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CAPACITY REMUNERATION IN POWER MARKETS: THE COST OF PRECAUTION

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Overview

Energy-only markets and scarcity pricing used to prevail in many power systems. However questions remain about whether this is the best market design. Because of market inefficiencies it can be doubtful that the Energy only market can ensure an adequate level of security of supply. Regulators sometimes implement capacity remuneration mechanisms (CRMs) as a precautionary measure when reserve margins are expected to be too. It is designed to correct market imperfections low so that capacity is to be as optimal as possible. Plants then get paid for their very existence in addition to their production; CRMs consider capacity as a separate good from electricity. The decision to implement a CRM is made based on the regulator's assumptions regarding optimal reliability and investors' risk aversion that it is unable to observe directly. But without being able to quantify the actual bias caused by the suspected market imperfections, it is legitimate to wonder about the cost of precaution for the affected agents. Using a cross country econometric regression, this paper seeks to determine the net financial cost of capacity remuneration as it is passed through to end user consumers. CRMs are expected to have a downward effect on wholesale prices. In parallel, end user consumers bear the cost of the additional reliability a CRM is supposed into bring to the system. The net effect on end user prices is not straight forward.

Methods

Using a panel of 25 states over 24 years with both US states and European countries, industrial and residential end user power price dynamics are assessed to set out the net effect of CRM implementation. The econometric model accounts for individual effects and state specific electricity price drivers. The model assesses the effect of CRM implementation in the long run as it considers a progressive change in prices following implementation. Indeed, the impact of CRM implementation is not expected to be instant, but rather slowly changes price dynamics over time toward a new equilibrium. Surely, the capacity gap is not expected to occur straight ahead so assumption is made that the new equilibrium has not been reached yet. This hypothesis is supported by the constant evolution of capacity remuneration schemes. The diversity of CRMs is here accounted for by controlling for the existence of a forward period. The forward period allows actors to have additional information on market conditions compared to a short term mechanism, and this should induce different dynamics on the market.

Results

Electricity mix and gas prices control variables have an impact on both residential and industrial power prices rather consistent with expected market dynamics. Interestingly, the share of electricity produced from renewable sources leads to an increase of end user prices in both the US and Europe, suggesting that costs related to renewable penetration might not only be associated with subsidies but also with increasing system costs. On average, capacity mechanisms in the US are associated with an increase of the industrial end user power prices by bewteen 1.2% and 2.5% for every additional year of implementation while residential end user power prices would rather increase by between 1.5 and 3%. Although industrial end user usually benefit from a better bargaining power, both groups of consumers surprisingly bear the same cost. In the EU, no evidence of an impact of CRM implementation on industrial end user prices is found while residential consumers rather benefit from lower power price by between 1.9 and 2% for every additional year of implementation. Unlike expectations, the existence of a forward period does not have an impact significantly different from zero on industrial real power price index. Robustness is on two regional sub panels confirm the results.

Conclusions

CRM implementation does significantly increase industrial consumers' bill in the US, which seems reasonable considering the additional security of supply consumers are supposed to benefit from. This result is in line with theoretical existing literature: higher prices stem for consumers paying for the improved level of security of supply. However, european end users prices do not increase with CRM implementation, and residential consumers appear to be rather protected against upward price evolution. All recently implemented CRMs, as well as those in the pipeline include a forward period. However, results show no evidence of the superiority of such a design over

other capacity mechanisms, and even weak evidence of the contrary. Caution should be employed when reading this result because the forward period is a rather recent evolution in CRM design. Finally, the cost of precaution can go up to 3% increase in end user prices. It is worth evaluating the security of supply gains from implementation in order to be able to conclude on the actual efficiency of the mechanism and whether the gains are worth such a cost.

References

Battle, C., & Rodilla, P. (2010). A critical assessment of the different approached aimes to secure generation supply. *Energy Policy.*

Cramton, P., Ockenfels, A., & Stoft, S. (2013). Capacity Market Fundamentals. *Economics of Energy and Environmental Policy (Vol. 2 No. 2)*

Steiner, F. (2001). Regulation, Industry Structure and Performence in Electricity Supply Industry. *OECD Economic studies*.

Joskow, P. L. (2006). Markets for power in the United States: An Interim Assessment. *The Energy Journal.*

Yücel, M., & Swadley, A. (2011). Did Residential Electricity Rates Fall After Retail Competition? A Dynamic Panel Analysis. *Energy Policy*.