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Regulatory unbundling in telecommunications

by Günter Knieps

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Abstract:

Due to its dynamic nature, and the increasing importance of competitive subparts, the telecommunications sector provides particularly interesting insights for studying regulatory unbundling. Based on the theory of monopolistic bottlenecks the fallacies of overregulation by undue unbundling obligations are indicated. Neither the promotion of infrastructure competition by mandatory unbundling of competitive subparts of telecommunications infrastructure, nor regulatory induced network fragmentation within monopolistic bottleneck components is justified. The impact of the shrinking of the areas of network specific market power on the remaining unbundling regulation is analyzed. Finally, the phasing-out potentials of unbundling regulation in European telecommunications markets are pointed out.

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1. Introduction: Market driven versus regulatory unbundling

In competitive markets the optimal degrees of bundling or unbundling of complementary components within a value chain result endogenously, depending on the cost and demand characteristics. The stronger the demand for one-stop-shopping of different product components and the stronger the synergy effects of bundling different product components into one end product, the lower the incentives for unbundling.

Bundling products can be frequently observed. There is typically a demand for complete cars, rather than individual components like the engine, wheels, or driving system. Bundling products are often the results of consumer preferences. But there are also viable markets for consumers to buy individual components of the value chain separately and assemble some complementary components themselves. The huge success of do-it-your-self stores is an obvious result of such unbundling strategies. The degree of bundling versus unbundling of products in competitive markets results endogenously, depending on consumer preferences and production conditions. The focus of the markets is therefore not solely on avoiding interfaces between different product components per se, but on preventing the atomizing of the value chain into an artificially high number of interfaces. Not everything that is technically feasible is also economically beneficial. The definition of interfaces between different product components is a genuine entrepreneurial decision. In particular, the supply of a subset of components of a value chain requires viability without losses.

The question of economic incentives for bundling products versus unbundled components has to be differentiated from the incentives for vertical integration versus vertical separation. The latter is focused on firm organization. Several technically separable functions of a firm are executed by one entrepreneurial unit or by different firms. In contrast, the issue of bundling versus unbundling is focused on the product, where several technically separable components are produced as one product or as separate components. A vertically integrated enterprise can also produce unbundled products, leaving some components for final assembly by the consumer. And vice versa, a vertically separated firm may

offer a bundled product by ordering some components from other firms and selling the end product to the customer under its own brand name.

For the case that individual components of the value chain cannot be sold directly to the end consumer, a firm can produce a subset of components by itself and buy the remaining components as inputs. These make-or-buy decisions lead to some interesting questions from an organizational perspective. However, they do not raise concerns from a regulatory policy point of view (Knieps, 2008, pp. 238 ff.).

In network industries end-consumers' services are provided by means of complementary components of a value chain, which may be offered via different submarkets. For example, letter mail conveyance is provided by the components of collecting, sorting, transport and delivery. Electricity systems consist of generation, transmission networks and regional/local distribution networks and the resale activities. Railway systems consist of railway traffic, railway traffic control and railway infrastructure. Telecommunications is differentiated in terminal equipment, telecommunications services, satellite/mobile networks, long-distance cable-based networks and local cable-based networks.

The basic idea behind the disaggregated approach to network regulation is to identify those parts of networks where network specific market power can be localized, which may be abused in the interconnection process between different submarkets of the value chain. The focus of regulatory unbundling concepts is the set-up of transparent interfaces between those parts of networks with market power and the complementary competitive parts. The goal of regulatory unbundling is to guarantee non-discriminatory access to the areas where network specific market power exists. Since the global entry deregulation of the telecommunications industry in 1998 there has been an ongoing debate on the proper role of regulatory unbundling resulting in various forms of unbundling. The regulatory obligations to offer individual network elements or subparts of networks at regulated prices may entail unbundling between telecommunications services and infrastructures, unbundling between long distance networks and local networks and different forms of unbundling within local telecommunications net-

works. Local loop unbundling may consist of direct access to copper cable (full unbundling), the obligation to lease a copper line (line sharing) or bitstream-access-services.

The goal of this paper is to provide a network economic analysis of the concept of regulatory unbundling in the telecommunications industry. Due to its dynamic nature, and the increasing importance of competitive subparts, the telecommunications sector provides particularly interesting insights for studying regulatory unbundling. In section 2 the localization of network specific market power by means of the theory of monopolistic bottlenecks is introduced, resulting in a generalization of the essential facilities doctrine. In section 3 the fallacies of overregulation by undue unbundling obligations are indicated. Neither the promotion of infrastructure competition by mandatory unbundling of competitive subparts of telecommunications infrastructure, nor regulatory induced network fragmentation within monopolistic bottleneck components is justified. In section 4 the impact of the shrinking of the areas of network specific market power on the remaining unbundling regulation is analyzed. Section 5 concludes, pointing out the phasing-out potentials of unbundling regulation in European telecommunications markets.

2. Regulatory unbundling and non-discriminatory network access

2.1 Localization of network specific market power

In order to determine the interface between the parts of networks with market power and the competitive parts of networks, network specific market power has to be localized. It is important to note that the underlying characteristics of network structures are not sufficient to guarantee market power. The markets for network services are far from the ideal picture of perfect atomistic markets. For example, an essential characteristic with respect to the supply of train services is its network structure. For train companies incentives may exist for bundling traffic either on a given line (economies of scale) or in serving several lines jointly (economies of scope). However, a possible lack of competition between active

firms in the market in a particular area with low population density could be replaced by efficient potential competition. The same argumentation also holds for other network service providers, for example airline companies, bus companies, telecommunications and postal service providers. If the incumbent companies produce inefficiently or make excessive profits, market entry by newcomers will take place.

The pressure of potential competition can create incentives for the active supplier to improve the quality and variety of services as well as to produce more efficiently. These networks are therefore called contestable (Baumol, Panzar, Willig, 1982). An essential condition for the functioning of potential competition in order to discipline firms already providing network services is that the incumbent firms do not have asymmetric cost advantages with respect to potential entrants. In fact, trains, like planes or busses, do not need to be considered as sunk costs. They can be used to serve other networks in different locations once demand in the former network has dropped too far to keep up a profitable train service. Other examples for contestable networks are the markets for telecommunications services.

An important condition for the effectiveness of potential competition is, however, that all (active and potential) suppliers of service networks have equal (symmetric) access to the complementary infrastructures. As long as a train company has preferred access to rails and stations (e.g. if there is congestion) or has advantages with respect to scheduling procedures, it possesses competitive advantages with respect to potential entrants and active competitors. The same holds for airline companies having preferred access to landing rights, or telecommunications service providers having preferred access to local telephone networks.

When a natural monopoly situation (due to economies of scale and scope) arises in combination with sunk costs, so that entry and exit are not free, a monopolistic bottleneck with network specific market power emerges (Knieps, 1997). A natural monopoly exists when a single provider is able to serve the relevant market at lower costs than several providers. Sunk costs are no longer decision relevant for the incumbent monopoly, whereas a potential entrant is confronted

with the decision whether to build its own network infrastructure and thereby incur the irreversible costs. Therefore, the incumbent firm has lower decision relevant costs than the potential entrants. This creates room for strategic behaviors of the incumbent firm in such a way that inefficient production or excessive profits do not automatically result in market entry. Natural monopolies together with irreversible costs are characteristic for the construction of transportation infrastructures such as railroads and airports. Consider, e.g. a domestic railroad operator supplying rail capacities and simultaneously rail transport services as all national railroad companies do. The railroad operator may exploit its monopoly position vis-à-vis a foreign rail transport company and restrict access to its own market. Monopolistic bottlenecks can also be observed in local infrastructures for gas, water and electricity, as well as for telecommunications.

Network infrastructure, however, need not always create network specific market power. Firstly, the natural monopoly situation may disappear, as for example in long-distance telecommunications transmission with parallel transmission lines. Secondly, technological change may provide alternative network infrastructures, such that monopolistic bottlenecks are losing importance. Examples are the increasing relevance of cable-less local mobile communications and the increasing relevance of cable television networks for telecommunications purposes. Therefore, a clear-cut distinction between network infrastructure as monopolistic bottlenecks and competitive networks is not always easy to find. Careful sector studies seem inevitable.

2.2 The essential facilities doctrine and unbundling regulation

An adequate starting point for government interventions when market power is involved in interconnection/access processes seems to be the essential facilities doctrine. Well known and often applied in the US antitrust law, the essential facilities doctrine has gained increasing importance also in the European competition law. The focus is on access to an essential facility on equal terms for all competitors. It is through the application of the Sherman Act of 1890 that the essential facilities doctrine has developed in the US. Liability under the essential

facilities doctrine is based on the following criteria: control of an essential facility by a monopolist (endowing monopoly power); a competitor's inability practically or reasonably to duplicate the facility; the denial of the use of the facility to a competitor; and the feasibility of providing the facility.[1]

It is obvious that the preconditions of the essential facilities doctrine are not fulfilled in the case of interconnection/access among competitive networks, because competitors always possess access to alternative (potential) networks. If an incumbent carrier were to foreclose access or behave in other aspects in a non-competitive way, new network providers would arise automatically (independent of the market share of the incumbent carrier). The application of the essential facilities doctrine to interconnection /access among competitive networks would even be detrimental, because it would artificially restrict degrees of freedom in the search for pareto-optimal bargaining solutions among the market participants.

As a consequence, the essential facility doctrine should be applied in a restrictive manner only to those interconnection/access cases where market power (at least on one side) is involved. In the US antitrust law the essential facilities doctrine has been applied in a case-by-case procedure to specific infrastructures (e.g. terminal railroads, local electricity network of a municipality). In spite of the purpose of the essential facility doctrine to restrict monopoly power, interpretations of this doctrine by different US courts have varied over time. One controversial issue was, whether the feasibility of providing infrastructure capacities to a competitor would be an absolute criterion or whether "valid business reasons" would be a rationale for a refusal to deal with a direct competitor. This quite elusive interpretation can easily be criticized because, obviously, the fact that granting access would reduce the profit of the owner of the facility cannot by itself constitute a "valid business reason" (Tye, 1987, p. 346).

[1] City of Anaheim v. Southern California Edison Co., 995 F. 2d 1373, 1380 (9th Cir. 1992).

An effective application of the essential facilities doctrine must be combined with an adequate regulation of access conditions (quality and tariffs). Partly, this requirement has been included in the criteria of the essential facilities doctrine itself. Not only the denial of the use of the facility but also the imposition of restrictive terms for the use of the facility with the consequence of substantial harm to competition has been considered in earlier case law as a criterion for the essential facilities doctrine. Nevertheless, a significant scope for interpretation remains, especially given the historical fact that antitrust lawyers are typically not specialized in dealing with complex matters of access conditions.

As a consequence, enforcement of the essential facilities doctrine should be combined with the application of regulatory instruments focusing on access conditions (especially regulation of interconnection/access charges). Another advantage of the explicit combination of regulatory concepts with the antitrust concept of the essential facilities doctrine is the shift from case-to-case applications towards the definition of a class of cases characterized as monopolistic bottlenecks. In contrast, the rather global concept of the abuse of market power by dominant firms requires that the relevant market has to be established (in a narrow sense) and that the meaning of dominance has to be clarified (George, Jacquemin, 1990, p. 228). Nevertheless, a generalization of the concept of the essential facilities doctrine seems possible focusing on the class of cases where market power is based on the same reasons. Within networks, this leads to monopolistic bottleneck infrastructures.

The reference point for regulatory rules concerning interconnection/access charges should be the coverage of the full costs of the monopolistic bottleneck in order to guarantee the viability of the facility. In particular, when alternatives to bypass essential facilities are absent, the cost-covering constraint may not be sufficient to forestall excessive profits. Therefore the instrument of price-cap regulation should be introduced (Beesley, Littlechild, 1989). Its major purpose is to regulate the level of prices, taking into account the inflation rate (consumer price index) minus a percentage for expected productivity increase. In contrast, the design of pricing structures should be a part of the decision making process of the firms. It is important to restrict such price-cap regulation to the monopo-

listic bottleneck parts of networks, where market power due to the monopolistic bottleneck is really creating a regulatory problem. Regulation of interconnection/access conditions should be strictly limited to those parts of networks where market power has been localized. In competitive subparts of networks the price setting should be left unregulated.

3. Promoting infrastructure competition by regulatory unbundling?

Since the abolishment of legal entry barriers the question of how regulatory policy can influence incentives to invest for incumbents and entrants has led to the issue of mandatory unbundling at regulated access prices (Farrell, 1997; Hausman, Sidak, 2005, pp. 189 f.). It was later considerably transformed by the conviction that "the way to promote infrastructure competition is to make available easy and inexpensive access to the assets of the incumbent which are not replicable. At the outset this might include a large numbers of assets, which initially are complements to the entrant's investment, but with time become substitutes." (Cave, 2003, p. 16).[2] This concept immediately makes room for a large variety of regulatory discretion with respect to unbundling and access pricing regimes in order to encourage competitive infrastructures. The ladder of investment approach either results in an oversized regulatory basis, when the unbundling of competitive subparts of telecommunications infrastructure is made mandatory, or in undue regulation of monopolistic bottleneck infrastructures, thereby destroying the advantages of the natural monopoly with subsequent inefficient cost-duplication (Knieps, Zenhäusern, 2007, pp. 260 ff.).

The regulatory goal of applying the ladder of investment approach is to guarantee an opportunity for entrants of gaining access to unbundled network components at any place of their choice, so that the identity of the non-replicable complementary assets varies with the nature of the entrant's strategy. This might be achieved through a decision by the regulator to prescribe time-variant access

[2] The idea of the ladder of investment was already indicated in Cave, Prosperetti, 2001, p. 421. For the context of narrowband see Cave, Vogelsang, 2003, p. 724; for the context of broadband see Cave, 2006, pp. 231 f. and Cave 2010.

pricing principles under which the prices of certain network resources are initially low, even below cost and therefore cross-subsidized, and then rise over time according to the regulator's preference for network duplication. Thus, it is mainly up to the regulator when and to what extent inter-platform competition can emerge.

If, according to the business models and subsequent make-or-buy decisions of the competitors, some resources are not replicable, this does not mean that they already fulfill the characteristics of a monopolistic bottleneck. Firstly, competitive components may also belong to the ladder of investment. When entrants are starting their business activities with reselling services, they may consider competitive long-distance infrastructure components as non-replicable, claiming mandatory access at subsidized access charges. Competitive components are also involved in bitstream access, for example the provision of DSLAM equipment. Due to the low investment that entrants are assumed to make initially, they suffer from low service flexibility compared to a network operator. Thus, according to the ladder of investment approach, entrants are starting their business activities by reselling services/elements, that are on the one hand not aligned with huge investment activities, but lead on the other hand to low service flexibility in comparison with the degree of freedom of a network operator. In fact, it is assumed that assets cannot unambiguously be classified in categories that are easily, with difficulty, or not at all replicable (see figure 1).

Secondly, monopolistic bottlenecks are to be regulated as a whole, focusing globally on the relevant infrastructure characteristics as natural monopolies. Within monopolistic bottlenecks the network owner's business model should be relevant. The network owner should provide non-discriminatory access to monopolistic bottlenecks at cost-covering prices. If regulatory unbundling of certain bottleneck components at subsidized access charges is applied, incentives for excessive investments are created, ignoring the relevance of the viability of the existing infrastructure. Instead of regulating monopolistic bottleneck as a whole, the corresponding facilities are split up and concomitant economies of scope destroyed. Thus the viability of network facilities is threatened.

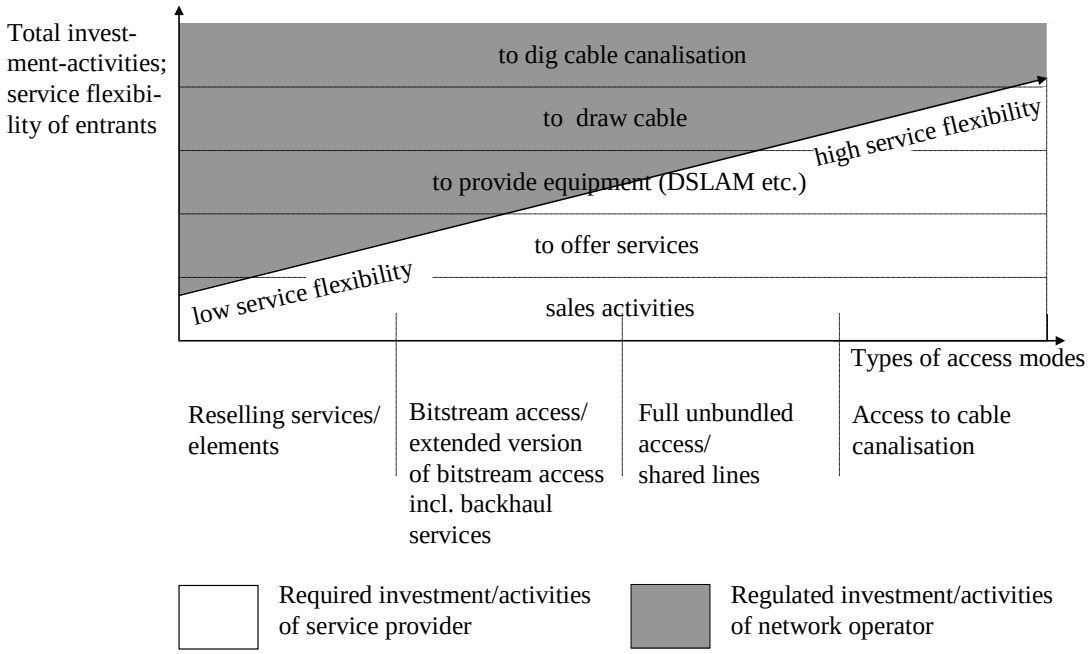

Figure 1: Layout of the ladder of investment approach (Source: Knieps, Zenhäusern, 2007, p. 262).

4. Regulatory unbundling and shrinking monopolistic bottlenecks

The markets for telecommunications services are important examples for competitive networks. The market for public telephone services is competitive, because suppliers of value added services are also prepared to offer telephone services. Even if market shares of incumbent firms are large, inefficient suppliers would be immediately confronted with rapidly decreasing market shares. Nevertheless, competitive subareas can also be localized in the area of telecommunications infrastructure. The pressure of potential competition in wireless networks, for example satellite or microwave systems, is guaranteed as long as symmetric access to complementary inputs, for example right of way, radio spectrum etc., is ensured. In the meantime, long-distance telecommunications networks are competitive.

As long as network specific market power may exist in the local infrastructure network due to the absence of alternative network infrastructures, the question arises what the remaining bottleneck components on the upstream markets are depending on the required transmission qualities in the relevant service markets (see figure 2).

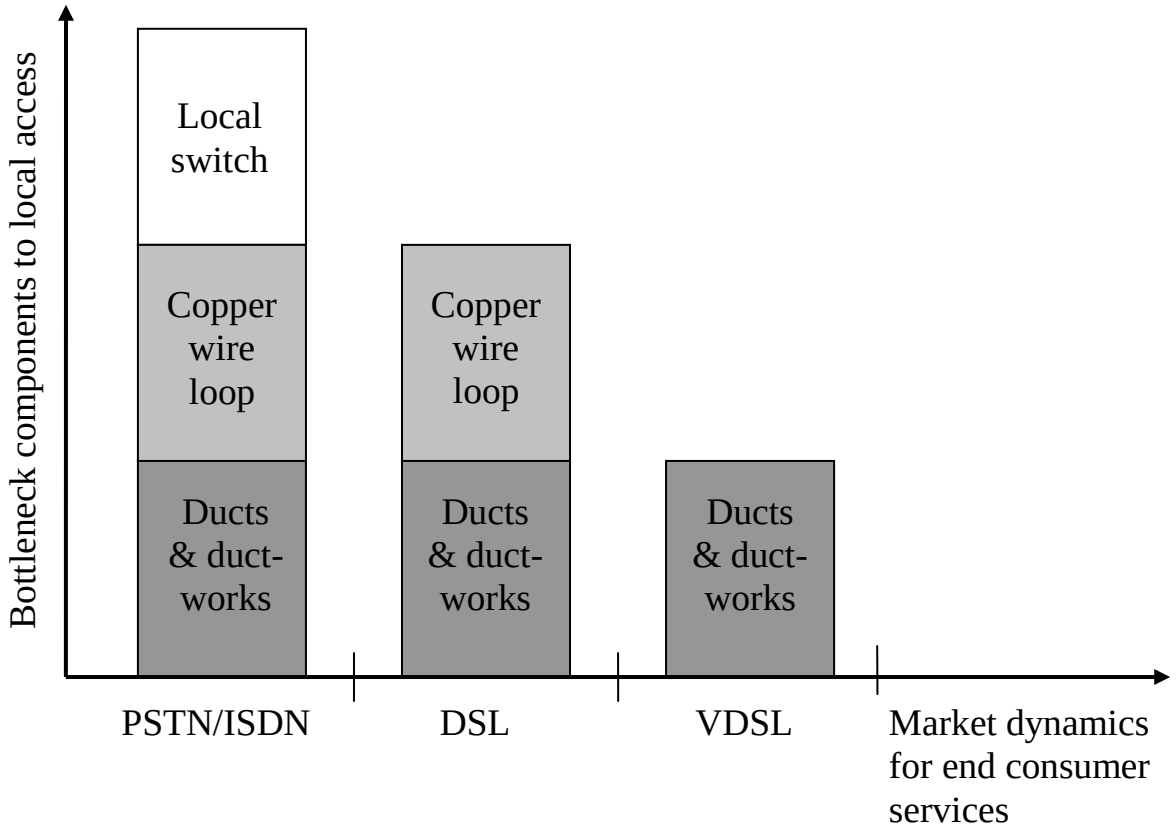

Figure 2: Shrinking monopolistic bottleneck
(Source: Blankart, Knieps, Zenhäusern, 2007, p. 426)

For narrowband services like PSTN/ISDN, the components belonging to the monopolistic bottleneck are local switch facilities, copper loops, ductworks and ducts. In order to provide DSL services, access to copper cable rather than local switch facilities is necessary. Competing providers can implement alternative upgrading strategies, for example, upgraded copper cable by DSLAMs. Modems are not assets that can be characterized as sunk costs. Due to the potentials for a

large scope of innovative network services, parallel investments in modems cannot be regarded as socially inefficient cost duplications.

The provision of VDSL services requires investing in fiber-to-the-curb or fiber-to-the-home. In order to apply upgrading strategies by means of fiber cable, access to ductworks and ducts is necessary. Rather than a duplication of ductworks, fiber cables can be laid between relevant points in existing ductworks of local telecommunications networks. Competing upgrading strategies by means of fiber cables and other upgrading components are feasible on the basis of ducts and ductworks. In addition, ducts and ductworks from electricity or water companies may also be available.

Ex ante regulation of access to ducts and ductworks is required, if alternative infrastructures for end customers (e.g. interactive broadband cable) are not in place; and if alternative duct networks, which can be upgraded for VDSL purposes at reasonable cost, are not available. A differentiated unbundling and concomitant incentive regulation is required, consisting of an accounting separation regime, in combination with price cap regulation. Only then may alternative carriers become active in upgrading investments (e.g. fiber and modems) in order to provide VDSL services.

It is important to realize that the competence for network design should always remain with the network operator. On the basis of the essential facilities doctrine, regulators cannot force a network operator to build a new network, upgrade an established network or rebuild a network (e.g. to remove switches or copper loops). This shows that the theory of monopolistic bottlenecks is capable of dealing with concerns regarding the dynamic development of telecommunications, although the criteria for localizing network-specific market power possess similar validity for other (stationary) network sectors. Criteria for defining where network-specific market power still exists do not depend on the emergence of new markets for telecommunications services. However, the market dynamics of service markets inevitably lead to a shrinking of the monopolistic bottleneck within the local loop.

5. Outlook: Phasing-out unbundling regulation in Europe

A distinction needs to be made between those kinds of networks industries where the monopolistic bottleneck characteristics tend to be relatively stable over time (e.g. electricity grids or rail networks) and dynamic network industries where monopolistic bottleneck characteristics tend to constitute a transitory phenomenon due to the development of technology. The telecommunications sector, where extensive phasing-out potential had already been expected with the onset of market liberalization, provides a key example in this respect. In the meantime, the development from narrowband to broadband communications has already significantly shrunk the monopolistic bottleneck areas.

European telecommunications regulation is a clear example of how a vague regulatory mandate can systematically lead to overregulation. In 2002, the European Parliament and the Council passed a Framework Directive and an Access Directive that failed to map out the precise extent of future market power regulation. As a result, the EU Commission has the competency, by means of guidelines, to specify a large number of markets where the introduction of sector-specific regulatory provisions should at least be considered. The markets which the Commission classified as potentially in need of regulation included service markets such as international and domestic telephone calls, leased lines and transit services that are undoubtedly competitive. Where substantial market power is established, the national regulatory authorities are practically required to take over these markets under pressure of the Commission's right of veto. The EU Directives have been an ideal breeding ground for varied forms of discretionary intervention, depending on the particular influences of the interest groups involved (Knieps, 2005).

In the meantime, the institutional process regarding the phasing-out of economically unfounded regulation has made significant progress. In particular, the European Commission (2007) removed several competitive markets from the list of markets regarded as in possible need of regulation. Nevertheless, there still remains some scope for overregulation (Knieps, Zenhäusern, 2010).

Ex ante regulation of access to ducts and ductworks (physical access remedies) is required, if alternative broadband infrastructures for end customers are not in place, and alternative duct networks, which can be upgraded for VDSL purposes at reasonable cost, are not available. What may, however, be called the bitstream regulation fallacy is that additional remedies may be imposed, including regulation of broadband bitstream access (European Commission, 2010, recitals 36 and 37). To maintain the market for bitstream access in the list of markets in possible need of sector-specific regulation implicates double regulation and therefore overregulation.

Nevertheless, the bandwagon towards the phasing-out of European telecommunications regulation is gaining speed. In contrast to other network industries, the shrinking of monopolistic bottlenecks and the increasing relevance of competing access infrastructures leads to an irrevocable transition of the European telecommunications sector from a regulated to a competitive industry.

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