

# Agenda

## Advancing economics in business

### Boost for broadband? Is there a case for government intervention in the provision of broadband infrastructure?

There is currently considerable debate across Europe on plans to expand ‘universal service’ for broadband, including the use of public funding for the roll-out of fibre-based access networks. These initiatives are argued to have the potential to make a significant contribution to the development of the wider economy and to prevent social exclusion by providing broadband to all. What considerations would policy-makers need to address to achieve these goals, and are such programmes vulnerable to claims that such support constitutes state aid?

Across the developed world, a number of recent proposals for publicly funded broadband networks have been put forward by politicians and industry stakeholders. These initiatives can be divided into two broad categories: expanding the universal service regimes to include broadband, and providing some form of public funding for the roll-out of next-generation access networks (NGAs). Examples of such schemes include the following.

- The Digital Britain Report, published in June 2009, sets out proposals and commitments on the funding of network investments which would not otherwise be commercially viable. Specifically, it introduces the concept of a Universal Service Commitment, as well as monetary support for investments in NGAs, funded (in part) by a 50p levy on all fixed-line connections.<sup>1</sup>
- Similar initiatives have been introduced in other European jurisdictions (eg, Finland, Sweden and the Netherlands) and by the European Commission. Indeed, in 2008 the Commission initiated a debate on the potential revision of the Universal Service Directive with the aim of extending universal service obligation (USO) to cover broadband, given the apparent gaps in broadband availability in a number of Member States.<sup>2</sup>
- In the USA, the Recovery Act 2009 states that the ‘National Broadband Plan’ will seek to ensure that ‘all people of the United States have access to broadband’.<sup>3</sup>

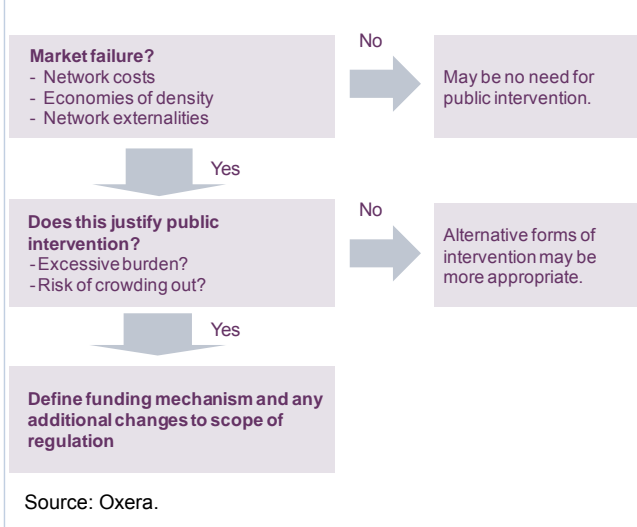
A common theme in all ‘broadband-stimulus’ proposals is the recognition of (high-speed) broadband as an important driver of economic growth. It is also widely recognised that high levels of coverage are needed to prevent social exclusion.<sup>4</sup>

This article does not seek to challenge these justifications. Instead—reflecting on the recently published European Commission broadband state aid guidelines—it focuses on the economics of public funding of (next-generation) broadband networks. In particular, it asks whether there is a market failure that warrants public intervention, and what implications such measures might have for competition and regulation.

#### (Why) does the market fail to deliver broadband connectivity?

While it is noted that all forms of regulatory intervention influence investment incentives and, hence, that broadband roll-out could be promoted through non-financial regulatory terms, the focus here is on direct financial aid—ie, state support through subsidies. Such ‘equity participation’ or ‘capital injection’, as it is termed by the European Commission, is usually regarded as a means of ‘last resort’ to expand network coverage, to be applied only where non-financial intervention alone would not result in sufficient network coverage.

Figure 1 illustrates a simplified framework for assessing the relative merits of broadband funding.

**Figure 1 Framework for assessing broadband funding**

Taking it as given (for the purposes of this article) that widespread access to high-speed Internet connections will promote economic growth and social inclusion, the critical issue for policy-makers is whether the market will, independently of government intervention, adequately deliver the necessary infrastructure. If it will not deliver the desired infrastructure in rural areas then, in order to understand how financial aid could correct the market failure inherent in the provision of rural broadband, it is useful to distinguish between the 'private value' of an investment to businesses and the 'public value' of such investment to society as a whole. The former is the value recoupable by an investor (in this case, the direct monetary value of expanding network coverage) in the form of increased returns on services launched as a result of that investment. The latter refers to the wider social benefits arising from broadband investment, which cannot be appropriated by the investing operator.

There is a body of economic literature covering the need for, and implications of, public intervention and state-funded investments, and ways of funding these investments.<sup>5</sup> From an economic perspective, public funding might be warranted insofar as it addresses any market failures inherent in the provision of these services. More specifically, the economic rationale for broadband funding is based largely on (network) externalities, the cost structures inherent in broadband networks, and risk-sharing mechanisms.

- **Externalities.** Broadband networks are expected to exhibit positive externalities for the wider economy. Moreover, network externalities—the utility of each individual within a network increasing in line with the number of other users within that network—have been shown to exist in broadband markets and in relation to the services provided over those networks. Thus, the more consumers in rural areas that

subscribe to broadband services, the more likely it is that services attractive to rural consumers will be developed, in turn enhancing the attractiveness of, and demand for, the enabling broadband services. These externalities may not be fully captured by infrastructure providers, leading to inefficiently low levels of provision.

- **Cost characteristics.** Fixed-line networks are expensive to construct, particularly in the 'last mile' (the final part of the network reaching the end-consumer), and the costs of deploying them are significantly influenced by population density, making them less economic to provide in rural and remote areas.
- **Risk-sharing.** Both rural broadband and NGA stimuli are examples of investments with high demand uncertainty. Put another way, private investors are faced with a higher risk, and hence require higher returns on their investment which, in turn, can result in higher financing costs for a firm. While there appears to be consensus among regulators that the risks of private investment should be reflected in the allowed returns,<sup>6</sup> another way of addressing any potential underinvestment might be through sharing the upfront investment with other, in this case public, parties.<sup>7</sup>

Some industry stakeholders have indicated that the evidence on the extent of market failures suggests only a limited role for public funding.<sup>8</sup> It has been argued, for example, that while there may be a social case for the provision of telephony networks (eg, access to emergency services), this does not extend to broadband, let alone to NGAs. Among the reasons provided in support of this argument is the concern that the incremental social benefit of Internet access may be limited; this would undermine the need to extend current USOs, and thus the consequent need for potential financial support.

Nevertheless, while the rationale for using public funds to facilitate the construction of NGAs or to provide a broadband element within the USO is not always fully articulated, a number of policy-makers seem to have concluded that the public benefits of broadband and NGA roll-out exceed the costs; consequently, a range of initiatives for capital injections are taking place, as identified above.<sup>9</sup>

## In the grey area?

As with any government financial intervention, a 'broadband stimulus' may raise concerns about the potentially distortive impact of state aid. More specifically, there appear to be at least two types of concerns that may arise, which require careful consideration from the regulators.

- **Crowding out competitive investment.** Long-term incentives for private investment by both the incumbent and alternative providers may be distorted if there is an expectation that state funding will be provided for broadband networks. Such ‘crowding out’ may offset the positive spillover effects associated with such expanded networks. In this respect, regulators should bear in mind the principle of technological neutrality, in that prospective private investment may not be limited to fixed-access platforms (ADSL, FTTx). For example, long-term evolution (LTE) mobile networks may, in some instances, prove a more efficient way of delivering super-fast broadband than ‘traditional’ fibre-based solutions.<sup>10</sup>
- **Market structure.** The designation of subsidised USO/NGA operators might result in sub-optimal market outcomes if there is no effective competition for the rights being allocated. For example, this might occur if local economies of scale and/or scope (perhaps arising from existing backhaul or access networks) imply that only a limited number of operators are able to acquire the rights to operate the extended networks.

To address these potential concerns, the European Commission recently issued guidelines on state aid issues in relation to broadband/NGAs. Three areas are defined in the guidelines, depending on the extent of competition:<sup>11</sup>

- **white areas**—no commercially viable broadband/NGA networks exist, and state funding would not distort competition;
- **black areas**—at least two providers are engaged in facilities-based competition, no market failure exists and therefore no further public funding is warranted;
- **grey areas**—only one broadband/NGA network is present and further assessment is required. More specifically, with the aid of the respective national public authority, the European Commission would seek to obtain information on the prospects of private network deployment within the next three years.

In practice, significant economic analysis would be required to establish the degree of competitiveness of different areas. An assessment of potential competition requires careful assessment of the business case to roll out networks in a given area, taking into account the pace of technological progress and developments in the costs of network equipment. In carrying out such assessment, tools analogous to those applied in geographic market definition are likely to prove useful.<sup>12</sup>

A particular challenge is that analysis underlying state aid intervention would need to be forward-looking, as the economic lives of broadband and (in particular) ‘passive’ NGA assets (eg, dark fibre, ducts) are long; accordingly, technologies that may now seem commercially unviable may have a strong business case in five or ten years’ time. The Commission has specified that the time frame for prospective entry would be as short as three years. Hence, a potential risk inherent in this framework is that a state subsidy for an asset with a long economic life could crowd out the competitive investment that would occur after three years in any case. Identifying whether an area should be classified as white or grey, and, if grey, what shade of grey, could have significant implications for the future of competition in those areas.

## Considerations for policy-makers

Faced with the above risks of market distortion, governments and regulators need to take into account two areas of focus when considering the scope of intervention, as discussed below:

- the choice of funding mechanism for network construction has a direct impact on the market structure that follows from the designation of the USO provider or rural NGA operator;
- the regulatory regime designed for private investment may need to be revisited in the context of state-funded networks.

Where there is a net burden to fulfil a universal broadband and/or NGA coverage obligation, the regulator and/or policy-maker will need to assess whether that burden is sufficiently significant to warrant public financial intervention, and if so, what funding mechanism is appropriate. (For example, in the case of BT, the UK communications regulator, Ofcom, has concluded that the narrowband USO does not result in an excessive burden and therefore should not be publicly funded.) While beyond the scope of this article, such a funding mechanism could be financed in various ways (eg, through an industry levy or general taxation) and the suitability of the mechanism may vary across a number of factors, including the particular characteristics of the USO/NGA coverage obligation.

Similar funding mechanisms can be employed in the funding of both broadband USO and NGA networks, given that the underlying market failure is similar. While the Commission’s guidelines do not specify how any potential capital injection would be financed (eg, whether through tax rebates or subsidies), the guidelines are clearer about the granting mechanism:

The open tender approach ensures that there is transparency for all investors wishing to bid for the realisation of the subsidised project.<sup>13</sup>

Advocates of such franchising or competitive tendering approaches argue that, if properly designed, competitive tendering could promote the cost-efficient provision of (high-speed) broadband services, as well as allowing the market to reveal the true cost of delivering the broadband networks in particular geographic regions and/or for specific services.<sup>14</sup> Competitive tenders are usually designed as 'reverse auctions', such that the operator asking for the lowest subsidy is designated as the provider of rural broadband or NGA connections. An important consideration in the design of such tenders is whether a genuinely competitive process can be guaranteed. For instance, in some areas the economies of scope or scale available to the incumbent may mean that other operators would not have a realistic prospect of success through such an auction process.

Aid for broadband NGAs may have profound implications for the structure of the communications markets. Under some funding mechanisms, entry might be expected by a range of different operators with (potentially overlapping) independent infrastructures. Other funding mechanisms might imply a degree of vertical separation to be necessary in respect of the incumbent if the government were to create a new infrastructure provider to manage its co-financed investment (as is the case in Australia).<sup>15</sup>

Therefore, this raises the question of whether changes to the scope of regulation would be required, given government investment in NGAs/broadband USOs. The Commission's guidelines set out concrete conditions which would apply to the regulation of access to state-subsidised networks. It is, first of all, apparent that 'all possible forms of network access' should be provided to third parties. With regard to broadband, the Commission sets principles for benchmarked wholesale charges and claw-back mechanisms for overcompensation.

In designing an appropriate regulatory regime once state aid has been granted, it can be useful to distinguish between different layers of the telecoms network, and to identify those parts that would be operated by the designated universal service or NGA operator. More specifically, the degree and form of

regulation would depend, crucially, on the extent to which those operator(s) controlling the funded networks would be providing:

- passive access inputs only (eg, duct access, physical unbundling of fibre connections); or
- passive access as well as active wholesale products (eg, managed bitstream);<sup>16</sup> or
- retail services, in addition to passive and active wholesale products.

For example, in Sweden and the Netherlands, municipalities (partly) own the fibre networks, whereby the public owner has an evident incentive to provide open access to the passive layer on fair terms to all service or intermediate-level providers.<sup>17</sup> However, if the incumbent operator, with market power at both the wholesale and retail levels, acquires rights for subsidised network operations, issues of vertical foreclosure may be of relevance. More extensive access regulation may be warranted—for example, in the form of price controls and measures of equivalence (similar to those imposed on Openreach) in the provision of wholesale inputs.<sup>18</sup> Importantly, whatever the regulatory framework employed, it should be specified before any assignment of rights to operate the network, and before the award of any funding, given that firms' ex ante appraisals of such investment (and hence the bid valuation) depend on the subsequent regulatory regime which, in part, determines the expected returns.

## Conclusions

Decisions to award funding and to regulate funded firms involve several bodies. While many initiatives supporting public investment in broadband USO or NGA start from the premise that this is necessary to support economic growth or social inclusion, it is arguable that the decision is essentially a political one which goes beyond the remit and powers of most regulators. Notwithstanding this, regulators have an important role to play in managing the allocation of funds and/or in deciding on the appropriate course of action in response to the broader competitive/regulatory implications that such funding (or indeed, lack of funding) may engender.

<sup>1</sup> Department for Culture, Media and Sport and Department for Business, Innovation & Skills (2009), 'Digital Britain: Final Report', June.

<sup>2</sup> European Commission (2008), 'Broadband Internet for all Europeans: Commission Launches Debate on Future of Universal Service', press release, IP/08/1397, September 25th.

<sup>3</sup> Federal Communications Commission (2009), 'Overview of the American Recovery and Reinvestment Act of 2009 (Recovery Act)'.

<sup>4</sup> European Commission (2009), 'Community Guidelines for the Application of State Aid Rules in Relation to Rapid Deployment of Broadband Networks', OJ C235/04, September 30th.

<sup>5</sup> See, for example, Laffont, J.J. and Tirole, J. (2000), *Competition in Telecommunications*, Cambridge, MA: The MIT Press; OECD (2006), 'Rethinking Universal Service for a Next Generation Network Environment', April 18th; Riordan, M. (2002), 'Universal Residential Telephone Service', chapter 10, pp. 423–473, in M. Cave, S. Majumdar and I. Vogelsang (eds), *Handbook of Telecommunications Economics*, Volume 1, Amsterdam: North-Holland; and CEG (2008), 'Reforming Universal Service Policy: A Report for GSM Europe', February.

<sup>6</sup> European Commission (2009), 'Draft Commission Recommendation of [...] on Regulated Access to Next Generation Access Networks (NGA): Second Public Consultation', June, p. 5.

<sup>7</sup> Risk-sharing arrangements are not limited solely to the direct aid of the upfront investment. Indeed, a variety of mechanisms, such as a pre-commitment by entrants to purchase a certain amount of wholesale inputs, can mitigate the investment risk.

<sup>8</sup> See, for example, CEG (2008), 'Reforming Universal Service Policy: A Report for GSM Europe', February.

<sup>9</sup> In addition to proposals of larger scale, a number of smaller-scale broadband financing projects have taken place, as indicated by the large number of approved broadband state aid decisions by the European Commission: a full list of such decisions is available from the European Commission website.

<sup>10</sup> Some public funding initiatives have also been announced for LTE networks. European Commission (2009), 'EU Invests a Fresh €18 million in Future Ultra High-speed Mobile Internet', press release, IP/09/1238, August 18th.

<sup>11</sup> European Commission (2009), 'Community Guidelines for the Application of State Aid Rules in Relation to Rapid Deployment of Broadband Networks', September.

<sup>12</sup> The standard SSNIP (small but significant non-transitory increase in price) framework does not produce meaningful geographic market definitions in the telecoms sector. See, for example, Oxera (2008), 'Divide and Conquer: Geographic Segmentation of Telecoms Markets', *Agenda*, July.

<sup>13</sup> European Commission (2009), 'Community Guidelines for the Application of State Aid Rules in Relation to Rapid Deployment of Broadband Networks', September, para 59 (b).

<sup>14</sup> See, for example, OECD (2006), 'Rethinking Universal Service for a Next Generation Network Environment', April 18th.

<sup>15</sup> Minister for Broadband, Communications and the Digital Economy (2009), 'New National Broadband Network', Canberra, Australia, April 7th.

<sup>16</sup> Active access products (bitstream) are such that the owner of the infrastructure owns and manages the active electronics, with the consequence that there is less scope for entrants to differentiate their offerings than if they were installing their own electronics and using passive inputs only.

<sup>17</sup> See, for example, Caio, F. (2008), 'The Next Phase of Broadband UK: Action Now for Long-term Competitiveness. Review of Barriers to Investment in Next Generation Access', September, p. 34.

<sup>18</sup> In the UK, BT's functionally separated network operator, Openreach, is subject to equivalence measures that seek to address non-price discrimination in the provision of wholesale products.

**If you have any questions regarding the issues raised in this article, please contact the editor, Dr Gunnar Niels: tel +44 (0) 1865 253 000 or email [g\\_niels@oxera.com](mailto:g_niels@oxera.com)**

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