The increase in **renewable energy** generation expectations **reduces supply elasticity and increases price variations**. In turn, higher **demand** expectations **produce the opposite effect** by absorbing price shocks

The impact of market expectations on supply elasticity and price volatility in the German-Austrian day-ahead electricity market

INTRO

- The characteristics of the electricity market make it more responsive to price variations.
- Greater price variations imply a higher risk for market participants.

AIM

- Find how expected variable renewable energy (VRE) and demand impact the day-ahead supply elasticity and, ultimately, make the wholesale price vary.

METHODS

- Compute the German-Austrian hourly supply elasticities between 2011 and 2018 (two main elasticities).
- Fixed effect model to estimate the impact of hourly VRE expected production and demand on elasticities.
- Compute the realized daily variance of log returns.
- Fixed effect model to estimate the impact of elasticities on realized variance.

RESULTS

- The relation between VRE and elasticities is negative and statistically significant.
- The link between expected demand and hourly elasticities is positive and statistically significant.
- A 1% increase in the inflexible elasticity of the curve reduces realized volatility by a greater amount than the same increase for the peak elasticity.

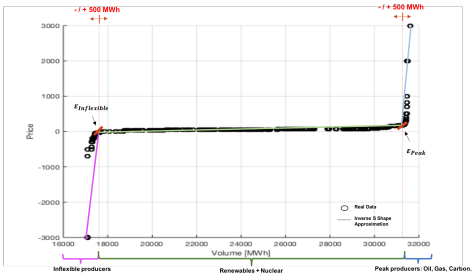
DISCUSSION

- The increase in VRE can decrease the efficiency of the electricity market by raising the price risk of market participants.
- The anticipation of demand absorbs price shocks and enhances market efficiency.
- It is essential to understand the drivers that affect supply elasticity due to their policy and investment implications.

TABLE – Elasticity estimates on daily realized variance

	RDVar All hours
Inflexible Elasticity	**-75.53*** **(16.57)**
Peak Elasticity	**-7.335*** **(2.138)**
Control variables	Yes
Time dummies	Yes
Fixed effects	Yes
Observations	42144

Driscoll-Kraay standard errors are in parentheses.
* $p<0.1$, ** $p<0.05$, *** $p<0.01$



$$\varepsilon_{Inflexible\{h,t\}} = \alpha_h + \beta_1 E[demand]_{\{h,t\}} + \beta_2 E[wind]_{\{h,t\}} + \beta_3 E[solar]_{\{h,t\}} + \beta_{4\dots x} \boldsymbol{X}'_{t-1} + \beta_{5\dots x} \boldsymbol{F}'_t + \upsilon_{\{h,t\}}$$

$$\varepsilon_{peak\{h,t\}} = \alpha_h + \beta_1 E[demand]_{\{h,t\}} + \beta_2 E[wind]_{\{h,t\}} + \beta_3 E[solar]_{\{h,t\}} + \beta_{4\dots x} \boldsymbol{X}'_{t-1} + \beta_{5\dots x} \boldsymbol{F}'_t + \upsilon_{\{h,t\}}$$

$$Realized\ Variance_{\{t\}} = \sum_{k=1}^{24} r_k^2$$

$$Realized\ Variance_{\{t\}} = \alpha_h + \beta_1 \varepsilon_{inflexible\{h,t\}} + \beta_2 \varepsilon_{peak\{h,t\}} + \beta_{3\dots x} \boldsymbol{X}'_{t-1} + \beta_{5\dots x} \boldsymbol{F}'_t + \upsilon_{\{h,t\}}$$

TABLE – Expected VRE and demand estimates on supply elasticities. Dependent variables : inflexible producers' elasticity and peak producers' elasticity

	Inflexible elasticity	Peak elasticity
Lag demand in TWh	**0.145*** **(0.0240)**	**0.164*** **(0.0833)**
Wind forecast in TWh	**-0.375*** **(0.0174)**	**-1.032*** **(0.0596)**
Solar forecast in TWh	**-0.320*** **(0.0231)**	**-0.286*** **(0.0995)**
Control variables	Yes	Yes
Time dummies	Yes	Yes
Fixed effects	Yes	Yes
Observations	42384	42384

Driscoll-Kraay standard errors are in parentheses.
* $p<0.1$, ** $p<0.05$, *** $p<0.01$

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