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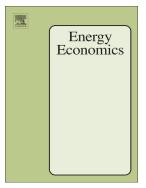
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Uncovering the nonlinear predictive causality between natural gas and electricity prices

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Abstract

We measure the directional predictability between electricity and natural gas prices at different quantiles of their respective price distributions. This reveals significant nonlinearities in the relationship that characterizes the interconnected gas and electricity markets of both New England and Pennsylvania-New Jersey-Maryland. We identify a double causality from gas to electricity and vice versa, which increases as their respective market prices rise. In general, this causality is decidedly higher for both price sets at market values at and above their median. The feedback effect from electricity to gas is stronger in the case of New England – where 50% of the power generation mix comprises natural-gas-fired plants – than it is in the case of Pennsylvania-New Jersey-Maryland – where only 24% of the generation mix relies on natural gas sources.

Keywords: Natural gas; Electricity; Directional predictability; Quantiles; Cross-quantilogram.

JEL Codes: Q40, L94, L95, C22.

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