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# Energieversorgung 2011: Märkte um des Marktes Willen?

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AAEE (Austrian Association for Energy Economics)

### COMPONENTS OF THE FORWARD MARKET PREMIUM IN ELECTRICITY

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#### Motivation und zentrale Fragestellung

This paper presents a multifactor empirical analysis of the determinants of the realised premia in forward prices for electricity, when compared to their associated spot prices. Starting from a wideranging taxonomy of factors involving fundamental, behavioural, dynamic, market conduct and shock components, a number of propositions are examined econometrically on a long data set from the most liquid of European forward markets, the EEX. We show that much of what is conventionally regarded as the price of electricity market risk is actually that of its underlying fuel commodity, gas; that market power has a double effect on prices, notwithstanding the theoretical precompetitive properties of forward trading, insofar as it increases spot prices and the forward premium; that oil price sentiment spills over and that these premia react in an positive way to scarcity and the higher moments of spot price uncertainty.

#### Ergebnisse

Baseload forward premia are positively influenced by the volatility in the oil market. This confirms the "sentimental" importance of the oil market for energy commodities in general. Its influence is as important as the influence of the volatility on the electricity market itself. The volatility of electricity spot prices positively influences the futures price and, hence, the forward premium. Furthermore, realised premia in the gas market influence the electricity premia, which shows the importance of gas fired power plants also in baseload. If market participants perceive a decreasing margin in the spot market, measured as the ratio of available generation to consumption, the forward premium increases since forward prices increase. The significant positive influence of the basis (current forward-spot difference) shows that upward trends in the, to a certain extent, tied spot and forward price series yield an increasing forward premium. Finally, the significant positive margin shock coefficient can assess misjudgements of future supply/demand conditions and captures parts of the premium's forecast error part.

The electricity peak load premium is positively influenced by realised premia in the gas market. The significant positive influence confirms the importance of these generation technologies. The skewness of spot prices positively influences peak forward premia. Positively skewed spot prices increase the hedging demand of retailers given fixed retail prices. On the other hand, they represent opportunity costs of generators having sold forward. Both factors contribute to a positive forward premium (Bessembinder and Lemmon, 2002). However, we observe a negative influence of price spikes occurring in the spot market which appears counterintuitive. Yet, skewness, which computes cubic difference terms, can put too much weight on extremes (i.e. spikes) which gets trimmed by a negative influence of the spike dummy variable. Still, if market participants perceive a decreasing margin in the spot market the forward premium increases. A decreasing margin is related to the increased likelihood of spikes occurring in the spot market and, due to the convex supply curve, an increased skewness of spot prices. Interestingly, the forward premium is positively influenced by the market power estimate. In fact, spot price mark ups yield increases in the forward premium. This can be caused by a higher willingness to pay of the buyers, which price generator market power as a risk factor, a compensation demanded by dominant producers to be willing to sell forward (Anderson and Hu, 2008), and hence loose incentives to exercise their market power in the spot market due to the contracted generation, or a combination of both. This result suggests that any (positive) procompetitive effect of forward markets is, in fact, counteracted by an increased risk premium. Upward trends in the, to a certain extent, tied spot and forward price series yield an increasing basis. This, in turn, results in an increasing forward premium which is reflected in a significant regression coefficient. Finally, the scarcity shock coefficient

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shows the expected sign and is statistically significant. This variable captures, similar to the baseload case, the forecast error part of the forward premium.

#### Schlussfolgerungen

Overall, the forward premium in electricity is a rather complex function of fundamental, behavioural, dynamic, market conduct and shock components. It is clearly an oversimplification in practice to analyse it only in terms of the stochastic properties of the spot prices (variance and skewness). Only part of the risk can be attributed to the electricity sector per se, but in that, risk aversion to scarcity, volatility and extreme events, as well as behavioural adaptation and oil sentiment spillovers characterises agent behaviour. Furthermore, market concentration appears to translate market power effects into the risk premium, which may have important market monitoring implications since forward markets have, so far, been considered to be procompetitive. The reserve margin plays a crucial role since increased scarcity increases spot prices (which is amplified in the case of concentrated markets) and, moreover, also the forward premium. Hence, consumers take a "double hit" if the margin reduces. In general, some of the insights presented here suggest that forward premia should be considered key elements of a transaction cost view of market efficiency in power trading.

#### Literatur

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