Ensuring Capacity Adequacy in Liberalised Electricity markets

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Executive summary

Wholesale electricity markets have now been liberalised in numerous countries. However, concerns about the ability of decentralized market decisions to achieve desired policy objectives have sometimes led policy-makers to impose different constraints on wholesale electricity markets. Amongst the most emblematic of such measures, price caps set an exogenous upper bound to the price at which power may be traded. These price caps have been repeatedly criticized for creating a so-called "missing money" problem (Cramton (2006)), raising concerns that too little new capacity may be installed compared to what would be socially optimal. Additionally, when there is a shortage of capacity and prices are at the cap, they fail to elicit socially efficient demand reductions.

Following these observations, various mechanisms have been implemented in many markets in a move to restore short-term allocative efficiency and long-term investment incentives. As a result, demand-side and supply-side mechanisms aimed at ensuring adequacy often coexist. It is therefore crucial to identify their limits and to understand how these mechanisms may compete and interact with one another. This paper aims at improving our understanding of this interaction.

In a first step, we show that "traditional" models of both demand and supply-side adequacy mechanisms can be described within a common analytical framework, contributing to the literature by clarifying how these mechanisms relate to each other. Using this framework we observe that optimal investment signals can be restored by making the high social marginal costs during peak states either explicit or implicit. The latter approach will often be preferred as it does not require a show of "socially unacceptable" prices.

A second contribution is to highlight that, while mechanisms which allow to keep implicit these high marginal costs are likely to be preferred from a political perspective (most likely for the very same reasons that led to the implementation of a price cap in the first place), they also appear to be less efficient, notably because of uncertainty, and incomplete or asymmetric information.

We finally provide two simple policy recommendations if implicit mechanisms are to be used nonetheless. First, the price cap should be set higher than the highest marginal cost of conventional generation, so that the inefficiencies of the supply-side implicit mechanism are minimized. Second, a careful investigation of the limits of implicit mechanisms should precede the implementation of a demand-side mechanism.

This research should be useful to policy makers, regulators and industrial stakeholders of the electricity sector.

Keywords: liberalised electricity markets, capacity adequacy, capacity remuneration mechanisms, demand response, electricity market design

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