



Legal unbundling can be a golden mean between vertical integration and ownership separation[☆]

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ABSTRACT

We study an industry in which an upstream monopolist supplies an essential input at a regulated price to several downstream firms. Legal unbundling means in our model that a downstream firm owns the upstream firm, but this upstream firm is legally independent and maximizes its own upstream profits. We allow for non-tariff discrimination by the upstream firm and show that under quite general conditions legal unbundling never yields lower quantities in the downstream market than ownership separation and integration. Therefore, typically, consumer surplus will be largest under legal unbundling. Outcomes under legal unbundling are still advantageous when we allow for discriminatory capacity investments, investments into marginal cost reduction and investments into network reliability. If access prices are unregulated, however, legal unbundling may be quite undesirable.

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1. Introduction

In many industries vertically integrated firms are not only active in the final product market, but they also supply essential inputs to potential downstream competitors. Prominent examples are network industries, like energy, rail, or telecommunications where access to a transmission or a railway network is an essential input. Another example is the software industry where, e.g., Microsoft offers “compatibility” to Windows and at the same time competes in the applications market. An important and heavily researched policy question is: should vertical integration be allowed? Standard arguments in favor of integration are that integration at least partially overcomes the double marginalization problem and that it might provide better investment incentives for the upstream operations. The main motiva-

tion to vertically separate an integrated firm is that integration can lead to discriminatory behavior against downstream competitors.

We analyze a third alternative: legal unbundling. Legal unbundling means that the essential input must be controlled by a legally independent entity with an autonomous management, but a firm that is active in the downstream market is still allowed to own this entity. Ownership under legal unbundling entitles the downstream firm to receive the entity's profits, but interferences in the entity's operations are forbidden.

Forms of legal unbundling are commonly observed in network industries. In Europe, legal unbundling is the current standard requirement for the energy industry in Europe, and it can also be imposed by national regulators in the telecoms market.¹ An interesting

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¹ For the electricity market, see Directive 2009/72/EC. For distribution, Article 26 requires legal unbundling. For transmission, Article 9 generally requires ownership unbundling, but as an exemption, allows for an independent Transmission System Operator (TSO), Article 18 and 19. The TSO is essentially also a form of legal unbundling. Similar for the gas market, see Directive 2009/73/EC, Articles 9, 18, 19. For telecommunications, see Directive 2009/140/EC, Article 2 (introducing Article 13a into Directive 2002/19/EC) for the option to impose further “functional separation”. Cave (2006) provides an overview on different intensities of vertical separation.

example in the telecoms market is the UK, where the incumbent British Telecom has separated the network access part into a separate legal entity (“Openreach”). Detailed arrangements with the regulator Ofcom are meant to ensure independence of Openreach.² In the US, forms of legal unbundling exist for natural gas pipelines and in large parts of the electricity transmission systems.³ In all these regulations, it is the bottleneck facility which must be legally separated, while it can still be owned by a group active on the non-bottleneck part. An important alternative setup is one which requires the non-bottleneck activity to be legally separated, while still owned by the firm controlling the bottleneck. The latter was formerly required in the US in the telecommunications industry: the Regional Bell Operating Companies (RBOC) were obliged to legally separate long-distance call business (i.e., the non-bottleneck part of telecommunications).⁴ Thus, in addition to analyzing whether legal unbundling can be beneficial, it is important to understand which kind of legal separation is most promising.

Irrespective of how the industry is vertically structured, the price for the essential input is usually regulated. Typically, regulators use linear tariffs above the marginal cost, e.g., in order to allow for the coverage of fixed costs. While non-discrimination with respect to the access tariff is relatively easy to impose,⁵ non-tariff discrimination remains an important problem in practice. Regulators and competitors report of such “sabotage” in the form of discriminatory information flows, undue delays in delivery of the service, overly complex contractual requirements, requiring unreasonably high bank guarantees, and the like.⁶ Our research question therefore is: how does legal unbundling compare to the outcomes of vertical integration and ownership separation if access prices are regulated while non-tariff discrimination cannot be prevented?

To answer this, we propose a fairly general setup. There is one upstream monopolist (F_0), a potentially integrated affiliated downstream firm (F_1), the “incumbent”, and $n - 1$ potential downstream competitors. The upstream firm produces an essential input at constant marginal cost c_0 , which the downstream firms need in a fixed proportion to produce the final output. We impose no other restriction on the downstream firms’ technologies, in particular, some or all competitors might be more or less efficient than the incumbent F_1 . In the downstream market, the incumbent moves first; no other restrictions are imposed on the downstream competition. Strategies could, for example, affect quantities, (non-linear) prices, investments or entry decisions. That the incumbent moves first is mainly a simplifying assumption; we exemplify with Cournot competition that the main results also apply with simultaneous moves in the downstream market.

² See, e.g., Ofcom’s annual report 2005/06, Section B, p. 18–20, or the consultation on “Re-prioritising BT’s remaining Undertakings commitments on information systems separation”, published 29 May 2009.

³ See Federal Energy Regulatory Commission, Order 636 (issued 1992-04-18) for natural gas and Order 2000 (issued 1999-12-20) for electricity transmission.

⁴ See Section 272 of the Telecommunications Act of 1996.

⁵ Although this also can be an issue, e.g., if non-linear tariffs are used. They might be tailored such that only the subsidiary of the integrated company can realize low prices. Exactly for this reason, regulators are skeptical about such tariffs. See, e.g., European Commission, Energy Sector Inquiry, Competition report on energy sector inquiry (Jan. 10, 2007), part 1, para 155, p. 58. In the German telecommunications market, the incumbent Deutsche Telekom used to offer an access product (needed to offer narrowband internet access, and called T-Online-Connect-Interconnect) with a quantity rebate. Only its own subsidiary, “T-Online” had enough sales to benefit from this rebate. The regulatory authority ruled this to be discriminatory. See the German regulator’s annual report “Tätigkeitsbericht 1998/99”, p. 67.

⁶ See, e.g., European Commission, Energy Sector Inquiry (Jan. 10, 2007), Competition report on energy sector inquiry, part 1, para 169, or para 493, p. 163: For the Telecommunications sector in the UK, see Cave (2006), p.91, or for Germany see a submission of the VATM (Association of competitors to Deutsche Telekom) to the European Commission, “Markteintrittsbarrieren im deutschen Telekommunikationsmarkt”, September 2001.

The upstream firm F_0 sells the input to all downstream firms at a regulated linear access price a above marginal cost (we also extend this setup to more general forms of price regulation). Although price discrimination is not possible, F_0 can “sabotage” the downstream firms, i.e., it can influence the cost and demand situation of each downstream firm.

Four different vertical structures are compared: integration of F_0 and F_1 ; ownership separation (i.e., all firms are independent); legal unbundling (F_0 is legally independent and maximizes its own profits; F_1 owns F_0 and therefore acts to maximize joint profits, taking as given that F_0 cares only about its own profits); and finally, we discuss also “reverse unbundling” where the downstream firm is legally unbundled (F_1 acts independently and maximizes its own profits, while F_0 acts to maximize joint profits, taking as given that F_1 cares only about its own profits). “Reverse unbundling” is close to the former telecoms (RBOC) regulation in the US.

Our main result is that legal unbundling leads to (weakly) higher levels of output than all the other vertical structures. In many cases, higher output will translate into higher consumer surplus under legal unbundling. The intuition why legal unbundling leads to higher quantities than vertical integration is as follows. Due to the access price regulation, upstream profits of F_0 are maximized when total output is maximal. Thus, if F_0 is legally unbundled, it wants to maximize total output and refrains from sabotage of the downstream firms. In contrast, with vertical integration, F_0 also takes into account downstream profits of F_1 and may engage in sabotage of downstream competitors in order to increase downstream profits. We call this the “sabotage effect”.

When comparing legal unbundling to ownership separation, different forces are at work. First, since in both cases the upstream firm wants to maximize total output, neither under legal unbundling nor under ownership separation will the upstream firm (usually) sabotage downstream firms, i.e., there is essentially no sabotage effect.

Second, while a vertically separated downstream firm F_1 is interested only in its own profits, under legal unbundling F_1 also has an interest in high upstream profits – and thereby in a high overall output. Under legal unbundling, the downstream firm F_1 will therefore select strategies that yield higher total output compared to separation. We call this the “downstream expansion effect”.

Part of the downstream expansion effect is explained by the well-known intuition from the double marginalization problem: Under legal unbundling the incumbent calculates with the true input costs c_0 and not – as under separation – with the higher access price a and is therefore willing to expand output. In addition, the incumbent takes into account that he can induce an output change by downstream competitors. We call this the “induced output effect”. For instance, in the case of legal unbundling and price competition, the incumbent sets a lower price than under separation, in order to increase the output of entrants, who respond to the more aggressive pricing by lowering their own prices. That the induced output effect is indeed additional to the effect from double marginalization becomes apparent when one considers more sophisticated regulatory schemes that solve the double marginalization problem. We also provide a Bertrand example to highlight this.

Since one of the main policy concerns is about efficient network investments, we extend our analysis to different forms of investment decisions. Given our quantity results, it is quite intuitive that incentives for reducing the upstream firm’s marginal costs are highest under legal unbundling. We also discuss capacity investments, which can discriminate between downstream firms, and incentives to invest in network reliability. For these two types of investments it is not generally clear that legal unbundling provides the highest investment incentives, although legal unbundling exhibits some desirable properties also for these sorts of investment decisions.

Despite its great policy relevance, there is little literature on legal unbundling. Two important exceptions are Sibley and Weisman

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