

[Renewable Energy Supply Shocks from Wind Electricity](#)

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This paper adds to the literature on macroeconomic effects of energy price increases by developing a supply shock to electricity prices to study their impact compared to fossil fuels. Advanced economies are undergoing a fundamental energy transition that shifts economic activity from fossil fuels toward electricity through widespread electrification. While the supply shock literature has focused primarily on transport disruptions and fossil fuels, electricity supply shocks may operate through different mechanisms.

To identify exogenous changes in electricity prices, the paper constructs electricity supply shocks from wind speeds at wind farms. With near-zero marginal costs, wind and other renewable generation is used first to satisfy electricity demand, such that changes in wind output shift the entire electricity supply curve. To isolate supply-relevant variation, the shocks weight regional wind by installed capacity and control for demand patterns using seasonal effects and wind in non-generating regions.

Wind electricity supply shocks provide strong instruments for wholesale electricity price changes in a panel of European countries. Using local projections exploiting mostly cross-sectional variation, I estimate the dynamic impact of wholesale electricity price changes on macroeconomic variables.

Results show significant passthrough from wholesale electricity to both energy and non-energy prices. More surprisingly, macroeconomic activity effects do not follow classic supply shock predictions. While unemployment rises and electricity consumption falls, industrial production increases at longer horizons rather than decreasing, and GDP remains largely unaffected. These effects are driven by smaller price changes and not explained by the recent energy crisis.

Structural differences between electricity and fuels in pricing geography, retail passthrough, and storability translate into different macroeconomic effects. While initial price impacts are similar, electricity price increases have different implications for economic activity, highlighting how the energy transition will alter business cycle dynamics.