Double marginalization and vertical integration

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Antitrust standards in European and US guidelines

Merger specificity of EDM

- EU V/HMG: *Efficiencies are relevant to the competitive assessment when they are a direct consequence of the merger*
- US VMG: *Do not reject merger specificity solely because it could theoretically be achieved but for the merger*

Passing-on to consumers

- EU V/HMG: Relevant benchmark in assessing efficiency claims: consumers will not be worse off as a result of merger
- US VMG
  - only concerned about “the likely cost saving to the merged firm”
  - never mention the benefits to direct (and/or final) customers
What we do

Develop a framework where

- DM is \textit{optimal} under sophisticated contracts
- EDM is merger-specific
- Effect of merger on consumers depends on the interaction of foreclosure and EDM
- Foreclosure of \textit{efficient} independent suppliers can harm or benefit consumers

Main research question
Under what circumstances do foreclosure effects harm consumers?
Ingredients

Asymmetric information

- Buyer does not know the suppliers’ costs
- Extension: Buyer’s private information

Bargaining under Asymmetric information
Loertscher and Marx’s framework

Buyer power (BP)

- Ability to choose trading partners [Selection]
- Ability to influence trading terms (price/quantity) [Production]
Preview of results

DM governed by bargaining over quantity/price

- Monopsony power to reduce quantity and informational rents
- Nonlinear pricing *can* eliminate DM but often *does not* in equilibrium

Vertical integration (VI) ⇒ “Customer foreclosure”

- **Efficient** independent suppliers deprived of access to final consumers
- With full buyer power for production, consumers always benefit from VI.
- But this Chicago-like result fails to hold as soon as the buyer has less bargaining power over production than selection (at least vis-à-vis one supplier).
Firms and consumers

Buyer $B$ dominant on downstream market

- Monopoly or competitive fringe (that uses another input)
- Revenue $R(q) = P(q)q - C(q)$
- Consumer surplus $S(q) = \int_0^q [P(x) - P(q)] \, dx$
- Monopoly quantity $q^m(c) = \arg \max_q R(q) - cq$
- Uses input in fixed-proportion (one to one) to produce output

Upstream suppliers $S_0, \ldots, S_n$

- Cost with $c_0, c_1, \ldots, c_n$ distributed according to $F_i$
Sequential timing

1. Monotonic selection of supplier(s) (Milgrom and Segal, 2020)
   - Supplier $i$ is selected, $x_i(c_0, \ldots, c_n) = 1$
   
   $$c_i < c_i' \implies x_i(c_i; c_{-i}) \geq x_i(c_i'; c_{-i})$$
   - Selection reveals minimum information on selected supplier (UWP)

2. Production stage: Determination of prices and quantities
Bargaining over prices and quantities

General mechanism \((Q_i(c), M_i(c))\)

- that maximizes weighted industry profit

\[
\mu^B \Pi_B(c) + \sum_i \mu^S_i U_i(c) = \mu^B \left[ \Pi_B(c) + \sum_i \frac{\mu^S_i}{\mu^B} U_i(c) \right]
\]

- As in Loertscher and Marx (2019), here with a single buyer
- No contractual restriction

Bargaining weights for prices and quantities

- \(\mu_i = 0\): Full buyer power for production
- As \(\mu_i\) rises, \(B\) finds it more difficult to reduce \(Q_i\)
Selection rule maximizes $\Pi_B(c) + \sum \lambda_i U_i(c)$

Parameters $\lambda_i$ and $\mu_i$ reflect bargaining conditions

- $\mu_i = \lambda_i$: no change in environment, simultaneous game
- $\mu_i \geq \lambda_i$: for large and complex project, contractor obtains leverage upon being awarded the contract
- $\mu_i \leq \lambda_i$: difficult to avoid $S_i$ at the selection stage

Monopsonistic buyer has more BP than all suppliers

- Baseline model: $\lambda_i < 1$ and $\mu_i < 1$ for any $i$.
- Extension with bilateral asymmetric information
Bargaining over price/quantity with selected suppliers

- Contract granted to supplier $i$ with lowest weighted virtual cost

\[ \psi_i(c_i; \mu_i) = c_i + (1 - \mu_i) F_i(c_i)/f_i(c_i) \]

- Bilaterally inefficient traded quantity, $q^m(\psi_i(c_i; \mu_i)) < q^m(c_i)$

- Exercise of monopsony power $\Rightarrow$ Double Marginalization

- Degree of DM decreases with supplier’s weight $\mu_i$
Supplier selection
After selection $B$ learns selected suppliers’ costs below thresholds

Selecting the supplier with the highest virtual profit

$$\pi^v_i = R(q^m(\Psi_i(c_i; \mu_i))) - \Psi_i(c_i; \lambda_i)q^m(\Psi_i(c_i; \mu_i))$$

- If $\lambda_i = \mu_i$ for all $i$, at given cost, decision biased in favor of most powerful supplier
- If $\lambda_i = 0$ for all $i$, decision biased against powerful suppliers
Implementation

Deferred acceptance auction and two-part tariffs

- Descending auction where suppliers are offered a less and less rich menu of two-part tariffs
- They can exit at any time
- The winner is the last active bidder
- He picks a tariff in the final menu
- Buyer chooses quantity given selected tariff

In equilibrium, a two-part tariff is observed

Wholesale price

\[ w(c_i) = \Psi_i(c_i; \mu_i) > c_i \]

... and there is double marginalization
Assumption: Merger between $B$ and $S_0$ causes $\mu_0$ to rise

$$\Pi^{VI} = \Pi_B(c) + \mu'_0 U_0(c) + \sum_{i \geq 1} \mu_i U_i(c)$$

- $\mu'_0 = 1$ makes it costless to extract information about $c_0$
- Imperfect internalization of profits within the integrated firm (Crawford et al. 2018): $\mu_0 < \mu'_0 = 1$
Main effects of merger with $S_0$

- **DM is eliminated** (or reduced) whenever $B$ purchases from $S_0$ pre-merger
- **Exploitation.** Conditional upon producing, an independent supplier sells the same quantity as pre-merger but earns a lower profit
- **Customer foreclosure.** After $S_0$ is vertically integrated, the independent suppliers are less likely to have access to downstream market
Effect of foreclosure on consumers

Post-merger make-or-buy rule aligned with consumers’ interests if and only if $\lambda_i \geq \mu_i$ for all $i > 0$

- True under one-stage bargaining: selection based on virtual costs, which drive quantities.
- Otherwise, $\Pi \left( q^m \left( \Psi_i(c_i; \mu_i^S) \right); \Psi_i(c_i; \lambda_i^S) \right) < \Pi^m(\Psi_i(c_i; \mu_i))$ implies too much foreclosure from the consumers’ perspective
Example: Buyer fully controls selection, $\lambda_i = 0$ for all suppliers

Symmetric environment

Figure 1: Effect of merger with $S_0$ on consumer surplus ($F_0 = F_1$, $\mu_0 = \mu_1$)
Profit-maximizing selection
Symmetric environment

Figure 2: Expected consumer harm increases with $\mu$. 

(a) Small supplier weight $\mu$

(b) Large supplier weight $\mu$
Conclusion

Exclusion of efficient suppliers never harms consumers if and only the buyer does not lose BP vis-à-vis any supplier after selection.

Antitrust enforcers should document

- How quantities are determined and **how suppliers are selected**
- Buyer’s ability to exclude suppliers and to impose quantity/price
Convex costs and multi-sourcing

Two symmetric suppliers with cost functions $c_i q_i + \alpha q_i^2$

If same BP for selection and production

- Both suppliers always selected pre- and post-merger
- VI always benefits consumers

If buyer controls only selection

- Separation: To minimize rents, $B$ doesn’t select $S_j$ with large $c_j$
- Vertical integration:
  - Foreclosure of efficient competitors harms consumers
  - New effect: VI corrects inefficient exclusion of $S_0$ pre-merger
Convex costs and multi-sourcing
Buyer controls only selection. Two symmetric suppliers with cost $c_i q_i + q_i^2$, $\lambda = 0, \mu = 1$

Figure 3: Multisourcing in OADB pre-merger and below EE' post-merger
Bilateral information
Buyer has private information about cost or demand

If buyer is dominant (as we assumed so far)
$B$’s private info plays no role

If a supplier is dominant ($\max \mu_i^S > \mu_B = 1$)
With same BP for selection and production, merger with that supplier
- benefits consumers
- eliminates DM due to $B$’s private information
Choice of merging partner

Under one-stage bargaining
Buyer prefers to integrate with less powerful supplier, keeping powerful supplier as an independent competitor

Under two-stage bargaining
Preferred choice of merging partner is ambiguous