Mergers, Entry, and Consumer Welfare

Peter Caradonna\textsuperscript{1}    Nathan Miller\textsuperscript{1}    Gloria Sheu\textsuperscript{2}

\textsuperscript{1}Georgetown University
\textsuperscript{2}Federal Reserve Board

The analysis and conclusions set forth are those of the authors and do not indicate concurrence by other members of the Board research staff or the Board of Governors.

Spring 2020
Horizontal Mergers

Increase market power
Create efficiencies
Spur entry
When does entry eliminate the adverse effects of an otherwise anti-competitive merger?

• More nuanced than: “when entry barriers are low.”
• It depends on the capabilities of prospective entrants, the efficiencies of the merger, and entry barriers.
• We provide a unified framework.
Plan for the Talk

- Mostly graphical analysis. Convey intuition.
- Market with 4 incumbents and one prospective entrant. Bertrand competition and logit demand.
- Some generalization is possible.
- Some results have been proved, others in progress.
For the Theorists:

Agents: Incumbents \((f = 1, \ldots, F - 1)\) and an outsider \((f = F)\).

Differentiated products (logit) and constant marginal costs.

The agents play the following three-stage game:

1. Two incumbents decide whether to merge (possibly with efficiencies).
2. An outsider decides whether to enter the market.
3. All firms in the market compete in prices à la Bertrand and earn profit.

Examine SPE with merger-induced entry. Apply the Nocke-Schutz (2018 ECMA) \textit{type-aggregation} representation of the model.
Five Main Results

1. Entry alone does not mitigate adverse effects.
2. Mergers and efficiencies (together) can eliminate consumer surplus loss.
3. Requires particular combinations of efficiencies and entry.
4. The profit opportunity for entrants is small.
5. Difficult to determine whether entry will occur.
Entrant Type

Merger Efficiency

Entrant Type
Indices of Neutrality

- Increases Consumer Surplus

- Consumer Surplus
“Compensating Efficiency” (Werden [1996]; Froeb and Werden [1998]; Nocke and Whinston [2020])

Indices of Neutrality

Increases Consumer Surplus

Consumer Surplus

Entrant Type

Merger Efficiency

$e^*$
“Compensating Efficiency”
Werden [1996]; Froeb and Werden [1998]; Nocke and Whinston [2020]

“Compensating Entrant”
Sufficient to Preserve Consumer Surplus
Entrant Type
Merger Efficiency
Profitable Merger
Indices of Neutrality
Merger Profitability

Indices of Neutrality
- Profitable Merger
- Merger Profitability

Entrant Type
Merger Efficiency

Caradonna, Sheu, and Miller

Mergers and Entry
"Best-Case Entrant"
Merger is Profit-Neutral (without efficiencies)

Indices of Neutrality
- Profitable Merger
- Merger Profitability
Indices of Neutrality

- Merger Profitability
- Consumer Surplus

Pro-Competitive and Profitable Merger
Important Result:

\[ a < b \]

(without efficiencies)
Best-Case Entry Is Insufficient

**Theorem:** In any SPE featuring merger without efficiencies, consumer surplus is lower than in a counterfactual without merger.
Best-Case Entry Is Insufficient

**Theorem:** In any SPE featuring merger without efficiencies, consumer surplus is lower than in a counterfactual without merger.

- Holds with Bertrand logit.
- Holds with Bertrand nested logit if entrant is in the same nest.
- Holds with Bertrand nested logit if entry is in a different nest, so long as the nesting parameter is not too large (proof in progress).
- Probably mostly true: holds in narrow antitrust markets.
- Holds with Cournot and arbitrary cost functions (Spector [2003]).

(Aside: no post-merger entry in efficient procurement auction models.)
Best-Case Entry Is Insufficient

**Theorem:** In any SPE featuring merger without efficiencies, consumer surplus is lower than in a counterfactual without merger.

- Holds with Bertrand logit.
- Holds with Bertrand nested logit if entrant is in same nest.
Best-Case Entry Is Insufficient

**Theorem:** In any SPE featuring merger without efficiencies, consumer surplus is lower than in a counterfactual without merger.

- Holds with Bertrand logit.
- Holds with Bertrand nested logit if entrant is in same nest.
- Holds with Bertrand nested logit if entry is in different nest, so long as nesting parameter not too large (proof in progress).
Best-Case Entry Is Insufficient

**Theorem:** In any SPE featuring merger without efficiencies, consumer surplus is lower than in a counterfactual without merger.

- Holds with Bertrand logit.
- Holds with Bertrand nested logit if entrant is in same nest.
- Holds with Bertrand nested logit if entry is in different nest, so long as nesting parameter not too large (proof in progress).
- Probably mostly true: holds in narrow antitrust markets.

(Aside: no post-merger entry in efficient procurement auction models.)
Best-Case Entry Is Insufficient

**Theorem:** In any SPE featuring merger without efficiencies, consumer surplus is lower than in a counterfactual without merger.

- Holds with Bertrand logit.
- Holds with Bertrand nested logit if entrant is in same nest.
- Holds with Bertrand nested logit if entry is in different nest, so long as nesting parameter not too large (proof in progress).
- Probably mostly true: holds in narrow antitrust markets.
- Holds with Cournot and arbitrary cost functions (Spector [2003]).
Best-Case Entry Is Insufficient

**Theorem:** In any SPE featuring merger without efficiencies, consumer surplus is lower than in a counterfactual without merger.

- Holds with Bertrand logit.
- Holds with Bertrand nested logit if entrant is in same nest.
- Holds with Bertrand nested logit if entry is in different nest, so long as nesting parameter not too large (proof in progress).
- Probably mostly true: holds in narrow antitrust markets.
- Holds with Cournot and arbitrary cost functions (Spector [2003]).
- (Aside: no post-merger entry in efficient procurement auction models.)
Best-Case Entry Mitigates Price Increases?
Best-Case Entry Mitigates Price Increases?
Back on Track: Entry and Efficiencies

Indices of Neutrality

- Merger Profitability
- Consumer Surplus

Pro-Competitive and Profitable Merger
Entrant Type
Merger Efficiency
Pro-Competitive Merger
Lines
Profit Neutrality
Consumer Neutrality
Lower Efficiency Bound

Caradonna, Sheu, and Miller
Mergers and Entry
"Minimum Efficiencies" Required for Consumer Gain (Requires Specific Entrant)
What About the Entrant’s Profit?

![Graph showing Indices of Neutrality and Pro-Competitive and Profitable Merger]

- **Indices of Neutrality**
  - Merger Profitability
  - Consumer Surplus

- **Pro-Competitive and Profitable Merger**

Entrant Type

Merger Efficiency

Entrant Type: a, b, c, d

Caradonna, Sheu, and Miller

Mergers and Entry
Entrant Type

Merger Efficiency

Anti–Competitive Efficiencies?
Pro–Competitive Merger
Indices of Neutrality
Merger Profitability
Consumer Surplus
Entrant Profitability

Indices of Neutrality

Caradonna, Sheu, and Miller
Mergers and Entry
Five Main Results

1. Entry alone does not mitigate adverse effects.
2. Mergers and efficiencies (together) can eliminate adverse effects.
3. Requires particular combinations of efficiencies and entry.
4. The profit opportunity for entrants is small.
5. Difficult to determine whether entry will occur.
Five Main Results

1. Entry alone does not mitigate adverse effects.
2. Mergers and efficiencies (together) can eliminate adverse effects.
3. Requires particular combinations of efficiencies and entry.
4. The profit opportunity for entrants is small.
5. Difficult to determine whether entry will occur.
Entrant Profitability (No Efficiencies)

Entrant Profit

Entrant Type

Pre-Merger
Entrant Profitability (No Efficiencies)

Entrant Profit

Pre−Merger
Post−Merger

Caradonna, Sheu, and Miller Mergers and Entry
About 10% Higher (Variable) Profit
About 10% Higher (Variable) Profit

With Lower-Bound Efficiencies, Even Smaller Profit Opportunity: 0%-5%
With these entry costs, get entry before the merger.
With these entry costs, no entry.
Leads to Merger-Induced Entry

Entrant Profitability (No Efficiencies)

- Pre-Merger
- Post-Merger
Suppose entrant’s (variable) profit increases from $100 to $103. Let entry cost (EC) be $500, fixed cost (FC) be $51, $\delta = 0.90$. $\Psi(TF) = (1 - \delta)EC(TF) + FC(TF) = $101. Merger-induced entry is profitable. With efficiencies might be sufficient.

But if $\delta = 0.85$ then $\Psi(TF) =$ $126, and entry does not occur. Even if entry seems feasible, the “confidence interval” for predictions will probably incorporate the possibility (or probability?) of no merger-induced entry.
Suppose entrant’s (variable) profit increases from $100 to $103.

Let entry cost (EC) be $500, fixed cost (FC) be $51, \( \delta = 0.90 \).

\[ \Psi(TF) = (1 - \delta) EC(TF) + FC(TF) = $101. \]

Merger-induced entry is profitable. With efficiencies might be sufficient.

But if \( \delta = 0.85 \) then \( \Psi(TF) = $126 \), and entry does not occur.

Even if entry seems feasible, the “confidence interval” for predictions will probably incorporate the possibility (or probability?) of no merger-induced entry.
Suppose entrant’s (variable) profit increases from $100 to $103.

Let entry cost (EC) be $500, fixed cost (FC) be $51, $\delta = 0.90$.

$$\Psi(T^F) = (1 - \delta)EC(T^F) + FC(T^F) = $101.$$  

Merger-induced entry is profitable. With efficiencies might be sufficient.
Suppose entrant’s (variable) profit increases from $100 to $103.

Let entry cost (EC) be $500, fixed cost (FC) be $51, $\delta = 0.90$.

$$\Psi(T^F) = (1 - \delta)EC(T^F) + FC(T^F) = $101.$$ 

Merger-induced entry is profitable. With efficiencies might be sufficient.

But if $\delta = 0.85$ then $\Psi(T^F) = $126, and entry does not occur.
Precision in Forecasting

1. Suppose entrant’s (variable) profit increases from $100 to $103.
2. Let entry cost (EC) be $500, fixed cost (FC) be $51, $\delta = 0.90$.

$$\Psi(T^F) = (1 - \delta)EC(T^F) + FC(T^F) = $101.$$ 

Merger-induced entry is profitable. With efficiencies might be sufficient.

3. But if $\delta = 0.85$ then $\Psi(T^F) =$126, and entry does not occur.

Even if entry seems feasible, the “confidence interval” for predictions will probably incorporate the possibility (or probability?) of no merger-induced entry.
Five Main Results

1. Entry alone does not mitigate adverse effects.
2. Mergers and efficiencies (together) can eliminate adverse effects.
3. Requires particular combinations of efficiencies and entry.
4. The profit opportunity for entrants is small.
5. Difficult to determine whether entry will occur.
When does entry eliminate the adverse effects of an otherwise anti-competitive merger?

- More nuanced than: “when entry barriers are low.”
- It depends on the capabilities of prospective entrants, the efficiencies of the merger, and entry barriers.
When does entry eliminate the adverse effects of an otherwise anti-competitive merger?

- More nuanced than: “when entry barriers are low.”
- It depends on the capabilities of prospective entrants, the efficiencies of the merger, and entry barriers.

Implications for Merger Review?
Thank You!
More Considerations

1. Perfect vs. imperfect information (fog of uncertainty).
2. Static Nash equilibrium vs. coordination.
3. Timing of entry: immediate vs. delayed.
4. Fixed cost efficiencies.
5. No divestitures.
Related Literature