Market Power in the German Wholesale Electricity Market: What are the Political Options?

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Abstract
This paper evaluates four publicly discussed policy options to mitigate market power in the German wholesale electricity market. These four options are: a regulatory solution favoured by the Federal Ministry for Economics and Technology, the implementation of a day-ahead flow-based market coupling in the Central West Region advocated by five European regulators, the expansion of cross border capacity as stipulated by the European Commission and the divestiture of dominant suppliers as proposed by the Hessian Ministry of Economics. The following questions are answered in this paper: are these options adequate measures to mitigate market power? What are the intended and non-intended effects on market efficiency? How likely is the political implementation?
1. Introduction

The German wholesale electricity prices have increased by almost 170% in the last seven years. The average EEX base load spot market price was less than 19 Euros per MWh in 2000 compared to more than 50 Euros per MWh in 2006. Several studies (Müsgens 2004, Schwarz and Lang 2006a, Von Hirschhausen et al. 2007) have shown that an increasing exercise of market power is not the only but one decisive factor for increasing wholesale electricity prices. Indeed, the nature of electricity production and consumption make the power market particularly susceptible to market power. The two most important factors are: the supply response to price changes is relatively inelastic because electricity cannot be stored cheaply (except in hydro facilities) and short run capacity constraints are binding. In addition, demand responsiveness of electricity customers is limited and therefore very inelastic (Twomey et al. 2005: 11). Studies of the British electricity market have shown that even relatively small suppliers can affect market prices substantially (cf. Newbery 2002: 8, Monopolkommission 2004: 584).

There are several political options to mitigate market power (cf. e.g. Twomey et al. 2005: 12 f.). Especially four options are discussed publicly: a regulatory solution as favoured by the Federal Ministry for Economics and Technology (BMWI 2007), an implementation of a day-ahead flow-based market coupling in the Central West Region as intended by five European regulators (CREG et al. 2007), an expansion of cross border capacity as stipulated by the European Commission (2005, 2007), and a divestiture of dominant suppliers as proposed by the Hessian Ministry of Economics (HMWVL 2007).

The Federal Ministry for Economics and Technology has made a proposal on a revised Gesetz gegen Wettbewerbsbeschränkung (BMWI 2007). According to this, utilities misuse market power as soon as the stipulated prices exceed the costs in an unreasonable way. The proposal aims at an extensive public price control of electricity suppliers and a rigid re-regulation of electricity pricing. The approach of the five European regulators (CREG et al. 2007) as well as of the European Commission (2005, 2007) aims at a decreasing concentration of generation by expanding the geographic market over which suppliers are competing. The Central West Region covers Belgium, France, Germany, Luxemburg and the Netherlands. In contrast to the status quo of separated spot markets and explicit auctions of cross-border capacities, a flow-based market coupling regime as intended by the five European regulators would lead to a single market with one price for all hours at least when there are no congestions concerning cross-border capacities. The European Commission (2007: 6) mentions 32 key projects with respect to the expansion of cross-border capacities. Especially an expansion of the
transmission system from Central Western Europe to Italy and from North-eastern Central Europe to Germany is of high priority (European Commission 2006: 16). The Hessian Ministry of Economics (HMWVL 2007) demands a revision of the Gesetz gegen Wettbewerbsbeschränkung. In contrast to the regulatory solution of the Federal Ministry for Economics and Technology, the Gesetz gegen Wettbewerbsbeschränkung should be enlarged by rules which permit the divestiture of dominant suppliers. In the first run, this includes the compulsory sale of power plants of the four big German electricity producers to new entrants or municipal utilities.

It is the objective of this paper to discuss and evaluate these four political options. The questions to answer are: are these options adequate measures to mitigate market power? What are the intended or non-intended effects on market efficiency? And how likely is the political implementation?

The paper is organised as follows: the question whether the exercise of market power is necessary for the functioning of wholesale electricity markets is discussed in section 2. Indicators of market power and the situation in the German wholesale electricity market are presented in section 3. Section 4 evaluates the regulatory approach of the Federal Ministry for Economics and Technology. The effects of a market coupling regime as stipulated by five European regulators are discussed in section 5. Section 6 presents the cross-border capacity expansion approach as stipulated by the European Commission. The divestiture approach of the Hessian Ministry of Economics is evaluated in Section 7. Finally, the results are summarized in section 8.
2. **Exercise of market power: a necessary evil?**

Market power is typically defined as the ability to alter prices away from competitive levels in a profitable way (cf. Stoft 2002: 318, Twomey et al. 2005: 5). How market power is exercised depends on the exact structure of the market, and in particular the price setting mechanism. The primary methods of exercising market power which are of special interest in this paper are (Twomey et al. 2005: 9):

1) Physical or quantity withholding, which involves deliberately reducing the output that is bid into the market. Withholding can be done by not bidding, de-rating or declaring unit outages.

2) Financial or economic withholding, which involves bidding in prices higher than the competitive bid for the particular unit.

3) Capacity shutdowns, which involve, just like physical or quantity withholding, deliberately reducing the output that is bid into the market.

From an analytical point of view, these strategies are often equivalent. A leftward shift of the supply curve can be the result of withdrawn output, raised bid prices or capacity shutdowns. In either case, these strategies are not profitable in a competitive market. Raising the bid price or physically withholding output would just result in a smaller market share without receiving any additional revenue on the company’s portfolio.

The exercise of market power usually changes the merit order and, therefore, leads to production inefficiency. Additionally, welfare losses are produced by increasing prices. Indeed, demand is in the short run inelastic at the wholesale electricity market. But, as soon as rising prices are passed to final customers, electricity demand *ceteris paribus* decreases.

Nevertheless, there is an ongoing debate whether the exercise of market power might be necessary for the functioning of the wholesale electricity market. The proponents argue that, if prices are equal to marginal costs, there will not be enough revenue to cover the fixed costs and to produce an incentive for the construction of new plants (e.g. Pfaffenberger 2004: 156). This argument seems to be less relevant for base load power plants. Increasing maintenance costs or capacity shutdowns of aging power plants lead to rising market prices also in competitive markets. Additionally, investment opportunities arise because of technological improvements, changes in relative fuel prices or different CO₂ opportunity costs. Indeed, marginal cost pricing (with no additional capacity bonuses) can cause problems especially for peak load power plants. The construction of a peak load power plant mitigates the capacity scarcity (with high prices) and, therefore, erodes the necessary revenues (e.g. Weber 2002). But, this investment paradox is not only a problem of competitive but also of oligopolistic
markets. Exemption could be a very highly concentrated market with only one or two dominant suppliers (and, therefore, rising market power problems). A lack in peak load capacity can lead to a breakdown in power supply. This could lead to a – for suppliers costly – re-regulation of power markets. If suppliers are big enough, the cost-revenue ratio for additional peak load capacity could be positive because of these expected costs of re-regulation while it is negative for smaller ones (this argumentation follows Olson 1968).

As already denoted, there is an alternative solution of the investment paradox: the establishment of a capacity market as proposed by Cramton and Stoft (2005). In this sense the exercise of market power is not a necessary evil. Capacity markets are not a new idea but are realised for example in several US states (like New York, so called NYISO) and in the German balancing market. Cramton and Stoft (2005) develop a proposal for a capacity market in New-England. According to Cramton and Stoft (2005: 49), this capacity market should be realised as a future market for physical capacity (and not for power generation). The buyers of electricity are forced to buy capacity proportional to their energy purchases (Ockenfels 2007: 40). The initial subject of design is the fixed costs recovery or short run profit of a benchmark peaker. This profit consists of the capacity payments from the capacity market and the peak-energy rents from the power market. The short run profit of the benchmark peaker depends on capacity available. If the available capacity is lower than the defined minimum capacity, the short run profit is highest (2 fold fixed costs). The short run profit decreases with rising capacity. The proposed design ensures that fixed costs are barely covered if the target capacity is reached. If the target capacity is exceeded, the short run profit of the benchmark peaker is lower than fixed costs. If the maximum capacity is reached, the short run profit is zero (for more details of the complex design see Cramton and Stoft 2005). In consequence, the proposed capacity market creates investment incentives as long as capacity is scarce. Therefore, it is ensured that enough peak load capacity is available.

At the moment, there is not much fear of capacity scarcity in Germany and Europe (Ockenfels 2007: 40). The new building of power plants is very attractive because of the EU emission trading system (e. g. Schwarz 2006). Therefore, the implementation of a capacity market seems unnecessary for the moment. But, it is an interesting option for the future, if capacity scarcity problems should arise.
3. Indicators of market power and the situation in Germany

There is a great variety of indicators to detect market power in wholesale electricity markets (for a survey see Twomey et al. 2005: 9 f.). Structural indices like market shares, Herfindahl-Hirschman Index (HHI) or the Residual Supply Index (RSI) assess the potential market power of suppliers while the Lerner Index (LI) or the Price-Cost Margin Index (PCMI) calculate the extent of actually exercised market power.

The German Antitrust Agency concentrates on market shares. The Gesetz gegen Wettbewerbsbeschränkung mentions quantitative threshold values for market shares. If the biggest supplier exceeds a market share of 33 %, market power is assumed. The same is true if the cumulative market share of the three biggest and the five biggest suppliers exceed 50 and 66 %, respectively. Figure 1 shows the cumulative capacity and market shares of the biggest, the three and the five biggest suppliers in the German wholesale electricity market in 2006. The cumulative capacity as well as the cumulative market shares of the three and the five biggest suppliers exceed (partly clearly) the quantitative threshold values given (for a detailed discussion see Zimmer et al. 2007).

![Diagram showing market shares and capacity for the biggest, three biggest, and five biggest suppliers in the German wholesale electricity market in 2006.](image)

Figure 1: Market shares in the German wholesale electricity market 2006 and the quantitative threshold values of the German Antitrust Agency (Zimmer et al. 2007)
The HHI is calculated by taking the sum of squares of the respective market participant’s market shares. The US Department of Justice mentions the following quantitative threshold values in the Merger Guidelines: a market is not concentrated if the HHI is lower than 1,000 points, it is moderately concentrated if the HHI is in-between 1,000 and 1,800 points, and it is highly concentrated if the HHI is greater than 1,800 points. Zimmer et al. (2007) have calculated an HHI of 1,840 points for the German wholesale electricity market. That means that the German wholesale electricity market is highly concentrated in the definition of the US Department of Justice.

In order to calculate market shares as well as the HHI, some preliminary definitions must be made which are not uncontroversial. The question of the relevant product seems to be less problematic in the wholesale electricity market. But the question of the relevant geographic market is not easy to answer. If the law of the one-price criterion (Twomey et al. 2005: 15) is used for defining regional boundaries, Germany can be seen as a relevant market in the short run but not in the long run. The hourly spot market prices can be quite different in Germany and in the neighbouring countries because of separated spot markets. This is also true for German prices compared with French and Austrian prices although there are (almost) no congestions. Comparing monthly or annual instead of hourly or daily prices, there are only slight differences between German, French and Austrian prices because of successful counter trading (cf. Schwarz and Lang 2006b: 14 f.).

Apart from problems with the definition of the relevant market, there is no theoretical foundation for the quantitative threshold values as determined by the German Antitrust Agency for market shares and by the US Department of Justice for the HHI. This is a main difference to the RSI discussed in the following. As already mentioned, even relatively small suppliers can affect market prices substantially in the electricity market because of its special features. Therefore the quantitative threshold values for market shares of the German Antitrust Agency and for the HHI of the US Department of Justice are much too high with respect to electricity markets.

The RSI is an attempt to incorporate demand conditions, in addition to supply condition in a measure of potential market power. It is a comparatively new indicator and was developed by Sheffrin (2001, 2002) especially for the (Californian) electricity market. The RSI for a company $i$ measures the percentage of supply capacity remaining in the market after subtracting company $i$’s capacity of supply:

\[
\text{RSI}_i = \frac{\text{Total Capacity} - \text{Company i’s Relevant Capacity}}{\text{Total Demand}}.
\]
Where: total Capacity is the total regional supply capacity which is available diminished by reserve capacity plus total net imports, Company i’s relevant capacity is Company i’s available capacity and total Demand is the metered load.

Ockenfels (2007: 28-29) states that not the net imports should be added to the total capacity but the net import capacity. But, this does not seem to be the appropriate way:

1. The neighbouring countries must be able to export 16.5 GW (net import capacity of Germany) to Germany. But they are not able to do this, especially France has scarce capacities.

2. The second reason why net imports are more appropriate is the congestion management with separated spot markets (Germany). If the domestic suppliers exercised their entire potential market power, the neighbouring countries would export to Germany as much as they can. So the net import seems to be appropriate. If the electricity suppliers exercise their market power randomly, the foreign countries will not be able to react because of the congestion management and so the net imports are more appropriate than the net import capacity.

When the RSI is greater than 100 %, the suppliers other than company i have enough capacity to meet the demand of the market, and company i should have a comparatively low influence on the market clearing price. On the other hand, if the RSI is lower than 100 %, company i is needed to meet demand, and is therefore a pivotal supplier in the market. Because of the demand, which is very inelastic in the short run, this company can theoretically push up the price until infinity.

Sheffrin (2002) has analysed the relationship of RSI and the price-cost mark up in the Californian market (which will be discussed later on in this section). The relation indicates that on average an RSI of about 120 % will result in a market price outcome close to the competitive market benchmark. Therefore he proposes the following simple screening rule for market competitiveness using RSI: RSI must not be less than 110 % for more than 5 % of the hours in a year (about 438 hours).

Figure 2 shows the RSI of E.ON and RWE (descending from left to right) for the national German wholesale electricity market for the year 2006. The RSI of RWE is less than 110 % for more than 55 % of the hours in the year 2006 (and less than 100 % for ca. 35 % of the hours). The RSI of E.ON is less than 110 % for ca. 53 % of the hours (and less than 100 % for ca. 31 % of the hours). In other words, the RSI screening signalises at least problematic values for all peak hours on workdays.
The RSI is an improvement compared to market shares and HHI, considering the special supply and demand conditions for every hour of a year. Besides, the quantitative threshold values are theoretically and empirically founded. Several studies on different electricity markets have approved the inverse relationship of RSI and exercised market power (e.g. for the German market Schwarz and Lang 2007). The discussion on market coupling in the Central West Region in the following section will clarify that, in contrast to the RSI screening, the market share screening of the German Antitrust Agency can lead to wrong conclusions concerning potential market power. Nevertheless similar to market shares and HHI, the geographically relevant market has to be defined before the RSI analysis. As already mentioned, this is problematic for the German case because the geographic boundaries of the relevant market differ depending on the time horizon considered.

In contrast to structural indices, LI and PCMI determine the actual exercised market power. The LI is defined as (exchange) price (P) minus marginal costs (MC) divided by price, while the PCMI is defined as price minus marginal costs divided by marginal costs:

\[ LI = \frac{P - MC}{P} \quad \text{and} \quad PCMI = \frac{P - MC}{MC}. \]
Prices and marginal costs are equal in a perfectly competitive market. Therefore LI and PCMI are zero in this case. Rising mark-ups on marginal costs lead to increasing LI and PCMI and indicate an increasing exercise of market power.

While (exchange) prices are publicly available, the marginal cost estimators must be assessed by complex simulation models. There are three studies for the German wholesale electricity market which assess marginal costs estimators by complex simulation models (Müsgens 2004, Schwarz and Lang 2006a, Von Hirschhausen et al. 2007). These studies differ in the regional boundaries assumed, the time period considered and modelling details (for a model discussion see Schwarz and Lang 2007). All three investigations conclude that market power has been exercised in the German wholesale market at least since 2003. The studies of Schwarz and Lang (2006a) as well as of Von Hirschhausen et al. (2007) assess a price-cost margin of ca. 20% for 2005.

As already emphasized, the question of regional boundaries is very important for all structural indices discussed. This question is less important for studies on exercised market power using the price-cost-margin as an indicator. Because of separated spot markets and the objective to evaluate their outcome, it is advisable to interpret Germany as a relevant market as done in Schwarz’s and Lang’s study (2006a). The influence of foreign demand and supply decisions on the domestic marginal cost estimator can be easily considered by adjusting domestic load for foreign trade. The only alternative would be the use of a model of the complete EU market considering the net transfer capacity figures of ETSO (different volumes) limiting power exchange (see Müsgens 2004). If the European electricity markets were coupled, this would be an adequate approach. But in fact, spot markets are separated and international electricity exchanges as well as spot market outcomes are far away from the theoretical model of a market coupling regime (a market coupling regime would lead to equal spot market prices as long as there are no congestions!). Therefore, the marginal cost estimator of such an EU model would be too high if real net imports were larger than assessed in the model run and too low if the real net imports were lower than assessed.

The on-going discussions on market power have shown that using simulation models to assess marginal costs and comparing them with exchange prices can be seen as ‘best-practice’ in order to quantify market power. This holds particularly true for cases like the German market, where it is impossible to study the bidding behaviour of operators directly (Twomey et al. 2005: 27-28). However, simulation models tend to underestimate marginal costs as they do not incorporate the complexities of real electricity markets correctly. Harvey and Hogan (2002) for example remodeled the Californian electricity market to revise the results of the
simulation model of Joskow and Kahn (2001). In contrast to Joskow and Kahn, the model of Harvey and Hogan produced no marginal costs substantially below exchange prices due to different assumptions on wind energy production, capacities available and reserves. Both author collectives based their studies on a very short period of several months. A rather simple method to prevent such conflicts of results could be the use of an expanded time frame of several years especially if marginal cost pricing can be assumed for some months and the simulation model can be validated for these months. This procedure was proposed and realised by Schwarz and Lang (2006a).

4. The regulatory approach of the Federal Ministry for Economics and Technology

The Federal Ministry for Economics and Technology has submitted a revised version of the Gesetz gegen Wettbewerbsbeschränkung. According to the revised version it is forbidden for producers of electricity that have a dominating market position to exploit their position by:

‘1. Repay, payment components, or other demand conditions, which are more unfavourable than those from enterprises on comparable markets or other supply enterprises, or
2. Repay require fees, which exceed the costs in an inadequate way. There is no abuse, if the producer proves that the deviation is businesslike justified. Costs and cost elements, which would adjust themselves at perfect competition, may not be considered.’ (Entwurf des Gesetzes gegen Wettbewerbsbeschränkung § 29)

There are numerous criticisms concerning the regulatory approach of the Federal Ministry for Economics and Technology. Beckmerhagen and Stadler (2007) deal with the legal problems. The economic implications are discussed by the scientific adviser of the Federal Ministry for Economics and Technology (Wissenschaftlicher Beirat des Bundesministeriums für Wirtschaft und Technologie 2006), by Schmitt (2006) and by Von Weizsäcker (2007). Apart from the legal ambiguity in the revised version and the practical problems that derive from it, the main economic criticism is that the draft mentions costs and cost elements but not explicitly marginal costs. In consequence, the revised version of § 29 could lead to a regulation on average costs basis with all the problems that are connected with this kind of regulation. This would be the end of the liberalisation experiment of electricity markets. In our opinion this holds true. But then the question arises: is price controlling based on marginal costs more appropriate?

Under the terms of the existing § 19 GWB it is legal that the German Antitrust Agency controls prices of the EEX on marginal cost basis (Von Weizsäcker 2007: 32). But up to now
the German Antitrust Agency does not avail of this possibility. But what would be the consequences if it did?

As presented in chapter 2, there are several possibilities to exercise market power. If one assumes an effective price controlling, the power producers will exercise their market power no longer with price mark ups on marginal costs or capacity withholding but with shutdowns and cuts of investment. This would finally lead to a substantial distortion of the production structure, inefficiency and capacity shortage. That means: each governmental price controlling, not only on average cost basis, but also on marginal cost basis, does not lead to lower prices in the long run, but only to inefficiency.

It is not the point that the German Antitrust Agency should not make a market and price monitoring. It seems to be quite important that the politicians are well informed whether market power problems exist on the electricity market. Yet, the monitoring results should not be used for price adjustment. Instead they can justify order-political structural changes like market coupling and/or divestiture.

5. Market Coupling in the Central West Region

Figure 3 shows the present and intended market organisation in Central Europe (for a discussion on different market organisations see e.g. Knops et al. 2001, Consentec and Frontier Economics 2004, Schwarz and Lang 2006b). Market coupling is realised for Denmark, Finland, Norway and Sweden (Nord Pool) and for Belgium, France and the Netherlands (trilateral market coupling). Market coupling is announced for Germany and Denmark. The German Danish Market Coupling is supposed to start in the fourth quarter of 2007 (Dobelke 2007).

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<th>Frequent Congestion</th>
<th>Existing Market Coupling</th>
<th>Announced Market Coupling</th>
<th>Planned Market Coupling</th>
<th>Not (yet) Deregulated</th>
</tr>
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</table>

Figure 3: Present and intended market organisation in Central Europe (Based on Google Earth)
The action plan of the five European regulators aims at a market coupling regime in the Central West Region which consists of Belgium, France, Germany, Luxemburg and the Netherlands (cf. CREG et al. 2007). This plan is of special interest because market coupling would produce an integrated market in the Central West Region. At present, there are almost no congestions concerning cross-border capacities in the Central West Region and the planned flow based market coupling would lead to further improvement (see Schwarz and Lang 2006b). While there are almost no congestions within the Central West Region, there are frequently congestions to all the neighbouring countries with the exception of Austria and Switzerland. In consequence, the Central West Region plus Austria and Switzerland (if these countries are integrated in the market coupling regime) has to be seen as the relevant geographic market for market power investigations in the long and in the short run.

Figure 4 shows the capacity shares of the biggest suppliers in the Central West Region (plus Austria and Switzerland). The EDF is the biggest supplier with a capacity share of 30 %, followed by E.ON and RWE with 9 and 8 %, respectively. The quantitative threshold values for market shares of the German Antitrust Agency would signal an unproblematic situation concerning competition in the Central West Region (plus Austria and Switzerland).

Figure 4: Net capacity shares in the Central West Region (plus Austria and Switzerland) (Häfner 2007)

Figure 5 shows the RSI of EDF, E.ON and RWE relating to the Central West Region (plus Austria and Switzerland) for four weeks (672 hours) from 22/01/2007 to 18/02/2007. The RSI of EDF is less than 110 % for ca. 95 % of the hours (and less than 100 % for ca. 75 % of the hours). The RSI of RWE is less than 110 % for ca. 12 % of the hours (and never less than 100
The RSI of E.ON is less than 110 % for ca. 11.7 % of the hours (and never less than 100 %).

In contrast to the capacity shares, the RSI screening indicates a very problematic situation concerning competition in the Central West Region (plus Austria and Switzerland). It is mainly the EDF which controls too much capacity and which is pivotal supplier for almost three quarters of the hours investigated.

A more detailed investigation shows that the RSI of EDF is lower than 100 % for almost all hours at workdays (see Figure 6). Values greater than 110 % are only typical for off-peak hours at weekends (see Figure 7).
In other words: a market coupling regime in the Central West Region would be an improvement compared to the status-quo of comparatively small national markets. But such a
market coupling will not be sufficient to solve market power problems. Especially the EDF would still be too big to realise workable competition.

6. Expansion of cross-border capacity

One possibility to solve the remaining market power problems would be the further expansion of the relevant market by an expansion of cross-border capacity (perhaps combined with an EU market coupling regime) as stipulated by the European Commission (2007). Indeed, the expansion of cross-border capacity seems to be the silver bullet to solve market power problems. Figure 8 shows the capacity shares of the biggest supplier in the EU27 (plus Norway and Switzerland). EDF is the biggest player with a capacity share of 15 %, followed by E.ON with 6 %, Enel with 6 % and RWE with 5 %.

If one applies the quantitative threshold values for market shares of the German Antitrust Agency or for the HHI of the US Department of Justice (the HHI is less than 400 points), no problems with potential market power seem to exist. RSI calculations for the EU27 do not exist at present. But a comparison of the net capacity shares and the RSI of EDF, E.ON and RWE in their national markets and the Central West Region (plus Austria and Switzerland) as presented in Table 1 is helpful. A net capacity share of 8 or 9 % is obviously sufficient to
produce RSI values less than 110 % in much more than 5 % of the hours (the quantitative threshold value). A net capacity share of about 20 % produces RSI values less than 110 % in more than 50 % of the hours. The EDF with 15 % net capacity share at the EU27 Region (with Norway and Switzerland) lies between these capacity shares. Therefore, it can be assumed that RSI values less than 110 % are produced for ca. 20 to 40 % of the hours. In other words: even if a market coupling regime was in operation in the entire EU27, and even if there were no cross-border congestions, market power problems would still exist according to the RSI screening.

Table 1: Net capacity shares and RSI of EDF, E.ON and RWE in their national markets and the Central West Region (plus Austria and Switzerland)

<table>
<thead>
<tr>
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<th>Net capacity share [in %]</th>
<th>RSI &lt; 110 % [in % of hours]</th>
<th>RSI &lt; 100 % [in % of hours]</th>
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<tbody>
<tr>
<td>National markets</td>
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<tr>
<td>EDF</td>
<td>85</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>E.ON</td>
<td>22</td>
<td>53</td>
<td>32</td>
</tr>
<tr>
<td>RWE</td>
<td>19</td>
<td>55</td>
<td>35</td>
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<tr>
<td>Central West Region (plus Austria and Switzerland)</td>
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<tr>
<td>EDF</td>
<td>30</td>
<td>95</td>
<td>75</td>
</tr>
<tr>
<td>E.ON</td>
<td>9</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>RWE</td>
<td>8</td>
<td>12</td>
<td>0</td>
</tr>
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(Own calculations)

Because of the initiative of the European Regulators (2007) and its support by EUROPEX and ETSO (2004), the implementation of a market coupling regime in (larger parts of) the EU27 is likely in the next years. In contrast, progress on the development of networks is insufficient (greater parts of the EU27 are still more or less electricity islands) despite the fact that the EU has already formulated a series of policies aimed at supporting the expansion of cross-border capacity in Europe (European Commission 2005 and 2007). The reasons for the delays are manifold (European Commission 2005 and 2007). Among others, a lack of harmonized planning and deficient interest of transmission system operators or national politics play a decisive role. Even if the Priority Interconnection Plan of the European Commission (2007) accelerated the planning and implementation process, it would take many years to mitigate cross-border congestion problems existing among many EU members.
7. Divestiture

The Hessian Ministry of Economics (HMWVL 2007) aims at a divestiture of the four big German suppliers. As already clarified, the national German market can be seen as the relevant market in the short but not in the long run. Besides, it can be assumed that a market coupling regime in the Central West Region will be realised in the next few years. Therefore, a divestiture approach (just) for German suppliers seems to be inadequate because the biggest player in the Central West Region is the French supplier EDF, with a 2.5 fold capacity compared to E.ON and RWE.

The British experiment has shown the potential of a divestiture approach for mitigating market power. The number of three price-setting fossil-fuelled generators taken as starting point, this number had more than doubled to eight (Bower 2002: 19) during the second round of the divestiture process after 1998. As a consequence, in the year 2000, there was no company which played a pivotal role anymore (Burns 2004: 5). Prices, HHI, and LI decreased in the following (Fabra and Toro 2003, Newbery 2005). Several studies have come to the conclusion that the divestiture process had been responsible for these developments and thus for decreasing exercise of market power (e. g. Bower 2002, Newbery 2005).

Dominant power producers do often not exercise the entire potential market power they possess (Wolfram 1999, Schwarz and Lang 2006). One reason could be their fear of the regulatory response of the state. If the state authorities use a divestiture strategy, the reaction of the suppliers could be to exercise their entire potential market power. Although potential market power is mitigated, the exercised market power could be higher than before. Therefore, it is important for a successful divestiture strategy to downsize the suppliers to appropriate size rapidly. The state authorities should be aware that the suppliers of electricity could exercise their entire market power if they still had potential market power after divestiture. The appropriate size of electricity producers depends on the size of the relevant market. If the relevant market is enlarged simultaneously, less capacity must be sold.

If, as expected, a market coupling regime in the Central West Region will be implemented, a divestiture of the big German suppliers seems to be unnecessary. In contrast, the RSI calculations in chapter 5 have indicated that such a measure might be necessary for EDF.
8. Summary

It was the objective of this paper to evaluate four intensively discussed political options to mitigate market power in the wholesale electricity market. The regulatory approach of the Federal Ministry for Economics and Technology aims at an extensive public price control of electricity suppliers and a rigid re-regulation of electricity pricing. Even taking account of the vagueness of the proposal, the effects on market efficiency would be so negative that the proposal has to be rejected. The approach of five European regulators aims at an implementation of a day-ahead flow-based market coupling in the Central West Region. This would lead to an integrated market in the Central West Region and to an extension of the relevant market in the short and in the long run. This proposal does indeed reduce market power. Because of the support of EUROPEX and ETSO, it is very likely that the initiative of the five European regulators will be realised in the next few years. Nevertheless according to RSI screening, this measure will not be sufficient to solve (all) market power problems. Especially, the EDF would still be too large to realise workable competition. The proposal of the European Commission aims at an expansion of the relevant market by expanding cross-border capacity. At first sight, the expansion of cross-border capacity (perhaps combined with an EU market coupling regime) seems to solve market power problems. But, the RSI screening shows that even if a market coupling regime was in operation in the entire EU27, and even if there were no cross-border congestions, market power problems would still exist. Again, the EDF would still be too big to realise workable competition. Besides, even if the Priority Interconnection Plan of the European Commission accelerated the planning and implementation process, it would take many years to mitigate cross-border congestion problems existing among many EU members. The Hessian Ministry of Economics aims at a divestiture of the four big German suppliers. But, the national German market can be seen as the relevant market only in the short but not in the long run. Besides, the realisation of a market coupling regime in the Central West Region is very likely. Therefore, a divestiture approach (just) for German suppliers seems to be inadequate because the biggest player in the Central West Region is the EDF, with a 2.5 fold capacity compared to E.ON and RWE. Indeed, dominant supplier is in this case certainly the EDF which would cause market power problems in an integrated Central West Region as well as in an entirely integrated EU27. The appropriate size of electricity producers depends on the size of the relevant market. If the relevant market is enlarged the dominant supplier EDF, will have to sell less capacity.
Reference


ETSO (different volumes): Indicative values for Net Transfer Capacities.


