

# The hidden financial costs of intermittent power generation

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## Abstract

We investigate the hidden financial costs of the increase in the share of intermittent renewable power generation in the electricity production mix. Because electricity can not be stored, the prices of the electricity futures contracts that enable industry participants to hedge against potentially large variations in spot prices can not be determined by arbitrage.

We develop a model in which electricity retailers buy electricity from conventional and intermittent power generators to match final demand. At equilibrium, futures prices encompass a risk premium which sign and magnitude depend on the market participants' risk exposures.

We structurally estimate the parameters of the model using intraday limit order book data on the German/Austrian electricity day-ahead and futures markets (2013-2018). This enables us to propose a counterfactual analysis in which we vary the characteristics of the distribution of intermittent power generation. Our simulations suggest that an increase in the share of intermittent renewable power generation or its volatility raise non-diversifiable risks, resulting in an increase in the risk premium.

JEL classification: **G12, G23**

Keywords: electricity futures, risk premium, asset pricing, renewable energy