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## **Why Event Studies Do Not Detect Anti-Competitive Mergers**

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## Abstract

Anticompetitive mergers increase competitors' profits, since they reduce competition. Using a model of endogenous mergers, we show that such mergers nevertheless may reduce the competitors' share-prices. Thus, event-studies can not detect anti-competitive mergers.

Key Words: mergers & acquisitions; event studies; antitrust; coalition formation.

JEL classification: L41; L12; G14; G34.

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# 1 Introduction

The most debated question about horizontal mergers is if they are motivated by market power or efficiency gains such as cost savings.

One strand of the empirical literature shows that prices tend to rise (Barton and Sherman, 1984; Kim and Singal, 1993), and that the merging firms' (insiders') market shares tend to fall as a result of horizontal mergers (Mueller, 1985). These studies indicate that increased market power dominates possible efficiency gains (from a consumer's perspective).

The event study literature suggest the opposite conclusion. The event studies examine how the competitors' (outsiders') share-prices move in response to the announcement of a horizontal merger. If share-prices increase, the merger is deemed anticompetitive. The reason is that an anticompetitive merger raises the product price, thereby increasing the outsiders' profits. Stillman (1983), Eckbo (1983) and Schumann (1993) show that competitors do not benefit from horizontal mergers. Banerjee and Eckard (1998) show that competitors suffered significant value losses.

McAfee and Williams (1988) use the event study approach to study a merger *known* to be anticompetitive, and show that outsiders' share-prices are nevertheless reduced. This finding casts doubts on event studies being able to detect anticompetitive mergers. McAfee and Williams argue that their result is likely due to the fact that the outsiders, in their sample, were large multi-product firms that derived only a small fraction of their revenues from the affected market.

We provide an additional explanation for why event studies fail to detect anticompetitive mergers. If it is more profitable to become an insider than an outsider, firms compete to become insiders, even if also the outsiders' profits are increased. When such a merger is announced, the competitors' stock

market values are reduced. Intuitively, the pre-merger value of an outsider is high, since it reflects the possibility of becoming an insider. Once the merger has taken place, this possibility is eliminated, and outsiders' share-prices are reduced. The new information in the merger announcement is not that a merger has occurred. Rather, it is which firms are insiders and which are outsiders. Therefore, changes in share prices reveal the difference in the value of becoming an insider vs. an outsider, but not the value of becoming an insider or an outsider relative to remaining in status quo.

This result is derived in a simplified version of Fridolfsson's and Sten-  
nek's (2000) model of endogenous mergers (non-cooperative model of coalitional bargaining). There we show that unprofitable mergers may occur in equilibrium, and that the combined stock market value of the merging firms nevertheless is increased—a potential explanation of another empirical puzzle.

## 2 The Model

For expositional simplicity, we consider an industry which initially consists of three identical firms, and assume that mergers to monopoly are illegal.

Time is infinite and continuous but divided into short periods of length  $\Delta$ . The common discount rate is  $r$ . Each period is divided into two phases. In the first phase, there is an acquisition game, in which one firm is randomly selected to submit a bid for another firm. A firm receiving a bid can only accept or reject it; if it rejects, it can give a (counter) offer in the next period (if selected).

In the second phase, there is a market game. Rather than specifying an explicit oligopoly model, we take the profit levels of each firm in each market structure as exogenous. In the triopoly, each firm earns profit flow  $\pi(3)$ . If

a merger to duopoly takes place, the insider earns profit flow  $\pi(2^+)$ , and the outsider earns  $\pi(2^-)$ . We assume that mergers from triopoly to duopoly are profitable, that is  $\pi(2^+) > 2\pi(3)$ . If the merger is anticompetitive (that is, if it increases price), the outsider's profit is increased, that is  $\pi(2^-) > \pi(3)$ . If insiders reduce their marginal costs substantially, they become a more difficult competitor, and price is reduced. Then, the outsider's profit is reduced. Note that a (pro-) anti-competitive merger has a (negative) positive externality on the outsider.

We restrict attention to symmetric Markov perfect equilibria, characterized by the triple  $(p, b, a)$ , where  $p \in [0, 1/2]$  denotes the probability of a firm bidding for one specific firm in any given period,  $b$  denotes the size of this bid, and  $a$  denotes the lowest bid that a target firm will accept.

After a merger has occurred, the values of the insider (+) and the outsider (-) are given by

$$W(2^i) = \pi(2^i)/r \quad (1)$$

for  $i \in \{+, -\}$ . In the triopoly, the expected value of any firm is given by

$$W(3) = \frac{1}{r}\pi(3)(1 - e^{-r\Delta}) + e^{-r\Delta} \left[ \frac{2}{3}p(W(2^+) - b) + \frac{2}{3}pb + \frac{2}{3}pW(2^-) + (1 - 2p)W(3) \right]. \quad (2)$$

The second term is the discounted expected value of all future profits. The value of being a buyer ( $W(2^+) - b$ ), seller ( $b$ ), outsider ( $W(2^-)$ ) and triopolist ( $W(3)$ ), is multiplied by the probability of becoming a buyer, seller, outsider and triopolist in the next period. For example, the probability of becoming a buyer is  $(2p)/3$ , since a firm is selected to bid with probability  $1/3$ , and since it bids for each of the two other firms with probability  $p$ .

Three equilibrium conditions complete the model. First, by subgame perfection, an offer is accepted if, and only if, the bid is at least as high

as the value of the firm. Second, a bidder does not offer more. Hence:  $b = a = W(3)$ . Third, a firm bids if, and only if, bidding maximizes its value. If the firm does not bid, its value is  $W(3)$ . If it bids, the value is  $W(2^+) - b$ . Hence, in equilibrium,

$$\begin{cases} p = \frac{1}{2} & \text{and } W(2^+) - b \geq W(3) & \text{or} \\ p = 0 & \text{and } W(2^+) - b \leq W(3) & \text{or} \\ p \in (0, 1/2) & \text{and } W(2^+) - b = W(3). \end{cases} \quad (3)$$

**Lemma 1** *Assume that mergers from triopoly to duopoly are profitable, that is  $\pi(2^+) > 2\pi(3)$ . Consider the set of symmetric Markov perfect equilibria as  $\Delta \rightarrow 0$ . A merger occurs immediately if, and only if, it is better to be an insider than an outsider, that is  $\frac{1}{2}\pi(2^+) - \pi(3) \geq \pi(2^-) - \pi(3)$ . A merger occurs after delay if, and only if, it is better to be an outsider than an insider, that is  $\frac{1}{2}\pi(2^+) - \pi(3) \leq \pi(2^-) - \pi(3)$ .*

**Proof:** Consider an equilibrium with  $p = 0$ . By (2),  $W(3) = \pi(3)/r$ . Therefore, condition (3) requires that  $\pi(2^+) \leq 2\pi(3)$ , violating the assumption that mergers are profitable. Consider  $p = 1/2$ . By (2),  $W(3) = [\pi(2^+) + \pi(2^-)]/(3r)$  as  $\Delta \rightarrow 0$ . Therefore, (3) requires that  $\pi(2^+) \geq 2\pi(2^-)$ . Consider  $p \in (0, 1/2)$ . Solve for  $p$  and  $W(3)$  using equations (2) and (3). Then,  $p = -\frac{3}{4} \left( \frac{1-e^{-r\Delta}}{e^{-r\Delta}} \right) \left( \frac{\pi(2^+) - 2\pi(3)}{\pi(2^+)/2 - \pi(2^-)} \right)$ . It is required that  $\pi(2^+)/2 < \pi(2^-)$  for  $p > 0$ . QED.

Assuming that the stock market is efficient, the evolution of the stock market value of a firm is described by the evolution of its expected discounted value. Hence:

**Proposition 1** *An anticompetitive merger [ $\pi(2^-) > \pi(3)$ ] reduces the outsiders' stock market value [ $W(2^-) < W(3)$ ], if becoming an insider is more advantageous than becoming an outsider [ $\pi(2^+)/2 > \pi(2^-)$ ].*

**Proof:** Mergers characterized by  $\pi(2^-) > \pi(3)$  and  $\frac{1}{2}\pi(2^+) \geq \pi(2^-)$  occur immediately. In such an equilibrium,  $W(3) = \frac{1}{3}[\pi(2^+) + \pi(2^-)]/r$ . Hence,  $W(2^-) = \pi(2^-)/r < W(3)$  if, and only if,  $\frac{1}{2}\pi(2^+) > \pi(2^-)$ . QED.

Intuitively, the pre-merger value of the outside firm is high, since it reflects the possibility of becoming an insider. Once the merger has taken place, this possibility is eliminated, and the outsider's share-price is reduced. The new information in the merger announcement is which firms are insiders and which are outsider.

### 3 Conclusions

By showing that anticompetitive mergers may reduce competitors' share prices, we reconcile the diverging empirical evidence on the welfare effects of horizontal mergers. We conclude that event studies cannot detect anticompetitive mergers.

The diverging empirical evidence on M&A's has created a controversy regarding the benefits of merger control. Based on the evidence from event studies, indicating that even mergers challenged by antitrust authorities do not increase competitors share-prices, Eckbo and Wier (1985) argue that "all but the 'most overwhelmingly large' mergers should be allowed to go forward." Our results show that this opposition toward merger control is not well-founded.

Our results also indicate that competition authorities should be cautious when using event study techniques to assess proposed mergers' effects on competition. While an increase in competitors' share prices indicate that a merger is anticompetitive, a decrease in their share prices does not indicate that a merger is procompetitive.

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