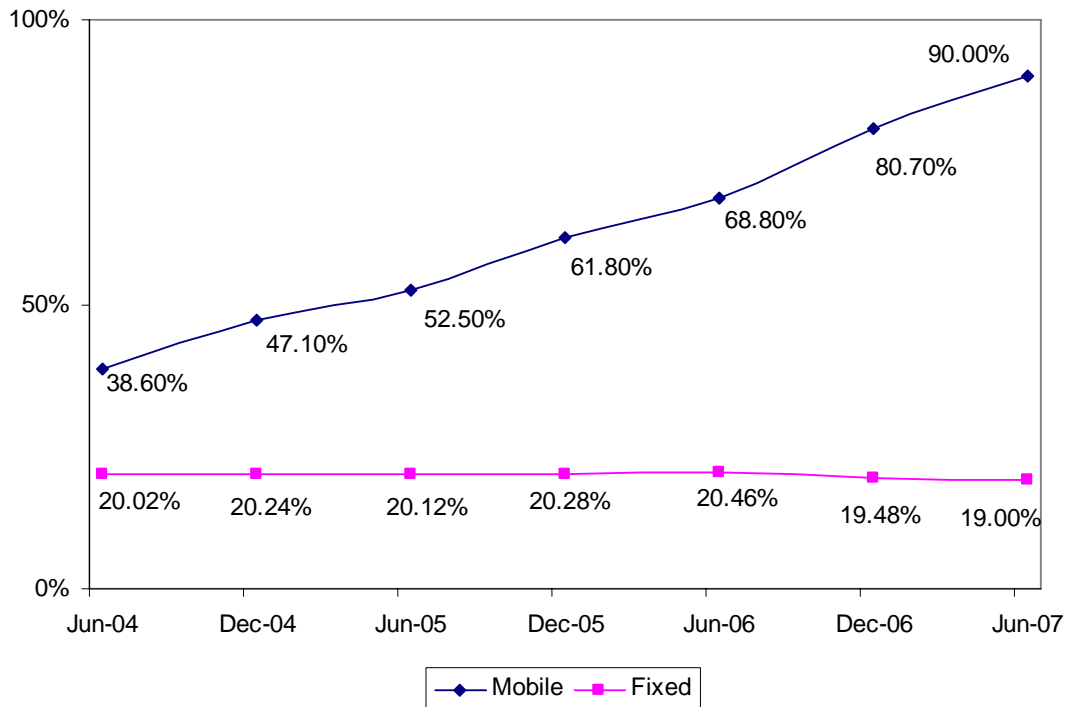


Mobile access has also been growing strongly in many of the new Member States where growth rates of 5 per cent or higher between end 2005 and end 2006 were common. In countries such as Romania with limited fixed penetration, mobile services have grown rapidly to greatly improve overall telephony access (see Figure 3). In contrast, the number of households with a fixed phone has been declining significantly in the EU down from 78 per cent of households at the end of 2005 to 73 per cent of households at the end of 2006.<sup>6</sup>

<sup>5</sup> Reproduced from Eurobarometer, *E-communications household survey*, April 2007, p.12.

<sup>6</sup> Eurobarometer, *E-communications household survey*, April 2007, p.5.

Figure 3 – Growth in mobile versus fixed penetration in Romania



Source: Data for 2004 - 2006 from the NRACTI. Data for 30 June 2007 is an estimate of Vodafone Romania

In old Member States with relatively low fixed penetration, such as Portugal, mobile services have played a similar role in achieving high overall levels of access to telephony particularly with the take-up of prepaid phones by low income households.<sup>7</sup>

The importance of mobile services to low income households has also been found in research for Ofcom. The research showed that that UK consumers under 65 living in low income households were much more likely to have a mobile phone (82 per cent) than a fixed phone (66 per cent).<sup>8</sup> Low income consumers were also much more likely that the average (33 per cent compared with 11 per cent) to live in mobile only households with this number increasing significantly between 2005 and 2006.<sup>9</sup> These consumers were predominately on prepaid plans. Ofcom’s research also found that UK consumers under 65 with a disability were as likely to have a mobile phone as the average for the population as a whole and indeed were more likely to be mobile only households.<sup>10</sup> The number of consumers with a disability who have a fixed phone is decreasing.

<sup>7</sup> The role of mobile phones in the growth in telephony access in Portugal is described in A. Carvalho, *Diffusion of mobile phones in Portugal: unexpected success?*, 15 March 2006.

<sup>8</sup> Ofcom Consumer Panel, *Consumers and the communications market: 2007*, p.19.

<sup>9</sup> Ofcom p.9.

<sup>10</sup> Ofcom, P.17

The rapid growth of mobile penetration reflects a range of factors:

- Widespread coverage across the EU with only a small share of the population without GSM coverage in some of the new Member States (see Figure 4). Many mobile operators have been under coverage obligations although they have not generally received Government or industry funding to meet those obligations.
- Vigorous competition. Almost all Member States have 3 or more mobile operators (as well as additional service providers) and the average of the market shares of the leading mobile operator in each Member State fell to less than 40% in 2006.<sup>11</sup>
- Ongoing price reductions. The price of a typical bundle of mobile services acquired by consumers fell by more than 20 per cent on average across the EU between 2004 and 2006.<sup>12</sup>
- The attractiveness of prepaid packages to lower income households. Ofcom's research found that the most common reasons for having a mobile phone and not a fixed phone were to control costs or keep them low (47 per cent), because they do not want to get into debt (13 per cent) or cannot afford the charges for a fixed phone (13 per cent).<sup>13</sup>
- The benefit of mobility (i.e. the ability to make and receive calls from anywhere), additional services (e.g. SMS) and personalisation (e.g. address books) that mobile phones offer in comparison with a fixed phone.

The presence of these factors can be expected to continue to increase mobile penetration, particularly in those new Member States where penetration lags significantly behind the current EU average and growth rates remain high. Measures to reduce operators' costs in providing mobile services can help support greater access to mobile voice and data services going forward.

The take-up of VoIP on fixed and mobile services seems unlikely to significant impact access to networks. Customers using VoIP would still need to contribute to the cost of access and data transmission and such costs are increasingly recovered through monthly charges. As such, VoIP does not represent a low cost form of telephony for light users which suggests that broadband access, independent of services, is unlikely to be an appropriate basis for the USO in the short-to-medium term.

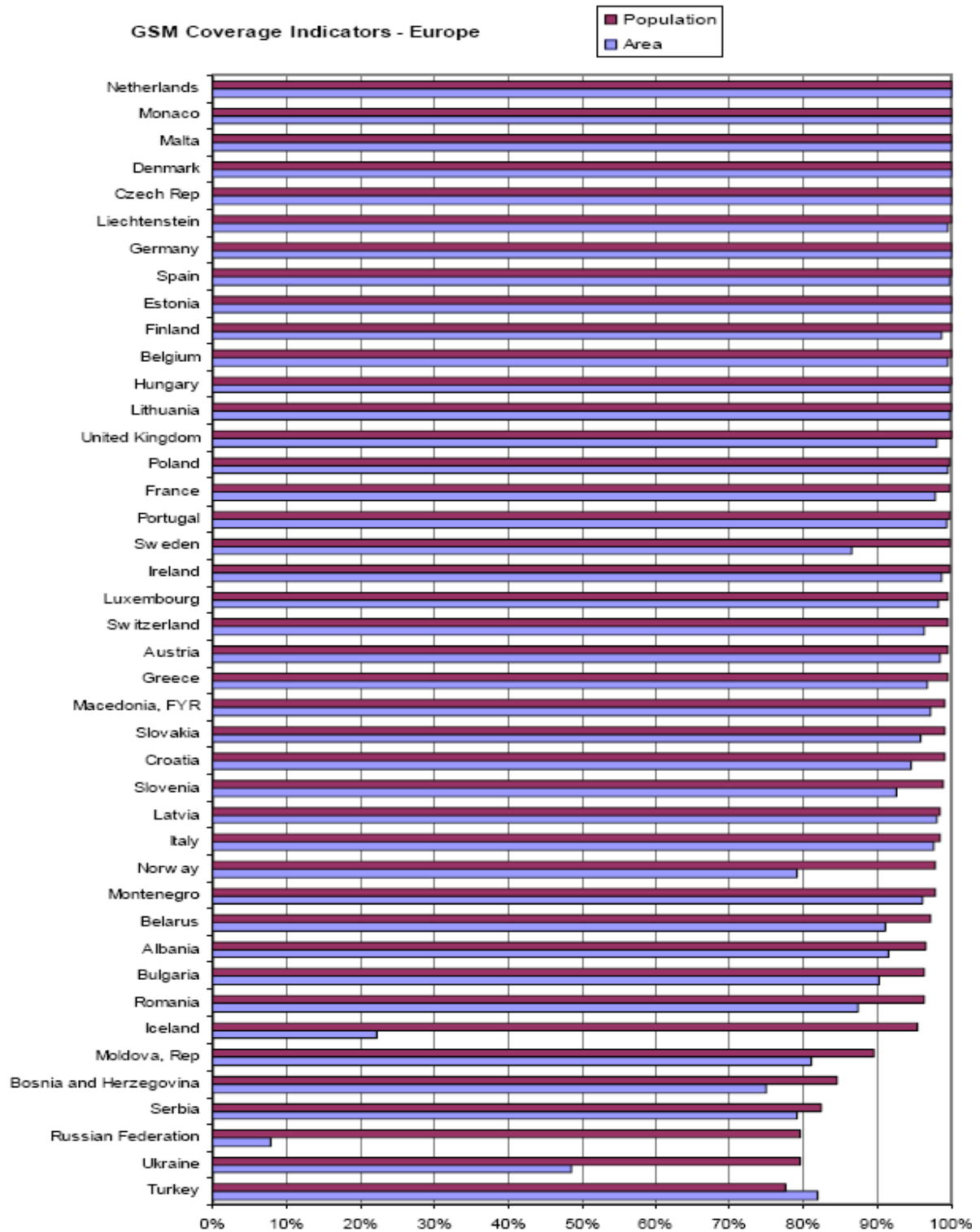
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<sup>11</sup> European Commission, 12th Implementation Report, Annex A, p.17.

<sup>12</sup> European Commission, 12th Implementation Report, p.8.

<sup>13</sup> Ofcom, 23.

Figure 4 – GSM coverage in Europe<sup>14</sup>



### 2.3 Limited use of payphones for regular communication

<sup>14</sup> GSM, *Universal access report*, p.8.

The use of payphones is limited and declining. Only 12 per cent of respondents to the Eurobarometer survey indicated that any members of their households had used payphones in the last year, down 3% over the figure from the year before.<sup>15</sup> Further, of those using public payphones, only around 20 per cent did so on a weekly basis. Ofcom's research has found that only 5 per cent of UK consumers use payphones at least once a month with this number falling from 2005.

Around a quarter of those using public payphones did so because they did not have a fixed phone with the other reasons given including that they were not able to use their mobile phone for various reasons (39 per cent) or they did not have a mobile phone and needed to make calls away from home (21 per cent).

#### **2.4 Broadband access is growing but from a low base**

Households with broadband access remain a minority in the EU but their number has been growing rapidly. 28 per cent of households had broadband access at the end of 2006 (up from 23 per cent the year before) while overall Internet access in the EU stood at 44 per cent. Broadband access varied greatly across the EU from 65 per cent of households in the Netherlands to 6 per cent in Greece (with the range between Member States growing over 2006).<sup>16</sup> Broadband penetration, measured as the number of broadband lines per 100 people, increased from 14.9% in July 2006 to 18.2% in July 2007.<sup>17</sup>

The main reasons given by households with narrowband for not having a broadband connection were related to their current use of the Internet not requiring broadband. Similarly, the main reason given by households with no Internet access was that no one in the household is interested in the Internet (45 per cent of respondents). 13 per cent said that the cost of a personal computer and modem was too high and 12 per cent said that the monthly subscription cost was too high. Households in some of the new Member States were particularly affected by cost factors while a lack of interest in the Internet was more frequently cited by households without Internet access in the old Member States. Ofcom's research found that most UK consumers without broadband did not see a need to get broadband rather than being excluded by cost reasons.

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<sup>15</sup> Eurobarometer, *E-communications household survey*, April 2007, p.6.

<sup>16</sup> Reproduced from Eurobarometer, *E-communications household survey*, April 2007, p.74.

<sup>17</sup> Communications Committee, *Broadband access in the EU: situation at 1 July 2007* (COCOM07-50), 15 October 2007.

**Table 2: Reasons for household with narrowband not having a broadband connection**

Reason	Percentage of households without a fixed phone
Satisfied with speed of narrowband	26
Do not use the Internet enough	16
Cost is too high	15
Plan to subscribe to broadband in next 2 months	12
No broadband coverage in local area	11
Equipment (eg PC) is not compatible	4
Not enough attractive content	3
Other	6

Source: Based on data in Eurobarometer survey.

The pattern of broadband growth internationally shows the key role of competition between different broadband platforms.<sup>18</sup> Differences in underlying cost and demand conditions also help explain the differences in broadband adoption across countries. For example, a key factor affecting the cost of broadband provision (and of course the provision of telecommunications services more generally) is population density.<sup>19</sup> Populations that live in relatively concentrated areas are less costly to serve and this may also better support the development of alternative networks. Demand-related variables that have been found to have a significant impact include income levels and the pricing of substitute products, particularly narrowband (dial-up) Internet.<sup>20</sup>

The degree to which competition has become established in the broadband market differs significantly across Member States. For instance, the incumbent operator still accounts for 98.3% of retail broadband connections in Cyprus but BT only accounts for 24.8% of broadband connections in the UK.<sup>21</sup> Regulated access to the incumbent's local loops may not yet be having a significant impact in some of the new Member States. Nonetheless, while such regulation can boost particular forms of competition, caution is also needed to ensure that the regulation does not discourage competitors from rolling out their own networks to a greater extent given that platform competition may bring greater competitive benefits in the longer term. Mobile broadband is increasingly competing with fixed broadband services. 3G coverage now exceeds 85% of the population in some Member States although it is

<sup>18</sup> Distaso, W., P. Lupi, F. Maneti, (2006), "Platform competition and broadband uptake: Theory and empirical evidence from the European Union", *Information Economics and Policy*, 18, at 89.

<sup>19</sup> See, for instance, J. Bauer, J.H. Kim and S. Wildman, (2003), "Broadband Uptake in OECD Countries: Policy Lessons from Comparative Statistical Analysis".

<sup>20</sup> Income was found to be significant by K. Flamm, (2005), "The Role of Economics, Demographics and State Policy in Broadband Availability", LBJ School of Public Affairs, Austin, Texas, while the significance of dialup prices was found to be significant by A. Chaudhuri and K. Flamm, (2005), "An Analysis of the Determinants of Broadband Access", LBJ School of Public Affairs, Austin, Texas.

<sup>21</sup> European Commission, 12<sup>th</sup> Implementation Report, Annex A, p.33.



much more limited in some of the new Member States.<sup>22</sup> 3G penetration is highest in Italy at 20 per cent (driven largely by relatively low call prices) and also high in Portugal, Luxembourg, UK, Ireland and Sweden.<sup>23</sup> Moreover, there are now 95 mobile operators in Europe using HSDPA that enables download speeds of 7.2 Mbps and HSUPA upgrades are being introduced to achieve higher upload speeds.<sup>24</sup> Ongoing technological evolution is expected to lead to substantial further data speed increases in the coming years.<sup>25</sup> Notebook PCs increasingly incorporate HSPA modems and SIMs so that customers do not need to install additional hardware to access mobile broadband. Mobile broadband prices have been falling significantly and are increasingly competitive with fixed broadband prices. For instance, Three in Ireland offers a 10GB mobile broadband package for €19.99 while eircom offers its 10GB fixed broadband package for €24.99.<sup>26</sup>

## 2.5 Conclusions

This section has reviewed the current state of access to electronic communications across Europe. Key findings are that:

- Current high levels of access to telephony in the EU reflect the combination of mobile and fixed services that are available. The level of access achieved calls into question the need for large ongoing Universal Service schemes. To the extent that such schemes are retained, they should be focused on access gaps in the newer Member States of Eastern Europe.
- Despite the current USO being focused on subsidised fixed services, mobile phones have become a leading means of telephony access in the EU and are the preferred means of telephony access for low income households. Mobile services are also important in bringing access to electronic communications to rural areas of the new Member States for the first time.
- While fixed access is declining, it remains an important means of telephony access and fixed call prices remain lower than mobile call prices.
- Public payphones are now used by only a small share of the population.
- Less than half of households in most Member States have a broadband connection and there are many Member States in which less than one fifth of households have broadband. The main reasons for a household not having broadband access relate to a lack of interest. European broadband markets are nonetheless highly dynamic with demand still growing rapidly and different technologies competing.

In the next section, we build on the analysis of the current state of access to electronic communications to consider how the objectives and scope of the USO should be reformed going forward.

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<sup>22</sup> A map showing both 2G and 3G coverage across Europe is available at [www.coveragemaps.com/gsmposter\\_europe.htm](http://www.coveragemaps.com/gsmposter_europe.htm)

<sup>23</sup> European Commission, 12th Implementation Report, Annex A, p.17.

<sup>24</sup> Based on a survey by the Global Mobile Suppliers Association. See, also, GSMA Case Study Series, "Mobilkom Austria – Mobile broadband has become a reality in Austria", 22 March 2007.

<sup>25</sup> Further information on the expected development of HSPA technology is available at <http://hspa.gsmworld.com>

<sup>26</sup> Company websites as at 15 January 2008.

### 3. Reviewing the objectives and scope of Universal Service

In this section, we first review the Commission's current tests for determining the appropriate scope of the USO and consider what objectives and principles should guide policy aimed at improving access to electronic communications services going forward. We then examine what policy approach is appropriate in relation to specific circumstances where intervention has been proposed.

#### 3.1 The objectives of Universal Service

As outlined in the previous section, the market environment in which electronic communications services are delivered in the EU today is very different from the situation in which the USO was initially introduced. The developments in electronic communications markets do not reduce the value of individuals having access to electronic communications. In fact, the benefits of communications access have undoubtedly increased as consumers can now access a greater range of services over communications networks. The significance of the market changes is that they raise questions over:

- (i) what specific services should governments ensure access to; and
- (ii) what is the best means of achieving that access.

As we will discuss, these questions are closely interrelated as the appropriate policy measure needs to be targeted at the specific objective and services that it is intended to address.

It is useful to first consider the Commission's current test for determining whether a service should be included in the USO. The current Universal Service Directive (Annex V) sets out the following criteria to be taken into account in determining changes in the scope of the USO over time:

- Are specific services available to and used by a majority of consumers and does the lack of availability or non-use by a minority of consumers result in social exclusion?
- Does the availability and use of specific services convey a general net benefit to all consumers such that public intervention is warranted in circumstances where the specific services are not provided to the public under normal commercial circumstances?

Cawley has referred to these as a combination of a majority use test and a market failure test.<sup>27</sup>

A majority use test alone would not provide a reliable basis for government intervention. If a majority of a population own cars or smoke tobacco, there is no reason as to why the government should seek to ensure universal car ownership or tobacco consumption. Rather it must be something in the nature of the particular

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<sup>27</sup> Cawley, R., "Universal Service: specific services on generic networks – some logic begins to emerge in the policy area", CoRR cs.CY/0109063: (2001), p.11.

communication service that warrants intervention to ensure universal access and why intervention is justified for that service but not for other products whose consumption might be considered desirable. Accordingly, the focus should be on the other components of the Commission's test, i.e. "the lack of availability or non-use by a minority of consumers [would] result in social exclusion" and "the availability and use of specific services [would] convey a general net benefit".

### **Social exclusion**

The term 'social exclusion' is not adequately defined in the Universal Service Directive. Social exclusion could potentially arise from not having access to a particular communications service because it would directly and significantly limit a person's ability to communicate with others or, more indirectly, because it limits a person's ability to participate in society more generally and/or access particular public and private services. Determining whether social exclusion would, in fact, arise requires an investigation of:

- (a) whether the inability to access the particular communications services would actually lead to social inclusion in a meaningful sense – this requires an examination of the specific communications needs and/or public or private services that are made available via the service;
- (b) whether regulatory intervention is necessary to ensure access or whether the service would still be available and affordable without intervention; and
- (c) whether there are substitute communications services or alternative means of accessing the public and private services that are available and affordable.

For more basic communications needs such as telephony, a range of technologies may be available that can effectively meet consumers' needs and hence an examination of all potential substitutes in those cases will be important. For more advanced services such as high speed Internet access, the risk of a lack of availability of the service in particular areas may be higher. However, such services are likely to be less important for social inclusion as key communications and information needs are likely to be met by more basic services (in a residential setting, higher bandwidth services primarily support online entertainment services). Even where it is found that access to a particular service can promote social inclusion, it is important that the expected benefit of the intervention is weighed against the expected costs including any direct cost such as higher prices for other consumers as well as longer term risks that may arise from distortions to competition and investment.

### **Market failure**

Market failures arise where a market left to itself does not lead to efficient outcomes, i.e. where there is the potential for resources to be re-allocated so that overall welfare would be improved. Economists identify four main causes of market failure: (i) where particular sellers or buyers have market power; (ii) where there are externalities so that a consumption or production activity impacts others who are not a party to the transaction; (iii) for public goods (i.e. products, such as national defence, for which consumption by one person does not reduce the amount available for another person and for which it is not possible to exclude particular consumers); and (iv) where there is incomplete or asymmetric information.

The existence of network externalities has provided the main economic rationale for USO intervention. In particular, an individual's decision to join a network can bring benefits to other subscribers in terms of being able to call and to be called by that individual more readily. In the absence of intervention, some individuals may choose not to subscribe to a communications network based on an assessment of their private benefits and costs of doing so even when their decision to subscribe may bring benefits to other subscribers so that overall welfare would be higher from them subscribing. Subsidising subscription costs to such individuals can in principle be welfare enhancing. However, network externalities do not imply *universal* access but rather measures to influence some consumers at the margin to join a network<sup>28</sup> and it is important to determine to what extent the market may lead to too few subscribers in practice. Further, the expected benefit of intervening should be weighed against the expected costs so as to ensure that there will, in fact, be a net benefit.

The existence of market power and incomplete or asymmetric information can also significantly impact access to electronic communications services. These problems are however addressed outside of the USO regime. Market power is addressed through policies to promote competition as well as through ex ante and ex post regulation. Information problems are addressed through consumer protection legislation as well as through government action to raise awareness of new technologies. One rationale for e-Government initiatives that make more public services accessible over the Internet is to encourage the more general take-up of broadband services.

In short, the existence of market failures suggests only a limited role for Universal Service policy although they do support more general policy measures that can help increase access to communication services.

We next turn to consider the future role for the Universal Service arrangements in relation to specific types of circumstances.

### **3.2 Reforming the scope of Universal Service schemes**

The previous section noted the need to go beyond the general objectives of Universal Service in terms of addressing social exclusion and market failure to consider the specific problems that would arise from a lack of access to a service as well as to assess the extent to which the market or alternative policy measures may effectively address these problems in practice. In this section, we consider specific circumstances in which a role for the Universal Service intervention has been proposed to determine whether those circumstances should form part of the scope of Universal Service schemes.

By way of introduction, we note that there are three general types of reasons as to why an individual may not use an electronic communications service:

- Lack of availability/accessibility (i.e. there may be no network coverage in the area where the individual lives or the individual may not be able to access the service due to their special needs);

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<sup>28</sup> For instance, a number of regulators have recognised that the level of termination charges can act to support lower prices to subscribers and thereby help to achieve a socially optimal number of subscribers.

- Lack of affordability (i.e. due to the individual's low income or because they live in a high cost area); and
- Lack of interest (i.e. the service may be available and affordable but the individual may choose not to acquire the service).

While the first two types of reasons do form the basis for USO regulation, all three types of reasons may potentially have an impact on service usage leading to differences in service take-up between customer types and even between countries. Indeed, the Eurobarometer survey found that key reasons for people not having a fixed or mobile phones or broadband access relate to a lack of a perceived need for one. However, there is little basis for government intervention aimed at encouraging consumers to use a service they have freely chosen not to.<sup>29</sup> An implication of this is that as electronic communications markets deliver a greater variety of services and applications over a range of technologies, there is unlikely to be a public policy reason to expect all consumers to access all services. Moreover, there would be a significant risk of reducing overall welfare if highly costly interventions are undertaken to try to encourage consumers to take-up services for which they themselves see little value in acquiring. Accordingly, where current take-up of services is relatively low amongst particularly consumers or in particular areas, it is important to determine the extent to which this is attributable to a lack of interest.

In determining the appropriate scope for Universal Service, we focus instead on the issues of availability/accessibility and affordability which reflect the role of Universal Service schemes as a safety net. We consider these issues in relation to the following specific circumstances:

- (i) where telephony services are not available in particular geographic areas;
- (ii) where telephony services are not affordable;
- (iii) the provision of public payphone services;
- (iv) the provision of services for consumers with special needs;
- (v) access to mobile services; and
- (vi) access to broadband services.

At the end of this section, we then conclude with our specific recommendations in relation to each of these cases.

### **(i) Lack of availability of telephony services**

There are reasons to believe that ensuring the widespread availability of telephony should be the focus of government universal access policies. First, social exclusion

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<sup>29</sup> Network externalities do provide a limited rationale as discussed earlier. Governments may also be able to contribute to the initial take-up of new services, such as through e-Government initiatives as discussed earlier, but generally providers of services can be expected to be well-placed to market their services.

arising from a lack of access to voice services is likely to be more serious than any effect from a lack of access to other services.<sup>30</sup> Second, there can be substantial benefits from improving availability particularly where it enables a significant number of people to access telephony for the first time. Improving availability can enable individuals who highly value telephony to acquire the service which is likely to generate greater benefits than policies that seek to induce customers to take-up a service who have freely chosen not to have the service. Improving availability may also help realise network externalities, particularly where a single operator is unable to fully capture the benefits to society from extending coverage to additional consumers. Promoting regional development can provide a further objective for extending coverage to new areas.

While ensuring the availability of telephony is important, it is also the case as outlined in Section 2 that this objective has already been achieved in many of the old, and indeed new, Member States which have high levels of both fixed and mobile coverage. For instance, the Eurobarometer survey found that only 1 per cent of respondents with no telephony access identified a lack of network coverage as the reason for not having either a mobile or fixed phone.<sup>31</sup> The focus of competition between mobile operators on providing high levels of coverage has been particularly important to this achievement.

To the extent that coverage gaps remain in particular Member States, governments should first consider whether current government policies may be acting to create an unnecessary barrier to greater availability. Such barriers could include:

- artificial scarcity of spectrum for communications services particularly at low frequency band (such as can result from restrictions on refarming or delays in re-assigning the Digital Dividend spectrum that can delay the realisation of cost savings and impact on the viability of extending coverage);
- restrictions on network sharing (particular forms of network sharing are able to support greater network rollout with little impact on competition particularly where the scope for service differentiation remains);
- restrictions on pricing which limit an operator's ability to recover some of the cost of network expansion from higher charges to customers who are able to pay those charges – indeed, the success of the mobile industry in achieving high take-up of services is in many ways attributable to flexible pricing practices just as aviation is also expanding rapidly with more flexible pricing; and
- excessive or protracted planning processes.

Only where such measures designed to make the market work better prove ineffective, would there be a case for considering other government measures to help extend availability. Government support for initial network deployment in new areas is captured by the objective of the EU's Structural Funds to "support the takeoff of economic activities in these regions by providing them with the basic infrastructure they lack, whilst adapting and raising the level of trained human resources and encouraging

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<sup>30</sup> An implication of this is that any extension of Universal Service beyond voice services should not be at the expense of making voice services less affordable.

<sup>31</sup> Eurobarometer, *E-communications household survey*, April 2007.

investments in businesses.”<sup>32</sup> Regional and local authorities can play an important role in identifying coverage needs and in aggregating public demand to improve the viability of network extensions.

Direct government support to help cover the fixed cost of network extensions has a number of advantages. One-off government payments for network development which seek to leverage private investment can be a lower cost means of promoting access to communications services compared with a USO involving ongoing consumption subsidies.<sup>33</sup> Further, providing specific financial support on a contestable basis for one operator to provide coverage in a non-economic area is likely to be more efficient than imposing obligations on all operators to provide coverage to that area as has commonly resulted from licence obligations.<sup>34</sup>

Where Government support is being considered to bring network coverage to new areas, the way in which that support is provided can significantly affect the resulting costs and benefits. The Commission has previously issued guidelines to govern the use of structural funds to support electronic communications.<sup>35</sup> The following principles can help ensure that support for network development generates a general net benefit:

- consideration should be given first to reducing barriers to the market provision of the service which may allow the coverage objective to be achieved without the need for a subsidy;
- support should not be provided where the market itself would result in network coverage in the relevant areas in the short-to-medium term – indeed, in many Member States, appropriate universal access may have already been achieved or be achieved by market developments in the near future so that further measures are unnecessary;
- any subsidies should be targeted at providing coverage to the areas where the subsidies will generate the greatest net benefits particularly noting that extending coverage to increasingly remote areas may bring little benefit (i.e. because of the small number of customers in those areas) while carrying the greatest costs;
- the subsidy should be limited to the smallest amount necessary, particularly noting the ability to leverage off private investment and the potential for greater pricing flexibility to enable a greater proportion of the cost of network deployment to be recovered from customers of the service; and
- the subsidy should be allocated in a technologically and competitively neutral manner, including considering the use of competitive tendering to determine which technology and provider can deliver the greatest net benefits taking into account considerations of effectiveness and efficiency. In this regard, the potential cost and timing advantages of using mobile services to bring telephony to new areas should

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<sup>32</sup> [http://ec.europa.eu/regional\\_policy/objective1/index\\_en.htm](http://ec.europa.eu/regional_policy/objective1/index_en.htm)

<sup>33</sup> Economic theory indicates that subsidies to cover fixed costs can be efficiency-enhancing, whereas consumption subsidies will generally reduce efficiency.

<sup>34</sup> In this regard, the FCC Chairman has argued that: “I do not believe it is viable in the long term to continue subsidizing multiple competitors to serve areas in which costs are prohibitively expensive for even one carrier” (Remarks of FCC Chairman, Kevin J. Martin to the Telecom 05 Conference of the United States Telecom Association, 26 October 2005.

<sup>35</sup> *Commission staff working paper - guidelines on criteria and modalities of implementation of structural funds in support of electronic communications*, 28 July 2003.

be recognised. One-off funding and funding of infrastructure and equipment that can be shared by all providers is likely to be less distortionary than ongoing consumption subsidies to one technology.

## **(ii) Lack of affordability of telephony services**

Problems of affordability have traditionally provided the rationale for USO policies aimed at improving access for low income households and for people living in high cost areas. Indeed, the Commission has stated the purpose of the USO as providing a “safety net of universal service for those whose financial resources or geographical location do not allow them to access the basic services that are already available to and used by the great majority of citizens and which are considered essential for participation in society.”<sup>36</sup>

The need for an ongoing USO to ensure affordability of telephony is again called into question by the success of competitively provided mobile services as well as increasing competition for fixed services. The evidence discussed in Section 2 shows that low income households are particularly attracted to mobile phones and account for a disproportionately high number of mobile only households. This reflects the attractiveness of prepaid phones that can represent the lower cost alternative to a fixed phone with regular line rental charges and the benefit of better budget control. Mobile services can also be an affordable means of telephony in rural areas given that they tend to be offered at national uniform prices.

To the extent that there remains a demonstrable problem arising from a lack of affordability in particular Member States, it is important to diagnose the reason for the lack of affordability. Fundamentally, a lack of affordability could result from either prices being set artificially high or consumers lacking the money to pay the actual cost of the services. If prices are artificially high because of a lack of competition then regulators already have appropriate instruments to promote competition and/or address market power under the European regulatory framework. Prices may also be artificially high because of the impact of specific government policies and particular barriers that may impact service provision have been discussed earlier.

If the problem is instead that consumers cannot afford to pay the actual cost of the services, then the obvious solution is to ensure that households receive sufficient income support so that they are able to afford them. General income support is likely to be preferable to subsidies to a particular communication service as it allows the household to determine how best to meet their needs given their limited resources. The problems with governments trying to select where households should spend their money is that they frequently make poor choices – for instance, despite subsidies to fixed services being available, low income households are increasingly turning to mobile services as their sole means of telecommunications access. Subsidies to fixed services that are funded by making mobile services more expensive would end up harming these low income households. Accordingly, even if some stakeholders view the USO as a desirable additional means of redistributing income, at best it is poorly targeted (given that some low income households may have greater demands on their budgets) and at worse it may harm some of the group it is intended to benefit.

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<sup>36</sup> European Commission, Communications on the Review of the Scope of Universal Service in accordance with Article 15 of Directive 2002/22/EC, 24 May 2005, p.2.



Network externalities do provide a limited rationale for intervention to improve the specific affordability of certain communications services (i.e. two-way communications services such that an individual's decision to join a network will impact on other subscribers who may be called by or who may call that individual). As discussed above, network externalities support measures to encourage additional customers at the margin to subscribe to a network (i.e. involving a need to balance the social benefit from the additional customer joining with the social cost arising from funding them to join).

Network externalities are likely to be particularly relevant in new Member States, such as Bulgaria and Romania, where a significant proportion of the population have neither fixed nor mobile access and there is a good prospect of penetration increasing significantly.<sup>37</sup> Measures to improve affordability include vouchers providing some discount off commercially set prices and that can be targeted to low income households who may be keen to subscribe if affordability is improved. Eligibility should be based on criteria directly relating to income such as receiving welfare payments rather than other measures such as low usage that can be a poor means of targeting low income households. Intervention based on the externality rationale would also be more likely to generate a net overall benefit where the funding is recovered in manner that minimises distortions particularly general taxation (we consider this further in Section 4).

We next consider problems of affordability due to the higher cost of service provision in rural and remote areas. Such problems have tended to be considered separately from affordability due to low incomes, however, separating the two may not be sensible from a public policy perspective. In particular, general subsidies to consumers in rural areas are likely to be a poor means of improving access given that many consumers living in rural areas have income levels (particularly income net of housing costs) that are above the level of some of the urban households.<sup>38</sup> Some households in rural and particularly remote areas will also be holiday homes which would make doubtful recipients of subsidies provided for reasons of social inclusion. Rather, income support should be targeted to low income households (which are primary residences) in both urban and rural areas, with potentially a greater level of income support to low income household in rural areas if costs are greater.

In summary, the lack of affordability of telephony services is unlikely to be a problem in Member States given the success of mobile services. To the extent that intervention is considered necessary, this should be targeted at low income households and potentially take the form of general income support or vouchers offering some discount off commercial prices.

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<sup>37</sup> In other Member States with virtually ubiquitous fixed and mobile access, network externalities are unlikely to provide a reason for government intervention (albeit, as with the case of Ofcom in relation to mobile termination, they may imply affect the optimal choice of intervention for other reasons).

<sup>38</sup> For instance, in the UK, a greater percentage (23%) of people living in urban areas are low income compared with the percentage of low income people in remote rural districts (19%) and in accessible rural districts (16%) (New Policy Institute, *The Poverty Site*).

### **(iii) Provision of public payphone services**

As discussed in Section 2, only a relatively small, and declining, share of the population (12 per cent of EU households) use payphones and most of these people use payphones relatively infrequently.

The declining use of public payphones warrants a review to determine what current payphones requirements are no longer appropriate given that the cost of maintaining them outweighs the benefit of doing so. In areas where mobile penetration is already high and in areas where payphones would be economically provided without the need for regulation, a requirement to maintain extensive public payphones is unlikely to be needed for reasons of social inclusion and would risk displacing the commercial services.

To the extent that a number of households do rely on particular public payphones as their main means of communications, it will be important to carefully identify these phones. Local or regional authorities may be best placed to undertake such an exercise although this should be within an overall framework that provides for an assessment of the benefits and costs of maintaining certain numbers of payphones in particular areas. Further, contestable models of service provision should be considered including the potential for the needs of households reliant on public payphones to be met with prepaid phones.

### **(iv) Provision of services for consumers with special needs**

It is important that Governments ensure that consumers with special needs are not excluded from access to key communications services. In particular, the development of modified services may not always be commercially profitable. That said, some commercially provided services have resulted in large benefits to consumers with special needs such as the ability of customers with hearing impairments to use text messages. Indeed, Ofcom's research found that UK consumers under 65 with a disability were as likely to have a mobile phone as the average for the population as a whole and indeed were more likely to be mobile only households.<sup>39</sup> Further, many operators have recognised the need to ensure accessibility of services for consumers with special needs as part of their corporate social responsibility.

A number of steps can be undertaken to determine the appropriate provision of services to customers with special needs:

- first, given the gaps in services currently provided, identify the specific needs of different customer groups (particularly by directly surveying customers in key groups including hearing impaired customers, profoundly deaf customers, sight impaired customers and customers with impaired motor function);
- identify what services would best address those needs taking into account the expected benefits and costs so as to ensure that funds are used to maximum benefit;<sup>40</sup> and then

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<sup>39</sup> Ofcom, P.17

<sup>40</sup> In principle, the targeted consumers should prefer to receive the service rather than a cash payment equivalent to the per customer subsidy that the service would cost to provide.

- identify which operator (or operators) is best placed to provide each particular service (we consider contestable models of Universal Service provision in Section 4).

It is unlikely to make sense to impose an obligation on all operators. If operators are not currently providing a service, this suggests that it is uneconomic to offer that service and that provision of the service will require funding from other sources. Imposing an obligation on all operators would risk wasting funding on duplicated services which could instead be used to fund a greater variety of services (for instance, different operators could target customers with different types of needs). Even if one operator offers a particular customised service, consumers can be protected by funding to the particular operator being provided on the condition that the service is offered on equivalent terms to similar, commercially provided, services.

#### **(v) Access to mobile services**

In Section 2, we noted the high level of access to mobile services across the EU and that mobile phones have become the leading overall means of access to telephony. Further, low income households account for a disproportionately high number of mobile only households reflecting the attractiveness of prepaid phones to this group. Competition and pricing flexibility have been critical to the success of mobile phones.

In the context of a longer term review of Universal Service, the specific role of mobile services warrants examination.

First, as mobile services have become the preferred means of telephony access for many low income households, it is important that policy should not inadvertently reduce the affordability of mobile services including through the imposition of a levy on the industry.

Second, to the extent that gaps in access to communications services remain, governments should examine what measures they can take to support the ongoing competitive supply of affordable mobile services. Indeed, growth in mobile subscription is already significantly reducing the remaining telephony gaps in the new Member States. As discussed above, key measures that can reduce the cost of providing mobile services and improve the profitability of extending mobile networks, including 3G networks, to the high cost areas that are not currently served include ensuring the availability of sufficient spectrum (particularly at low frequency bands), permitting network sharing and streamlining planning processes.

As well as measures which facilitate the commercial provision of mobile services, some Governments have also directly helped fund the extension of mobile networks, taking into account that the remaining underserved areas are likely to be extremely costly to cover. For instance, the French Government and local authorities have contributed funding for passive infrastructure such as towers to support the extension of mobile coverage to areas that were not currently served.

To the extent that Universal Service subsidies are maintained then regulators should examine the extent to which mobile operators may be best placed to provide the service. In Section 4, we consider the role for contestable models for Universal Service provision. A number of Member States, including Belgium, Finland and Sweden, have

already recognised mobile services as being a means to meet Universal Service objectives.

A final issue is whether mobile services should be subject to a separate new USO, such as may result from an obligation to provide access at any location. There are a number of reasons which suggests that a separate mobile USO is inappropriate:

- competitive markets already result in highly affordable mobile services and services provided at nationally uniform prices;
- in most Member States, households that currently do not have a mobile phone have largely made that decision because they do not perceive they have a need for one.<sup>41</sup> While cost is a factor in some new Member States, subscriber growth in these countries is strong suggesting that any cost barrier will soon be overcome by the market itself; and
- in any event, the absence of access to mobile services does not appear to result in any significant social exclusion.

#### **(vi) Access to broadband services**

Raising broadband access is a priority of many governments and the level of broadband penetration has become a key indicator by which the success of a country's overall communications policies are measured. The European Commission has noted that:

"The access to high speed internet through "broadband" connections is opening up huge possibilities and constitutes concrete evidence of the promises of the "information society". The benefits of broadband are such that the inability to have access to it is an issue which should be addressed urgently."<sup>42</sup>

A first step to identify appropriate policies in relation to broadband access is to analyse the current state of access across the EU. As discussed in Section 2, key features of EU broadband markets are:

- Households with broadband connections remain a minority in all but two Member States and represent less than one fifth of households in many Member States.<sup>43</sup>
- Broadband markets in the EU are highly dynamic with an increasing range of technologies and with demand growing rapidly. The main existing technologies are rapidly developing with DSL and cable services being upgraded to provide faster speeds and with HSPA delivering faster speeds over 3G. Fibre is being rolled out in some urban areas, broadband over power-lines is being introduced and broadband wireless services such as WiMax together with 3G and satellite services is offering the potential to improve access to broadband services in rural and under-served areas.

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<sup>41</sup> See, for instance, the survey evidence in Eurobarometer, *E-communications household survey*, April 2007.

<sup>42</sup> European Commission Communication, *Bridging the broadband gap*, 20 March 2006, p.3.

<sup>43</sup> Eurobarometer, *E-communications household survey*, April 2007.

- The main reason for households not having broadband relate to either not being interested in the Internet or that narrowband is sufficient for their Internet use.<sup>44</sup> Cost was only identified by 15 per cent of narrowband households as a reason for not having a broadband connection.

These features of the current state of access to broadband have a number of policy implications. With only a minority of households with broadband access currently across the EU (and indeed only a small minority of households having broadband in many of the new Member States), a policy that sought to rapidly increase penetration through usage subsidies would be hugely costly. For instance, providing a €5 subsidy per month for each EU household currently without broadband would result in a total cost of €9 billion per year *if fully taken up*. If such a subsidy were required to be raised from general telecommunications services, the effect of providing broadband usage subsidies could be to significantly reduce the affordability of more basic voice services.

Subsidies that effectively favour one operator or technology over others may also carry indirect costs through distorting market and technological development and this risk would be exacerbated where subsidies for one operator are funded from taxes on competing operators. Ofcom has previously noted that:

“the efficiency case for a broadband USO is not compelling...[due to] still limited take-up, the dangers of distorting the market (through non-technology neutral intervention at an early stage of market development), the lack of convincing efficiency or social policy arguments for universal broadband access and the number of existing private and public broadband initiatives”.<sup>45</sup>

Despite their costs, usage subsidies are likely to be of limited effect. As noted above, a large proportion of people without broadband are simply not interested in having broadband at this time. While there are relatively few studies of the responsiveness of demand for broadband to price changes, one study found a price elasticity for broadband access of -0.22.<sup>46</sup> Assuming an average monthly cost of a broadband subscription of €25, offering a €5 subsidy per month to all EU households currently without broadband would be expected to lead to an increase in EU broadband penetration from 28% to only 29.2%.<sup>47</sup> Even if the demand elasticity was twice the level found in the study, penetration would only increase by around 2.5 percentage points. Further, given the current rapid growth in broadband penetration, a large proportion of usage subsidies may simply be wasted in being paid to people who would have acquired broadband anyway.

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<sup>44</sup> Ibid.

<sup>45</sup> Ofcom's response to the European Commission's "On the review of the scope of the universal service in accordance with Article 15 of the Directive 2002/22/EC", 24 May 2005.

<sup>46</sup> Flamm, K. and A. Chaudhuri, "An analysis of the determinants of broadband access", presented at the Telecommunications Policy Research Conference Washington, DC, September 24, 2005 (based on US data). The authors criticise assumption of a very high price elasticity made in some earlier studies – price elasticity would also be expected to be higher in the initial years of broadband development when less applications and content were available leading to weaker demand.

<sup>47</sup> The cost of providing the subsidy for the limited number of households currently without broadband who would be expected to take it up would be €154 million per year. The cost would clearly rise proportionately, the greater the number of households who do take up the subsidy.

Studies of the factors leading to higher broadband penetration in particular countries and growth in broadband penetration over time can help in determining what policies are likely to be most effective in raising broadband access while minimising direct and indirect costs. Government policy should not aim to increase broadband penetration at any cost but rather to identify areas in which the market is not working optimally today and where policy measures could lead to net benefits.

As noted in Section 2, a number of econometric studies have found that platform competition plays a strong role in leading to higher broadband take-up. The impact of platform competition suggests that governments should attach priority to creating the conditions to encourage investment in multiple broadband platforms and should avoid policies that would act to strengthen the dominance of one player.

With the faster speeds offered by HSPA technology, mobile broadband has greater potential to provide an additional source of competitive pressure. Governments can help realise the competitive potential of mobile broadband through improving the availability of low frequency spectrum for 3G including through timely refarming and access to spectrum previously used for analogue broadcasting. A study for the GSMA found that enabling the use of 3G at 900MHz could generate cumulative capex reductions of 40% over a five year period compared with limiting 3G use to 2100MHz.<sup>48</sup> These cost savings could support lower mobile broadband prices and more widespread mobile network rollout and thereby more intense platform competition. Access to analogue broadcasting spectrum would lead to even greater cost savings given the lower frequency band. Mobile broadband can be expected to be particularly significant in those Member States with limited fixed networks.

While platform competition can be expected to generate substantial benefits in terms of price, quality of service and the introduction of new services, broadband network deployment may not be commercially viable in all areas. For instance, the cost of deploying DSL and cable services is likely to be prohibitively expensive in many rural and remote areas given the limited potential customer base over which to recover the costs. One means of supporting the commercial extension of networks to less densely populated areas is to permit operators to reach network sharing agreements in those areas so that the cost of the network extension can be recovered across a larger volume of calls. Network sharing agreements do not imply a loss in competition as they can be structured so as to maintain the scope for service differentiation and, in many cases, operators will face competition from other networks.

There may, in addition, be a case for targeted public funding to support the availability of broadband to potential customers in rural and remote areas where the commercial provision of broadband is unlikely to occur in the short-to-medium term. Such public funding, including through Structural Funds, could particularly help to accelerate the development of rural areas in some of the new Member States. One economic study found that subsidising the expansion of broadband coverage to previously unserved areas would generate substantially higher welfare gains than from subsidising usage:

“A subsidy to usage tends to induce adoption by people with low valuations of the new product, and its revenue cost exceeds the gain in consumer surplus. An investment subsidy potentially extends the product to users with particularly high valuations who previously did not have access; therefore, its efficiency cost

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<sup>48</sup> Ovum, *Market study for UMTS900*, February 2007.

is much smaller as a share of revenue. Although the absolute number of new users is smaller with the investment subsidy than with the usage subsidy, welfare gains are approximately four times greater.”<sup>49</sup>

While such subsidies can potentially generate significant welfare gains, care should be taken to avoid subsidising investment in areas where it is commercially viable to rollout broadband coverage. In such cases, the subsidies may simply displace commercial investment and, worse, risk creating local monopolies. Any subsidies to rural and remote areas should also be subject to a cost benefit analysis and be put to competitive tender on a technologically neutral basis.

Policies to support the extension of broadband coverage, rather than extending the USO to broadband, have previously been advocated by the OECD<sup>50</sup> and by Richard Cawley of the European Commission in the context of USO reform. In particular, Cawley has argued that the solution to deal with growing political demands for measures to support broadband access is to focus universal access policies on ensuring universal *availability* of broadband access rather than seeking to achieve universal *affordability* of broadband access which he regards as excessively costly particularly with the EU now including the new Member States.<sup>51</sup>

Finally, the Commission's earlier consultation considered a proposal to reshape the USO to focus on the provision of access to a network as distinct from the provision of specific services. Such an approach risks leading to the development of a Universal Service policy that is divorced from the specific customer needs relating to social inclusion that should be its objective. A USO relating to the provision of access to a network may be insufficient to ensure that the needs of particular customer groups are actually met if, say, the provider does not have the incentive to offer all services required for social inclusion. Alternatively, a USO relating to network access may be defined in terms of technical parameters, such as bandwidth speed, that go beyond those actually required for the necessary service. Further, access may unnecessarily exclude particular technologies that are capable of delivering the service. Access regulation in areas where platform competition is limited does play an important role in supporting the provision of competitive services. However, such access regulation is appropriately determined under the general regulatory framework. USO policy should instead be targeted at the delivery of specific services required for purposes of social inclusion.

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<sup>49</sup> Goolsbee, A., “Subsidies, the Value of Broadband, and the Importance of Fixed Costs”, in *Broadband: should we regulate high-speed internet access?* (Robert W. Crandall & James H. Alaman eds., 2002), p.79-80.

<sup>50</sup> See, for instance, OECD, *Rethinking universal service for a next generation network environment*, 18 April 2006, p.37-43.

<sup>51</sup> Cawley, R., “Universal Service: specific services on generic networks – some logic begins to emerge in the policy area”, CoRR cs.CY/0109063: (2001).

### 3.3 Conclusions

The discussion of this previous section highlights that there is not a unique objective for government intervention in relation to promoting access to communications services. Rather there is a range of underlying objectives and the best means to meet specific objectives is likely to vary. In many Member States with high availability and affordability of services, it is questionable whether there remains a rationale for continuing the USO.

In other Member States where policies to promote access may still be relevant, governments should target any Universal Service policies at the specific problem that is intended to be addressed. Obliging a particular provider to deliver a service is only one means of promoting access. There are also a number of principles that should guide the overall choice and design of approach. These include first considering the potential to remove barriers to the commercial provision of the services, designing any support in a competitively and technologically neutral manner and finally ensuring that the measure will actually deliver greater benefits than costs. The range of considerations to be taken into account suggest that the best policies to address particular objectives are likely to vary between Member States and even within Member States, i.e. as targeted customer groups and costs of provisions vary.



## 4. Who should provide the Universal Services?

In this section, we first examine the general role for contestable models in determining the Universal Service provider and then turn to assess the appropriateness in particular circumstances of the main types of models including auctions, comparative selection, vouchers and play or pay schemes.

### 4.1 The role for contestability in Universal Service provision

The benefits of contestability in the universal service regime arise from the potential for competition for the market (i.e. where it is economic to have only one provider) and/or competition within the market (i.e. where it is efficient for there to be competing providers of Universal Services within a given market). Competition for the market is focused on identifying and assigning the obligation to the operator who can best provide the service particularly in providing the service at lowest cost. Where competition within the market is efficient<sup>52</sup>, there may be additional benefits of customer choice and service differentiation. Contestable models such as auctions can also help reveal the net cost of Universal Service provision in terms of what is the smallest subsidy that an operator would accept to voluntarily choose to provide the service.

Considering the extent to which different providers and different technologies may meet a particular Universal Service objective may also provide a useful check on whether any intervention is still required as it may be that a combination of providers is already effectively achieving the objective through their commercial provision of services.

Article 8 of the current Universal Service Directive requires that Member States determine which operator(s) should provide the USO using:

“an efficient, objective, transparent and non-discriminatory designation mechanism, whereby no undertaking [operator] is a priori excluded from being designated. Such designation methods shall ensure that universal service is provided in a cost-effective manner and may be used as a means of determining the net cost of the universal service obligation in accordance with Article 12.”

The Directive plainly envisages that the USO should not be automatically assigned to one operator but that provision should be contestable.

The extent to which contestability has actually been introduced across the EU has been limited to date. The use of open tenders to determine the USO provider has been confined to particular new Member States (i.e. Cyprus, the Czech Republic, Estonia, Hungary, Poland and Slovenia). In a few other cases, a designation process was adopted using a public consultation and administrative selection. However, in other Member States, the incumbent operators are still effectively designated under legal provisions still in force for a transitional period from the old regulatory framework. Further, in most Member States, the incumbent operator continues to be designated as

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<sup>52</sup> For instance, multiple providers may be efficient where subsidised services can be provided as a small addition to an operator's existing services such as services for low income households in areas where the operator is already present.

the USO provider. Only in Estonia, does an alternative operator provide the whole USO, albeit without compensation. In some other Member States, including Belgium and the Czech Republic, alternative operators provide some USO services.

The limited success of contestability to date does suggest a need to carefully consider under what circumstances particular contestable models may be useful and how best to implement those models. Table 3 provides an overview of different contestability models which we consider in more detail in the remainder of this section.

**Table 3: Options for providing Universal Service**

Option	Advantages and disadvantages
Reverse auction (auction of Universal Service provision to carrier requiring least subsidy)	<p>Advantages:</p> <ul style="list-style-type: none"> <li>• May be appropriate for areas of new coverage</li> <li>• May be appropriate for payphones where scope of service becomes narrowly defined</li> <li>• Appropriate where there are economies of scale in universal service delivery to particular groups/areas</li> <li>• Identifies and allocates to least cost provider</li> </ul> <p>Disadvantages:</p> <ul style="list-style-type: none"> <li>• The obligation must be well specified</li> <li>• Possibility of suboptimal trade-off between quality of service and cost of provision</li> <li>• Efficiency requires multiple providers to bid</li> </ul>
Comparative selection	<p>Advantages:</p> <ul style="list-style-type: none"> <li>• May also work well in areas of new coverage</li> <li>• Enables providers to put forward proposals against a range of criteria (such as new services and speed of rollout) in addition to the subsidy required</li> <li>• Allows optimal trade-off between quality and cost of service provision</li> </ul> <p>Disadvantages:</p> <ul style="list-style-type: none"> <li>• Vulnerable to regulatory bias in favour or against the incumbent</li> <li>• May not result in least cost provision</li> <li>• May lead to disputes</li> </ul>
Vouchers supplied to particular interest groups (poor, disabled, homeless)	<p>Advantages:</p> <ul style="list-style-type: none"> <li>• Can help improve targeting of subsidy</li> <li>• Appropriate for areas and services where there is the potential for multiple providers</li> <li>• Improves targeting of subsidies</li> <li>• Gives governments clear budgetary control</li> </ul> <p>Disadvantages:</p> <ul style="list-style-type: none"> <li>• Still requires level of subsidy to be set</li> <li>• Not feasible for extending networks to new areas</li> </ul>
Pay or play	<p>Advantages:</p> <ul style="list-style-type: none"> <li>• Allows competing operators the option to provide services where the level of subsidy makes them economic</li> </ul> <p>Disadvantages:</p> <ul style="list-style-type: none"> <li>• May lead to inefficiency (e.g. if subsidy set too high)</li> <li>• Administratively difficult given the need to monitor quality of service for multiple operators</li> </ul>

Before considering specific contestable models, it is also worth noting one particular risk of introducing contestability where funds are available to any operator meeting certain criteria. This has been the approach in the US in relation to the provision of support for operators in high cost areas. The cost of the high cost support program has grown from around US\$2.6 billion in 2001 to around US\$4.2 billion in 2006.<sup>53</sup> This explosion in the size of the fund has led the Federal State Joint Board on Universal Service to recommend that the FCC take immediate action to contain the growth in high universal service support fund by imposing an interim, emergency cap on the amount paid to competitive carriers, such as mobile networks. The cost explosion in the USA highlights the substantial economic cost that can be created by having multiple operators provided subsidised services.

## 4.2 Auctions and tenders

Auctions can help reveal the smallest subsidy required for the Universal Service to be provided and which operator or operators can best provide the service. As such, auctions can overcome the informational difficulties the regulator faces in determining the efficient size of the subsidy and to whom it should be allocated. Indeed, if an operator is prepared to bid a zero subsidy then an auction can demonstrate that a USO is no longer required.

A drawback of an auction, however, is that it requires the regulator to specify precisely the nature of the service to be provided and it does not allow for operators to present proposals with differing combinations of service levels and subsidies. As a result, governments may not have a good understanding of the trade-off between different service levels and the required subsidy.

It is also important to determine the features of markets that make it more or less likely that auctions would work well. Key features of markets which impact on the success of auctions are:

- a) the extent to which the economics of the market imply that service provision is contestable – for instance, if an operator with high sunk costs is already providing the service in the area then it is unlikely that other providers would be able to compete to be the Universal Service provider and an auction may result in an unnecessary high subsidy being paid;
- b) the ability to define and monitor the terms and quality of service – once an operator wins the auction, it will have the incentive to minimise its costs in providing the service; and
- c) the degree to which the main objective is cost minimisation – if the best trade-off between service levels and required subsidies is unclear then a comparative selection process is likely to be superior (see the next subsection).

Auction theory is increasingly sophisticated and there is a growing literature on its potential application to Universal Service provision. However, its application to Universal Service provision in practice is limited (we discuss below some applications within the EU and in Australia).

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<sup>53</sup> These figures refer to the size of the USF for serving customers in high cost areas.

It is difficult to discuss the merits of an auction without discussing a particular design. One particular proposal, that has received significant attention, is that of the GTE Group to the FCC in the US. The GTE proposal is summarised by Alleman, Rappoport and Weller:

“... the regulator should first define the universal service obligation it wishes carriers to undertake. We also define the market area for which this obligation would be assigned, suggesting that these should be relatively small, standard geographic areas. The universal service obligation for each small geographic area should be put up for auction when one or more of the carriers nominates that area for bidding. The auction would be a single-round, sealed bid; the form of the bid would be the per-customer support amount the carrier would require.

The low-bidder would win the rights to serve that market and receive the support. The auction would allow more than one carrier to win, with the number of winners in a given area determined endogenously. A limited form of conditional bidding is used to take account of possible economies of density. Repeated auctions over time allow this framework to adapt to changes in technology, costs, or policy objectives.”<sup>54</sup>

The GTE auction design allows us to consider some of the key choices to be made in the design, the reason such choices are needed and their significance. Table 2 discusses these issues.

**Table 2: Auction design issues**

Design issue	Significance
Defining the service	<p>It is important that the nature and quality of the service to be provided is clearly specified as once an operator has won the subsidy it will have the incentive to seek to minimise its cost in providing the service with the risk of poor quality of service for customers. On the other hand, it is efficient for operator to seek to minimise the cost of provision so long as this does not come at the expense of quality of service.</p> <p>The service specification should be objectively justified to avoid unduly excluding particular technologies that may meet the underlying Universal Service rationale.</p> <p>Allowing pricing freedom on complementary services may mitigate the incentive to reduce quality of service. For example, if the incumbent is allowed to provide value added services at unregulated prices across subsidised lines, then the incentive to reduce quality might be reduced.</p>

<sup>54</sup> Alleman, J., P. Rappoport and D. Weller, “Universal service: the poverty of policy”, University of Colorado Law Review, Vol.71, p. 874.

<p>The size of the areas to be auctioned</p>	<p>If the auction or tender relates to the provision of universal services in particular geographic areas then the size of areas to be auctioned need to be appropriately defined prior to the auction.</p> <p>Auction proposals generally define small areas that exclude profitable areas. This is in part to minimise the incentive for cream-skimming in larger areas, but also simply to avoid subsidising profitable areas.</p> <p>Defining the size of the area to be auctioned is particularly important because of the existence of historical provision of services in the market or related markets, that is, the presence of sunk costs or complementary investment in nearby areas. For example, if there is a sunk network in adjacent areas the incumbent may be advantaged by having the area defined narrowly.</p> <p>Both of these issues become less important in remote areas of more consistent density and cost.</p>
<p>Determine the number of potential winners</p>	<p>Universal Service auction proposals may allow for either a single or multiple ‘winners’. Auctions have the potential to endogenously determine the market structure, however the structure could be determined ex ante if it is obvious that there is likely to be strong economies of scale.</p> <p>Encouraging multiple providers may increase the required subsidy, because earnings from related services and gains from cost saving innovation will be limited by competition. The subsidy bid by operators will reflect this effect.</p> <p>The winning operators become Universal Service providers and compete ex post in the market for customers based on per customer subsidies.</p>
<p>Determine the nature of the bid and the structure payment of the subsidy</p>	<p>The payment might be in the form of an upfront lump sum or an on-going annual subsidy paid in advance or arrears. If there are multiple providers, a per line subsidy might be appropriate. If the providers have different cost structures it may be efficient to have an operator specific subsidy.</p>
<p>Set the structure of auction</p>	<p>The potential for collusion is high in any auction but particularly one that is repeated over a number of small areas (see Laffont and Tirole (2000)). Sophisticated auction design theory can address some of these concerns by amending the number of rounds, the way in which bids are received (sealed or open bidding) and allowing combinatorial bids.</p> <p>Combinational auctions can also recognise economies of scope in providing adjacent areas.</p> <p>Depending on the structure of the auction the winner could be required to pay the lowest bid subsidy or the second</p>

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price bid (Vickery).

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Reserve price or other constraints on bidding acceptance	Additional constraints may be needed in case the auction does not attract bidders that are competitive. For example, if there is a wide variance in cost structures the auction process may not lead to least cost provision because the operator with the lowest structure will only need to outbid the much less efficient operator.
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In general, Laffont and Tirole (2000) are pessimistic about the potential for using auctions in Universal Service provision:

“[we] have tried to provide a framework within the analysis of such auctions can begin. The first insights thus gleaned do not build as strong a case for the introduction of competition as we had expected. First, and a fact mostly ignored in the literature, in-market competition raises the level of the subsidy and is therefore a mixed blessing. Second, the use of simple auctions may deliver the wrong market structure or the wrong subsidy level even in simple environments. Of course, further work is warranted before we draw definitive conclusions.”<sup>55</sup>

Practical examples of auctions for Universal Service provision are limited. However, in the limited sample, successful examples exist in Latin America and Australia. Notably, these relate to auctions or tenders which were for the provision of services in remote areas with no existing incumbent or for public payphones.

There has also been a debate in the United States exploring a number of different auction models and extending the theory of auction design<sup>56</sup>. The experience in the United States is however coloured by seeking to design an auction that will allow multiple providers (with different service qualities, characteristics and cost structures) to compete for universal services in high cost areas. The submissions of parties to the recent FCC USO review clearly demonstrate that inter-modal auctions in areas of potentially significant economies of scale and scope greatly complicate the design issues.

Based on our survey of the international experience the characteristics of a market in which auctions appear to be workable are:

- Where there is the potential for multiple bidders;
- The absence of an incumbent in the area with significant sunk costs and scale economies;
- Ability to define service precisely and monitor quality; and
- The main objective of the auction being to minimise the cost of provision.

Carefully designed auctions may be particularly relevant where subsidies are to be provided to bring coverage for the first time to some areas of the new Member States as well as to meet the needs of households reliant on public payphones.

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<sup>55</sup> They recognise in the complexity of auction design that “[e]conomists struggle to translate their theories into workable mechanisms” (page 262).

<sup>56</sup> [http://www.fcc.gov/wcb/tapd/universal\\_service/JointBoard/020220\\_jointboard\\_enbanc/](http://www.fcc.gov/wcb/tapd/universal_service/JointBoard/020220_jointboard_enbanc/)

### 4.3 Comparative selection approaches

Comparative selection approaches involve the regulator deciding which operator should provide the Universal Service with regard to a range of criteria (such approaches can also be called a 'beauty contest'). Operators present their own proposals which can include the extent to which coverage will be extended, the type and quality of service to be provided as well as the amount of subsidy required. The key feature of mobility that mobile phones offer over fixed phones could be an important quality difference between providers.

A comparative selection approach can be useful where it is desirable to take into account a range of criteria and can help a regulator to choose the optimal trade-off between service level and quality and the required subsidy. In contrast, an auction is focused on determining which operator can meet a specific Universal Service requirement for the lowest subsidy.<sup>57</sup> On the other hand, precisely because a comparative selection process takes account of a range of criteria, it may not result in the service being provided at least cost.<sup>58</sup> Further, comparative selection approaches may lead to the USO being provided by the operator that presents an attractive proposal rather than necessarily the operator that can most efficiently provide the Universal Service and it can be difficult afterwards for a regulator to enforce the service level proposals. Administrative discretion is also more vulnerable to bias or even corruption of officials and perceived bias can lead to administrative approaches ending in legal disputes. This risk is greater where clear tender procedures and evaluation criteria are not applied.

As with auctions, importance should also be attached to the detailed design of the approach. Key issues include: (i) ensuring a transparent process with sufficient time and information being provided to maximise participation; (ii) how to determine the subsidy; (iii) what non-price objectives should be targeted either in the criteria; and (iv) what rules should govern participants particularly to prevent coordination. Public consultation can help in ensuring that all key issues are taken into account.

A fuller discussion comparing auctions and beauty contests as well as specific design issues is set out in Maarten Janssen's book, *Auctioning Public Assets*.<sup>59</sup>

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<sup>57</sup> In this regard, any non-price objectives need to be targeted through the specification of the obligation that will apply to the winner of the auction.

<sup>58</sup> One alternative is for regulators to first request proposals against a range of criteria, determine its preferred service level and quality and then hold an auction to determine which of the operators that are able to meet that service level and quality should provide the USO based on accepting the lowest subsidy. More sophisticated approaches involve assigning a bidding handicap based on the operator's service proposal.

<sup>59</sup> Janssen, M.C.W. (ed.) 2004. *Auctioning Public Assets*. Cambridge University Press.

#### 4.4 Voucher arrangements

Vouchers are a means of providing Universal Service where there is the potential for multiple providers. In particular, vouchers enable customers to choose which service provider best meets their needs and they are flexible in that service providers may offer a variety of service levels. By creating a market for Universal Service provision, vouchers may also promote efficiency in terms of leading to the service being provided by the service providers best able to meet the customer's needs including that lower cost providers would be able to offer the service to customers at lower cost or even with a rebate depending on the amount of the voucher.

Vouchers can also ensure the subsidy is not tied to any particular technology. Providers offering a higher quality for the same level of cost are likely to be preferred by users regardless of the technology they use.

Vouchers can also provide for more targeted support, e.g. by limiting the vouchers to customers who meet particular income criteria or who are welfare recipients. Greater targeting can reduce the size of the universal service fund or alternatively enable a greater level of funding to the group of customers most in need. On the other hand, the eligibility criteria would also need to be designed to ensure that they are practical for operators to administer as necessary.

Vouchers are likely to be less useful to support networks being extended to new areas for the first time. In particular, by allowing individual customers to determine which operator receives their subsidy, there would be the risk of coordination failures. Customers may choose a number of operators which would limit the amount of funds available for any one operator with the risk that no operator finds it viable to extend their network to the new area.

International experience is that voucher arrangements (perhaps combined with subsidy auctions) can work well in targeting the delivery of universal services for low income groups. Various forms of vouchers are used in the United States for the supply of universal telecommunications services. Low income households are eligible for a discount under the "Lifeline" or "Link-up" programs. The Lifeline program offer discounts from monthly charges and the Link-up program provides for a reduction or waiver of installation charges. The eligibility of customers is determined and administered by the telecommunications operator subject to defined criteria.<sup>60</sup>

Key design issues in relation to voucher schemes include:

- The eligibility criteria taking into account both the aim of targeting funds to the customers in need as well as the practical enforcement of the criteria.
- Define the nature of the service to be provided, including the price and minimum service levels. Minimum service levels need to be set because a fixed subsidy per

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<sup>60</sup> In the US, eligibility for a Federal subsidy is generally based on participating in one of the following programs: Federal Public Housing Assistance (FPHA); Food Stamps; Low Income Home Energy Assistance Program (LIHEAP); Medicaid; National School Lunch Program's free lunch program; Supplemental Security Income (SSI); and/or Temporary Assistance for Needy Families (TANF). In addition, a consumer may be eligible if his or her household income is at or below 135% of the federal poverty guidelines.



customer will give the incentive for lowering quality and require the regulator to monitor the quality of service. The trade-off in using a more restrictive service definition is that it may limit the potential for competition to innovate and increase customer choice.

- Determine the level of the subsidy. The level of the subsidy needs to be sufficient to compensate the operator for the net cost it incurs in providing the service to eligible customers at the defined price. The level of the subsidy could be determined via an auction or tender arrangements if the conditions could be adequately defined. As discussed below in relation to 'play or play' models if the subsidy is set 'too high' there may be inefficient participation in universal services provision.
- Provide for the arrangement to be reviewed as the service definition and level of subsidy may need to be adjusted over time.

While noting these specific design issues, we consider that vouchers can be an attractive means of Universal Service provision in certain circumstances particularly for the provision of socially affordable tariffs for low income households where different providers may be able to offer a variety of services that address their needs.

#### 4.5 Play or Pay

Play or Pay arrangements are an alternate means of determining which operators should provide the Universal Service:

- Operators either offer Universal Service over their networks potentially in competition with other Universal Service operators providing those services. These could be low use service offers or providing services in high cost areas [Play]; or
- Compensate those operators that do offer Universal Services in the form prescribed by the funding model [Pay].

The level of subsidy is generally administratively set.

Belgium currently uses a Play or Pay model for socially affordable tariffs.

By creating the scope for competitive provision, Play or Pay models may appear attractive to policy makers and potentially some operators. Such models will lead to those operators who can supply the service at lower net cost than the subsidy choosing to be the Universal Service provider while those operators with higher net costs will chose to instead pay into an industry fund.

Play or Pay models do require the regulator, at least initially, to estimate the level of the subsidy. Clearly if the subsidy is set too low, then no operator will choose to provide the Universal Service and the regulator will need to offer a higher subsidy. If the subsidy is set too high then there may be multiple providers of the Universal Service. This would suggest scope to reduce the subsidy particularly so as to avoid encouraging inefficient investment by operators who are not the least cost suppliers but nonetheless wish to avoid paying into a fund for the excessive subsidy. Multiple providers may be particularly costly where there are potentially large scale economies. However, the regulator should also consider whether a somewhat higher subsidy that allows for multiple providers can bring other benefits in terms of greater service innovation and

consumer choice. Thus, the nature of the service will help determine if a Play or Pay model is suitable.

Further, in a Play or Pay model the definition of ‘playing’ must be precisely defined and potentially require multiple providers’ services to be monitored to so that operators do not avoid paying into a fund by offering a poor quality of service. As such, these models are likely to carry significant administrative costs to regulators.

For services for which consumers are likely to value a choice of providers and where there are limited scale economies, Play or Pay models may be attractive and justify the administrative costs involved. In this regard, they may be appropriate for socially affordable tariffs which are offered as an additional to an operator’s unsubsidised service. Nonetheless, they would need to be designed carefully.

**Table 3: Play or Pay design issues for socially affordable tariff**

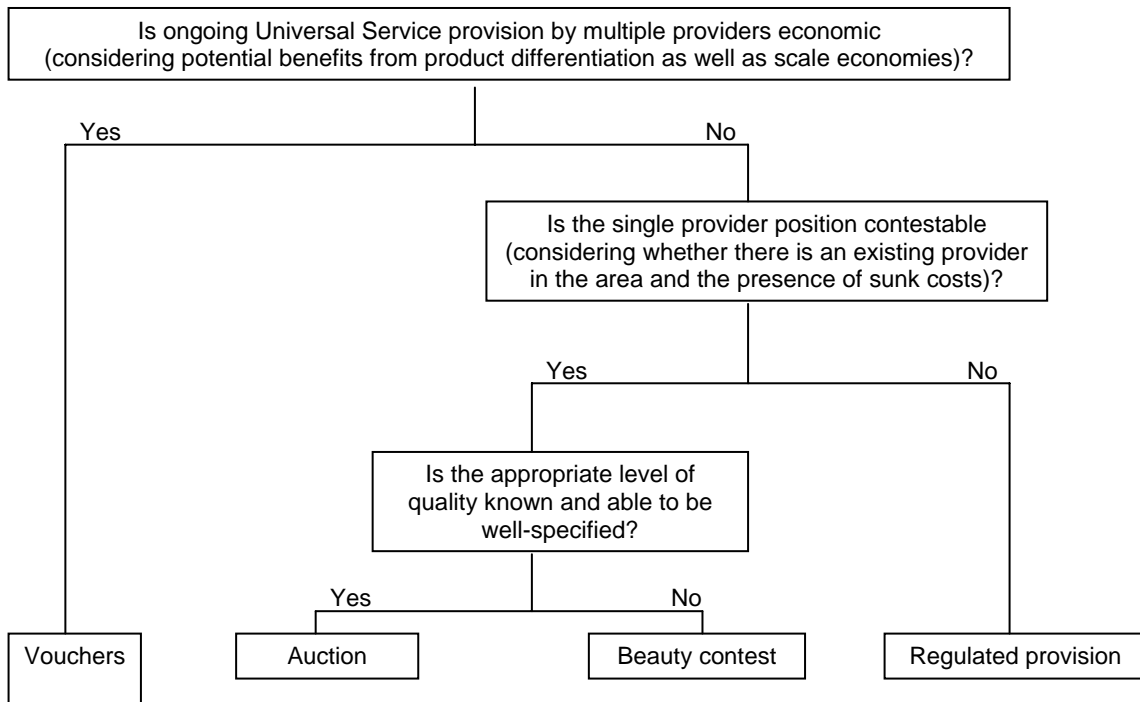
Design issue	Description
Service to be defined	Participating in socially affordable service may require an offer of a particular tariff or an obligation on recognising a voucher supplied by a customer (see below).
Nature of playing	Minimum service qualities may need to be set as an anti-avoidance measure, e.g. to prevent carriers not truly playing by offering lower quality service. Similarly, non-discrimination between potentially higher cost customers within the socially disadvantaged group may also need enforced.
Fine for opting out and subsidy for playing	The fine for opting out will need to send the appropriate signal for efficient universal provision. This would equal the cost savings that those operators would make if the opting out party took over their participation. Or in other words, the required subsidy.

## 4.6 Conclusions

In principle, greater contestability in Universal Service provision can improve efficiency particularly by enabling specific Universal Services to be provided by the technology and operator who is best placed to supply the service. Contestability may also help limit the cost of providing Universal Service. However, there are important practical constraints on contestability for Universal Service provision and particular contestable models are likely to be effective in only certain circumstances.

Figure 5 highlights key factors that help determine the potential role for specific contestable mechanisms in Universal Service provision.

**Figure 5 – Potential role for contestable mechanisms in Universal Service provision**



Where it is efficient to have multiple providers of a particular Universal Service, then vouchers can provide a means of enabling customers to choose which particular provider and technology best meets their needs. Vouchers may be appropriate for the provision of the Universal Service for low income customers.

Where a particular Universal Service can only be efficiently provided by one provider then there is the need for the regulator to determine which operator should be assigned the role of Universal Service provider. In new areas where there is not currently a provider and where the appropriate quality of service can be clearly specified, auctions can enable the Universal Service to be assigned to the provider requiring the lowest subsidy. Where regulators want to consider a range of criteria and different trade-offs between service levels and subsidy amounts then comparative selection processes (beauty contests) may work well.

Where the Universal Service is already being provided by one operator that has already made substantial investments that it would not otherwise be able to recover (i.e. where sunk costs are significant) then it may not be possible to make the provision of the service contestable so that both the service quality and subsidy amount would need to be determined by the regulator.

Finally, where contestability is introduced, careful attention to the details of implementation will be important to its success.



Europe

## 5. How should the Universal Service be funded?

The current Universal Service Directive provides that where an operator incurs a net cost in providing the USO, it should be compensated either through public funds or from all users.

In this section, we first consider the relative merits of funding Universal Service out of general taxation compared with the use of an industry fund.<sup>61</sup> Our analysis shows strong public policy reasons that favour funding Universal Service from general taxation. If, despite these reasons, some Member States were to retain industry funds then it is important to consider how they can best be designed to minimise the risks of harm to competition and investment in the long-term interests of end-users. Accordingly, we also consider certain principles to avoid some of the key risks that can arise from the use of industry funds.

### 5.1 General taxation versus industry funds

Public finance theory has identified a set of principles for optimal taxation as well as an analytical approach to estimate the losses to the economy that can result from inefficient taxation models. Standard taxation principles include:<sup>62</sup>

1. Economic efficiency. This has two components:
  - a) First, the tax regime should minimise the administrative burden (to both payees and the collection agency) associated with collecting the required revenue.
  - b) Second, and generally more importantly, the tax should be levied in a way to minimise distortions to production and consumption decisions.
2. Vertical equity – taxation should reflect ability to pay with more tax raised from individuals with higher income.
3. Horizontal equity – people in similar economic circumstances should pay similar levels of tax (i.e., the tax system should not arbitrarily discriminate between different types of taxpayers)
4. Competitive neutrality – taxes should not distort competition (such as between different firms offering similar services) or business decisions (such as whether to carry out an activity in-house or whether to out-source that activity to an external supplier).
5. Enforceability, simplicity, transparency and certainty – firms and individuals should be able to understand and accurately predict the implications of the tax. A necessary condition for this to be true is that the tax law must be able to be enforced in the manner in which it is actually legislated.

We deal with each of these in turn. In doing so, we examine the merits of funding the USO through general taxation compared with an industry fund.

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<sup>61</sup> In some circumstances, other sources of public funding, apart from taxation, may be available such as revenues earned on spectrum auctions. The general principles discussed in the comparison of taxation with industry funds can be used to evaluate such alternative funding sources.

<sup>62</sup> A similar set of principles is set out in a document of the European Commission's CCCTB's Working Group, *General taxation principles (CCCTB/WP\001Rev1\doc\en)*.

## **Economic efficiency**

### *Administration costs*

There are compelling reasons in terms of minimising administration costs as to why general taxation is to be preferred to the operation of an industry fund.

In order to raise Universal Service revenue through an industry fund, it is necessary to fund the personnel and other resources required to:

- establish the fund including the definition of the tax base and tax rate structure, consulting on its appropriate design and ensuring that it remains appropriate as an increasingly diverse range of service providers compete with each other;
- give legal effect to that tax base and the associated tax obligations on the provider which may be particularly difficult where, say, VoIP providers are located internationally;
- require providers to develop and maintain systems for complying with that obligation (including collecting the information necessary to estimate that obligation);
- audit the assessments made by the providers; and
- have a mechanism for resolving disputes (enforcing the law) where disputes arise between the taxpayer and the collection agency.

The proportionality of establishing and maintaining an industry fund should also be assessed taking into account that in, many Member States, the estimated level of net costs is relatively low (and in many cases zero) and often much lower than the amounts proposed in the late 1990s when industry funds were first being developed. For instance, the level of net costs has been estimated to be €32 million in France in (down from €765 million in 1997), €37 million in Italy 2002 and €110 million in Spain 2002. With the cost of the USO at these levels, the proportionality of administering a separate industry fund to cover the USO cost is questionable.

By contrast, in order to raise the required Universal Service revenue through general government revenue all that is necessary is to increase the rate of existing taxes (or not reduce them as fast as they otherwise would be reduced). In fact, the size of estimated net costs can be so small relative to the general taxation revenues as to not require any specific change to general taxation rates.<sup>63</sup> Further, given that the general government revenue measures are already established and being levied the additional administrative costs on all parties (payers and collectors) of doing so would be very small – much smaller than establishing a completely new tax and associated regime.

### *The cost of distortions to consumer decision making*

The other economic efficiency cost associated with taxation is the cost of distorting the decisions of citizens and taxpayers.

For goods supplied in a perfectly competitive market, tax reduces economic efficiency, by introducing what economists call “deadweight cost”. Economic efficiency is promoted when the price of a particular good reflects the marginal cost to society of

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<sup>63</sup> For instance, the estimated net USO cost in France would account for 0.004% of French general government revenues (based on IMF 2006 data).

supplying that good. When this is the case consumers have an incentive to consume up until the point at which the value they place on consuming that good is equal to the cost to society of producing that good.

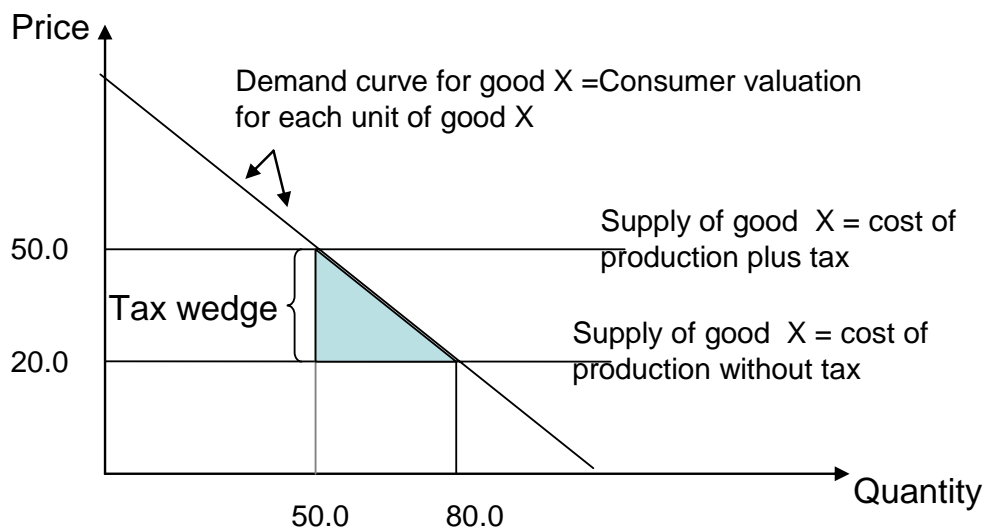
Taxes have the effect of raising the price above marginal cost, i.e., creating a wedge between what it cost to provide and what the consumer has to pay. This distorts consumption by discouraging consumers from buying the good - even though they value it at more than the cost of supplying it to them.

As a consequence, an inefficient level of consumption occurs and citizens gain less from participating in the market. This destroys value, and is known as the 'deadweight cost of taxation'.

In practice, most taxes — including income tax and sales tax — have a significant deadweight cost. However, the deadweight costs of taxation increase exponentially with the rate of tax. This means that it is more efficient to tax a large number of goods lightly than to tax a few goods heavily.

The reason for this can be illustrated in the figure below.

**Figure 4.1.1**



This figure shows a linear demand for hypothetical good X (mathematically the above demand curve can be written as Demand = 100 – Price). Absent any tax, the price of good X is equal to €20 (the production cost of good X) and consumption will be 80 units (the quantity at which demand equals supply). Now imagine that a €30 unit tax is imposed. Competition will tend to cause this tax cost to be passed through to customers in higher prices. As a consequence, the price for good X will rise to be equal to €50 and sales will fall from 80 to 50 units. The amount of revenue raised is €1,500 (€30\*50).

However, this revenue comes at an economic cost associated with the fall in consumption from 80 to 50 units. Each one of those units was previously valued at

more than €20 (the production cost of providing it to consumers). As a consequence, consumers previously enjoyed an economic surplus on that consumption equal to the difference between their valuation and the production cost of providing the service. The value of this surplus is shown diagrammatically as the shaded area in the above diagram.

This means that the cost of the tax to consumers is equal to:

- the tax they actually pay on the 50 units they continue to buy; plus
- the loss of surplus on the 30 units they no longer buy.

The first amount is a pure transfer of value from the consumers to the collection agency (and eventually the final recipient of that revenue). However, the second amount is a pure loss to society. Economists call this the 'deadweight loss' of taxation. As drawn above, the deadweight loss of this tax is equal to the area of the shaded triangle. This in turn is equal to:

$$\begin{aligned} \text{Deadweight loss} &= \frac{1}{2} * \text{Tax rate} * \text{Discouraged consumption as a result of tax.} \\ &= \frac{1}{2} * 30 * 30 \\ &= €450 \end{aligned}$$

In this example the cost of raising €1,500 in revenue is €450 in deadweight loss (before even considering administration costs). That is, the efficiency cost of the tax is equal to almost a third of tax revenue raised.

In the above example we have used a linear demand curve. This simplifies the estimation of discouraged consumption – which is simply equal to the inverse of the slope of the demand curve multiplied by the tax rate. In this special case the deadweight cost of the tax can be written as:

$$\begin{aligned} \text{Deadweight loss} &= \frac{1}{2} * \text{Tax rate} * \text{Discouraged consumption as a result of tax.} \\ &= \frac{1}{2} \text{Tax rate} * \frac{1}{\text{Slope}} * \text{Tax rate} \\ &= \frac{(\text{Tax rate})^2}{2 * \text{Slope}} \end{aligned}$$

That is, the deadweight loss of the tax increases with the square of the tax rate. This is one of the reasons why deadweight loss is minimised if a low tax rate is applied to many goods rather than a high tax rate applied to few goods. Accordingly, the objective of much tax reform is to “broaden the base and lower the rate”.

Another implication of the above formula is that goods where the demand curve has a relatively low slope (high sensitivity to price) should be taxed more heavily than other goods. This principle is known as the Ramsey-Boiteux pricing rule.<sup>64</sup> However, the difficulties in accurately estimating slopes of demand curves makes implementation of this rule complex.

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<sup>64</sup> Conceptually, the least distortionary tax would be a lump sum tax which is raised without distorting any consumption, labour supply, investment or production decisions. A tax levied at €100 per person regardless of purchases, income or wealth might approximate such a tax. However, such a tax clearly violates vertical equity objectives (ie, that those on higher income pay greater tax than those on lower income).



To illustrate the importance of having a broad tax base, consider the difference between raising €1,500 from taxing only good X and raising €1,500 from taxing both good X and good Y (where, for simplicity, good Y has an identical demand curve and supply curve to good X).

In this case, the tax rate need only be €10.8 per unit to raise the same €1,500. That is, doubling the tax base reduces the required tax rate by almost two thirds. The reason for this is that when only one good is taxed it must be taxed heavily and this results in high discouraged demand. In turn, this discouraged demand reduces the tax base and requires an even higher tax rate – giving rise to a “vicious cycle”. By broadening the tax base there is less discouraged demand to start with and so less need to raise taxes to compensate.

The lower tax rate also means that deadweight loss is reduced. The total deadweight loss in this scenario is only €118 (or nearly one quarter of the deadweight loss in the scenario where only good X is taxed).<sup>65</sup>

The general tax principles illustrated above are critical when considering funding Universal Service. Funding from an industry levy is equivalent to raising the required revenue by taxing one product (telecommunications) while funding Universal Service from general taxation more closely approximates the scenario where all goods<sup>66</sup> are taxed. Thus, we can expect the deadweight cost associated with an industry levy to be an order of magnitude greater than the deadweight loss of funding Universal Service from more broadly based taxes.

In fact, an industry levy on telecommunications is likely to be particularly inefficient for the following two reasons:

- High fixed costs in telecommunications mean that operators need to set prices above marginal cost in order to be viable (even before any taxes are imposed); and
- Network externalities suggest telecommunications should optimally be taxed less heavily (or even subsidised) than other industries (not more heavily).

Both of the above facts mean that, even without any tax, the cost to society of providing additional units of telecommunications (calls, minutes or subscriptions) to consumers is less than the value to society of providing them. Hence, society would actually benefit by encouraging additional telecommunications consumption - *indeed this is a primary objective of Universal Service policy.*

However, taxing telecommunications in order to fund Universal Service is counterproductive. It actually discourages consumption of precisely the services that efficiency considerations suggest should be encouraged by Universal Service policy.

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<sup>65</sup> This \$118 can be calculated by inserting a \$10.8 tax rate into the above equation and multiplying by 2.

<sup>66</sup> Funding the USO from general revenue will tend to be associated with an increase in either a general sales tax (or value added tax) or from income tax. Income tax is a tax on labour which feeds into all goods and services in the economy.

In technical terms, the wedge between consumer valuation and marginal cost is already high even before a tax is imposed. This means that imposing a tax on telecommunications will not just result in a deadweight loss proportional to the square of the tax rate. Rather, the deadweight loss will be proportional to the square of the sum of the tax rate and the pre-existing wedge between price and marginal cost.

Similarly, network externalities mean that even without taxation an inefficiently low level of consumption will occur. Communications occurs, by definition, between two parties and, in general, both parties benefit from that communication. However, generally only one party pays the costs of provision (eg, the calling party on a phone call). If that party makes decisions solely on the basis of their personal costs and benefits then too little communication will result (eg, too few calls will be made). By taxing telecommunications, we make this pre-existing distortion worse.

When account is taken of these factors it is reasonable to believe that the deadweight loss associated with an industry levy on telecommunications will exceed the actual value of tax revenue raised. In fact, Hausman has estimated the deadweight loss of the industry levy in the US to actually exceed the amount of revenue raised.<sup>67</sup> He calculated that in raising US\$2.25 billion, the use of this industry fund would result in additional efficiency losses of at least \$2.36 billion, i.e. for each dollar raised an additional \$1.05 to \$1.25 would be lost to the economy.

By contrast, estimates of the deadweight loss associated with general taxation tend to be around 10% to 30% of the amount of revenue raised.<sup>68</sup> This alone is a strong basis for preferring general taxation to an industry level fund

#### *The cost of distortions to business decision making*

The above discussion has been based on the implicit assumption that all consumption of telecommunications is made by final consumers. If this were true then the USO tax would solely distort decisions by final consumers.

This implicit assumption allows the analysis of the efficiency of the tax system to concentrate on distortion to consumer behaviour and, in doing so, ignore any distortions to producers decisions. That is, while consumers are forced to distort their demand for services, it is implicitly assumed that whatever services they do buy are produced in the most efficient manner possible.

However, if businesses also buy telecommunications services (as is clearly the case) then this underestimates the distortions associated with an industry tax. In addition to distortions to consumer decision making there will also be distortions to the input decisions for businesses.

Narrowly taxing business inputs has even greater costs to economic efficiency than does taxing final consumption. In fact, it is a well accepted 'rule' of good taxation policy

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<sup>67</sup> Hausman, J., "Taxation by telecommunications regulation", *NBER Working Paper 6260*, November 1997. The US levy is imposed on only long distance calls. While a levy of all telecommunications revenues would be spread over a larger base, it would still be a much narrower base compared with general taxation.

<sup>68</sup> For instance, see M. Feldstein, "Tax avoidance and the deadweight loss of the Income Tax", *NBER Working Paper No. W5055*, March 1995.

that business inputs should not be taxed (unless taxed uniformly such as under a VAT). This is perhaps best illustrated by quoting from the 1996 citation for the Nobel Prize in Economics awarded to James Mirlees and William Vickrey.

“The general theory of optimal taxation in a second-best economy encompasses few clear cut recommendations. If one condition for social efficiency is violated, as a rule there is reason to violate others as well. However, Diamond and Mirrlees (1971) obtained a highly universal result. Under relatively general conditions, it is desirable to maintain production efficiency. *In concrete terms, this means that taxes should not be levied on factors of production.*” [Emphasis added.]

Moreover, telecommunications is a vital input to almost every sector of the economy and any tax on the telecommunications sector will tend to distort producer decisions throughout the economy in a particularly pernicious manner. For example, an across the board increase in the cost of telecommunication products will tend to artificially increase the cost to businesses of expanding to diverse locations or from transmitting information to workers or customers not physically present at a location.

By taxing the free flow of information in the economy a telecommunications industry levy is likely to impose considerable efficiency costs above and beyond those relating to the final consumption decisions of consumers.

### **Vertical equity**

The progressivity of a tax system defines the rate at which tax obligations increase as citizens' income or wealth increases. Vertical equity objectives are achieved when the progressivity of the tax system reflects citizens' ability to pay while being balanced by retaining some reward for their efforts and skills. The level of progressivity in any country's tax system is ultimately shaped at the ballot box.

Industry funds can not hope to achieve vertical equity because all consumers pay the tax equally per unit of consumption. For example, an industry levy on calls will mean that a poor citizen will pay as much per call as a wealthy citizen. Similarly, a carer of dependent children or dependent parents will pay as much as another citizen who does not have any dependents. The general tax system can and does make these distinctions between citizens when raising revenue. However, an industry levy can not.

### **Horizontal equity**

Horizontal equity requires that differences in tax paid by citizens reflect some underlying difference in their ability to pay or some other criteria that would justify differential taxation.

However, an industry levy on telecommunications would collect more tax from citizens that use telecommunications more. It is difficult to see that there is any equity justification for this differential taxation. That is, it is difficult to see why citizens who use telecommunications more heavily, say because they live further from their family or in remote areas, should pay more than others who use telecommunications less intensively.

## **Competitive neutrality**

It is difficult to comment on competitive neutrality without a specific structure of an industry fund in mind. However, we do note that industry funds are often imperfectly designed and lead to competitive distortions or distortions of business structure decisions. For example, imagine a levy per customer. This would tend to favour businesses and business models with fewer higher value customers. Alternatively, consider an industry fund that taxes total retail sales less payments to other operators. This would tend to favour businesses and business models that rely on the use of other businesses' infrastructure (i.e., would encourage retail rather than wholesale business models).

In fact, it is difficult to conceive of any industry fund that would be both practical to implement but would not create some competitive distortions. This is especially the case given the rapid rate of technological changes and market changes in the industry - as services and networks converge, more diverse companies (such as VoIP providers) enter the sector and vertical linkages become more rather than less complex.

## **Transparency**

Finally, we note that general taxation is also more transparent and would link political decisions concerning the scope of Universal Service to the political responsibility for funding that decision.

## **Conclusion**

Well-established taxation theory finds that the welfare loss of raising a given amount of revenue is substantially reduced by collecting that revenue over as wide a base as possible. The deadweight cost of general taxation is generally estimated to be in the range of 10% to 30% of the amount collected, while an empirical estimate of the deadweight cost of industry levies suggest that they may be three times or more as costly. The relatively small size of USO net costs estimated in a number of EU Member States also suggests that general taxation is to be preferred to incurring the administrative costs of establishing and maintaining an industry levy. Funding Universal Service through general taxation can also be expected to be more equitable, competitively neutral, and politically transparent than an industry fund.

## **5.2 Design of industry funds**

While there are strong arguments in favour of collecting any net cost of the Universal Service through general taxation, there is the potential for industry funds to be imposed by particular Member States. In this section, we examine the implications of different types of industry funds. We find that in addition to the general disadvantages of industry funds compared with general taxation funding described above, that particular fund designs can further problems particularly in terms of distorting competition and business decisions.

## Criteria for assessing fund design

The current Universal Service Directive requires any industry levy should be:

“based on objective and non-discriminatory criteria and...in accordance with the principle of proportionality. This principle does not prevent Member States from exempting new entrants which have not yet achieved any significant market presence...shared between all or certain specified classes of undertaking. Member States should ensure that the sharing mechanism respects the principles of transparency, least market distortion, non-discrimination and proportionality. Least market distortion means that contributions should be recovered in a way that as far as possible minimises the impact of the financial burden falling on end-users, for example by spreading contributions as widely as possible.”<sup>69</sup>

The objective of minimising market distortion is in line with efficient taxation principles.

As discussed in the previous section, a key finding from economic theory is that the (dead weight) welfare loss resulting from collecting a given amount of revenue can be minimised by recovering a greater proportion of the revenue from price inelastic services.<sup>70</sup> As such, one issue in the design of an industry fund is whether a higher levy should be imposed on services that are significantly more price inelastic than others.

A further public policy consideration is that the design of the levy should not induce inefficient market outcomes such as would occur where the levy is imposed on some firms but not others that offer competing services. The risk of an industry fund creating distortions is heightened by the increasing variety of different players that are competing in the industry, including:

- vertically integrated operators using networks based on a fixed, mobile and cable technologies and serving both wholesale and retail customers;
- pure suppliers of wholesale services; and
- service providers without their own network but who resell the services of other networks (e.g., MVNOs and ISPs).

In addition, the design should not distort firms' own technology or business structure decisions, e.g. it should not distort the decision as to whether to carry out an activity in-house or whether to outsource the activity to an external contractor.

The other general tax policy objectives are also relevant to designing the funding mechanism, particularly administrative simplicity, transparency and potentially equity.<sup>71</sup>

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<sup>69</sup> Paragraphs 21-23.

<sup>70</sup> Conceptually, the least distortionary tax would be a lump sum tax which is raised without distorting any consumption, labour supply, investment or production decisions. A tax levied at €100 per person regardless of purchases, income or wealth might approximate such a tax.

<sup>71</sup> Equity is unlikely to be an appropriate objective in setting a USO levy given that varying levies on different communication service providers would provide a poor means to raise

We next consider some of these issues in more detail with reference to the implications of levy per customer and a levy on revenues.

### Levy per customer

First, we consider an approach of recovering the Universal Service cost through a fixed levy on each customer, telephone number or on each telephone connection. The attraction of such approaches is that they may help minimise the welfare loss from raising the revenue. In particular, demand for fixed subscription has generally been found to be less price elastic compared with mobile subscription and compared with call services generally.<sup>72</sup>

The empirical evidence on relative elasticities would suggest recovering the bulk of any USO net cost from fixed subscription services. Indeed, a levy per customer has been advocated by the Chairman of the FCC as the best means to fund the USO out of industry revenues.<sup>73</sup> A uniform customer levy would have a number of advantages:

- the overall welfare loss from a customer levy is likely to be lower than a levy on general revenues precisely because of the very price inelastic nature of demand for fixed subscription; and
- levies per customer or per subscription may be more sustainable and less distortionary compared with revenue funds as customers increasingly access services from a wide variety of players, including VoIP providers, for whom it would be difficult to impose the levy on.

However, a major drawback of a uniform customer levy is that it may be seen to be inequitable as the same amount would be charged regardless of household income (a revenue tax might instead may roughly lead to those with more income paying more tax). This problem could be moderated by exempting low income earners, however, that would raise the costs of administering the fund. A customer levy may also be inequitable if it is levied on each subscription so that customers that have both a fixed and mobile subscription (and multiple mobile subscriptions) end up paying more of the levy than other customers who may be no worse off than them.

### Levy on revenues (*ad valorem*)

A more common form of industry levy is a levy on revenues. There are a number of ways such a levy could be imposed. In particular, the levy could be imposed as a fixed percentage of:

1. Retail revenues being revenues earned on providing services to end-users

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more revenue from households with a greater capacity to pay. However, it is worthwhile to examine whether a particular levy design may have inadvertently harm equity objectives.

<sup>72</sup> Talyor, L. D., (2002) "Customer Demand Analysis", in *Handbook of Telecommunications Economics*, Volume 1, Structure, Regulation and Competition, edited by Cave, Majumdar and Vogelsang, North Holland, Chapter 4.

<sup>73</sup> In this regard, the FCC Chairman has argued that: "I do not believe it is viable in the long term to continue subsidizing multiple competitors to serve areas in which costs are prohibitively expensive for even one carrier" (Remarks of FCC Chairman, Kevin J. Martin to the Telecom 05 Conference of the United States Telecom Association, 26 October 2005.

2. Gross revenues being revenue earned from both retail and wholesale service provision
3. Net revenues being gross revenues less inter-carrier payments made to other carriers

Each of these approaches has potential problems.

In cases where there are vertical relationships in the industry, imposing the levy on more than one layer may lead to the problem of 'double marginalisation'. Such vertical relationships exist for options (2) and, to a lesser extent, (3) above. Double marginalisation occurs when a less than effectively competitive retail market is supplied by a less than effectively competitive wholesaler. The profit maximisation behaviour of each firm will lead them to mark-up prices above their own marginal costs. As the mark ups flow through the 'chain of monopolies' the resulting total mark-up will be more than what was profit maximising for the wholesaler.<sup>74</sup> If the Universal Service levy is imposed on wholesale revenues it would be seen in effect as a cost increase for retailers, to which a mark-up would be added<sup>75</sup>. This would result in a further distortion from the imposition of the levy and a further reduction in economic efficiency. The implication of this analysis is that taxes on wholesale inputs should generally be avoided for efficiency reasons.<sup>76</sup>

Option 2, above involves a potentially highly distorting form of taxation as it is applied at both retail and wholesale levels. This may result in double taxation of services that are supplied via a series of firms at different stages in a supply chain (particularly in comparison with a vertically integrated operator). Option 3 reduces this problem by allowing retail service providers to deduct from their revenues for the purpose of assessing their levy contribution, payments to other carriers. This Option has been adopted in a number of jurisdictions, including Italy, France as well as in New Zealand and Australia. In Italy, the contributions are based on turnover of the major operators, which has been set at one per cent of revenue less payments on interconnection, leased lines and roaming services.

One variant of the option would be to only impose the levy on retail revenues minus payments to other operators. However, this option would effectively mean that retailers who also own networks (and hence make lower outpayments) pay more than retailers who do not own networks.

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<sup>74</sup> See Tirole, J. (1988) *The Theory of Industrial Organization*, MIT Press, Cambridge, Massachusetts, pp. 174-175. These are similar effects to that captured in the complementary monopoly problem identified by Cournot .

<sup>75</sup> Assuming the retail market is less than effectively competitive. As the USO levy on wholesale revenues is a marginal tax on the wholesaler it is unlikely that it can effectively use non-linear pricing to reduce the double marginalisation effect.

<sup>76</sup> As discussed above, the citation for the Nobel Prize in Economics (1996) awarded to James Mirlees and William Vickrey notes that: "*The general theory of optimal taxation in a second-best economy encompasses few clear-cut recommendations. If one condition for social efficiency is violated, as a rule there is reason to violate others as well. However, Diamond and Mirrlees (1971) obtained a highly universal result. Under relatively general conditions, it is desirable to maintain production efficiency. In concrete terms, this means that taxes should not be levied on factors of production.*"

Whichever revenue base is considered, a key issue is which, if any, operators should be made liable to contribute to the Universal Service fund. Key considerations from a public policy perspective are:

- The wider the tax base (i.e. the greater the total revenues from which the levy is recovered), the smaller the percentage levy required to raise a given amount of revenues and hence the lower the welfare loss; and
- Competition would be distorted if providers who are supplying competing services are subject to different rates of levies. In this regard, it is important to consider not only competition between different types of networks but also between service providers such as VoIP providers who are an increasing competitive pressure at the retail level.

While a threshold can reduce the administrative cost of the fund by exempting smaller players, it risks distorting competition as it undermines competition on the merits (i.e. based on operators own costs and abilities in providing services) and it may encourage a service provider to remain small so as to avoid going above the threshold and thereby being subject to the levy.

A different form of exemption would be to provide a threshold for mobile operators to reflect the significant costs that they are already incurring in providing extensive coverage under licence conditions. Such a threshold could apply only after an operator reaches a certain coverage level and a greater threshold could be available for operators that extend their networks even further.

Finally, we note that where a levy is to be collected at both wholesale and retail levels, distortions can be minimised by imposing the levy based on an operator's value added.<sup>77</sup> In particular, in determining the amount of levy that the operator is required to pay they are allowed to deduct any levy amount already paid on their inputs. As such, the total amount of levy paid does not vary depending on the number of firms involved in the supply of the service, i.e. it is neutral with respect to a firm's choice of business structure. While such a levy system may seem administratively difficult, it could be imposed as a modification to a Member State's existing VAT system. One option would be for a percentage of the VAT collected from the telecommunications industry to be allocated to cover any Universal Service net cost – depending on a Member State's budgetary position, this need not involve a higher VAT tax rate than currently. Richard Cawley has noted that compared with straight levies on companies, a VAT system is "...likely to be more practical and transparent as well as more efficient and neutral".<sup>78</sup>

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<sup>77</sup> Value Added Taxes were first designed and introduced by Maurice Lauré, joint director of the French tax authority, in 1954.

<sup>78</sup> Cawley, R., "Universal Service: specific services on generic networks – some logic begins to emerge in the policy area", CoRR cs.CY/0109063: (2001), p.10.



### 5.3 Conclusions

Funding Universal Service through general taxation has substantial advantages from a public policy perspective. The use of general taxation can result in the welfare cost of raising the required funds being a fraction of the welfare cost that would result from raising the same revenue through an industry fund. Funding Universal Service through general taxation can also be expected to be more equitable, competitively neutral, and politically transparent than an industry fund.

General taxation can also avoid additional problems that can result from poorly designed industry funds particularly the risk that competition and business decisions will be distorted away from efficient levels. To the extent that industry funds are retained in particular Member States, the following principles are relevant:

- The welfare cost of the levy can be minimised by recovering the levy across as wide a base as possible;
- The same levy should be imposed on all competing providers so as not to distort competition;
- The levy design should not distort firms' decisions in relation to their business structure particularly by being levied in relation to a provider's value added; and
- The design should aim to minimise the administration and compliance costs of the levy.

Reflecting these considerations, a levy imposed as a modification to a Member State's existing Value Added Tax system is likely to be superior to existing USO industry funds that apply to only some providers and are not accurately based on providers' value added.

## 6. Determining the net cost of providing Universal Service?

Determining the net cost involved in providing Universal Service is necessary to identify whether the service provider(s) should be compensated and, if so, the level of that compensation. More fundamentally, accurately quantifying the net cost of Universal Service is important to ensure that adequate funding is available for the sustainable delivery of the services and that the level of funds collected does not distort competition in the market.

Where Universal Service is able to be provided by multiple operators then the net cost could be determined by a competitive selection process such as a downward auction. However, where an operator enjoys a significant cost advantage in supplying the Universal Service (such as would result from that operator having already incurred the cost of installing a network to supply the services) then competition to be the Universal Service supplier is unlikely to be effective and the regulator will need to estimate the net cost amount to be funded.

Accurately estimating the net cost of Universal Service provision is intrinsically difficult because of the detailed information required (e.g. in regard to uneconomic areas or customers) and the use of concepts such as optimised network costs and intangible benefits over which significant regulatory discretionary has been exercised. However, poor methodologies (particularly in terms of arbitrary assumptions) and poor regulatory practices (including limited transparency) have also contributed to the protracted disputes in Member States. In this section, we discuss a number of aspects of Universal Service costing as well as an approach that can help improve certainty for all industry players.

### 6.1 Developing costing principles

In principle, the net cost of Universal Service provision should be calculated as the amount of money that would be just sufficient to leave an operator no worse off from providing the service than if that operator did not provide the service. This principle is captured in the Annex to the current Universal Service Directive. The net cost of the Universal Service is the difference between the incremental (or additional) costs that an operator incurs in providing the Universal Service and the incremental revenues the operator receives as a result of being the Universal Service provider:

Net USO Cost = Incremental Cost of USO provision – Incremental revenue from USO provision

We next consider particular aspects of measuring the net cost.

## **Defining unprofitable areas or customers?**

The net cost of the USO is generally estimated with regard to particular areas or groups of customers. The method used to define the unprofitable areas (or customer groups) can have a significant impact on the calculated net cost. If an area is defined broadly it will likely include some unprofitable customers and some profitable customers with the potential that no net cost will be determined despite an operator being obliged to serve some customers it might choose not to serve in the absence of the obligation. On the other hand, the more narrow the area, the smaller will be the incremental cost base included in the model. For example, if an area is defined on an individual customer basis the incremental costs of serving the customer will only include the copper pair, any equipment at the customer's house and the line card. The cost of the remote concentrator and/or MDF and feeder cable will be common to other customers/areas and may be excluded from the calculation.

It is reasonable that areas be defined on a consistent basis with an operator's investment making decisions. This reflects the aim to determine an amount of funding that would make the operator willing to invest in and provide service to that area or group of customers.

## **The right cost concept**

The objective of costing the USO is to compensate an efficient operator for the imposition of the obligation. The costing therefore needs to be based on a counterfactual of what costs the operator would incur if it were not subject to the obligation. The same counterfactual applies to the revenues that the operator would receive if they were not subject to the obligation.

A long run incremental cost concept is relevant for the determination of the cost of Universal Service as it measures the additional costs that an operator would incur in the long run as a result of providing the service or equivalently the costs that the operator would avoid if it did not provide the service. The use of a long-run concept takes into account the need to ensure sufficient revenues to cover the operator's capital costs so that they have the incentive and ability to continue to invest in maintaining and replacing the assets required to deliver the service. Further, it is reasonable that operators only recover the costs that they necessarily incur in the providing the USO and that regard should be based on the efficient (least) cost of service provision.

Where a bottom-up theoretical model is used to estimate costs, the results of the model should be checked with top-down costs from the operator's accounts to ensure that the cost estimate is actually achievable by the operator.

The cost of capital is an important determinant of the cost of providing the Universal Service. In principle, the cost of capital should be estimated with reference to the operator's assets that are used in providing the Universal Service rather than simply applying the operator's overall cost of capital. However, in practice, it may not be possible to estimate a USO-specific cost of capital for the operator.

## **Revenue foregone**

The same approach to developing the appropriate cost concept should be employed in defining the revenues to net off the cost of the USO. That is, the revenues forgone should be based on the difference in the revenues received with and without the obligation. The counterfactual therefore needs to be clearly defined.

In addition to direct revenue from the universal services the provider may earn revenues from services complementary to the basic universal services, such as long distance calls and other value added services, which it would not have otherwise received. These revenues must be deducted from the costs defined above in order to define the increment net cost of imposing the obligation.

## **Estimating intangible benefits**

Intangible benefits are the gains that may arise from being a universal service provider and that are generally not reported for formal accounting purposes. Intangible benefits are not directly measurable in monetary terms although they may boost profits (or offset costs) through indirect ways. The requirement for EU regulators to take account on intangible benefits has been long-standing.<sup>79</sup> However, precisely because these benefits are not directly measurable, they have proved a highly contentious element in estimating the net costs of USO provision. Further, with the development of competing networks, the magnitude of any remaining benefits from being the USO provider is likely to be reduced.

## **Ensuring predictability**

The experience of a number of operators is that current modelling processes in particular Member States can be highly non-transparent and unpredictable.

Where obligations are imposed on operators that may require significant investment, it is appropriate that the operators are able

Predictability is an important for both the Universal Service provider and for other providers who may be called upon to contribute to a fund. Estimating the net cost of the Universal Service provision can also be a time consuming process for both operators and the regulator. A means of providing greater predictability and limiting resource demands would be for the net cost of the Universal Service provision to be estimated in detail only every few years and to rely on trends in costs and revenues to determine the net cost to be recovered in other years.

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<sup>79</sup> For example, see Article 5(4) of Directive 97/33 and Article 12(1)(a) of the Universal Service Directive (2002/22/EC).

## 6.2 Conclusions

While estimating the net cost of Universal Service provision is complex, a number of general principles can be identified to assist regulators. On the basis of analysis in this section, we identify the following principles of best principles to govern Universal Service costing exercises:

- Net costs should be calculated as the amount of money that would be just sufficient to leave an operator no worse off from providing the Universal Service than if the operator did not provide the service. Net costs should take account of the long run incremental costs and benefits to the operator arising from provision of the service or equivalently the costs and benefits that the operator would avoid if it did not have to provide the service.
- Net costs should be estimated with regard to particular areas or groups of customers that are consistent with operator's investment decisions.
- The level of funds to be collected from particular operators and the level of funds to be paid to particular operators should be predictable. Regulators could provide greater certainty for the industry by carrying out a detailed costing exercise and then using the estimated amount, indexed by known trends, as the Universal Service net cost for a number of years before another costing exercise is undertaken. Where there were significant changes in the Universal Service scope or market changes then the impact of those changes would need to be estimated. Maintaining a stable costing methodology can also help minimise uncertainty.