

What caused the drop in European electricity prices?

A factor decomposition analysis

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Executive summary

Wholesale prices for electricity in Europe have witnessed a dramatic decline during recent years. For example, prices in both Germany and Sweden have fallen by nearly two thirds since their peak in 2008-10. A number of factors have been blamed – or praised – for the price slump: the expansion of renewable energy, the collapse of the CO₂ price, over-optimistic power plant investments, the decline in final electricity consumption, the decline in fuel prices, and abundant water inflow into hydro reservoirs. Low power plant availability and the German nuclear phase-out, in turn, have helped stabilizing electricity prices.

This paper is an ex-post study of European day-ahead spot prices from 2008 to 2015. The fundamental electricity market model EMMA is used to quantify the individual impact of above mentioned factors one by one. Initially we use the model to replicate historical prices, using input parameters from the respective year. Then individual input parameters are substituted with their 2015 value. The change in modeled electricity prices is interpreted as the ceteris paribus impact of this parameter. We are aware of only three papers that conduct a similar exercise: Kallabis et al. (2016), Everts et al. (2016), and Bublitz et al. (submitted). This study extends them in a number of ways, including broader geographic coverage; focus on spot, rather than future, prices; and a richer set of factors that are studied.

Understanding what caused the price slump is important for a number of reasons. Obviously, understanding past price patterns helps anticipating future price developments, which is of interest for producers, consumers and traders alike. However, understanding the recent history of European power prices is also important for public policy. A number of policy interventions have affected prices – CO₂ trading, subsidies for renewable energy, and Germany's nuclear phase-out, to name some prominent examples. Changing prices means redistribute economic rents between producers and consumers and across different kinds of producers. Sometimes redistribution might be intended, while in other cases it might be a unintentional side-effect of pursuing other policy objectives. In both cases, understanding the price impacts of past policy action can help designing future policies.

In this study, ten factors are explicitly modeled. Six of them are found to have contributed to the price decline while three have mitigated it; one is ambiguous in the direction of its effect. Detailed results are reported for Sweden and Germany. These countries have been selected because they represent two quite distinct types of markets: Germany has a predominantly fossil generation mix, while Sweden generates electricity mostly from hydropower and nuclear power. As a consequence, shocks had a different impact in each country. In Germany, the largest contributors to the decline of the power price since its peak have been the expansion of renewable

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energy and the CO₂ price decline. In Sweden, the major factors have been renewable energy, the decline in final electricity demand, and larger volumes of water inflow into hydro reservoirs. The major factors that mitigated the price erosion were the nuclear phase-out in Germany and the increase in net exports, particularly in Sweden. Interestingly, the combined effect of renewable expansion and the nuclear phase-out on German prices was close to zero. If one defines the Energiewende as the combination of these two policies, its net effect on power prices has been marginal..

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