
On Vertical Integration, Regulation and Non-Price Discrimination in German Electricity Markets

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Overview

Vertical separation has been discussed in European energy markets since their liberalization and particularly after the DG Competition initiated a sector inquiry in 2005. While the European Commission argues that vertical separation is welfare increasing due to higher consumer surplus,¹ there exists also a broad literature which argues that vertical integration allows cost savings due to economies of scope which are passed on to the consumers.

We aim to contribute to this discussion and investigate the impact of vertical integration of retail incumbents (downstream), mostly the former monopolists, and distribution system operators DSO (upstream) on retail prices and distribution charges in German electricity distribution and household retail markets. There is a lot of theoretical analysis done to answer the question whether unbundling, especially ownership unbundling of (transmission) network and generation/retail markets promotes higher consumer surplus due to increased competition. We concentrate on distribution network, since ownership unbundling of DSO from other activities - in contrast to ownership unbundling of transmission- has received little attention in the existing studies.² There is only scarce evidence on the effects caused by the separation of the distribution network. For instance, in the UK some voluntary activities could be observed in the separation of the distribution network (7 out of 14 vertically integrated firms). Davies and Waddams-Price (2007) find that the market shares of the vertically integrated incumbents are on average higher than for separated incumbents.³ In New Zealand the ownership unbundling of DSOs has not led to higher consumer surplus through lower retail prices as Nillesen and Pollitt (2008) show.

Methods

First of all we introduce a theoretical model based on Cremer et al. (2006) and Höffler and Kranz (2007) which we adjust to the German electricity markets. Since we are especially interested in studying the pricing behavior in the markets characterized by different vertical arrangements between the retail incumbent and network operator (DSO), we take into account different regulatory options that are aimed to eliminate non-price discrimination, namely: legal unbundling and ownership unbundling. Different market structures lead to different outcomes. This allows us to derive hypotheses which are examined in our econometric study using the data for the German electricity markets. The market structure in Germany allows us to empirically compare the effects that arise from different vertical relationships. Since there are about 850 (relevant) regional markets, each containing one retail incumbent and one DSO with different level of vertical integration across these markets, the effects caused by vertical integration can be compared considering the distribution charges and the retail prices for the household customers. In our empirical analysis we attempt to identify the economies of scope that might occur due to the vertical integration of the retail incumbent and DSO and non-price discrimination that, following the literature, might have impact on the retail prices. In addition, we distinguish between several schemes for regulatory separation of vertical integrated firms and

¹ <http://ec.europa.eu/comm/competition/sectors/energy/inquiry/index.html>

² For instance: Copenhagen Economics (2005) estimated the effects of unbundling on prices and productivity for 15 European countries (in 1990-2003) and found that the unbundling of transmission from generation leads to lower prices and higher productivity. Unfortunately, the effects of distribution unbundling could not be estimated due to no variation in the timing of distribution unbundling between the EU-15 countries.

Recently published report (2009) on behalf the German Federal Ministry for Environment (BMU) favours the ownership separation of transmission network with state's partial ownership:

http://www.bmu.de/files/pdfs/allgemein/application/pdf/gutachten_energieuebertragungsnetze.pdf

³ Unfortunately, there are no further investigations on the effects of ownership unbundling on retail prices i.e. consumer surplus.

examine whether legal unbundling and ownership unbundling, in contrast to vertical integration, differ in their effects on the consumer surplus in terms of retail prices.

Results

On the basis of our theoretical model we find that legal unbundling is the most favourable scheme for regulatory separation under the assumption of perfectly working regulation. However, we find that the mutual dependence between the mother firm and affiliate due to internal structure might increase the incentives to undertake non-price discrimination. This might happen by introducing internal leasing rates for distribution network operator.

Our empirical results partially support the theoretical outcomes. First, considering the distribution charges and the impact of vertical integration we confirm the existence of the **economies of scale** in the distribution networks. We find that marginal increase in the supply density decreases the distribution charges for the household customers. Distribution charges also go down as total energy supplied decreases in the geographic market. These findings suggest that there exist indeed economies of scale driven by the supply density and by the total energy supplied in a network. In contrast, the density of tapping points and consumption intensity have positive impact on the distribution charges. The vertical structure and regulatory unbundling options, among others, are also used to examine the factors which determine the distribution charges. Our hypothesis of a positive effect of vertical integration on distribution charges due to **economies of scope** (retail activity and distribution) was not supported in our study. In contrast, in markets with the legally unbundled retail incumbent and DSO we find statistically significant higher distribution charges for the household customers compared with full integration and ownership unbundling. This might be driven by additional costs from restructuring the vertical agreements between the retail and distribution. However, the coefficient is relatively small (although statistically significant).

The estimation results provide evidence that **vertical integration leads to higher prices for the household customers and thus** decreases the consumer surplus. Thus, the incumbents' prices, at least under the standard contract⁴, are significantly affected by the vertical structure. However, the lowest-price-contracts (with prepayment) are influenced by the standard contract price rather than by the vertical structure. In contrast, in case of the lowest-price-contract without prepayment, prices are lower in the markets with the legally unbundled firms but they are also affected by the standard contract price. Moreover, we find a positive significant effect of standard contract price on other contract prices. Therefore, we conclude that the standard contract takes the price leadership, however, not only due to its significance but also due to the high demand for such type of contract (on average about 60 percent of household customers). Consequently, vertical integration of the retail incumbent and DSO has not only direct impact on the standard contract price but also indirect effect on the other prices in the market. However, observing these estimation results one might conclude that higher prices in the vertical integrated markets indicate the presence of non-price discrimination. Furthermore, we find no evidence that **legal unbundling** leads to higher consumer surplus. The prices for the standard contract and for the competitive contracts that are offered by the incumbent are not influenced by any regulatory unbundling options. In sum, we conclude that legal unbundling does not work perfectly in the German electricity markets. Therefore stricter regulation is required.

Conclusions

Nevertheless, legal unbundling has some advantages as shown in Cremer, Crémer and de Donder (2006) and Höffler and Kranz (2007). In particular, there exists consensus that legal unbundling is investment-enhancing in comparison to ownership separation as long as an adequate regulation scheme is installed. In contrast to full separation the investor is able to benefit directly from its investments even under regulation as it benefits from a quality increase/cost reduction in the downstream market. Therefore, we recommend that legal unbundling should be kept as the regulatory option (rather than ownership unbundling due to huge one-off costs). At the same time regulation and control of the mechanisms which allow the incumbent to exercise non-price discrimination should be tightened. Second, we recommend that potential economies of scope arising from vertical integration between retail incumbent and distribution network operator should be investigated. If the investigation provides evidence for the existence of such effects, raising rivals' costs becomes an issue for the regulator.

References

1. Cremer, Helmuth; Crémer, Jacques; De Donder, Philippe (2006): Legal vs Ownership Unbundling in Network Industries. C.E.P.R. Discussion Papers.
2. Höffler, F., and S. Kranz (2007): Imperfect Legal Unbundling of Monopolistic Bottlenecks, Bonn Econ Discussion Papers 16/2007.

⁴ Incumbents are obliged to offer so called standard contracts (high priced contracts) to customers who have not switched their supplier or contract or to customers whose current supplier has dropped out of the market. On average about 60 percent of German customers have standard contracts. Another 34 percent stay with the incumbent but have other contracts. Only 6 percent of the household customers switch their supplier.

3. Nillesen, P.; Pollitt, M.G. (2008): Ownership unbundling in electricity distribution: empirical evidence from New Zealand. Faculty of Economics, University of Cambridge.
4. Pollitt, Michael (2008): „The arguments for and against ownership unbundling of energy transmission networks“. In: Energy Policy. 36 (2), S. 704-713.