Trophy Hunting vs. Manufacturing Energy: The Price-Responsiveness of Shale Gas

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Is shale gas supply more price responsive?

1. “Why shale plays really are different”, John Kemp, Reuters
2. Rob Jacobs, Caird Energy, personal communication
3. “BP acknowledges U.S. shale is different”, John Kemp, Reuters
4. “Shale: a Guide to Tailoring Legislation, SPAs, Farm-in Agreements and JOAs in Developing Unconventional Basins”, Humphrey Douglas
Is shale gas supply more price responsive?

Conventional

- “... a small number of highly productive holes”¹
- “finding a needle in a haystack”¹
- “Big game trophy hunting”²

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²Rob Jacobs, Caird Energy, personal communication
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Is shale gas supply more price responsive?

**Conventional**

- “... a small number of highly productive holes”
- “finding a needle in a haystack”
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**Unconventional**

- “like a manufacturing process”
- “gas [is] much more widely distributed”
- “far more predictable and less variable”
- “High initial production”

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Why do we care?

Gas price volatility affects...

- Reliance on gas-fired electricity
- Clean Power Plan costs
- LNG exports
- Energy-intensive manufacturing
Method

Data

- \( \sim 62,000 \) Texas gas wells from Drillinginfo, 2000-2015

Break analysis into 3 stages of gas production:

1. **Drilling (“Spudding”) Activity**
   - IV regressions of time series of drilling activity
   - Important margin for price response, \( \sim 0.7 \) elasticity

2. **Spud-to-Completion Time**
   - Survival time models
   - Small price effect
   - Shale wells take nearly 2x longer

3. **Time Profile of Gas Production from Operating Wells**
   - Fixed effect regressions of time profiles of gas production
   - Negligible price effect
   - Shale wells produce \( \sim 3x \) as much gas

Then combine 3 models into a single simulation
Drilling Supply Elasticity: Time Series IV Regressions

Estimated elasticity $\sim 0.7$, similar for shale & conventional

Newell, Prest, Vissing
Price-Responsiveness of Shale Gas
Economically small price relationship.
Economically negligible price relationship.
Simulation: Combining all 3 stages

Percent Change in Total Gas Produced

Months Since Price Shock

Time-varying elasticity

Unconventional

Conventional

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Price-Responsiveness of Shale Gas
Shale gas estimated to be \( \sim 3x \) as responsive as conventional due to higher productivity.

Completion times and time profiles are crucial to supply response dynamics.
Thanks!