The Power Fallacy

Energizing the Cellophane Fallacy

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Introduction and summery

Defining the relevant market is an important part of most merger and competition cases. This is also the case in the Nordic electricity market which is integrated through the Nordic power exchange Nord Pool.

Nord Pool allocates cross-border (import/export) capacity such that price differences between regions are minimised. If the transmission lines between two regions are not congested, the regions will belong to the same price area and have the same price. If the transmission lines between two regions (e.g. West-Denmark and Norway) are congested, the two areas are divided into two price areas (this is called market splitting).

Traditional approaches (e.g. SSNIP-test and price correlation analyses) to market delineation in such integrated power markets focus on the availability of transmission capacity between regions. Hence, two regions are delineated as belonging to the same relevant market if there is idle transmission capacity on the transmission line connecting them. The regions are only considered as separate relevant markets if the transmission line is congested. However, the traditional approach is incomplete.

In this article we argue that it is insufficient to consider only the availability of transmission capacity. We demonstrate that, in some situations, regions should be considered as separate markets, even when there is idle transmission capacity between regions and the regions have the same price.

Competition authorities use the SSNIP-test[1] when delineating relevant markets. The point of departure for the SSNIP-test is *competitive* behaviour.[2] Thus, if market delineation analysis ignores that idle capacity on transmission lines might actually be the result of *anti-competitive* behaviour the conclusions of the analysis might be false. This is what we refer to as 'the Power Fallacy'. The Power Fallacy has a strong parallel to the well known Cellophane Fallacy named after the Du Pont-case[3].

[1] The SSNIP-test (Small, but Significant Non-transitory Increase in Prices) is one important tool among others when delineation relevant markets. The test is sometimes referred to as 'the hypothetical monopolist test'. The test is described in "The internal market and the relevant geographical market", Copenhagen Economics (2004), EU Commission Enterprise Paper no. 15.

[2] "After all, market power is the ability to increase prices above the competitive level profitably, not above the current level." Schmalensee, Richard, 1987, *Horisontal Merger Policy: Problems and Changes*, The Journal of Economic Perspectives, Vol. 1, no. 2, (autumn, 1987), 41-54.

[3] United States v. E.I. du Pont de Nemours & Co, 351 U.S. 377, 391-91, 1956.

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If European transmission lines are vulnerable to anti-competitive behaviour, the result might be a too lenient approach by authorities in merger and antitrust cases. Since most European countries have large incumbent generators dominating the domestic markets, the precision in the delineation of the relevant market is important. A transmission line decongested by anti-competitive behaviour might – falsely – convince authorities that relevant whole sale electricity markets are larger than they actually are.

Power Markets

Electricity cannot be stored which means that the production and consumption of electricity has to be in a constant balance. If not black-outs will occur. Since most Nordic (and European) whole sale electricity markets are dominated by large national power generators, competition has to be international. Further imports are impossible if transmission lines are congested.

The price effect of the non-storability of electricity is exacerbated by the fact that the consumption of electricity is very inflexible and either cannot respond to changes in whole sale prices or simply does not face the whole sale price. The availability of *transmission capacity* on transmission lines connecting the national markets are, thus, all-important to competition in the European electricity markets. However, the availability of transmission capacity is not the only important determinant of the level of competition – the availability of *production capacity* is just as essential.

When a competition authority carries out a SSNIP-test to delineate the relevant geographical market for power (whole sale), the question is: *Would a hypothetical monopolist in a region be able to raise its price by 5-10 percent without competitive response from other regions that render the price increase unprofitable?*

If the transmission line connecting the regions is congested, the answer is clearly 'yes'. Demand is inelastic and competing electricity cannot be transmitted to the region in the period of the price increase if the transmission line is already filled up (or closed). Furthermore, electricity from other periods cannot be stored and sold in the period of the price increase.

If the transmission line connecting the regions is not congested, the answer can be both 'no' and 'yes'. Raising the price in one region is not profitable if there is (enough) idle, competitive production capacity in the other region. The competitive response from the generator with idle and competitive production capacity would be to ship electricity towards the high price area (that is increase generation). However, if the production capacity in the other region has significantly higher production costs there will not be any competitive response. Hence, producers in for example Denmark can increase the price in Denmark above the competitive level if the production costs are sufficiently high in Norway.

Only in the presence of sufficient idle capacity on transmission lines *and* sufficient idle and low-price production capacity there will be a real chance of competitive response into the region following a price increase of 5-10 percent. That is, only if both conditions (availability of sufficient competitive production capacity *and* availability of sufficient transmission capacity) are fulfilled, the answer to the question stated above would be 'no' and the relevant market should be widened. If not the relevant market is no bigger than the region proposed in the question.

Therefore, it might lead to markets being delineated too wide if authorities do not take both conditions into account. The case law reveals that so far only the availability of sufficient transmission capacity has been generally recognized by authorities.[4] However, in a recent

[4] See e.g. US Dept. of Justice v. Enova Corporation, Case Number: 98-CV-583 (THF), 8 June 1998; Statkraft/TEV, Konkurransetilsynet, Norway, 5 July 2002; Elsam/Energi E2, Konkurrencestyrelsen, Denmark, March 2003;

antitrust case[5] the Danish competition authority defined the relevant market as West Denmark even though the transmission lines to Norway were not congested in the relevant hours. The argument was that differences in technologies (hydro power in Norway and coal in Denmark) meant that the Norwegian producers were not relevant competitors.

The Power Fallacy

In (well functioning) power markets congestions in the transmission system occur when one region has a supply deficit and another a supply surplus and the transmission line connecting the regions are to small to balance out the deficit and surplus. The Nordic power exchange, Nord Pool, handles congestions by area prices: If the transmission capacity between two regions is insufficient to cover demand for transmission, Nord Pool splits the regions into two different price areas. The region with supply surplus is assigned a lower price and the region with supply deficit is assigned a higher price. This dampens demand and facilitates supply in the high price area and vice versa in the low price area. The transmission capacity is fully utilized.

In the Nordic market the local generator(s) in a region receives the area price for its entire production even though some of the electricity is exported to regions with higher prices. This creates incentives to anti-competitive decongestion by a dominant, exporting generator. Since all generation is sold to the low area price, the generator can profit from decongesting the transmission line because the generator then is paid the high price – both for the domestic sale and for exports. If the transmission line is decongested the areas will – due to the market design – be assigned the same price.

Since, the starting point for the SSNIP-test is competitive behaviour; the conclusions of the test would be false if the test ignores that decongestion may in fact be a result of such anti-competitive behaviour. This is what we refer to as the Power Fallacy. When production costs differs markedly between two regions, a anti-trust investigation of enterprises in the low-price region should consider this region as a separate relevant market, even though, the regions physically belong to the same market (since they are connected) and have the same price (since the transmission capacity is not used to the limit).[6]

We can illustrate the incentives for anti-competitive decongestion in a stylized example which describes the case of the Danish power market. Three observations of the Danish power market can initially be made:

(1) The Danish market has strong connections to the rest of the Nordic region,
(2) The production technology in Denmark differs from the technology used in the rest of the Nordic region,
(3) The Danish market has one major power generator.[7]

Now consider two extreme situations: One in which electricity can be produced much cheaper in Denmark than in the rest of the Nordic region, and one in which the production of electricity in Denmark is much more expensive.[8] In the latter situation the market will create extensive

Sydkraft/Graninge, EU Commission, COMP/M.3268, 30 October 2003; ENI/EDP/GDP, EU Commission, COMP/M.3440, 9 December 2004.

[5] Danish Competition Authority, 30.11.2005.

[6] Seen from the perspective of the high-price region, the two regions might belong to the same relevant geographical market.

[7] Actually, the Danish market is split into two separate markets. However, the markets have very similar characteristics: Strong transmission lines to the Nordic region and a very large local producer. Therefore, this example describes very well both of the Danish markets.

[8] Changes in cost structure can happen in the short run in the Nordic power market due to the prevailing position of hydro power. The technical production costs of a hydro power producer are fixed. However, the value of the water varies with among other things hydrology, i.e. the amount of water available for production. The value of the water is in reality the most important "production cost".

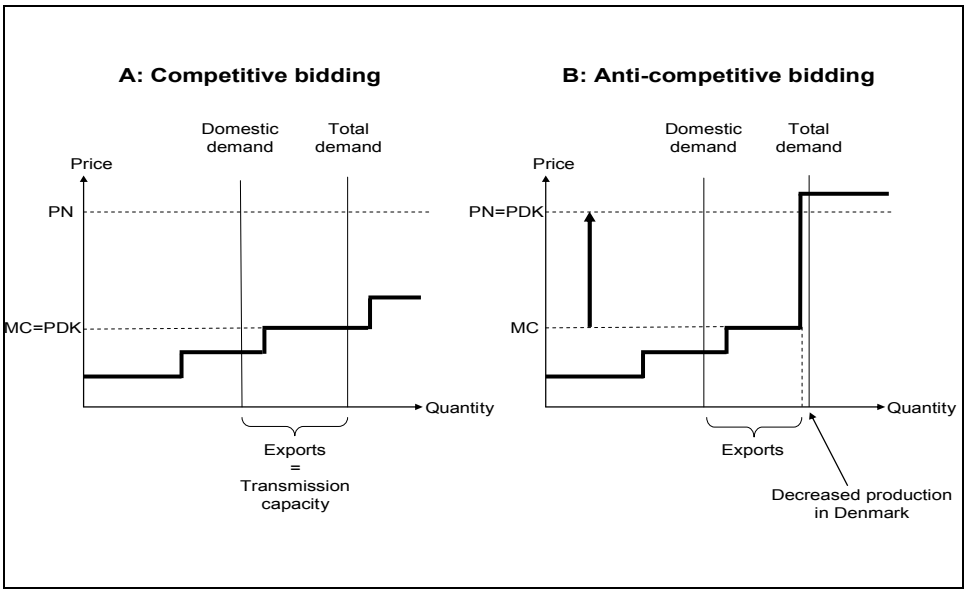
flow of electricity towards Denmark and the transmission lines will often be used to the limit and congest. The local, Danish generator will not have an incentive to avoid this, since the local price will be higher when the transmission line congest. It is well established in the case law that markets can be separated into different relevant geographic markets in the presence of congested transmission lines.[9]

When costs of producing electricity are much lower in Denmark than in the rest of the Nordic region the picture is more complex. In the rare case of import congested transmission lines into Denmark separate geographic relevant markets can of cause be delineated. But, there might be separate relevant markets even without import congestions and even when the regions have identical prices. If the local, Danish generator is capable of decongesting the transmission line, and ultimately alter the price formation in Denmark, it might be wrong to delineate the Danish market as part of a larger Nordic market. If a SSNIP-test is based on the observed prises the conclusion might be false, i.e. a Power Fallacy.

The Danish generator will have an incentive to decongest the transmission line. Due to the market design the prices in two connected regions in the Nordic electricity market are identical whenever there is idle capacity on the transmission line(s) connecting them. Therefore, the potential gain from higher prices might easily cover the loss of generation required for at local generator to decongest the transmission line.

A simple example illustrates this point. Suppose the initial price in Denmark is 100 per unit and the production is 100 units. This level of generation congests the transmission line to Norway (export) where the price is say 200 per unit. By lowering the generation slightly to 99 units the transmission line to Norway is decongested and the price in Denmark jumps to 200 per unit. This decongestion strategy is highly profitably for the Danish generator, cf. Figure 1.

Figure 1: The choice of market behaviour seen from the perspective of large producers in the Nordic countries



The figure shows the fundamental choice that the Danish generator is facing. Either the generator bids in its generation capacity at the true costs. If it does so the transmission line to the Nordic region will congest with exports, and a separate price area in Denmark with a lower price will appear. This is illustrated in panel A. Given the amount of domestic demand and demand for exports the transmission line will be congested by exports. This will create a

[9] Confer note 10.

Danish price (*PDK*), equalling the local producer's marginal production costs (*MC*). This corresponds to the situation where the market is competitive, and no single generator can alter the market outcome. However, if the market is not competitive the market outcome might be different. If possible the local Danish generator has incentives to choose a market outcome as illustrated in panel B: By sacrificing a small amount of export the generator can avoid the creation of a separate Danish low-price area. If the capacity of the export line is not fully utilized, the Danish price will equal the Nordic price (PN) by definition of the market design. It might be highly profitably for the generator to do this, since the entire generation of electricity is sold to the higher price and the initial sacrifice is small.

The Cellophane Fallacy

The Power Fallacy problem described above has clear parallels to the famous Cellophane Fallacy. In 1956 the US Supreme Court made a wrong judgement of the relevant market in a case concerning du Pont's behaviour on the market for flexible wrapping materials.[10] The court delineated the relevant product market too wide by using the right methods wrong. The mistake is famous and named '*the Cellophane Fallacy*'.[11]

The Court overruled a decision from the competition authority that delineated the relevant product market narrowly to cellophane alone. Instead the Court delineated a relevant product market consisting of all 'flexible wrapping materials'.

By estimating cross-price elasticities (the demand response following a change in relative prices) between cellophane and other wrapping materials the Court found that even a small price increase would provoke a significant demand response away from cellophane. The Court reasoned that due to the demand response a hypothetical monopolist would not be able to increase the price of cellophane by 5-10 percent (from existing levels) without loosing significant market shares rendering the price increase unprofitable. This is true. However, the Court's reasoning was, nevertheless, wrong and not in accordance with the SSNIP-test. It is easy to se why.

Suppose for a start that cellophane alone constitute the relevant product market. And suppose several producers of cellophane exist and that the market for cellophane is competitive. A SSNIP-test based on the observed prices would, in this situation, find small cross-price elasticises. A hypothetical monopolist on the market for cellophane would profitably be able to increase the price of cellophane by 5-10 percent since there are no close substitutes to cellophane. Therefore, the SSNIP-test would correctly conclude that cellophane constitute a separate relevant product market.

But, in reality, there where only one producer of cellophane in the market: du Pont. Du Pont was the predominant producer of cellophane and controlled prices. Therefore, it was profitable for du Pont to increase the price of cellophane to a level above the competitive level because consumers of cellophane had no or limited alternatives. Some consumers were fully dependent on cellophane. As du Pont increased the price the cross-price elasticity would raise steadily because more and more consumers would stop buying cellophane. In fact it would be profitable for du Pont to increase the price to the point where further price increases would be unprofitable. That is to the point where too many consumers stop buying cellophane. In other words du Pont would increase the price to exactly the point where the SSNIP-test (falsely) would reject a narrow relevant product market.

[10] United States v. E.I. du Pont de Nemours & Co., 351 U.S. 37, 391-92, 1956.

[11] Se e.g. Pitofsky, Robert. 1990. *New definitions of relevant market and the assault on antitrust*. The Columbia law Review 90. November 1990.

Below we have listed the differences between the two fallacies. First the Cellophane Fallacy concerned the delineation of the relevant *product market* for cellophane, whereas, the Power Fallacy concerns the relevant *geographical market* for power. Second the SSNIP-test was in the cellophane case based on (high) monopoly prices, hence, by definition revealing a high elasticity of demand. In the case of power the SSNIP-tast was based on (high) prices created by anti-competitive decongestion of transmission lines. Third the high prices in the cellophane case can be maintained due to the absence of close substitutes to cellophane. The high prices of power can be maintained due to the absence of competitive (low-price) generation capacity.

Cellophane Fallacy	Power Fallacy
Product market	Geographical market
SSNIP-test on monopoly prices causes high price elasticity	SSNIP-test on "decongest"-prices causes high price elasticity
No close substitutes to Cellophane	Power in high-cost region not competitive

Generally the SSNIP-test should be based on competitive prices. If not, the result would most likely be that the test delineates relevant markets to large either in the product or in the geographic dimension. The EU Commission acknowledges this:

> *"Generally, […] the price to take into account will be the prevailing market price. This might not be the case where the prevailing price has been determined in the absence of sufficient competition. In particular for investigation of abuses of dominant positions, the fact that the prevailing price might already have been substantially increased will be taken into account."*[12]

Conclusions

We argue that it is insufficient to consider the availability of transmission capacity between whole sale electricity markets when delineating relevant geographical markets. We have shown that if production costs differ markedly between regions, a case investigating the low-cost region should consider the low-cost region as a separate relevant geographical market, even though, the two regions are physically connected and have the same price.

The starting point of the SSNIP-test is competitive behaviour. If the analysis ignores that idle transmission capacity might actually be the result of anti-competitive behaviour the conclusions of the market delineation might be wrong and the SSNIP-test not carried out correctly. This is what we refer to as *the Power Fallacy*.

By not realizing the full potential of large, local producers' ability to affect the market, authorities risk delineating relevant markets too wide and, thereby, approving mergers that should not have been approved or failing to detect abuse of dominant positions. Hence, due to the Power Fallacy traditional tools based on the observed prices (e.g. SSNIP-tests and price correlation analyses) can result in too wide market definitions. Instead the definition of relevant markets should be based on analyses of cost differences between different regions caused by differences in production technologies.

In every region or country where sophisticated cross border market mechanisms are developing care has to be taken: The availability of transmission capacity between regions might indicate integrated markets. But taking idle transmission capacity as sufficient evidence of wide relevant markets will be a mistake if the idle capacity is due to anti-competitive decongestion.

[12] EU Commission, *Notice on the definition of the relevant market for the purposes of Community competition Law*, 9 December 1997, page 4.