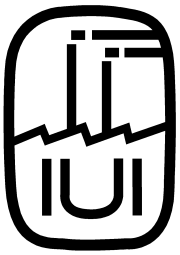

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Mergers by Partial Acquisition

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Mergers by Partial Acquisition*

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Abstract

This paper evaluates partial acquisition strategies. The model allows for buying a share of a firm before the actual acquisition takes place. Holding a share in a competing firm before the acquisition of another firm, outsider-toehold, eliminates the insiders' dilemma, i.e. profitable mergers do not occur. This strategy may thus be more profitable for a buyer than acquiring entire firms at once. Furthermore, the insiders' dilemma arises from the assumption of a positive externality on the outsider firm and acquiring an outsider-toehold is thus a signal of an anti-competitive merger.

Keywords: acquisition, antitrust, insiders' dilemma, mergers, toeholds

JEL classification: G34, L12, L13, L41

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1 Introduction

Some markets are characterized by cross ownership with firms holding shares in rival firms. These markets have essential implications for merger pattern and merger policy.

It has been shown in economic theory that there exists an important obstacle to anti-competitive mergers in oligopolies: being an outsider to an anti-competitive merger is often more profitable than participating, since outsiders benefit from a price increase, but need not reduce output themselves. This was first pointed out by Stigler (1950) and is consistent with a simple Cournot or Bertrand model and referred to as the *insiders' dilemma*.

In the endogenous merger literature, Stigler's point is central. Kamien and Zang (1990), a pioneering work in this field, studied a non-cooperative[1] endogenous merger model where firms simultaneously offer bids for the other firms and an asking price for the own firm, showing that the acquisition process may fail and the market structure will remain, despite monopoly being profitable. Consider, for example, a three firm industry where one firm tries to acquire the other two. By unilaterally rejecting the offer and becoming an outsider, a target will profit from a duopoly. Hence, in equilibrium, both firms require a duopoly profit to accept the offer. A buyer may not afford this high bid and the triopoly remains. This result arises from the assumption of a positive externality on the outsider.[2]

This simultaneous merger game was later developed by Kamien and Zang (1993). They then introduced sequential acquisitions where a buyer in the first period only has to pay a triopoly profit for the first firm but in the

[1] For cooperative endogenous merger models see e.g. Horn and Persson (2001).

[2] Models studied by Szidarovszky and Yakowitz (1982), Salant, Switzer and Reynolds (1983), Perry and Porter (1985) and Deneckere and Davidson (1985) show that outsider profits may be positive or negative depending on the situation.

second period, it still needs to pay a duopoly profit. Although this mitigates the insiders' dilemma, it still is considerable. Lindqvist and Stennek (2001) also demonstrate the existence of this dilemma in a laboratory.

Models within industrial organization often treat firms as one indivisible unit. In contrast, the finance literature often divides a firm into many shares with corresponding stockholders but treats the takeover exogenously, only looking at the two merging firms or possibly many firms in a bidding competition for a target. In the finance literature, it has long been argued that before the acquisition, it is profitable to buy a small share of the target firm.[3] This is referred to as a *toehold*. Firms with a toehold have an advantage in a bidding contest when the remaining firm will be sold out. A potential acquirer needs to pay a premium for fewer shares or, if losing the bid, gains from selling out the toehold at a profit. Grossman and Hart (1980) show that this kind of takeovers may have some complications since the buyer must pay at least the value of the remaining stocks if the bid succeeds, which may not be profitable for the buyer. This work was later developed by Bagnoli and Lipman (1988), arguing that the seller in the target firm must be pivotal for an equilibrium to exist.

Some arguments against controlling mergers have been raised due to the insiders' dilemma.[4] However, this paper suggests a theoretical solution to Stigler's point. The insiders' dilemma is likely to be less prominent when cross ownership exists since the merged firm holds shares in rival firms, i.e. *outsider-toeholds*, benefiting from the price increase following the merger.

[3] See e.g. Malueg and Schwartz (1991), Bulow, Huang and Klemperer (1999), Ravid and Spiegel (1999) and Högfeldt and Högholm (2000) for theoretical work and Bradley, Desai and Kim (1988), Franks and Harris (1989), Jarrell and Poulsen (1989), Stulz Walkling and Song (1990), Van Hulle, Vermaelen and Wouters (1991), Jennings and Mazzeo (1993) and Betton and Eckbo (2000) for empirical studies. See Lindqvist (2003) for an extended literature description and results.

[4] See e.g. Fridolfsson and Stennek (2004) for arguments against merger control.

Hence, buying outsider-toeholds before an acquisition can solve this puzzle.

There is also a policy implication from this result. The insiders' dilemma arises from the assumption of a positive externality on the outsider firm and acquiring an outsider-toehold is thus a signal of an anti-competitive merger. This result can also imply another interpretation of toeholds theoretically and empirically studied in the finance literature.

The purposes of this paper are to study under which circumstances outsider-toeholds increase incentives for mergers and under which circumstances a competition authority can use outsider-toeholds as a signal of anti-competitive mergers. In a broader view, this paper tries to link the modelling of the finance and industrial organization merger literature to explain merger strategies and market outcomes.

The paper is structured as follows. Section 2 describes the model for two cases; single owner firms and firms listed on a stock market, i.e. firms with multiple owners, section 3 provides some empirical validity and policy implications and section 4 concludes.

2 Model

Initially the industry consists of three firms; one buyer (firm a) and two sellers (firms b and c). Due to cash limits, cross-border constraints etc., firm a may be the only valid acquirer and this market situation may thus arise. The model starts with an acquisition game before the firm(s) enter(s) the market. The acquisition game consists of three periods, k. In each period, the buyer can choose not to bid or offer one bid to a seller. If a buyer ceases to bid, the acquisition game closes and the firm(s) enter(s) the market. The buyer offers one bid, (p_i^k, b_i^k), by stating the target firm, $i \in (b, c)$, the size of

the bid (transaction price), $b_i \in \mathbb{R}$, and the claiming share, $p_i \in [0,1]$. This bid can only be rejected or accepted by the corresponding seller. A selling firm vanishes from the market if and only if the entire firm is acquired, i.e. $\sum_{k=1}^{3} p_i^k = 1$, where $p_i^k = 0$ for a rejecting bid or a closed period.

After the acquisition game the firm(s) enter(s) the market. The market can be treated as one period with three different profit levels for one firm. If the market consists of three firms, there is a triopoly where each firm profits $\pi(3)$, two firms each profit $\pi(2)$ in a duopoly and a monopoly firm profits $\pi(1)$, where $\pi'(n) < 0$, $\forall n \in (1,2,3)$.[5] The profit structure is based on the assumption that a single manager of each firm only acts in the interest of its own firm, trying to maximize the profit of that firm. This implies that the profit structure becomes symmetric, since the owner structure is not considered by the manager. However, the owner(s) take(s) all decisions about the owner structure, i.e. if buying a share or making a full acquisition of another firm.[6]

The solution concept is a subgame perfect Nash equilibrium. To find the market outcomes, the analysis is divided into two parts depending on the number of owners for each firm. We start with the single owner case.

[5] Another way of defining profits is to use the Cournot model, where each firm optimizes its profit given the current ownership structure. Furthermore, a discounting factor can be introduced allowing for infinite number of periods. In fact, these assumptions were considered in an earlier version of this paper but were, for simplicity, changed to a fixed profit since the main results still hold.

[6] Note that the profit structure is assumed to be symmetric even after a merger, i.e. two merging firms will have the same profit as the non merging firm. Another possible assumption is to assume that the two merging firms have a profit twice that of the non merging firm. In a real market the truth may be somewhere between these two extremes which implies that the insiders' dilemma is still prominent (but decreases when approaching the latter extreme case).

2.1 Single owners

In this section, the firm has one owner. Let us start with a benchmark strategy when the buyer monopolizes the market without partial acquisitions, i.e. $p_i^k = 1$, $\forall i$. Note that this requires the buyer to acquire one firm in each period 1 and 2, respectively.

1. a acquires b
2. a acquires c
3. No bid

In the last period, the buyer cannot offer any bid since there exist no other firms in the market. It must pay a duopoly profit in the second period. In the first period, seller b accepts a bid of a triopoly profit in equilibrium, if it is unprofitable for a buyer to form a duopoly, i.e. $\pi(2) < 2\pi(3)$, which is illustrated as to the left of line 2 in Figure 1.[7]

In the market the buyer profits from a monopoly, $\pi(1)$, after the two acquisitions. The value of the firm, v_a, must exceed the initial triopoly profit, $\pi(3)$, for the buyer to monopolize the market in equilibrium, i.e.

$$v_a = \pi(1) - \pi(2) - \pi(3) \geq \pi(3), \tag{1}$$

which is illustrated in Figure 1 at or above line 4. In addition, subgame perfection of the equilibrium requires that the buyer has no incentive to deviate from the current strategy. In particular, upon reaching the second period, the buyer should still have an incentive to buy the remaining firm, i.e.

$$\pi(1) - \pi(2) \geq \pi(2), \tag{2}$$

[7] Assume that the buyer strategy is to bid for firm b also in the second period, if firm b rejects the first period offer. In equilibrium firm b does not increase its payoff if rejecting in the first period, and accepting already in period one is thus a Nash equilibrium.

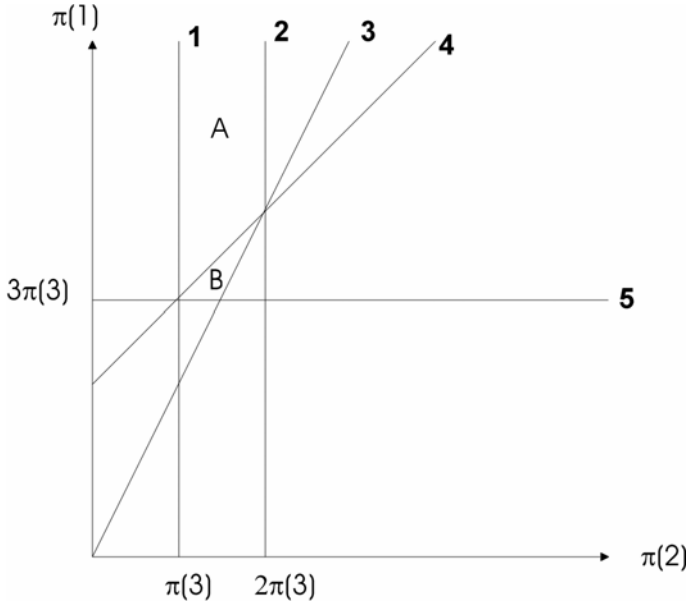

Figure 1: The Insiders' Dilemma

which holds at or above line 3 in Figure 1. Since a duopoly profit is larger than a triopoly profit (to the right of line 1), the monopoly equilibrium is illustrated as area A in the figure. However, the area of interest in Figure 1 is area B. Despite a monopolization being profitable, i.e. $\pi(1) > 3\pi(3)$ and $\pi(1) > 2\pi(2)$ represented as above line 5 and 3 respectively, the triopoly remains, due to the positive externality on the outsider, firm c. After the first acquisition, the market is concentrated and the rival (firm c) now becomes a duopolist with its corresponding profit. The buyer must now pay a duopoly profit to buy firm c since this is c's alternative cost. In area B, this is not profitable for a buyer. This mechanism is referred to as the insiders' dilemma and is thus illustrated as area B.

Now, let us see if this monopolization failure can be dissolved if a buyer uses partial acquisitions. Since there is a positive externality on the outsider, it may be more profitable for the buyer to purchase a share of the

future outsider before making a full acquisition of the other firm. This share, $p_i \in (0,1)$, is referred to as an outsider-toehold. Having an outsider-toehold implies a corresponding share of the profit in this firm. We start with the case where the buyer monopolizes the market according to the following:

1. a buys p_c of c
2. a acquires b
3. a acquires $(1-p_c)$ of c

Working backwards and starting with the third period in equilibrium, firm c requires a bid, b_c^3, of at least the share of the duopoly profit still held by c, which is

$$b_c^3 \geq (1-p_c)\pi(2). \tag{3}$$

Since the buyer offers the bids, and thus has all the bargaining power, this bid (and all other bids in this section) holds with equality. In the second period, firm b requires

$$b_b^2 \geq \pi(3), \tag{4}$$

since the market still consists of three firms. In the first period, firm c is considering the future bid in the third period in an equilibrium and the following must hold

$$b_c^1 + b_c^3 \geq \pi(3) \Leftrightarrow b_c^1 \geq \pi(3) - b_c^3. \tag{5}$$

For the first bid to firm c, b_c^1, and the bid to firm b, b_b^2, to be accepted, it must be unprofitable for the buyer to form a duopoly (to the left of line 2 in Figure 1). The value, $\widehat{v}_a$, of the buyer after a monopolization must exceed the initial triopoly profit in equilibrium, i.e.

$$\widehat{v}_a = \pi(1) - b_c^1 - b_b^2 - b_c^3 \geq \pi(3). \tag{6}$$

Substituting the bids from equations 3, 4 and 5 into equation 6 implies

$$\pi(1) \geq 3\pi(3). \tag{7}$$

This is illustrated in Figure 1 as at or above line 5. By subgame perfection, we also need the following to hold for a monopolization in equilibrium:

$$\pi(1) - (1 - p_c)\pi(2) \geq \pi(2) + p_c\pi(2) \Leftrightarrow \pi(1) \geq 2\pi(2) \tag{8}$$

$$\pi(1) - (1 - p_c)\pi(2) - \pi(3) \geq \pi(3) + p_c\pi(3). \tag{9}$$

Equation 8 ensures a buyer to have an incentive to acquire the rest of firm c in the third period. The buyer will profit from a monopoly but must pay for the rest of firm c, $(1 - p_c)\pi(2)$. The alternative is not to bid and receive a duopoly profit from the own firm and the holding share, p_c, in firm c. This inequality is illustrated as at or above line 3 in Figure 1. Equation 9 must hold for a monopolization to occur, since the buyer must have an incentive to continue after the first period. A monopoly profit minus the bids to firms b and c must exceed the triopoly profit from the own firm and the share of the triopoly profit from firm c. Equation 9 can be rewritten as

$$\pi(1) \geq (1 - p_c)\left[\pi(2) - \pi(3)\right] + 3\pi(3). \tag{10}$$

If the outsider-toehold, p_c, is zero the inequality holds at or above line 4 in Figure 1. This implies that a monopolization occurs in equilibrium in area A, which is exactly the same as in the benchmark case. However, when p_c is increasing, line 4 is rotating clockwise around the intersection with lines 5

and 1 down to line 5 as p_c approaches 1. The insiders' dilemma, area B, is thus decreasing in the outsider-toehold, p_i, and vanishes as $p_i \to 1$.

Proposition 1 *If* $\pi(1) > 2\pi(2)$ *and* $\pi(1) > 3\pi(3)$, $\exists$ *a* $p_i \in (0,1)$ *where a monopoly is a subgame perfect Nash equilibrium.*

Proposition 2 *The insiders' dilemma is decreasing in* p_i.

See proofs in the appendix.

Buying an outsider-toehold mitigates acquisitions as long as there are positive externalities on outsider firms, even when a monopoly (or other market concentration limits) is not allowed or when there are more than three firms in the industry. To see this, assume a market with k firms and a buyer that reduces the market to $k-2$ firms using the outsider-toehold strategy. Re-writing equations 1 and 6, we get

$$\widehat{v}_{ak} = \pi(k-2) - 2\pi(k) > v_{ak} = \pi(k-2) - \pi(k-1) - \pi(k), \tag{11}$$

since $\pi(k-1) > \pi(k)$.

Proposition 3 *Using the outsider-toehold acquisition strategy is more profitable than acquiring entire firms at once, in all* k*-firm markets if* $\pi(k-1) > \pi(k), \forall k > 2$.

Proposition 3 does not say that all mergers are profitable. If $k > 3$ there exist no-merger equilibria if any of inequality 7-9 do not hold for a corresponding k-firm market $\forall p_i \in (0,1)$.

In this analysis we have only allowed for three periods in the acquisition game. Relieving this assumption, other partial acquisition strategies can be an equilibrium, such as buying a small portion of firm c, a small portion of

firm b, and so on until a monopolization. Introducing e.g. a fixed cost (or a discounting factor) for the buyer in each acquisition period would eliminate these equilibria. This is intuitive; if the buyer can get all the surplus in two periods, why use more?

The analysis in this section builds on a firm with a single owner. An outsider accepts to sell out a share of the firm at a lower price than the actual value. The reason for doing this is the future profit the firm will receive when the rest of the firm is acquired in the last period. However, this is not possible when the firm has multiple owners. Who wants to sell out a share in the first period at this low price, not receiving anything in later periods? Now the buyer must pay the market price in the first period. This feature will be analyzed in the next section.

2.2 Multiple owners

A firm with multiple (atomistic) owners can be treated as a listed firm on a stock market. When using the same acquisition strategy as in the single owner case, the bid for the outsider-toehold in the first period is different in equilibrium. Some owners sell out their share in the firm in the first period and thus require at least a share of a triopoly profit, $\widehat{b}_c^1 = p_c\pi(3)$, for the outsider-toehold since they will not profit from the larger second bid, b_c^3 in equation 3, when the firm is sold in the last period. Hence, owners selling out their share in the first period will gain less than the remaining owners, since they receive a duopoly profit in the last period. In equilibrium, the first sellers must thus be pivotal, i.e. if rejecting, the monopolization collapses. Hence, the size of p_c will be unique in equilibrium and we must look at the buyer constraint to find its value.

The value of a buyer after a monopolization must exceed the triopoly

profit in an equilibrium. i.e.

$$\widehat{v}_a^v = \pi(1) - \widehat{b}_c^1 - b_b^2 - b_c^3 = \pi(1) - (1 - p_c)\left[\pi(2) - \pi(3)\right] - 2\pi(3) \geq \pi(3). \quad (12)$$

This constraint is oscillating with p_c between lines 4 and 5 in Figure 1, just like equations 9 and 10 in the single owner section. The necessary constraints for a subgame perfection are equal to the single owner case, since the acquisition process is the same after the first period.

However, to ensure acceptance when buying the outsider-toehold, sellers must be pivotal. Solving for p_c in equation 12 implies

$$p_c \geq [2\pi(3) + \pi(2) - \pi(1)]/[\pi(2) - \pi(3)].$$

This holds with equality if the right hand side is positive, i.e. in area B in figure 1 in a monopolization equilibrium. Otherwise, the insiders' dilemma does not exist.

Proposition 4 *If the insiders' dilemma exists, a monopoly is a subgame perfect Nash equilibrium with a unique* p_i.

See proof in the appendix.

The next section discusses the validity of the assumptions but also emphasizes a policy implication of the results.

3 Empirical validity and policy implications

Changes in consumer surplus are crucial for the competition authorities when deciding whether to block a merger. Unfortunately, the merging firms with which the competition authorities deal with are often hard cases and the effects on consumers are difficult to measure. However, merging firms may

hold shares in competing firms to extract profits from the positive externality a merger may have on other firms within the industry. This externality harms consumers and may be blocked. Although there may be other reasons for holding shares in other firms, outsider-toeholds may be used as signals of anti-competitive mergers and these cases need deeper investigations.

Policy implication *Holding outsider-toeholds is a signal of an anti-competitive merger.*

The empirical literature studying profits from merging firms reports a considerable positive reaction on the stock price of target firms when an acquisition is announced. Stock price reactions for the acquirer are more ambiguous and in general show no significant deviations from zero (see e.g. Bradley, 1988 and Betton Eckbo, 2000). Table 1 reports profits for firms after the strategies described in this paper have been carried out. Viewing sellers as one unity, we can see that the buyer in the single owner case takes the lion's share. Sellers will receive the initial triopoly profit. This appears not to be consistent with the existing literature but may have an explanation. Only firms listed on the stock market are included in empirical studies (so-called event studies) measuring the general effects of a merger and the lack of results from non-listed firms still holds the consistency question open.

When firms are listed on the stock market, i.e. have multiple owners, the theoretical results are more consistent with the literature when the insiders' dilemma exists, since the sellers (firm c) now receive the surplus. This is also true when the dilemma is not prominent if the monopoly profit is not too large in relation to the duopoly profit.

Table 1: Buyer and Seller Profits			
		Merger Profitable	
		No Insider' Dilemma	Insiders' Dilemma
Single Owners	Buyer	$\pi(1) - 2\pi(3)$	$\pi(1) - 2\pi(3)$
	Seller b	$\pi(3)$	$\pi(3)$
	Seller c	$\pi(3)$	$\pi(3)$
Multiple Owners	Buyer	$\pi(1) - \pi(2) - \pi(3)$	$\pi(3)$
	Seller b	$\pi(3)$	$\pi(3)$
	Seller c	$\pi(2)$	$\pi(1) - 2\pi(3)$

Comparing equation 6 and 12, we see that $\widehat{v}_a > \widehat{v}_a^v$ for all $p_c \in (0,1)$ implying that the value of a buyer is smaller when firms have multiple owners. This is due to the higher price a buyer must pay for the outsider-toehold. In the single owner case, however, the buyer wants the outsider-toehold to be large for two reasons. First, the insiders' dilemma is decreasing in p_c and second, by equation 5, the bid for p_c may be negative when the outsider-toehold is too low. This implies that the outsider is giving money to the buyer when selling out the share p_c. Negative bids may not be accepted or not even allowed in reality. Hence, the buyer must raise the bid to at least zero if p_c is too low, which implies a lower profit for the buying firm.

So far, there are no restrictions for the buyer. Introducing a maximum size of the outsider-toehold may restrain the concentration rate. By definition, the outsider-toehold is just a share of another firm. If this share is too large, an acquisition takes place and the target firm disappears from the market. In reality, the maximum share an owner can hold in a firm without acquiring it depends on the ownership structure in the rest of the firm.[8] The

[8] According to European Commission IV/M.025 - Arjomari/Wiggins Teape of February

only reason for the buyer to hold a large share in the outsider is to gain from its profit, and not to have voting power. If the voting power becomes too strong, an acquisition takes place, which is not the intention. In fact, in countries where different shares (A- and B-shares) have different voting power[9], concentrations of markets are facilitated according to the outsider-toehold theory. A buyer can receive a majority of the profit in the outsider, i.e. $p_c > 0.5$, by holding a large part of the B-shares (weak voting power) but still being a minority voter (if no or few A-shares are held).

Conjecture 5 *Shares with different voting power mitigate acquisitions.*

In the acquisition game of the model, only one firm can make acquisitions. To give you a flavour of what will happen when this assumption is relieved, we can consider the following. Assume that firm a holds, exogenously, an outsider-toehold, p, in firm c. Firms are listed on the stock market and have multiple atomistic stockholders, only one merger is allowed and agents in the stockmarket do not expect a merger. Four cases are possible; no merger, mergers a-b, a-c or c-b. If no merger occurs firms a, b and c profit $(1+p)\pi(3)$, $\pi(3)$ and $(1-p)\pi(3)$ respectively. If one merger occurs, a-b generates a combined profit of $(1+p)\pi(2)$, a-c of $\pi(2)$, and b-c of $(1-0.5p)\pi(2)$. The split of p in the last case is due to the assumption that firms b and c are of equal size and firm a's ownership in c, as a percentage, is only half of the initial size in the new firm, b-c.

The a-b merger surplus is $(1+p)\pi(2) - (1+p)\pi(3) - \pi(3)$ and hence

10, 1990, an acquisition takes place if a majority of the voting rights are held. A minority of the voting rights may also be treated as an acquisition if these votes obtain a majority at the shareholders' meeting, due to the remaining votes being spread out among many small shareholders. In the US, the so-called supermajority is applicable in many antitakeover amendments, stating that a change in control requires shareholder approval by at least a two-third vote and sometimes as much as 90 percent of the voting power.

[9]Such as in e.g. France and Sweden.

positive iff $p > (2\pi(3) - \pi(2))/(\pi(2) - \pi(3))$. In fact, this is the only merger that may be profitable since *a*-*c* creates a surplus of $\pi(2) - 2\pi(3)$, which is negative since merger to duopoly is unprofitable and the *b*-*c* surplus is always negative.

Now, ignore all assumptions from Figure 1 and simply assume that one merger takes place (without expectation from the stockmarket). The relative change in the combined stockvalue from the *a*-*b* merger is thus $(1 + p)\pi(2)/(\pi(3) + (1 + p)\pi(3)) = \frac{1+p}{2+p}\frac{\pi(2)}{\pi(3)}$. The two other mergers both result in a smaller relative change, i.e. $\frac{1}{2}\frac{\pi(2)}{\pi(3)}$ respectively. Hence, in this perspective, it can be argued that allowing all firms to merge would not change the market outcome, i.e. firms a and b would still merge. Note, however, that although a merger and an acquisition can be treated equally, this analysis does not specify an equilibrium bidding price, as in sections 2.1 and 2.2.

Conjecture 6 *Merging firms with an outsider-toehold generate a larger relative surplus than merging firms without outsider-toeholds.*

4 Conclusions

It has been shown in economic theory that there exists an important obstacle to anti-competitive mergers in oligopolies: being an outsider to an anti-competitive merger is often more profitable than participating, since outsiders benefit from a price increase, but need not reduce their own output. This implies that unprofitable mergers may not occur, i.e. the insiders' dilemma. However, this paper demonstrates that this theoretical puzzle can be solved. Holding a share in a competing firm, an *outsider-toehold*, dissolves the dilemma and all profitable mergers occur in equilibrium.

The analysis is split into firms with single owners and firms with multiple

owners, i.e. firms listed in the stock market. In the single owner case there exist a unique monopoly equilibrium with multiple acquisition strategies, since the size of the outsider-toehold can vary independently of the buyer's profit. When firms have multiple owners it is only necessary to buy an outsider-toehold when the insiders' dilemma exists. In this case the size of the outsider-toehold is unique in equilibrium.

There is a *policy implication* of this result. The insiders' dilemma arises from the assumption of a positive externality on the outsider firm and acquiring an outsider-toehold is thus a signal of an anti-competitive merger. Furthermore, the theoretical results indicate that the target receives the large portion of the merger surplus, which is consistent with the empirical findings. In some countries stocks for one firm are divided into two different categories on the stock market; stocks with strong and weak voting power. It has been argued that this split of the stocks thwart takeovers since a small capital share may be enough for controlling the firm if the capital is invested in the strong voting power stocks. This conclusion is contrary to the result in this paper. The only reason for buying an outsider-toehold is to extract profit from the corresponding firm and not to have voting power. In fact, the less voting power for a buyer, the larger an outsider-toehold can be without taking over the firm (acquiring it). Hence, weak voting power stocks mitigate acquisitions.

Finally a word of caution. Theoretically, it has been proved that profitable mergers may not occur since outsider firms may gain more than merging firms. One solution to this theoretical problem is to write contingent contracts between all firms in the industry making a market concentration possible. However, this is not legal. Furthermore it may be questioned if the insiders' dilemma is also relevant in the real world. Nevertheless, this paper

offers a legal way of solving this theoretical puzzle created in the merger literature.

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A Proofs

A.1 Proof of Proposition 1

Consider three periods where firm a in period 1 buys p_c of firm c, in period 2 acquires firm b and in period 3 acquires $(1-p_c)$ of firm c. Firm a offers $(p_c^1,$ $\pi(3)-(1-p_c^1)\pi(2))$, $(1,\ \pi(3))$ and $((1-p_c^1),\ (1-p_c^1)\pi(2))$ respectively, in the three periods and sellers respond by *accept*, *accept* and *accept*. By backward induction, firm c profits $(1-p_c^1)\pi(2)$ in period 3 by rejecting, which is not larger than accepting. In period 2, firm b profits $\pi(3)$ by rejecting, which is not larger than accepting since merger to duopoly is unprofitable. Firm c profits $\pi(3)$ by rejecting in period 1, since merger to duopoly is unprofitable and responses are irrevocable. This profit is not larger than the profit from accepting, i.e. the sum of bids from periods 1 and 3. Hence, conditional on the proposed bids, the responses from sellers constitute a subgame perfect Nash equilibrium.

In period 3, firm a offers the bid if it results in at least as high a net profit as that received by not bidding, i.e.

$$\pi(1)-(1-p_c^1)\pi(2) \geq \pi(2)+p_c^1\pi(2) \Leftrightarrow \pi(1) \geq 2\pi(2). \tag{13}$$

Bidding according to the strategy must result in a higher net profit than

not bidding in period 2, i.e.

$$\pi(1) - (1 - p_c^1)\pi(2) - \pi(3) \geq \pi(3) + p_c^1\pi(3). \tag{14}$$

Another strategy is to acquire $(1 - p_c)$ of firm c in period 2 and acquire firm b in period 3, paying $(1 - p_c)\pi(3)$ and $\pi(2)$ respectively. This cannot be profitable for firm a since these payments can never be smaller than the payments in the prevailing strategy. In the first period, firm a's strategy must be more profitable than not bidding, i.e.

$$\pi(1) - (1 - p_c^1)\pi(2) - \pi(3) - (\pi(3) - (1 - p_c^1)\pi(2)) \geq \pi(3). \tag{15}$$

$$\iff \pi(1) \geq 3\pi(3).$$

A higher bid, in all respective periods, is giving money away and a lower bid is not accepted by the seller. If $\pi(1) > 2\pi(2)$ and $\pi(1) > 3\pi(3)$, $\exists$ a $p_c \in (0, 1)$ where inequality 14 is fulfilled. Consequently there exist an infinite number of equilibrium strategies. QED.

A.2 Proof of Proposition 2

Only inequality 14 is dependent on p_c^1 and rewrites

$$\pi(p_c^1) = \pi(1) - (1 - p_c^1)\left[\pi(2) - \pi(3)\right] + 3\pi(3) \geq 0$$

implying

$$\frac{d\pi(p_c^1)}{dp_c^1} = \pi(2) - \pi(3) > 0.$$

QED.

A.3 Proof of Proposition 4

Consider the first period bid $([2\pi(3) + \pi(2) - \pi(1)]/[\pi(2) - \pi(3)], [[2\pi(3) + \pi(2) - \pi(1)]/[\pi(2) - \pi(3)]]\pi(3))$ if $[2\pi(3) + \pi(2) - \pi(1)]/[\pi(2) - \pi(3)] > 0$ and $(1; \pi(3))$ otherwise, assuming everything else equal as in proposition 1.

If $[2\pi(3) + \pi(2) - \pi(1)]/[\pi(2) - \pi(3)] > 0$, rejecting implies $[[2\pi(3) + \pi(2) - \pi(1)]/[\pi(2) - \pi(3)]]\pi(3)$ since merger to duopoly is not profitable, which is not larger than accepting. The buyer bids iff

$$\pi(1) - (1 - [[2\pi(3) + \pi(2) - \pi(1)]/[\pi(2) - \pi(3)]])\pi(2) - \pi(3)$$

$$-[[2\pi(3) + \pi(2) - \pi(1)]/[\pi(2) - \pi(3)]]\pi(3) \geq \pi(3)$$

$$\iff \pi(3) \geq \pi(3).$$

A higher bid or a lower share, p_c^1, is hence unprofitable and a lower bid is not accepted by sellers. A higher share, p_c^1, will not ensure acceptance from all sellers in equilibrium.

If $[2\pi(3) + \pi(2) - \pi(1)]/[\pi(2) - \pi(3)] \leq 0$, rejecting implies $\pi(3)$ since merger to duopoly is not profitable, which is not larger than accepting. The buyer bids iff

$$\pi(1) - \pi(2) - \pi(3) \geq \pi(3)$$

which holds since $[2\pi(3) + \pi(2) - \pi(1)]/[\pi(2) - \pi(3)] \leq 0 \iff \pi(1) \geq 2\pi(3) + \pi(2)$. A higher bid means giving money away and a lower bid is not accepted. Consequently, it is only necessary to acquire an outsider-toehold when the insiders' dilemma exists, i.e. $[2\pi(3) + \pi(2) - \pi(1)]/[\pi(2) - \pi(3)] > 0$, assuming the merger to be profitable. QED