CROSS-SECTORAL

Bottleneck regulation in telecommunications, railways and post

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Various regulatory remedies deal with monopolistic bottlenecks in network industries. In telecommunications, railways and post, the European regulatory provisions seem appropriate.

Sector specific regulation in network industries has become a widely discussed topic among academics, policy makers, industry economists and regulators themselves. The issue of these debates has usually been on whether such regulation is necessary and, if so, what its optimal design should be. We briefly describe a general economic framework to assess regulatory remedies. On this basis, we discuss the need for market power regulation in the following network industries: telecommunication, railways, and post. The economic need for regulation is then contrasted with the implementation of actual legislation in the European Union.

General analytical framework

Our theoretical framework starts from a free market primacy assumption: markets, if they function properly, provide firms with the right incentives to enter markets, set prices, and invest in innovation at a socially optimal level. Naturally, there are a number of obstacles for markets to function well in the above sense. Market failures are omnipresent and give rise to potentially beneficial regulation—at the risk of these regulations failing as well. Starting from a free market situation, if there is no market failure or no harmful potential market failure, there is no need to intervene. If the market fails persistently and government chooses to intervene, it sets up regulations. If the regulated situation still fails when confronted with the socially desirable outcome —either because regulation is not appropriate to cope with the initial market failure or due to other political or social goals—there is scope for re-regulation. However, if regulation in general is deemed not appropriate or detrimental to attain social goals, this should result in de-regulation.

There are various potential sources of market failure. In this contribution, we focus on natural bottlenecks and their specific need for regulation (see Jaag and Trinkner (2010) for a comprehensive discussion on market failures in network industries). Monopolistic bottlenecks are present if an industry, network layer or value chain element exhibits the properties of natural monopoly (subadditive cost function), considerable sunk costs, and no substitutes (that is, no economic possibilities for bypass). Such bottlenecks are present in most network industries and raise the issue of natural market power being capable to distort competition in a harmful way.

Deriving regulatory models to cope with monopolistic bottlenecks

The goal of any regulation of a stable monopolistic bottleneck is to enable non-discriminatory access by third parties (which cannot bypass the bottleneck owner) while minimizing the infringement of property rights on the bottleneck resource.

There are a number of potential regulatory instruments. Among them are ex post or ex ante regulation of prices and/or access conditions, and separation of accounts, functions, structures, and/or ownership. Some of them can be applied ex ante or ex post, some of them interrelate with each other.

Combinations of these regulatory instruments into specific regulatory models can potentially be applied in practice. As a precondition, the models must be technically and commercially feasible. Figure 1 shows the range of possible regulatory levels in terms of bottleneck regulation (0 to M). In increasing order, the regulatory models become more intensive and intrusive with respect to property rights infringement. The stronger the property rights of one or all operators are confined, the stronger it will affect investment and innovation incentives in the long-run. For example, doing without sector-specific regulation (level 0) results in strong incentives to the bottle-neck owner to develop it further, as it is the residual claimant of all profits resulting from its development. At the same time, all operators without access to the bottleneck have

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strong incentives to search for alternative technologies in order to bypass the bottleneck and offer substitute services. A structural separation of the bottleneck resource with regulated attractive access conditions (level V) adds to its incentives, risks, and the effects of regulatory and organizational dynamics.

The instrument with the least net economic cost is then the one which should be chosen—if it sufficiently

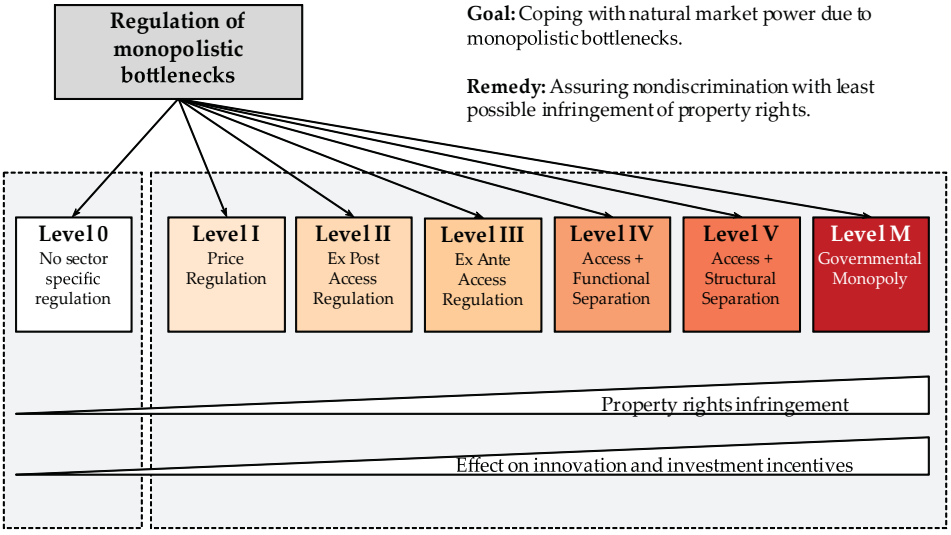

Figure 1 | Regulatory models designed to cope with monopolistic bottlenecks

stability and therefore creates the need for continuing (follow-up) regulation. At the same time, the owner's incentives to invest in its development are low as cost savings are automatically passed down to competitors. If there is an (unregulated) bypass opportunity, the bottleneck operator will rather invest there in order to bypass regulation.

Assessment Criteria

From an economic point of view, all regulatory models must first stand up a thorough economic analysis and comparison according to a number of qualitative and quantitative criteria. These are partly contradictory, which mirrors different interests of the various stakeholders in the marketplace: incumbent operators and their residual claimants, new operators, employees, business customers, private customers, and tax payers. The qualitative criteria include proportionality, expedience, competitive neutrality (including lightness, symmetry), incentive neutrality, subsidiary, simplicity, transparency, and temporality. While these criteria are of qualitative nature and mostly have an indirect impact on welfare, quantitative criteria should also be included to compare the economic effects of any model compared to the (non)regulation in place in the short to medium and long run (market failure versus regulatory failure). Thus, static effects such as benefits from regulation, productive efficiency, and direct costs of regulation should be considered as well as dynamic aspects such as efficiency incentives, innovation and investment conforms to the qualitative criteria. Of course, welfare effects are hard to quantify as they often take effect in the long-run (for example innovation incentives) and would therefore have to be explicitly considered in a dynamic setting.

Application to selected network industries

A common characteristic of all network industries is that they form a coherent and interrelated system. The central aspect of networks is their ability to transport goods or information between two geographically diverse locations. At the nodes in the network (which are connected by transportation means), the routing follows specific rules. For market power issues, networks can be subdivided into various network layers. Following the disaggregated approach of Knieps (2000), these layers can and should be analyzed separately—notwithstanding the strong connections among the layers. The underlying conviction is that some layers may be fully competitive while others constitute persistent monopolistic bottlenecks. An aggregate analysis would come to the imprecise conclusion that competition is not workable as one single non-competitive layer would bias the entire analysis. Figure 2 shows different network layers which are important in the framework of our discussion.

In the remainder below we identify monopolistic bottlenecks, derive the appropriate regulatory remedy based on the presented analytical framework, and compare our

findings with the current EC regulatory framework for Telecommunications, Railways, and Posts. We do not discuss the national implementation of EC directives and regulations as the latter constitute the common denominator and the legal basis and leeway for national regulation.

Telecommunication

network elements and wholesale services. Recently, functional separation has been promoted by the Commission but largely rejected by the European Parliament. With the approval of a major overhaul of EU telecoms rules in late 2009 national regulatory authorities are provided with the additional tool of functional separation as an exception-

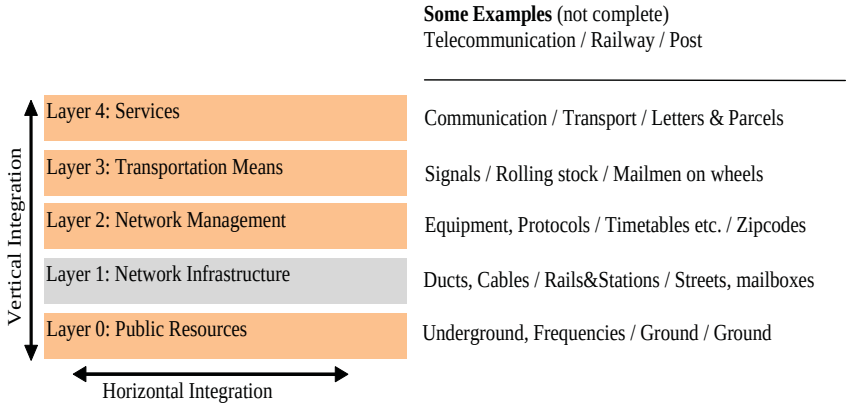

Figure 2 | Layers in network industries

In the (wire-bound) telecommunications sector, the relevant network layers are the wide-area and last-mile passive infrastructures (ducts, cables), active infrastructures (electronic equipment) and services. While all last-mile infrastructures can be considered a natural monopoly due to subadditive costs, only the last-mile ducts and cables are a monopolistic bottleneck which cannot (sensibly) be duplicated. However, as there is increasing intermodal competition (for example, by wireless communication, in many developed countries also by local loops established by electricity and cable companies) and fast technological progress (fiber optics), the traditional cooper bottleneck in the last mile becomes increasingly contested. Hence, from an economics perspective, access regulation—which can be phased out eventually—to these temporary (copper-based) bottlenecks is more appropriate than a persistent functional or structural separation which are considered to be irreversible by the European Regulators Group. Once new fiber optics are in place however, the fiber local loop might be a stable bottleneck in case consumers were to demand capacities that can be delivered by fiber-to-the-home infrastructures only.

Currently, national regulatory authorities in the European Union operate within the 2002 electronic communications regulatory framework. Providers considered having significant market power in the identified product and service markets may be subject to a variety of behavioral remedies including non-discriminatory access rules to al remedy. The Commission has so far been very careful about giving guidelines with regard to when the separation might be used. It believes that in exceptional cases it may be justified where there has been persistent failure to achieve effective non-discrimination, and where there is little or no prospect of infrastructure competition within a reasonable timeframe. With the emergence of fiber-based networks, it is currently unclear, whether these will constitute a stable bottleneck in the future.

Railway

Railways in Europe carry both passenger and freight traffic. They provide vital economic and social links both within countries and across Europe. However, they have steadily lost market shares to other modes of transportation over the last decades. Railways also require high levels of subsidies; less than half of the total costs of rail transport in Europe are borne directly by passenger and freight customers.

In the railways sector, the relevant network layers are tracks and railway stations, network management (slot allocation, safety measures), rolling stock, and services. The tracks and railway stations can be considered a monopolistic bottleneck due to subadditivity and significant sunk costs; hence, there is a potential for regulation. There is only little technological progress on that layer, meaning that the bottleneck will likely be persistent. However, railways find themselves in intermodal competition against

transportation means on roads, water, and air. Rail market shares exceed rarely more than 20 percent in the modal split. Depending of the effectiveness of this intermodal competition, two main scenarios are thinkable. Either price regulation of existing incumbents might be appropriate (level 1, for example, Japan), or an intense regulation of the monopolistic bottlenecks to enforce competition on the service level (level IV or V, EC approach). The latter necessitates strong regulatory interventions, such as access regulation combined with functional or structural separation of infrastructures (tracks, train stations) and passenger services in order to assure non-discriminatory access conditions. Thereby, the decision on the intensity of the separation depends on the existing synergies between the various network layers. Caution might be indicated in well developed railway systems exhibiting tight synchronized schedules and scarce capacities on rail tracks and train stations.

Starting in the 1990s, significant structural reforms have been initiated within the railways sector on the EU-level. Many of the reforms followed the approach adopted in other network industries such as telecommunications and electricity. Through Directives 91/440/EC and the First railway package (Directives 2001/12, 2001/13 and 2001/14), the EU introduced and reinforced the principle of separation between infrastructure and operations. The EU directives oblige national railway systems to implement vertical separation. This includes, firstly, accounting and functional separation of infrastructure from operations; second separate accounts for passenger and freight; and third a structural or ownership separation of slot allocation management to organizations not providing rail services to passengers. This unbundling requires separate companies (as implemented in Germany, Italy, France), but not necessarily ownership separation (as implemented in UK and Sweden). The second and the third railway packages have not furthered separation issues but predominantly dealt with market opening, interoperability and rather technical topics.

Post

The postal sector is one of the oldest if not the oldest network industry. It is usually not analyzed along the layer framework as in the other industries. If so, the only layer exhibiting subadditive costs as well as sunk costs would the road system positioned on layer 1. It is public and open to anyone on nondiscriminatory terms. Rather, a disaggregate analysis focuses on the various parts of the value chain which consist of collection, sorting, transport and delivery of mail and parcel items. Collection and delivery exhibit subadditivity and hence the characteristics of a natural monopoly. As there are no significant sunk costs, there is no bottleneck facility which would justify access regulation or even mandated separation in general. Hence competition law (level 0) should be sufficient. Nevertheless, access to post office boxes or information on change of addresses is often regulated in liberalized markets. Note that these are no monopolistic bottlenecks. In our general framework as presented in Jaag and Trinkner (2010), regulation can still be justified on the basis of market failures arising from network externalities (here between operators, in analogy to termination issues in mobile telecommunication). In such cases, expost access regulation (level 2) might be justified.

The purpose of the recent postal sector policy in the European Union is to complete the internal market for postal services and to ensure that efficient, reliable postal services are available at a good quality throughout the EU to all its citizens at affordable prices. Directive (2008/6/EC) foresees full market opening by 2013. The directive gives the member states the right, but not the duty to regulate access. Nevertheless, the directive suggests that access for certain elements of the postal infrastructure might be granted, such as information on change of address and postcodes, P.O. box delivery, redirection and return to sender services (Article 11 of the Directive).

Conclusion

When determining the appropriate regulatory model for network industries, not only the (non-)existence of a bottleneck facility has to be considered, but also qualitative criteria and their impact on competition. From an economic perspective, separation seems to be an adequate regulatory model in the railway market, but not necessarily in telecommunication where the appropriateness of separation remedies will depend on the future development of consumer demand towards very fast bandwidths that can only be provided with fiber wires. In the postal market, there is no need for separation. EC regulations are about in line with the regulatory need as derived from our analytical framework. ★

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