

Market Power and Price Exposure: Learning from Changes in Renewables Regulation

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In this paper we explore the impact of firms' price exposure on market power across sequential markets. We highlight two countervailing incentives. On the one hand, as first pointed out by Allaz and Vila (1993), reducing price exposure mitigates firms' incentives to increase prices, which also leads to less price discrimination. On the other hand, if firms are insulated from price changes, they face weaker incentives to arbitrage price differences across markets, which would ultimately mitigate the incentives of the dominant producers to exercise market power.

These issues apply to many goods (e.g., gas, electricity, emission allowances, bonds, stocks.) that are commonly traded in sequential markets, with forward markets followed by spot markets. Here, we focus on the impact of forward contracts on the performance of electricity markets, and in particular, on the debate as to how to pay for renewables. Under one of the most commonly used pricing schemes (Feed-in-Tariffs or FiTs), renewables receive a fixed price, equivalently to a forward contract. The alternative (Feed-in-Premia or FiPs) is to expose renewables to changes in wholesale market prices.

The changes in the renewable regulation that took place in the Spanish electricity market between 2013 and 2014 provide a unique opportunity to test these predictions, as wind producers were switched from FiPs to FITs in 2013, and then back to FiPs in 2014. Using detailed bid data, our empirical analysis provides four main findings. First, using a structural approach, we document a forward contract effect: when firms receive fixed tariffs (no price exposure), they do not internalize the market price increases on their wind output. Instead, under variable prices (price exposure), firms internalize the price effects on their total output, including wind. Thus, all else equal, firms' markups are lower under fixed prices. Second, using a differences-in-

differences approach, we document an arbitrage effect: wind producers stop arbitraging price differences after the switch from variable prices to fixed prices, but they resume arbitrage once exposed to variable prices again. Last, leveraging on our structural estimates, we show that firms' markups are lower under fixed prices given that the forward contract effect dominates over the arbitrage effect in mitigating market power.

In sum, our empirical analysis allows us to conclude that, given the market structure of the Spanish electricity market, FiTs led to more efficient wholesale market outcomes than FiPs. These results shed light on the current debate about renewables' regulation in electricity markets, but more broadly, they uncover the mechanisms giving rise or avoiding price discrimination as a tool for market power in sequential markets, and vice-versa.

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