

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

²Rob 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

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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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Conventional

- “... a small number of highly productive holes”¹
- “finding a needle in a haystack”¹
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Unconventional

- “like a manufacturing process”¹
- “gas [is] much more widely distributed”³
- “far more predictable and less variable”¹
- “High initial production”⁴

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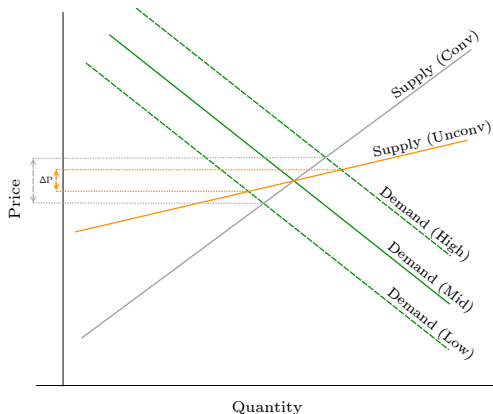
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Why do we care?

Gas price volatility affects...

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



Data

- ~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, ~ 0.7 elasticity

2 Spud-to-Completion Time

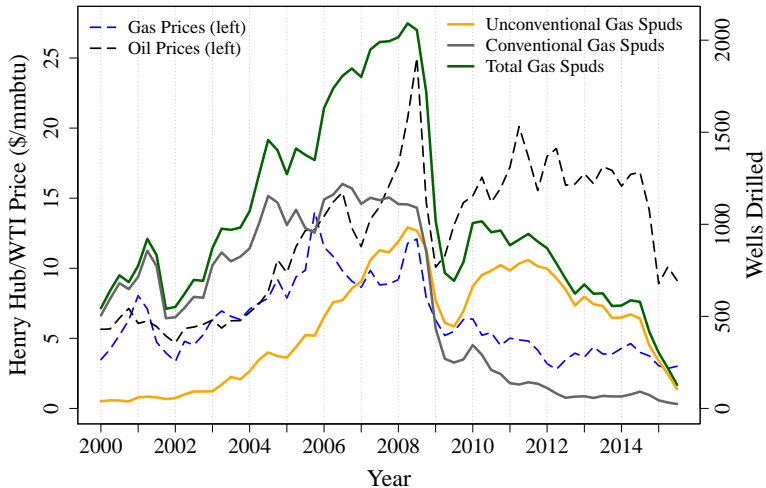
- Survival time models
- Small price effect
- Shale wells take nearly 2x longer

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

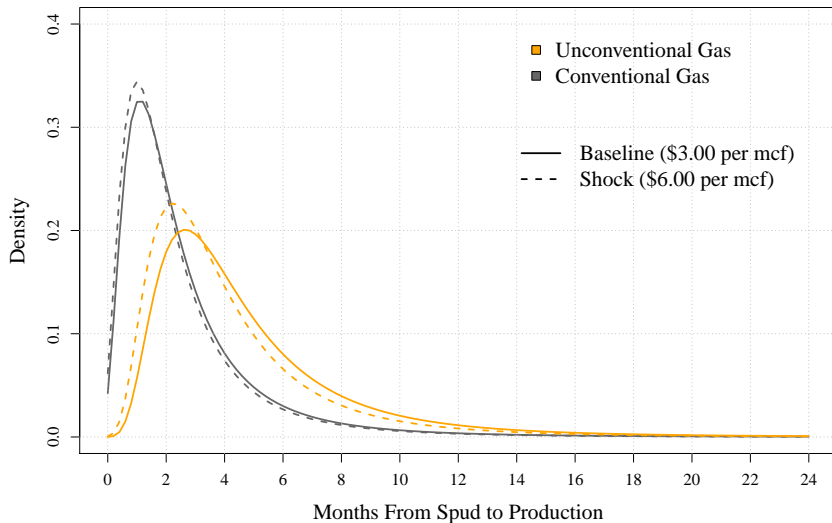
Then combine 3 models into a single simulation

Drilling Supply Elasticity: Time Series IV Regressions



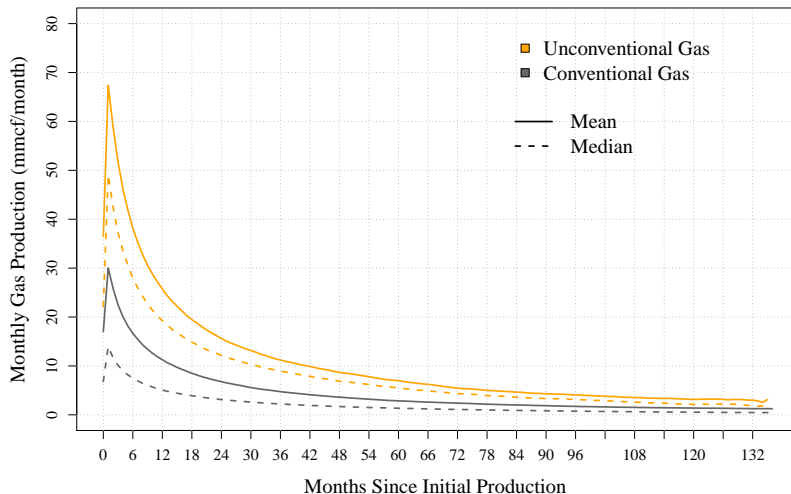
Estimated elasticity ~ 0.7 , similar for shale & conventional

Spud-to-Completion Times: Survival Time Models



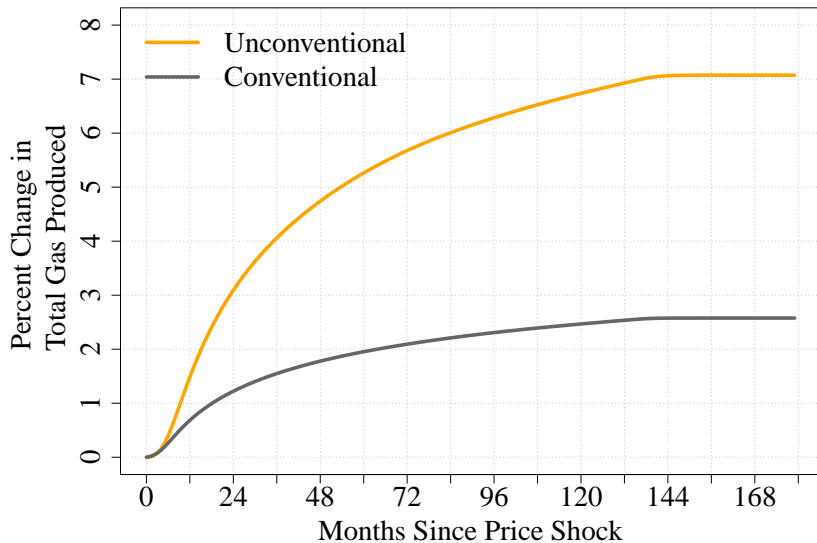
Economically small price relationship.

Time Profile of Gas Production: Panel Data, Fixed Effects



Economically negligible price relationship.

Simulation: Combining all 3 stages



Time-varying elasticity

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!