Market Power in Eastern Australia’s Natural Gas Market

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The Eastern Australian Gas Network
There are three large bidders with market power.
Large bidders are vertically integrated

- Vertically integrated companies:
  - **supply side:** inject gas to hub via contracts with upstream producers
  - **demand side:** withdraw gas from hub on behalf of retail customers

- Use of market power depends on *net* position:
  - **net sellers** want to raise the price
  - **net buyers** want to lower the price
Origin Energy Bids in Victoria, Aug 20, 2018

![Graph showing Origin Energy Bid Net Supply, Vic with a Net Supply Bid at 200.](image-url)
Origin Energy Bids in Victoria, Aug 20, 2018
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Graph showing the Origin Energy Bid Net Supply, Vic with price on the y-axis and Origin Energy Bid Net Supply, Vic on the x-axis. The graph includes a line for Withdrawals and another for Net Supply Bid.
Findings: Market power has unexpected implications

In a simple model of the Australian gas auctions:

- Prices are the same as competitive levels
- Volumes traded are less than competitive levels
- Oligopolists are worse off than competitive firms
Supply Function equilibrium:
- Klemperer and Meyer (1989)

Vertical Integration and Market Power in electricity:
- Kuhn and Muchado (2004 WP)
- Mansur (2008)
- Bushnell, Mansur & Saravia (2008)
Simplifying assumptions

- Network with two nodes

- Three large firms with identical costs
  - Gas Production Cost: linear marginal cost
  - Transport Cost: constant per unit transported

- Withdrawals by retail customers a random variable, not identical between firms.

- Firm knows its own withdrawals, it does not know its rivals’.
Equilibrium
Equilibrium
Equilibrium
Equilibrium

Bidder 1

Bidder 2

Bidder 3
Equilibrium
Equilibrium
Equilibrium

Bidder 1

Bidder 2

Bidder 3

ω₁

ω₂

ω₃
Is there evidence of market power?

Model predicts that bidders with market power shift their bids outward when retail customers withdraw more.

- data on 2018 bids is consistent with this.
- Intercept of linear fitted bids negatively related to total uncontrolled withdrawals.
Conclusions

- Under my assumptions, the equilibrium price generated by bidders with market power is the same as for competitive bidders. The market power of net sellers offsets that of net buyers.

- But oligopolistic bidders trade smaller volumes and leave gains-from-trade on the table, causing a welfare loss.

- Data is consistent with predictions that bids should shift outward when retail customer demand is higher.
Future Research

Model Extensions:
- Competitive Fringe
- Minimum Injection Levels
- Extended Network
- Congestion
- Asymmetric Bidders
- Storage

Policy Questions:
- How does congestion affect competition?

The AEMC has recommended consolidating to two hubs to improve liquidity. Will this also improve competition?
How well does this model fit the Australian market?

Model predictions for bidders with market power:

1. Slope of bid depends on marginal cost and number of bidders
   - neither marginal cost nor number of bidders changes over time
   - but slope of 2018 bids appears to change throughout the year
   - may need to consider competitive fringe, storage, capacity constraints
How well does this model fit the Australian market?

Model also predicts that the price difference should equal the transport costs.

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