The Competitive Effects of Common Ownership: We Know Less than We Think

Dan O’Brien and Keith Waehrer

June 30, 2017
Background

• Talk is based on three papers
  - “The Competitive Effects of Common Ownership: We Know Less Than We Think” (O’Brien and Waehrer, 2017)
  - “Price-Concentration Analysis: Ending the Myth and Moving Forward” (O’Brien, in progress)
Outline

- Common ownership by institutional investors
- Recent empirical research on common ownership
- Problems with the research
- Specifications motivated by oligopoly theory
- Preliminary empirical results from the airline industry
Common ownership by institutional investors
The Main Issue

- Institutional investors own a large fraction of public stock (70+%)
- **Obvious Benefit:** Allows retail investors to diversify at low cost
- **Possible Concern:**
  - Many institutions own multiple competitors in an industry – “common ownership”
  - If a common owner has “control” or “influence” over at least one firm, the owner **might** have an incentive to instruct a firm behave less competitively to increase the profits of another commonly owned firm
- The **if** and the **might** are important
  - Most institutional ownership involves minority positions that do not obviously allow them to influence managers’ decisions
  - Even with influence, a common owner does not obviously benefit from inducing anticompetitive actions
Economics of Common Ownership

• Purpose of our work is to address the possible harm side of the ledger
• For this, we need an economic framework
• Under common ownership, owners may have divergent interests
  ▪ Common owners may want a firm to behave less competitively than non-common owners
• How do we think about pricing in this context?
Economics of Common Ownership – A Framework


  Firm $j$'s Objective:  
  \[ \pi_j(y, X) + \sum_{k \neq j} C_{jk} \pi_k(y, X) \]

  $\pi_j$ is firm $j$’s profit  
  $y = (y_1, ..., y_N)$ is a vector of choice variables (price or quantity)  
  $X$ is a vector of exogenous cost and demand factors  
  $C_{jk} = \frac{\sum_i \gamma_{ij} \beta_{ik}}{\sum_i \gamma_{ij} \beta_{ij}}$ is a “common ownership incentive term”  
  $\beta_{ik}$ is owner $i$’s ownership share of firm $k$  
  $\gamma_{ik}$ is owner $i$’s “control weight.”

• Model predicts “reduced form”:  
  \[ y = f(X, C) \]  
  where $C = (C_{jk})$ is a matrix of common ownership incentive terms.

• **One empirical strategy:** Estimate the reduced form under different assumptions about control
• First Order Conditions (Under Bertrand Oligopoly)

\[ p = mc + \begin{bmatrix} \frac{\partial D_1}{\partial P_1} & C_{12} \frac{\partial D_2}{\partial P_1} & \cdots & C_{1N} \frac{\partial D_N}{\partial P_1} \\ C_{21} \frac{\partial D_1}{\partial P_2} & \frac{\partial D_2}{\partial P_2} & \cdots & C_{2N} \frac{\partial D_N}{\partial P_2} \\ \vdots & \vdots & \ddots & \vdots \\ C_{N1} \frac{\partial D_1}{\partial P_N} & C_{N2} \frac{\partial D_N}{\partial P_2} & \cdots & \frac{\partial D_N}{\partial P_N} \end{bmatrix}^{-1} \begin{bmatrix} -D_1 \\ \vdots \\ -D_N \end{bmatrix} \]

• Model yields structural equations:

\[ D_j = g^D(p, X), \quad j = 1, \ldots, N \]  
(Demand equations)

\[ p_j = g^p(p, X, C_j), \quad j = 1, \ldots, N \]  
(First order conditions)

where \( C_j = (C_{j1}, C_{j2}, \ldots, C_{jN}) \)

• Another empirical strategy: Estimate this system
When is Common Ownership “Bad”?  

Firm $j$’s Objective: $\pi_j(y, X) + \sum_{k \neq j} C_{jk} \pi_k(y, X)$

- Common ownership is “bad” if one or more common ownership incentive terms $C_{jk}$ are positive, other factors equal
  - $C_{jk}$ is positive if one or more owners with shares in $j$ and $k$ have influence over the competitive strategy of the manager of firm $k$
  - A complete merger is a special case where $C_{jk} = C_{kj} = 1$ for merging firms $j$ and $k$.
- Do minority shareholdings yield positive values of the common ownership incentive terms?
  - Do institutional investors have incentives to cause managers to behave this way?
  - Do managers have incentives to behave this way?
- These are empirical questions
Recent empirical research
Airline and Banking Papers

- Azar, Schmalz, & Tecu (2017) (“airline paper”)
- Azar, Raina, & Schmalz (2016) (“banking paper”)
- They estimate the following:

\[ p = f^M(X, MHHI) \] (banking paper)

\[ p = f^{MD}(X, HHI, MHHID) \] (airline paper)

where

\[ HHI = \sum_j s_j^2 \]

\[ MHHID = \sum_j \sum_{k \neq j} C_{jk} s_j s_k \] (“proportional control” \( C_{jk} \) terms)

\[ MHHI = HHI + MHHID \]
Problems with the Recent Research
Issues with the Airline and Banking Paper Specifications

- HHI, MHHI, and MHHID depend on market shares, which are endogenous
- The MHHI and MHHID depend on common ownership incentive terms, which might also be endogenous
- But one could instrument for concentration, right?
- Yes, one could. But it wouldn’t solve the problem
- Why not?
  - Empirical endogeneity is not the core issue
- The core issue:
  - \( p = f^M(X, MHHI) \) and \( p = f^{MD}(X, HHI, MHHID) \) do not exist over typical oligopoly domains
    - They are not implications of oligopoly theory
- What do the coefficients that represent \( \frac{\partial p}{\partial MHHI} \) and \( \frac{\partial p}{\partial MHHID} \) mean?
Relationship Between Price and Concentration

- MHHI and MHHID are effects, not causes
- The “reduced form” yields

\[ p = f(X, C) \]
\[ MHHI = h^M(X, C) \]
\[ MHHID = h^{MD}(X, C) \]

- Relationship between price, MHHI, and MHHID is a parametric one
- Q. Is there a relationship between price and the concentration indices that reflects the relationship between price and common ownership?
Price-Concentration Relation has Ambiguous Comparative Statics

- Dominant firm (firm 1) faces inelastic fringe
- Controlling owner of firm 1 purchase non-controlling share $C$ of each fringe firm
  - $MHHID = C s_1 (1 - s_1)$
  - What is $\frac{\partial p}{\partial MHHID}$?
  - NO PREDICTION
Price-Concentration Relation has Ambiguous Comparative Statics

- Two Cournot players with different marginal costs
- Common ownership incentive terms, $C_{12}$ and $C_{21}$.
- $MHHI = s_1^2 + s_2^2 + (C_{12} + C_{21})s_1s_2$
- What is $\frac{\partial p}{\partial MHHI}$?
- NO PREDICTION

Assumptions: Inverse demand $P = 1 - q_1 - q_2$. Marginal costs are $v_1 = .1$ and $v_2 = .2$. The same pattern emerges under more general circumstances.
False Positives and False Negatives

- Suppose common ownership carries no control
- **Experiment 1**: A demand increase raises firm 1’s share and price
- **Experiment 2**: A cost reduction raises firm 1’s share and lowers price
- Experiments cause ambiguous change in concentration and yield ambiguous price/concentration relationship
  \[ \implies \text{NO PREDICTION} \]
- Experiments generate “false positives” and “false negatives”

Assumptions: Symmetric common ownership incentive terms; 3 firms; firms 2 and 3 are symmetric. The same pattern emerges under more general circumstances.
More on False Positives

• Simplified relations without covariates:

  Airline Paper (Simplified): \[ P = \alpha_1 H + \alpha_2 M_D + u \]  
  True Reduced Form (Simplified): \[ P = \alpha C + u \]  

• Suppose common ownership carries no control.
• Then \( \alpha = 0 \)
• However, estimating (1) assuming some control yields:

  \[ \alpha_2 : \ K[-Cov(H, M_D)Cov(H, u) + Var(H)Cov(M_D, u)] \]

• Bias turns on the covariance terms, the sign of which depend on the data experiment (generally, the data generation process)
Price-concentration regressions are not useful for causal inference
Empirical Specifications
Motivated by Oligopoly Theory
"Reduce-form" and Structural Models

- **Reduced form**: \( p = X\theta + \lambda h(C) + \epsilon \)
  - Use different common ownership indices for \( h(C) \).

- **Structural model**: Nested logit with common ownership

\[
p = mc + \begin{bmatrix}
\frac{\partial D_1}{\partial P_1} & \tau C_{12} \frac{\partial D_1}{\partial P_1} & \cdots & \tau C_{1N} \frac{\partial D_1}{\partial P_1} \\
\tau C_{21} \frac{\partial D_1}{\partial P_2} & \frac{\partial D_2}{\partial P_2} & \cdots & \tau C_{2N} \frac{\partial D_2}{\partial P_1} \\
\vdots & \vdots & \ddots & \vdots \\
\tau C_{N1} \frac{\partial D_1}{\partial P_N} & \tau C_{N2} \frac{\partial D_2}{\partial P_2} & \cdots & \frac{\partial D_N}{\partial P_N}
\end{bmatrix} \begin{bmatrix}
-D_1 \\
-D_2 \\
\vdots \\
-D_N
\end{bmatrix}
\]

- Estimate the scaling factor \( \tau \).
Preliminary Empirical Results From the Airline Industry
## Replication of Airline Paper

<table>
<thead>
<tr>
<th></th>
<th>Azar, Schmalz &amp; Tecu (2017)</th>
<th>Replication</th>
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<tr>
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<td>Non-stop SW</td>
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<td>-0.12***</td>
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<td>Non-stop LCC</td>
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<td>Share Connect mkt-carrier</td>
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*** significant at 1% level;
### Effect of Common Ownership on Price - Reduced Form Estimates

#### Panel Regressions

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<td>0.133***</td>
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<td>-0.012***</td>
<td>-0.012***</td>
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<td>-0.061**</td>
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<td>Non-stop carriers</td>
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<td>0.071***</td>
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<td>ln (Population)</td>
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<td>0.288</td>
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<td>0.260</td>
<td>0.403**</td>
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#### Instrumental Variables Regressions

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*** significant at 1% level;
## Effect of Common Ownership on Price – Structural Model

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<td>Demand</td>
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<td>-1.19* (0.10)</td>
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<td>—</td>
<td>0.83* (0.01)</td>
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* Significant at 1% level; standard errors are reported in parentheses

Note: The models are estimated using a subset of the data that includes geographic markets with at least 2 million population and the 2011-2014 period.
Conclusions

- Recent empirical research purports to show that common ownership by institutional investors raises prices
- Research is based on ungrounded specifications that may create spurious correlations between price and common ownership
  - O’Brien and Waehrer (2017) describe the issues
  - O’Brien (in progress) provides a general analysis of problems with price-concentration regressions
- Kennedy, O’Brien, Song, and Waehrer (2017) test for the effects of common ownership in the airline industry using empirical specifications consistent with oligopoly theory
- Preliminary findings do not support the claim that common ownership raises airline prices
  - More work to do