Acquisitions, Common Ownership, and the Cournot Merger Paradox *

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Abstract

The "Cournot merger paradox" states that, in a symmetric Cournot game, all the gains from a merger between two firms are captured by non-merging rivals in the same industry. We extend the model to allow for overlapping ownership. We find that common ownership increases the profitability of horizontal mergers for diversified shareholders not only due to their ownership stakes in the target, but also due to their stakes in non-merging rival firms. Empirically we find that on average the CARs for acquirer shareholders are not negative when taking into account the effects of non-merging rivals in their portfolio. These results help explain why value-destroying mergers get approved and how a high-common ownership environment is correlated with higher M&A frequency.

Keywords: Common Ownership, Mergers and Acquisitions, Synergies, Cournot Merger Paradox.

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1 Introduction

It is a well-known fact that average returns to acquiring firms are negative around merger announcements, while average returns to target firms are positive. This finding has been interpreted as evidence of empire building, CEOs pursuing a personal agenda or CEOs' overconfidence.[1] More recently Matvos and Ostrovsky (2008) (MO) provide an explanation to this puzzle by examining overlapping ownership: acquirer's institutional investors may hold shares in the target and, therefore, the increase in value of the target may offset the losses on the acquirer side. This explanation was contested by Harford et al. (2011) (HJL), who argued that cross-ownership at the shareholder level was not large enough to oppose value reducing acquisitions.

The goal of this paper is to revisit this puzzle considering the role of commonly owned non-merging rival firms. While the debate so far has focused on the returns of the acquiring and target firms[2], mergers generally have effects beyond them, impacting other rivals in the industry that are not involved directly in the acquisition. Indeed, extensive empirical evidence documents a positive effect of takeover announcements on rival firm stock returns (Eckbo (1983), Eckbo (1985), Mitchell and Mulherin (1996), Song and Walkling (2000), Shahrur (2005), Servaes and Tamayo (2013)). Moreover, the theoretical literature has shown that, in a symmetric Cournot game, all the gains from a merger between two firms are captured by the other firms in the industry, while the merging firms experience a decline in profits. This is known in the industrial organization literature as the "Cournot merger paradox" (Salant et al., 1983).

This evidence suggests that common ownership of non-merging rival firms in the same industry should be incorporated when evaluating the overall value effect for the acquirer shareholders. For example, when Travelers Group announced the acquisition of Salomon Brothers

[1] See Jensen and Ruback (1983); Jarrell et al. (1988); Morck et al. (1990); Andrade et al. (2001); Moeller et al. (2004, 2005); Roll (1986); Malmendier and Tate (2008).

[2] See Hansen and Lott (1996) for the initial discussion on how cross-ownership of target and rival may help explain the negative announcement return puzzle. More recently, Brooks et al. (2018) examines the impact of common ownership on M&A deal characteristics.

in 1997, each of the top ten institutional shareholder lost on average $29.1 million from their stakes in Travelers. However -and this is the point of this paper- six of these shareholders obtained a net gain thanks to their ownership in target and rival firms. On announcement date, Equitable Companies, the second largest shareholder, lost $40.7 million on its Travelers' stake, gained a moderate $3.5 million from its stake in Salomon (the target), and gained a striking $65 million from its stakes in industry rivals. Overall, Equitable had a net gain of $27.8 million from its overall industry portfolio. Barclays, Fidelity, Bankers Trust, Mellon, and State Street all suffered losses ranging from $18 to $31.7 million yet ended up with strong positive gains thanks to their ownership in the non-merging industry rivals, with State Street netting a high $75 million gain.

We start our analysis by extending the theoretical framework of the Cournot merger paradox to account for common ownership. Our model provides two main insights. First, it shows that common ownership increases the profitability of the merger for the diversified acquirer shareholders, not because of their stakes in the target, but precisely because of the stakes in the *non-merging rival firms*. The model provides a rationale for "value-destroying deals": it shows that mergers without any cost saving or product differentiation synergies[3] can still take place because the gains from ownership in *non-merging rival firms* may offset the losses from the acquirer's ownership. Second, the model predicts a negative relation between common ownership and the level of synergy required for a merger. This is precisely because common owners internalize the profits in the rivals - and thus require a lower synergy than an undiversified shareholder, who only cares about the merging firms. A natural consequence of this prediction is that environments with high common ownership will be more prone to M&A activity.

We test empirically these two predictions. First, we re-examine returns for the acquirer shareholders accounting for ownership in both the target and non-merging rival firms. For a sample of 1,154 horizontal mergers from 1980 till 2016, we find that the returns for rival stakes

[3]Following HJL, we define "value-destroying deals" or "bad deals" as deals with negative acquirer cumulative abnormal returns in a 3-day window around announcement date.

are generally positive for each acquirer shareholder. When the return for the non-merging rivals is added to the adjusted-return of acquirer plus target, the overall portfolio return is no longer negative for the acquirer shareholders, both separately and in coalition. The effect of common ownership is particularly pronounced in deals with negative announcement returns. For such value-destroying deals, the returns of the non-merging rivals are much stronger and, therefore, its impact on the overall portfolio effect of the acquirer even larger. In these cases, nearly one third of the large acquirer shareholders are able to achieve positive net gains when accounting for common ownership in the target and non-merging rivals. We find that "winner" shareholders in value-destroying deals are more diversified within an industry: they put smaller weight on acquirer, larger weight on rivals, and cover a larger portion of the industry, on average 35%.[4]

Finally, we examine if a high-common ownership environment can lead to higher merger activity since it allows merging-firm shareholders to internalize some of the benefits captured by industry rivals. We find a positive relationship between the level of institutional common ownership within an industry and the number of horizontal mergers in the same industry, as predicted by the theory.[5]

2 Analytical Framework

In this section we present the Cournot merger paradox with separation of ownership (as it has been developed in the literature) and then we extend it to incorporate the effects of common ownership.

Consider the basic Cournot oligopoly game with N identical firms, linear demand $P =$

[4]These results are robust to different industry classifications as well as the use of the three-factor model for computing the CARs. We use historical CRSP 4-digit SIC codes for our baseline analyses and historical COMPUSTAT 4-digit SIC codes and Hoberg & Phillips industry codes (Hoberg and Phillips, 2010, 2016) as alternative robustness checks.

[5]Recently, Brooks et al. (2018) show that common ownership of target and acquirer increases the probability of a merger.

$1 - Q$, and zero costs. If the firms are separately owned, the first-order condition for firm n

$$1 - 2q_n - q_{-n} = 0, \tag{1}$$

where q_n is the quantity produced by firm n and q_{-n} is the quantity produced by the other firms.

This game has a unique equilibrium, with each firm producing $q^* = (N+1)^{-1}$ and total quantity $Q^* = N(N+1)^{-1}$ and price $P^* = (N+1)^{-1}$. The equilibrium level of profits per firm is $\pi^*(N) = (N+1)^{-2}$.

Suppose that a merger between two firms creates no synergies. A merger between two firms is value-increasing for the owners if and only if $\pi^*(N-1) > 2\pi^*(N)$, which is the same as

$$N^2 < 2N + 1. \tag{2}$$

This condition only holds in expectation if $N = 2$, that is, a merger to monopoly. The condition does not hold in expectation for any $N > 2$. This result is known in the industrial organization literature as the Cournot merger paradox:

Proposition 1 (Cournot Merger Paradox – Salant, Switzer and Reynolds, 1983)**.** *In the absence of synergies, the combined value of the acquiring and target firms falls after a merger, except in the case of a merger to monopoly.*

Intuitively, the reason is that the two merging firms lose market share after they become one firm relative to the market share of both of them separately – except in the case of a merger to monopoly. The non-merging rivals, on the other hand, gain market share and, therefore, they benefit more from the merger than the two merging firms. In the symmetric Cournot case the negative market share effect is so large that, in the absence of positive synergies, the owners of the merging firms are actually worse off after the merger.

Consider instead the case in which some shareholders have common ownership. In partic-

ular, consider a situation in which firm i has a set of shareholders of measure one. The number of shares is normalized to one. A subset of shareholders, with mass $1-\lambda$, hold one share – since the group has mass $1-\lambda$, in total they hold $1-\lambda$ shares of firm i. The rest of the shares are held by a mass λ of shareholders that hold one share in each firm in the industry – since the group has mass λ, in total they hold λ shares in each firm. Assume also that each firm maximizes a weighted average of shareholder profits, with control proportional to ownership. In this example, proportional control means that each shareholder gets equal control, implying that as a group the common owners have a share λ of control at firm i, and as a group the separate owners have a share $1-\lambda$ of control.

In this case, firm i puts a weight λ on the profits of other firms relative to its own profits (this is often referred to in the literature as the Edgeworth sympathy coefficient). The equilibrium level of profits per firm with N firms in this case is

$$\pi_N^{firm} = N^{-1}H(1+H)^{-2}, \tag{3}$$

where $H = N^{-1}\left[1+(N-1)\lambda\right]$ is the modified Herfindahl-Hirschman index (MHHI). The level of total industry profits with N firms is

$$\pi_N^{industry} = H(1+H)^{-2}. \tag{4}$$

Consider now a potential acquisition of firm 1 by firm 2 for a negotiated acquisition price b. We assume that the acquisition brings an exogenous synergy $s \geq 0$ that accrues to the acquiring firm if the acquisition happens.

We start by extending the result of Proposition 1 characterizing the change in the profits of the merging firms and of the industry in the absence of synergies, to the case of common ownership, that is, λ>0:

Proposition 2. *Suppose $N > 2$. Then, under common ownership ($0 < \lambda \leq 1$), and in the absence*

of synergies, a merger between two firms implies: (i) a decline in the combined value of the acquiring and target firms, (ii) an increase in the combined value of the non-merging firms, (iii) an increase in the combined value of the industry (except in the case of $\lambda = 1$, where the value of the industry is constant).

Proof. See Appendix A1. □

Corollary 1. *The return that the common owners obtain from their acquirer and target holdings is negative, but their overall portfolio return (including non-merging rivals) is positive.*

We next explore how the change in shareholders' incentives under the common ownership case may impact firms' decision to engage in a merger. The calculation of shareholder incentives is more complicated relative to the separate ownership case. Let's consider, in turn, the value for each type of shareholder if the acquisition goes through (their inside option) and if the acquisition does not go through (their outside option).

First, consider the shareholders of firm n that don't have ownership in the other firms. The value of their outside option V_1^O is equal to the profits of firm 1 when there are N firms in the market:

$$V_1^O = \pi_N^{firm}. \tag{5}$$

The value of their inside option V_1^I on the other hand is simply the payment they receive by selling their shares to the owners of firm 2 if the firm is bought:

$$V_1^I = b. \tag{6}$$

Now consider the shareholders of firm 2 that don't have ownership in the other firms. Just like for the owners of firm 1 that don't have common ownership, the value of their outside option V_2^O is equal to the profits of firm 2 when there are N firms in the market:

$$V_2^O = \pi_N^{firm}. \tag{7}$$

The value of their inside option V_2^I is the value of the profits of firm 2 when there are $N - 1$

firms in the market, minus the payment they made to acquire firm 1, plus the value of the synergy:

$$V_2^I = \pi_{N-1}^{firm} - b + s, \tag{8}$$

where H' is the MHHI with $N-1$ firms, given by $H' = (N-1)^{-1}\left[1 + (N-2)\lambda\right]$.

Consider now the shareholders with common ownership, which hold one share in each firm in the industry. The value of their outside option V_C^O is equal to the total profits of the industry when there are N firms:

$$V_C^O = N\pi_N^{firm} = \pi_N^{industry}. \tag{9}$$

The value of their inside option V_C^I is equal to the total profits in the industry when there are $N-1$ firms, plus the value of the synergy, minus the payment firm 2 makes to firm 1 for the acquisition (which they pay because they are shareholders of firm 2), plus the payment firm 2 makes to firm 1 for the acquisition (which they receive because they are shareholders of firm 1). The last two terms obviously cancel out, so their inside option value is simply the joint profits with $N-1$ firms:

$$V_C^I = (N-1)\pi_{N-1}^{firm} + s = \pi_{N-1}^{industry} + s. \tag{10}$$

Since the common shareholders have shares in all firms in the industry, they profit from the merger. The separate shareholders of the target and the acquiring firms jointly lose from the merger. A proposed merger therefore creates a conflict between the common and separate shareholders of the merging firms.

Mergers are negotiated by the management of the two firms, and each manager needs to balance the heterogeneous interests of her shareholders. Under the standard assumption that the manager of each firm maximizes a weighted average of shareholder utilities, we can construct aggregate inside and outside option values for each firm, which we denote as v_1^I, v_2^I, v_1^O,

and v_2^O:

$$v_1^O = \lambda V_C^O + (1-\lambda)V_1^O = \lambda \pi_N^{industry} + (1-\lambda)\pi_N^{firm} \tag{11}$$

$$v_2^O = \lambda V_C^O + (1-\lambda)V_2^O = \lambda \pi_N^{industry} + (1-\lambda)\pi_N^{firm} \tag{12}$$

$$v_1^I = \lambda V_C^I + (1-\lambda)V_1^I = \lambda \left[\pi_{N-1}^{industry} + s\right] + (1-\lambda)b \tag{13}$$

$$v_2^I = \lambda V_C^I + (1-\lambda)V_2^I = \lambda \pi_{N-1}^{industry} + (1-\lambda)\left[\pi_{N-1}^{firm} - b\right] + s. \tag{14}$$

A Nash bargaining solution in which two firms merge exists if there is a payment b such that the inside value is greater than the outside value for both the acquiring and the target firm. The condition for the merger to be accepted by the target is that the share-weighted-average of overall portfolio value of the target's shareholders is greater with the merger than without it, i.e., $v_1^I \geq v_1^O$:

$$b \geq \frac{\lambda}{1-\lambda}\left[-\Delta\pi^{industry} - s\right] + \pi_N^{firm}, \tag{15}$$

where $\Delta\pi^{industry} = \pi_{N-1}^{industry} - \pi_N^{industry} \geq 0$ is the change in industry profits induced by the acquisition.

Similarly, the condition for the merger to be accepted by the acquirer is that $v_2^I \geq v_2^O$:

$$b \leq \frac{\lambda}{1-\lambda}\Delta\pi^{industry} + \pi_{N-1}^{firm} - \pi_N^{firm} + \frac{s}{1-\lambda}. \tag{16}$$

Thus, a merger can occur if and only if the right hand side of equation 15 (i.e., the minimum payment required by the target firm) is smaller than the right hand side of equation 16 (i.e., the maximum payment that the acquirer is willing to offer). In this case there is a payment b such that both the objective function of the target and the acquirer would increase with the acquisition. We summarize this analysis in the following proposition:

Proposition 3. *A Nash bargaining solution in which two firms in the industry agree to merge exists if*

and only if the synergy is greater than a threshold $\bar{s}$:

$$s \geq \bar{s} = -\frac{1-\lambda}{1+\lambda}\Delta\pi^{merging} - 2\frac{\lambda}{1+\lambda}\Delta\pi^{industry}. \tag{17}$$

where $\Delta\pi^{merging} = \pi_{N-1}^{firm} - 2\pi_{N}^{firm}$.

The synergy threshold has two distinct components. The first one is the change in profits for the merging firms. From Propositions 1 and 2 we know that the combined profits of the merging firms is lower after the merger (or equal if $\lambda = 1$). The second component is the change in profits in the industry due to merger. Each term is weighted by a coefficient that depends on the degree of overlapping ownership as captured by λ[6].

For the case of separate ownership when $\lambda = 0$, the synergy threshold is at its maximum: all the weight is put in the first term and, therefore, the synergy threshold is positive and equal to the loss in profits by the merging firms. That is, separate owners require a positive synergy to support the merger.

For the case of common ownership, i.e. $\lambda > 0$, the overall synergy threshold will depend on the weight on the profits of the merging firms plus the weight on the profits of the industry. As λ increases and gets closer to 1, the coefficient weight shifts from the change in profits of the merging firms to the profits from the industry. Since the total profits of the industry are always higher after the merger, common owners would support the merger at a lower synergy threshold. For this reason, the second term in Equation 17 can reduce the synergy threshold.

It is important to note that the effect of λ on the synergy threshold is two-fold. As we just discussed, it affects the coefficient weights of the two components of the synergy (we call this the *direct effect*). However, it also affects the change around the merger in both the profits of the merging firms and the industry profits (we call this the *indirect effect*).

To understand the contribution of each effect, Figure 1a shows the synergy threshold as function of λ for different values of N. When $N = 2$, the synergy required is lower than 0

[6]These two coefficients are not proper weights that add up to 1, but behave in a monotonic fashion: as lambda increases the first coefficient decreases, while the second one increases.

for every λ, which is the case for merging to monopoly. When $N > 2$ but is also small, the combined value of the two firms after the merger drops significantly. If all shareholders are separate owners ($\lambda = 0$), they require a rather *high* synergy to compensate for the drop in the combined value of the firms. However, as we increase the presence of common owners, the synergy required drops monotonically to zero because the drop in the combined value of the two firms after the merger is compensated with the increase in value of the non-merging firms.

As we increase N, the effect of common ownership on the synergy threshold is less pronounced, because the change in both profits of the merging firms and the industry due to the merger become smaller. If N is very large then profits are small because the industry is close to perfect competition, and therefore the synergy required to compensate owners of the merging firms for their loss in profits is lower. We observe that, in this scenario, λ has a a very small effect on the synergy.

For low and mid levels of N common ownership has a strong impact on the level of synergy threshold because it changes the intensity of oligopolistic competition between the firms. However, this effect becomes small when N increases as the industry becomes close to competitive.[7]

For low levels of λ we actually observe a hump-shape. Since λ can affect both the weights (direct effect) and the change in profits (indirect effect), when common ownership is very low, an increase in λ actually increases the synergy threshold because the indirect effect on profits dominates the direct effect on weights. Figures 2 show the contribution of each effect to the change in the synergy threshold for N equal to 3 and 10. In sum, this model shows that the Cournot merger paradox is not *solved* with the presence of common ownership. When $N > 2$ we do need a positive synergy for the merger, so the paradox is still there. However we have shown that common ownership helps reduce the synergy required.

The model developed in this section illustrates a new scenario under which the Cournot merger paradox can be overcome and mergers are a rational outcome from the point of view of

[7]Note that when λ is 1 then the synergy threshold is zero across all N.

a subset of shareholders.[8] While we illustrate the idea that common ownership of rival firms increases the incentive to merge using the classic Cournot case, the same insight applies also to Bertrand competition and also more generally, as long as some of the gains from the merger are internalized by non-merging rival firms.

3 Empirical Analyses

3.1 Data Description and Sample Characteristics

Our sample includes all horizontal deals from 1980 to 2016 from SDC Thomson-Reuters[9]. We keep a deal if the acquirer owns less than 50% of the target prior to the announcement and is seeking to own more than 50% of the target. We match this sample with financial information from Compustat, pricing from CRSP and institutional ownership from the Thomson Reuters 13F database. The final sample is comprised of 1,154 horizontal mergers.

Table 1 presents the summary statistics of the deals in our sample. We define a horizontal M&A deals based on historical CRSP 4-digit SIC codes, however we also conduct robustness analyses with historical COMPUSTAT 4-Digit SIC codes and Hoberg & Phillips industry classification (Hoberg and Phillips, 2010, 2016), which are presented in Section 5. Acquisitions are on average value destroying for acquirers and value improving for targets in accordance to prior literature. The average cumulative abnormal return (CAR)[10] for a (-1,+1) 3-day window around the announcement of the deal is -1.34% for acquirers and 18.02% for targets. For firms with multiple securities (PERMNOs), we calculate the CARs and the dollar gain/loss as a value weighted average at the firm level (PERMCO). The average synergy gain[11] is 2.01% and aver-

[8] Perry and Porter (1985) and Deneckere and Davidson (1985) show that mergers could be rational under some conditions if firms are capacity-constrained or if they compete in prices with differentiated products

[9] Note that MO covers deals from 1981 to 2003 and HJL covers deals from 1984 to 2006. Hence we are examining at least 10 additional years of merger activity and changes in ownership structure.

[10] The CAR is calculated with the market model. We also conduct our analyses with the Fama-French model in our robustness check and obtain similar results.

[11] Synergy is the CAR (-1,+1) of the value weighted portfolio of the acquirer and target following HJL.

age dollar value of synergy gain is $46 million. The median acquirer share of synergy gain is 20% for deals with positive synergies, indicating that 80% of the synergy gain should be attributed to the target. The level of institutional ownership is higher for the acquirer firm (53%) than the target firm (39%), which is in line with the fact that target firms tend to be smaller in size. [12]

3.2 Stakes in Acquirer, Target and Industry Rivals

Table 2 shows the average stakes held by the largest acquirer shareholders across the acquirer, the target, and rival firms in the same industry. For each deal, the acquirer shareholders are ranked based on the controlling shares held in the acquirer only[13]. As HJL document, large acquirer shareholders have on average small stakes in the target. Since target firms are usually much smaller than acquirers, market value gains on targets may not offset completely the losses on the acquirer side. An average top ten acquirer shareholder owns 2.8% of the acquirer and only 0.7% of the target.

For the same ranked shareholders we also show the relevant ownership stakes in industry rivals. On average they hold 1.58% across such rivals, which is double relative to the stake in targets. We use historical CRSP 4-digit SIC codes to identify industry rivals. Again, robustness analyses based on different industry classifications are presented in Section 5. While the average stake in rivals is smaller than the 2.8% average stake held in the acquirer, we show that they hold a large number of rivals. On average they hold 25 rivals which correspond to 30% of the firms within the industry. If the top ten shareholders were to act in coalition, on average their joint stake in a rival firm is 6.51%, they hold jointly 80 rivals which correspond to 70% of the industry.

Next, we calculate the portfolio weights for each acquirer shareholder across acquirer, tar-

[12] Panel B provides descriptive statistics for the full sample of all M&A deals and is similar to both the MO and HJL samples.

[13] In some deals certain acquirer shareholders hold the same amount of shares, for example, there are more No.1-ranked acquirer shareholders than the number of acquisitions in the sample.

get and rivals. These weights are based on the dollar value of the combined holdings in the industry. Table 3 shows that the portfolio weight on rivals is on average larger than the weight on the acquirer for the largest shareholders. As well the weight on the target is very small. 71% of the top ten largest acquirer shareholders have larger weight on the industry rivals than on the acquirer. Adding in the weight on target only increase this percentage to 72%. This indicates the importance of taking rival ownership into account and the potential overall value-improvement for acquirer shareholders given that rivals tend to gain from value-destroying M&A deals as shown by (Song and Walkling, 2000; Shahrur, 2005; Servaes and Tamayo, 2013).

3.3 Acquirer Return and Adjustments for Cross-ownership

Having established the relevance of cross- holdings in rival firms, we now proceed to compute the total return for each acquirer shareholder.

$$r = \frac{\alpha_a V_a CAR_a + \alpha_t V_t CAR_t + \sum_{j \in J} \alpha_j V_j CAR_j}{\alpha_a V_a + \alpha_t V_t + \sum_{j \in J} \alpha_j V_j} \tag{18}$$

Equation 18 shows the return calculation for each acquirer shareholder. α stands for the shareholder's ownership percentage in the acquirer, target, and non-merging rival firms in the industry, respectively indexed by a, t, and j, with J representing the set of non-merging industry firms. V is the market capitalization two days prior to the announcement while CAR is the 3-day cumulative abnormal return around the announcement date.

Table 4 Panel A shows the acquirer shareholders' returns from the M&A announcements for all horizontal deals. Columns 1 to 3 report the shareholder's CAR (-1, +1) on the acquirer, target and rival stakes. It is worth noting that the return on the rivals are positive and significant. For the average top 10 acquirer shareholder the return on rivals is a significant 0.35%. In Column 4 we adjust the acquirer returns by taking into account the gains in the target. We show that target ownership does mitigate loss on acquirer stake for the average top ten acquirer shareholder, but the net return is still negative, around -0.35%, and significant. Next in Column 5 we

further adjust the return to account for a gain or a loss in the non-merging rivals and show that the net return is not negative anymore. These results are in line with Corollary 1, indicating that rival ownership plays a key role in offsetting the losses on the acquirer stake.

Next, we include the possibility of a coalition among both the top ten and all acquirer shareholders as assumed by MO, which is reflected in Equation 19. i is an individual shareholder within the set I of the top 10 largest or all acquirer shareholders.

$$r = \frac{(\sum_{i\in I}\alpha_a)V_aCAR_a + (\sum_{i\in I}\alpha_t)V_tCAR_t + \sum_{j\in J}(\sum_{i\in I}\alpha_j)V_jCAR_j}{(\sum_{i\in I}\alpha_a)V_a + (\sum_{i\in I}\alpha_t)V_t + \sum_{j\in J}(\sum_{i\in I}\alpha_j)V_j} \tag{19}$$

We find that when we treat the top ten acquirer shareholders as a block with aligned interests, target ownership makes the net return from the deal statistically insignificant, which is in line with MO findings. Gains on the stakes in non-merging rivals do not appear to have an effect in this case.

Next we focus our analysis solely on value-destroying horizontal deals by restricting our sample to deals with negative CAR (-1,+1). As shown in Table 4 Panel B, the CARs are significantly more negative with a mean of -5.46% for the top ten largest acquirer shareholders and -5.24% for the average shareholder. Most strikingly, we observe that the returns on non-merging rivals are much stronger than in panel A and double than the target returns in column 2, supporting the merger paradox that non-merging rivals capture the gains in a value-destroying deal. After adjusting for potential gains from target ownership, the returns for large acquirer shareholders only improve by an average of 1.32% (Column 2) and remain substantially negative with an average of -4.13% (Column 4). However, rival and target ownership combined do appear to significantly improve returns for these acquirer shareholders. For an average top ten acquirer shareholder in a bad deal, common ownership improves its return by 3.93% (Column 2 + 3). While it cannot completely offset the loss on the acquirer stake, common ownership cuts the loss substantially to an average of -1.53%. If the acquirer shareholders form coalitions, target ownership only improves the return by 1.53% while common ownership improves return

by 4.53%. Figures 3 visually show the magnitude of these improvements.

In sum, for all horizontal deals, return adjusted for common ownership mainly hovers around zero while acquirer CAR and return adjusted for target ownership are negative. For horizontal deals with negative announcement returns, the difference between acquirer CAR and return adjusted for common ownership is very substantial while target ownership barely mitigates the acquirer loss. The plots of the medians show the same patterns, indicating that our results are not driven by outliers. This evidence could suggest that large acquirer shareholders may approve value-destroying acquisitions since they can hedge the losses of the deal with their combined stakes in target and rival companies.

3.4 Dollar Value Gain/Loss

To better illustrate the magnitude of the returns, we look at gains and losses in dollar value for the bad horizontal deals. According to Table 5, on average a large acquirer shareholder loses $11.53 million from its acquirer ownership in a bad deal. Only 10% of large shareholders achieve a net gain from the deal when accounting for target ownership, which is consistent with HJL's results. However, when we take rival ownership into account, this percentage is tripled: 30% of the acquirer shareholders achieve a net gain from the deal. This can shed some lights as to why large shareholders of acquirers may approve value-destroying acquisitions: almost a third of them achieve a net gain for their overall industry portfolios.

The No.1 largest acquirer shareholder(s) in 25% of the 695 bad horizontal deals in our sample end up with a net gain after accounting for common ownership. In almost a third (32%) of the bad deals half or more of the acquirer's top ten shareholders generate positive returns to their industry portfolios in the 3-day window around the merger announcement. Table 6 presents the characteristics of large acquirer shareholders who win and lose in bad deals when taking into account their holdings of target and rival stocks. For the 30% of large acquirer shareholders that achieve a net gain from the value-destroying horizontal deals on the combined holding of acquirer, target, and rivals, they have higher weights on rivals in their portfolio than

the ones who lose. The winning shareholders also hold higher numbers of rivals, 38 versus 26 in the losers group, indicating that they have more diversified industry portfolios. As a result, such shareholders should pay more attention to overall industry gains rather than focusing only on losses from the acquirers when evaluating mergers. The average industry rival CAR is 0.6% in the winning shareholders' portfolio while it is -0.4% for the losing shareholders.

For the winning shareholders in bad deals, instead of losing an average of $7.16 million on their acquirer stakes, they achieve an average net gain of $39.08 million thanks to their stakes in the target and industry rivals. As an example, during Travelers Group's acquisition of Salomon Brothers in 1997, among the top ten largest controlling institutional shareholders of Travelers, the average loss on the Travelers stake was $29.1 million for each one. However, six of these shareholders generated a net gain from this deal thanks to their target and rival ownership.

Among them, the No.2 institutional shareholder of Travelers, Equitable Companies, lost $40.7 million on its Travelers stake around the deal announcement. While Equitable did hold shares in Salomon at that time, the gain from these shares merely reduced its loss from Travelers to $37.2 million. However, Equitable generated a net gain of $27.8 million from its overall industry portfolio after accounting for its ownership in both Salomon and other industry rivals. Barclays suffered a $31.7 million loss on its Travelers stake yet ended up with a $59.9 million gain after accounting for common ownership. Fidelity would have lost $28.2 million from the announcement of this deal but ended up with a net gain of $17.5 million after accounting for common ownership. Bankers Trust, Mellon, and State Street all suffered losses ranging from $18 million to $20 million but ended up with strong positive gain thanks to their ownership in the non-merging industry rivals, with State Street netting a high $75 million gain.

Another high profile example is the controversial $67 billion merger of AT&T and Bell-South in 2006. The deal was not well received by the market, leading to a loss of 3.26% for AT&T shareholders in the 3-day window around the merger announcement. However, all of AT&T's top ten institutional shareholders ended up with a positive net gain after accounting for common ownership. They included Barclays, State Street, Morgan Stanley, Wellington,

AXA, Northern Trust, Bank of America, UBS, Mellon, Lord Abbett, with dollar losses ranging from $33 million to $136 million. Taking common ownership into consideration, all ten of them walked away with strong positive gains from the announcement of this merger. Interestingly, in another well-known "bad deal" in the same industry in 2005, Verizon's acquisition of MCI, six of the top ten institutional shareholders of Verizon ended up with a positive gain after accounting for common ownership. Morgan Stanley, Mellon, and Lord Abbett were also among the winners of this deal. Such presence of diversified shareholders with strong common ownership might shed lights on the approval of deals like these which are value-destroying for pure shareholders of AT&T and Verizon.

4 Common Ownership and M&A Frequency

The evidence we have provided so far with our event study implies that common ownership allows many acquirer shareholders to internalize the gains by non-merging rivals of the acquirer from the merger, even in deals that are seemingly value-destroying to the acquirer. This leads to a suggestive hypothesis that higher common ownership increases the frequency of M&A activities within an industry. To test this hypothesis, we use the measure of the weight that acquiring firm shareholders put on the value of the target and rival firms. In our model, these two are the same, but in the data, of course, they can be different. In the data the weight that firm j puts on the profits of firm k relative to its own profits is

$$\lambda_{jk} = \frac{\sum_{i=1}^{I} \gamma_{ij}\beta_{ik}}{\sum_{i=1}^{I} \gamma_{ij}\beta_{ij}}, \tag{20}$$

where $i = 1, \ldots, I$ is the set of shareholders of firm j, γ_{ij} is the control weight of shareholder i in firm j, and β_{ij} is the ownership share of shareholder i in firm j. We calculate λ_{jk} for the firm pairs in our sample under the assumption of control proportional to voting shares.

We then calculate a weighted average (where a pair of firms is weighted by the product of

their market shares) of λ_{jk} for each industry:

$$\overline{\lambda} = \sum_{j} \sum_{k \neq j} \frac{s_j s_k}{\sum_l \sum_{m \neq l} s_l s_m} \lambda_{jk}, \tag{21}$$

where s_j is the market share of firm j.

We then run a negative binomial panel regression with the merger count within an industry as the dependent variable and the log of $\overline{\lambda}$ for that industry as the main explanatory variable[14]. We classify industries according to historical 4-digit CRSP SIC code. We restrict the sample to industry/year groups with number of firms greater than two. We also include the logarithm of number of firms in the industry for the given year in the regression. We control for industry growth opportunities, industry size, and industry capital structure. All explanatory variables are lagged one year to avoid simultaneity. The results are shown in Table 7.

Higher $\overline{\lambda}$ does appear to increase M&A activities within the industry, consistent with our theory. As indicated in the simulation results of our model, the effect of common ownership on industry merger activity decreases with the number of firms in the industry. In Column (2), (3), (4) and (5) of Table 7 we add the logarithm of number of firms in the industry/year group into the regression of industry merger deals on $\overline{\lambda}$. The effect of $\overline{\lambda}$ strongly depends on the the number of firms in the industry. Consistent with our model, $\overline{\lambda}$ has a positive effect on number of merger deals while the interaction between $\overline{\lambda}$ and the number of industry firms has a negative effect. With a higher level of common ownership in the industry, the synergy level required for a merger is smaller. As a result, higher common ownership leads to higher merger activity within the industry. This positive effect of common ownership is strongest when number of firms in the industry is small. The effect diminishes as number of firms in the industry increases and eventually gets completely offset when the industry has a large amount of firms. This relationship is robust to the inclusion of industry controls and fixed effects.

Among the control variables, higher growth opportunities leads to more M&As. Growth

[14]We have also run a Poisson panel regression and obtained similar results.

opportunities is proxied by market value weighted market-to-book ratio of the industry. We use the log of total industry asset to proxy for industry size. Larger industries offer more opportunities for firms to merge. Finally, we use market value weighted leverage ratio of the industry to proxy for industry capital structure. A more levered industry appears to have fewer mergers, which might due to difficulties in access to funding. However, this relationship is not statistically significant in the regression.

The two charts in Figure 4 visually illustrate the relationship between merger activities and common ownership. We calculate the average number of horizontal mergers for each level of $\overline{\lambda}$ and number of industry firms. A merger is more likely to occur when the industry has more firms. The average number of horizontal mergers increases as $\overline{\lambda}$ level increases except when $\overline{\lambda}$ reaches the highest level, providing further evidence that common ownership can lead to higher merger activity within the industry. As shown in the model, when $\overline{\lambda}$ is equal to one, there are no separate owners and the effect of common ownership on merger activity is no longer important.

5 Alternative Industry Classifications and Estimation Model

Since the industry classification is key to identifying horizontal deals and rival ownership we provide robustness analyses for two additional industry classifications in the appendix section. We use the historical COMPUSTAT 4-digit SIC codes and, most importantly, Hoberg & Phillips industry codes. The results remain the same. We require both the acquirer and target to have non-missing industry codes. COMPUSTAT started reporting historical SIC codes from 1986 while the H&P codes only started from 1996; hence, there are fewer observations using these two classifications.

Table A.1 presents the return comparisons using historical COMPUSTAT 4-digit SIC codes. Column 4 shows that target ownership alone completely offsets the loss on the acquirer stake for the top ten shareholders and the average shareholders. Column 5 adds the returns of com-

mon ownership and makes the return significantly positive. When restricted to only bad horizontal deals, target ownership only mitigates a small portion of the acquirer loss while common ownership substantially offset the -5.83% acquirer CAR by 4.11% for the average top ten acquirer shareholder. Table A.2 presents the return comparisons using H&P industry codes. As in the prior cases, the return adjusted for common ownership improves noticeably relative to the adjustment for only target ownership. In Panel A, the remaining -0.36% loss is substantially smaller than the -2.4% acquirer CAR for the average top ten shareholder. In panel B, common ownership offsets the -6.36% acquirer CAR by 4.67% while target ownership only provides a 1.76% correction.

Table A.3 Panel A presents the wealth improvement on bad horizontal deals for acquirer shareholders based on the two alternative industry classifications. Large acquirer shareholders suffer a smaller average loss on their acquirer stakes in the COMPUSTAT SIC sample, while target ownership completely offsets the loss for 13% of these shareholders and common ownership does it for 27% of them. Using the H&P sample, gains on common ownership compensates for over 100% of the acquirer loss for 29% of the large acquirer shareholders, which is consistent with the results of Table 6. Overall, we conclude that results based on the two alternative industry classifications are in line with our baseline findings that, in value-destroying horizontal deals, gains on common ownership mitigate the loss due to the acquirer stake for large shareholders. Moreover, over a quarter of such shareholders end up with a positive net gain after accounting for common ownership.

Finally, we provide robustness analysis using the Fama-French three factor model to compute the CARs. Table A.4 and A.5 present results of return comparisons and wealth improvement in bad deals using this alternative estimation model based on the historical CRSP 4-digit SIC codes. Again, results are consistent. For all horizontal deals, return to an average top ten acquirer shareholder only becomes statistically insignificant after accounting for common ownership. Common ownership mitigates the loss on acquirer stake of -5.38% by 3.92% while target ownership only provides a 1.34% improvement in bad horizontal deals. 30% of the top

ten acquirer shareholders achieve a positive net gain after accounting for common ownership in bad horizontal deals, in line with our baseline results.

6 Conclusion

We developed a theory of acquisition decisions with common ownership. Since in a symmetric Cournot model rival firms capture all the gains from the merger, when firms are separately owned they cannot agree to merge unless $N = 2$. However, if some of the firms' shareholders have common ownership of rival firms, they would gain from the merger. Therefore, if the firms maximize a weighted average of shareholder profits, an increase in common ownership increases the incentive to merge, and if common ownership is high enough there can be a merger despite a negative combined return to the acquiring and target firms.

Empirically, we find that positive returns for rival firms–together with common ownership of rivals–can help rationalize why acquisitions have negative cumulative adjusted returns for the acquiring firm. Taking into account common ownership of both the target firm and rivals, the average shareholder of the average acquiring firm makes a zero adjusted return around the acquisition announcement. Common ownership largely mitigates the negative announcement returns to acquirer shareholders in value-destroying deals. Specifically, 30% of the large acquirer shareholders in such "bad deals" end up with a net gain in their overall industry portfolios during the 3-day window around the merger announcements. We also find a positive correlation between common ownership and number of future mergers within an industry. We interpret this evidence as suggesting that a high common ownership environment is a contributing factor to high M&A activity.

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7 Figures

Figure 1: **Synergy Threshold Needed for a Nash Bargaining Solution.** This figure shows the minimum synergy needed for the existence of a Nash bargaining solution with agreement to merge between two firms, as a function of common ownership (measured by λ) and the number of firms (N).

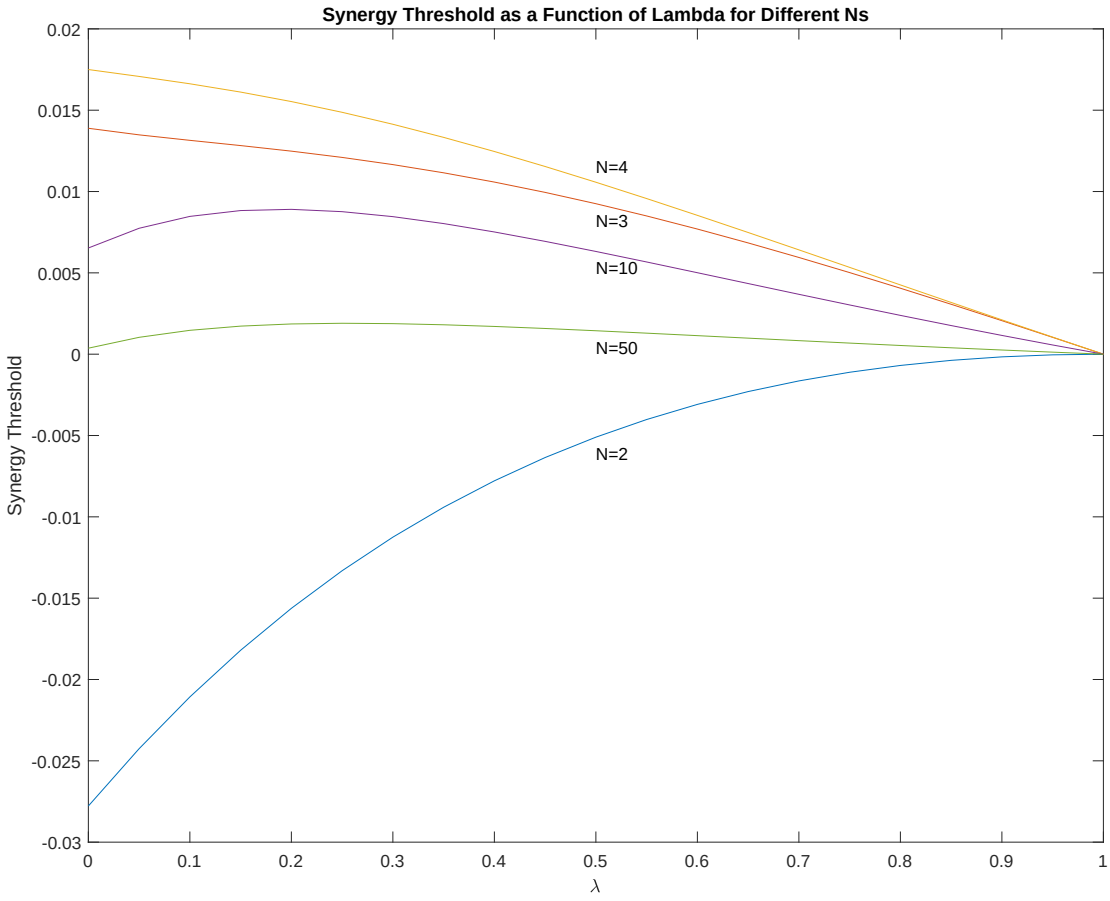
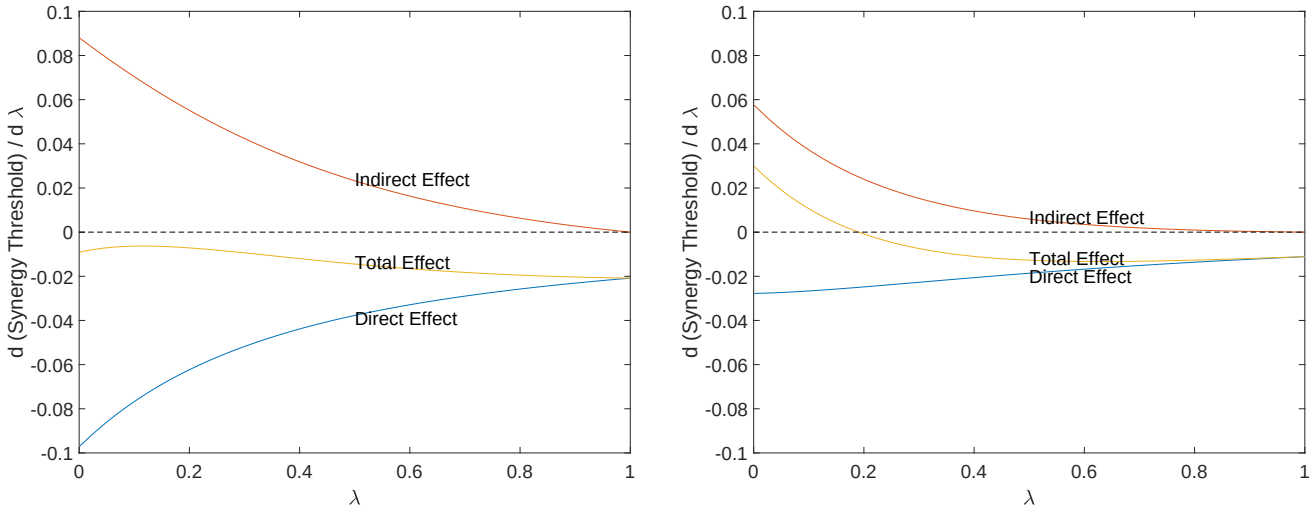


Figure 2: **Direct, Indirect, and Total Effects of λ on Synergy Threshold.** This figure shows the change in the synergy threshold as a function of common ownership (measured by λ) and the number of firms (N). The Direct Effect is the partial derivative on the weights keeping the change in profits constant. The Indirect Effect is the partial derivative on the change in profits keeping the weights constant. The derivative of the synergy threshold with respect to λ (obtained by taking derivative with respect to λ in the expression for $\bar{s}$ from equation 17) is:

$$\frac{\partial \bar{s}}{\partial \lambda} = \underbrace{\frac{2}{(1+\lambda)^2}\left(\Delta\pi^{merging} - \Delta\pi^{industry}\right)}_{\text{direct effect}} \underbrace{-\frac{1-\lambda}{1+\lambda}\frac{\partial\left(\Delta\pi^{merging}\right)}{\partial\lambda} - 2\frac{\lambda}{1+\lambda}\frac{\partial\left(\Delta\pi^{industry}\right)}{\partial\lambda}}_{\text{indirect effect}}.$$



(a) $N = 3$

(b) $N = 10$

Figure 3: **Annual Average Acquirer Shareholder Returns in All Horizontal Deals and Bad Horizontal Deals.** This figure shows the average return from acquirer ownership (acquirer CAR(-1,+1)), return from acquirer and target-ownership, return from acquirer, target, and rival ownership, for the top 10 largest shareholders of each acquirer from 1980 to 2016. All horizontal merger deals are shown in the first chart, bad horizontal deals are shown in the second chart. A deal is identified as horizontal when the acquirer and target have the same historical CRSP 4-digit SIC code. Bad deals are defined as deals with negative acquirer CAR(-1,+1) which results in a loss for the acquirer shareholders.

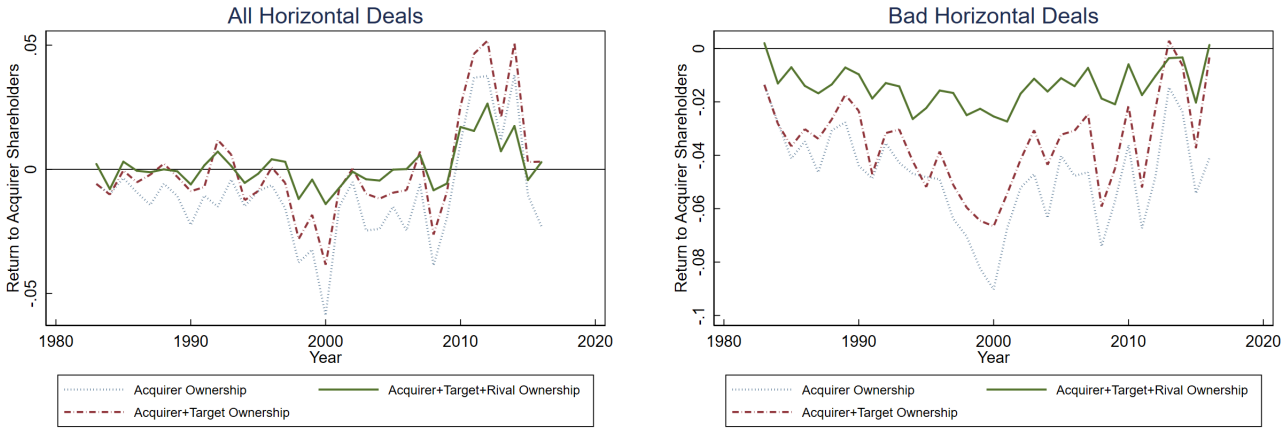


Figure 4: **Merger Activity Level and Industry Concentration Level.** This figure shows the average number of mergers at each level of industry common ownership and industry number of firms. The share weighted average lambda, $\overline{\lambda}$, measures common ownership within the industry, which is calculated with Equation 20 and 21. The $\overline{\lambda}$ in each industry/year group are ranked into deciles. Number of firms is the number of firms within the industry in the given year and ranked into deciles for each industry/year group. Average merger activity level is measured by average number of horizontal merger deals for each level of $\overline{\lambda}$ or number of firms

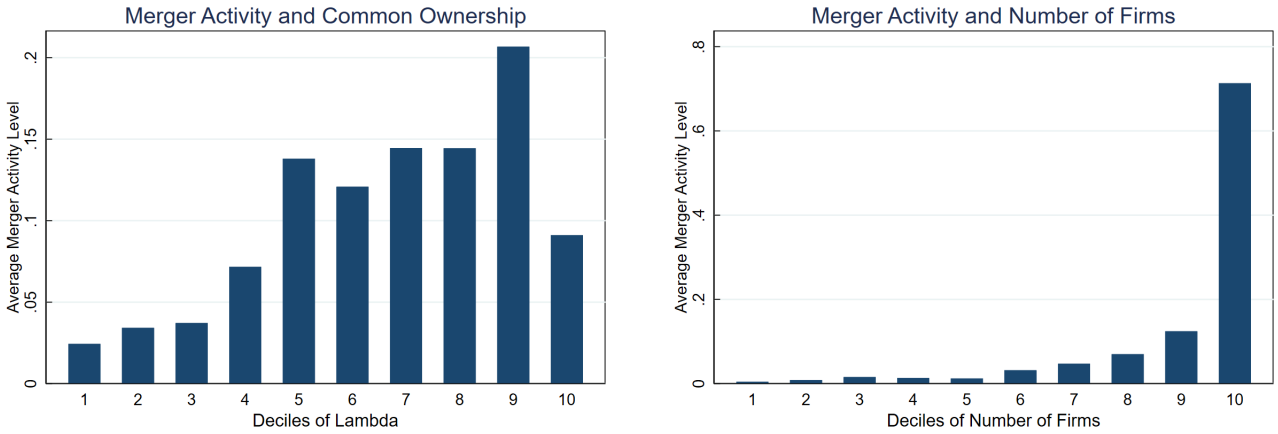


Table 1: **Summary Statistics for Key Variables.**

Panel A presents the horizontal sample, consisting of 1,183 acquisition attempts announced from 1980 to 2016. Panel B presents the full sample, which consists of 4,897 deals. Both the acquirers and targets can be matched with data in CRSP, Compustat, and CDA/Spectrum database. An acquisition is kept if the acquirer owns less than 50% of the target prior to announcement and is seeking to own greater than 50% of the target. For a completed deal to be included, the acquirer has to own greater than 90% of the target upon completion. A deal is considered diversifying if the target has a different SIC code than the acquirer. Following Harford, Jenter, and Li (2011), the CAR(-1,+1) is calculated using the market model with an estimation window of (-200, -60) prior to the announcement date. Rival CARs are calculated as the average CAR across all rivals in the industry. Synergies(percent) is the CAR (-1,+1) of the value weighted porfolio of the acquirer and target, with target adjusted for toehold. Synergies($) is synergies percentage times the combined market value of the acquirer and target two days prior to the announcement, with target market value adjusted for toehold. The acquirer share of synergies is calculated as the abnormal increase in acquirer market value divided by synergy dollar value during the (-1,+1) window. It is calculated for deals with positive synergies only and is winsorized at the 1% level.

Panel A: Horizontal M&A Deal Sample (1980-2016)

Variable	Obs	Mean	Median	Std. Dev	5th Perc.	95th Perc.
Acquirer CAR(%)(-1,+1)	1,154	-1.34	-1.15	7.09	-13.02	10.64
Target CAR(%)(-1,+1)	1,154	18.02	13.71	21.15	-6.49	57.95
Rival CAR(%)(-1,+1)	1,154	0.21	0.17	1.75	-2.67	3.29
Synergies(%)	1,154	2.01	1.17	6.98	-8.52	15.27
Synergies($million)	1,154	46.47	7.84	872.23	-606.20	1,061.10
Acquirer share of synergies(%)	712	-86.85	20.16	428.10	-615.22	98.58
Acquirer total institutional ownership	1,154	0.530	0.526	0.287	0.067	0.962
Target total institutional ownership	1,154	0.395	0.342	0.276	0.024	0.867
Premium(%)	963	41.49	33.16	39.71	-6.46	115.28
Complete	1,154	0.762	1.000	0.426	0.000	1.000
Competing	1,154	0.087	0.000	0.281	0.000	1.000
All cash	1,154	0.198	0.000	0.399	0.000	1.000
All stock	1,154	0.392	0.000	0.488	0.000	1.000
Toehold	1,154	0.006	0.000	0.040	0.000	0.004

Panel B: All M&A Deal Sample (1980-2016)

Variable	Obs	Mean	Median	Std. Dev	5th Perc.	95th Perc.
Acquirer CAR(%)(-1,+1)	4,897	-1.17	-0.87	7.47	-12.56	9.86
Target CAR(%)(-1,+1)	4,897	19.43	15.05	24.07	-6.56	60.74
Rival CAR(%)(-1,+1)	4,857	0.16	0.11	2.33	-2.83	3.26
Synergies(%)	4,897	1.86	0.86	2.41	-9.29	14.44
Synergies($million)	4,897	38.35	5.69	1333	-709	889
Acquirer share of synergies(%)	2,905	-45.96	30.35	339	-447	110
Acquirer total institutional ownership	4,897	0.516	0.519	0.262	0.079	0.933
Target total institutional ownership	4,897	0.374	0.320	0.265	0.026	0.851
Premium(%)	4,038	43.8	35.3	53.9	-6.0	116.2
Complete	4,897	0.740	1.000	0.438	0.000	1.000
Diversifying	4,897	0.764	1.000	0.428	0.000	1.000
Competing	4,897	0.093	0.000	0.291	0.000	1.000
All cash	4,897	0.241	0.000	0.428	0.000	1.000
All stock	4,897	0.369	0.000	0.483	0.000	1.000
Toehold	4,897	0.009	0.000	0.048	0.000	0.048

Table 2: **Target and Rival Cross-holding by Acquirer Shareholders.**

This table presents the holdings in the acquirer, target and rival by the largest institutional shareholders of the acquirer. The sample consists of 1,183 horizontal deals. Acquirer shareholders are ranked based on their controlling ownership percentage. The stake in rivals is calculated as the average stake the shareholder holds in companies within the same historical CRSP 4-digit SIC code. We also report the number of rival firms held by the acquirer shareholders. The bottom rows include the possibility of the top 10 acquirer shareholders and all acquirer shareholders acting as a block. The stakes and number of unique rivals held are aggregated in these cases. All numbers are winsorized at the 1%

Shareholder Rank in Acquirer		Stakes in Acquirer		Stakes in Target		Stakes in Rival		Number of Rivals Held		% of Industry Firms Held	
Rank	Obs	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
1	1,175	6.04%	6.58%	1.20%	0.00%	2.37%	1.93%	23	9	30%	19%
2	1,141	4.39%	4.16%	1.06%	0.00%	2.07%	1.75%	28	11	33%	25%
3	1,148	3.40%	3.18%	0.83%	0.00%	1.78%	1.41%	27	10	32%	23%
4	1,124	2.80%	2.58%	0.71%	0.00%	1.64%	1.28%	25	8	30%	21%
5	1,121	2.38%	2.24%	0.59%	0.00%	1.49%	1.14%	26	10	31%	22%
6	1,108	2.10%	1.95%	0.56%	0.00%	1.39%	1.05%	24	8	30%	20%
7	1,091	1.87%	1.73%	0.56%	0.00%	1.34%	1.00%	26	10	31%	21%
8	1,097	1.68%	1.58%	0.47%	0.00%	1.26%	0.91%	22	8	28%	19%
9	1,076	1.56%	1.45%	0.52%	0.00%	1.24%	0.93%	24	8	29%	20%
10	1,067	1.41%	1.30%	0.45%	0.00%	1.09%	0.83%	25	9	29%	21%
Avg. Top 10 Sh.	11,148	2.80%	2.17%	0.70%	0.00%	1.58%	1.16%	25	9	30%	21%
Avg. All Sh.	67,841	0.86%	0.36%	0.30%	0.00%	0.87%	0.50%	16	5	24%	16%
Coalition of Top 10	1,154	27.05%	26.99%	6.79%	5.58%	6.51%	5.62%	80	46	70%	72%
Coalition of All	1,154	50.61%	50.29%	17.79%	12.93%	16.00%	12.65%	93	52	78%	80%

Table 3: **Portfolio Weights on Acquirer, Target, and Industry Rivals.**

This table shows the portfolio weight an acquirer shareholder puts on its stake on the acquirer, target, and industry rivals relative to its overall industry portfolio. The industry holding portfolio is the shareholder's combined holding of the acquirer, the target, and the industry rivals. The portfolio weights are calculated as the dollar value holding of the acquirer, the target, or the rivals, respectively divided by the combined dollar value holding of the industry portfolio. We report the percentages of scenarios when an acquirer shareholder puts a larger weight on rivals than on the acquirer and when an acquirer shareholder puts a larger weight on target and rivals combined.

Shareholder Rank in Acquirer		Weight on Acquirer		Weight on Target		Weight on Rivals		% with larger weight on rivals than on acquirer	% with larger weight on target and rivals than on acquirer
Rank	Obs	Mean	Median	Mean	Median	Mean	Median		
1	1,175	40%	26%	2%	0%	57%	71%	64%	65%
2	1,141	34%	17%	2%	0%	64%	81%	71%	72%
3	1,148	33%	17%	2%	0%	65%	81%	71%	73%
4	1,124	34%	19%	2%	0%	64%	80%	70%	71%
5	1,121	32%	16%	2%	0%	66%	82%	72%	73%
6	1,108	33%	18%	2%	0%	65%	80%	72%	73%
7	1,091	31%	14%	3%	0%	67%	84%	73%	74%
8	1,097	32%	16%	2%	0%	66%	82%	73%	74%
9	1,076	32%	16%	2%	0%	66%	82%	72%	74%
10	1,067	33%	15%	2%	0%	65%	82%	71%	73%
Avg. Top 10 Sh.	11,148	33%	17%	2%	0%	64%	80%	71%	72%
Avg. All Sh.	67,841	36%	19%	3%	0%	62%	79%	69%	70%

Table 4: **Returns for Largest Shareholders of Acquirers around Horizontal M&A Announcements.**

This table presents the returns for 1,183 Horizontal M&A announcements from 1980 to 2016 for the largest shareholders of the acquirer. For each shareholder, returns are displayed across her portfolio in the industry: the returns delivered via the acquirer, the target and the rivals. The CARs are computed for the (-1,+1) window and are calculated using the market model with an estimation window of (-200, -60) prior to the announcement date. Column 4 reports the return adjusted for target ownership as the combined net gain/loss on acquirer and target divided by the combined holding value in acquirer and target for each shareholder. Column 5 reports the return adjusted to common ownership as the net gain/loss on acquirer, target and industry rivals, divided by the combined holding value of these firms by the shareholder. We report statistics for the the average top 10 shareholders and all shareholders regardless of ownership percentage. As well we include the possibility of the top 10 acquirer shareholders or all acquirer shareholders acting as a block. Panel B presents the same statistics for the sub-sample of Bad deals, that is, those deals with negative CAR(-1,+1). *, **, and *** note significance at the 10%, 5%, and 1% level respectively.

Panel A. Returns for Largest Shareholders of Acquirers in All Horizontal Deals

		(1)	(2)	**(3)**	(4)	**(5)**
Shareholder Rank in Acquirer		Return on Acquirer	Return on Target	**Return on Rivals**	Return Adj. Target Ownership	**Return Adj. Target+Rival Ownership**
Rank	Obs	Mean	Mean	**Mean**	Mean	**Mean**
1	1,175	-0.0146***	0.0099***	**0.0023**	-0.0047**	**-0.0024****
2	1,141	-0.0134***	0.0109***	**0.0025**	-0.0024	**0.0001**
3	1,148	-0.0137***	0.0101***	**0.0039****	-0.0036*	**0.0003**
4	1,124	-0.0138***	0.0114***	**0.0032****	-0.0024	**0.0008**
5	1,121	-0.0144***	0.0098***	**0.0046*****	-0.0046**	**0.0000**
6	1,108	-0.0152***	0.0099***	**0.0046*****	-0.0054**	**-0.0008**
7	1,091	-0.0158***	0.0124***	**0.0038****	-0.0033	**0.0004**
8	1,097	-0.0145***	0.0106***	**0.0040****	-0.0039*	**0.0001**
9	1,076	-0.0151***	0.0124***	**0.0023**	-0.0027	**-0.0005**
10	1,067	-0.0154***	0.0134***	**0.0038****	-0.0021	**0.0017**
Avg. Top 10 Sh.	11,148	-0.0146***	0.0110***	**0.0035*****	-0.0035***	**-0.0000**
Avg. All Sh.	67,841	-0.0141***	0.0121***	**0.0026*****	-0.0020***	**0.0007*****
Coalition of Top 10	1,154	-0.0140***	0.0162***	**-0.0010**	0.0022	**0.0012**
Coalition of All	1,154	-0.0140***	0.0191***	**-0.0033**	0.0051*	**0.0019****

Panel B. Returns for Largest Shareholders of Acquirers in Bad Horizontal Deals

		(1)	(2)	**(3)**	(4)	**(5)**
Shareholder Rank in Acquirer		Return on Acquirer	Return on Target	**Return on Rivals**	Return Adj. Target Ownership	**Return Adj. Target+Rival Ownership**
Rank	Obs	Mean	Mean	**Mean**	Mean	**Mean**
1	711	-0.0548***	0.0116***	**0.0229*****	-0.0432***	**-0.0202*****
2	682	-0.0540***	0.0134***	**0.0248*****	-0.0406***	**-0.0158*****
3	685	-0.0552***	0.0115***	**0.0286*****	-0.0437***	**-0.0151*****
4	678	-0.0540***	0.0140***	**0.0249*****	-0.0400***	**-0.0150*****
5	677	-0.0549***	0.0109***	**0.0288*****	-0.0441***	**-0.0153*****
6	671	-0.0543***	0.0128***	**0.0267*****	-0.0415***	**-0.0147*****
7	663	-0.0553***	0.0150***	**0.0266*****	-0.0402***	**-0.0136*****
8	665	-0.0536***	0.0128***	**0.0269*****	-0.0408***	**-0.0139*****
9	647	-0.0553***	0.0146***	**0.0245*****	-0.0406***	**-0.0161*****
10	648	-0.0544***	0.0160***	**0.0257*****	-0.0384***	**-0.0126*****
Avg. Top 10 Sh.	6,727	-0.0546***	0.0132***	**0.0261*****	-0.0413***	**-0.0153*****
Avg. All Sh.	40,644	-0.0524***	0.0155***	**0.0225*****	-0.0370***	**-0.0145*****
Coalition of Top 10	695	-0.0543***	0.0153***	**0.0300*****	-0.0390***	**-0.0090*****
Coalition of All	695	-0.0543***	0.0191***	**0.0283*****	-0.0352***	**-0.0069*****

Table 5: **Wealth Improvements from Target and Rival Ownership for Acquirer Shareholders in Bad Horizontal Deals.**

This table present the overall wealth effects for acquirer shareholders in bad deals (defined as deals with negative CAR(-1,+1)). Dollar value losses are reported for the top 10 largest acquirer shareholders as well as all shareholders. We also report the percentage of deals in which the acquirer losses are offset by the target gains and by the combined gains in target and industry rivals.Three measures are provided: the percentage deals in which the acquirer shareholders makes up none, more than 50%, or more than 100% of her loss. All gains and losses are calculated with abnormal announcement period returns over days (1, +1), where day 0 is the date of the initial bid announcement by the acquiring firm. Daily abnormal stock returns are computed using the market model and the estimation window is days (200, 60) prior to the acquisition announcement.

Shareholder Rank in Acquirer		Loss on acquirer stake (in 'millions)		Deals in which target ownership compensates for given % of loss on acquirer stake			Deals in which target and rival ownership compensates for given % of loss on acquirer stake		
Rank	Obs	Mean	Median	None	> 50%	> 100%	None	> 50%	> 100%
1	711	-24.93	-2.74	67%	13%	10%	56%	30%	25%
2	682	-17.66	-1.85	65%	16%	11%	55%	33%	30%
3	685	-14.08	-1.46	69%	14%	11%	55%	33%	29%
4	678	-10.79	-1.14	67%	16%	10%	54%	35%	31%
5	677	-9.33	-1.05	70%	14%	10%	58%	34%	30%
6	671	-9.16	-0.95	71%	14%	10%	53%	36%	30%
7	663	-7.70	-0.85	70%	16%	12%	55%	35%	30%
8	665	-6.86	-0.75	71%	15%	10%	56%	35%	29%
9	647	-7.55	-0.72	70%	17%	12%	56%	36%	31%
10	648	-5.94	-0.63	71%	15%	11%	56%	36%	32%
Avg. Top 10 Sh.	6,727	-11.53	-1.11	69%	15%	10%	55%	34%	30%
Avg. All Sh.	40,644	-4.36	-0.37	75%	16%	12%	57%	35%	30%
Coalition of Top 10	695	-111.64	-11.23	26%	22%	14%	48%	42%	37%
Coalition of All	695	-255.14	-22.06	22%	27%	17%	48%	44%	39%

Table 6: **Characteristics of Winning and Losing Acquirer Shareholders in Bad Horizontal Deals.**

This table shows the characteristics of the Top 10 largest shareholders for bad horizontal deals. Two groups of shareholders are reported: "Winners in bad deals" refer to acquirer shareholders with gains on target and rivals compensating greater than 100% the losses on their acquirer stakes; "Losers in bad deals" refer to acquirer shareholders with gains on target and rival stakes compensating none or even exacerbating the losses on acquirer stakes.

	Winners in Bad Deals			Losers in Bad Deals		
	Obs	Mean	Median	Obs	Mean	Median
Weight on acquirer	1,998	12.9%	5.5%	3,730	35.5%	17.1%
Weight on target	1,998	2.9%	0.0%	3,730	1.2%	0.0%
Weight on rivals	1,998	84.2%	93.5%	3,730	63.3%	81.3%
Number of rivals held	1,998	38	19	3,730	26	9
% of industry firms held	1,998	35%	30%	3,730	27%	17%
Acquirer CAR (-1,+1)	1,998	-4.6%	-3.0%	3,730	-5.8%	-4.2%
Target CAR(-1,+1)	1,998	19.5%	15.7%	3,730	14.5%	11.2%
Rival CAR(-1,+1)	1,998	0.6%	0.5%	3,730	-0.4%	-0.3%
Loss on acquirer($millions)	1,998	-7.16	-0.56	3,730	-10.05	-1.10
Gain on target($millions)	1,998	6.40	0.00	3,730	0.69	0.00
Net gain from industry portfolio($millions)	1,998	39.08	40.25	3,730	-34.78	-42.75

Table 7: **Negative Binomial Panel Regression of Industry Merger Counts on Common Ownership**

This table presents the results of a Negative Binomial Regression of number of industry M&A deals on common ownership for industries with number of firms N > 2. Number of deals is the number of horizontal deals announced within the industry in a given year. The $\overline{\lambda}$ measures the industry's level of common ownership. $\overline{\lambda}$ is calculated as in Equation 20 and 21. $\overline{\lambda}$ is included in the regression in log form. lnN is the natural log of the number of firms in the industry in the given year. Market-to-Book is the market value weighted average industry market-to-book ratio. Size is measured as the log of total asset of the industry. Capital structure is the market value weighted average industry leverage ratio. All explanatory variables are lagged one year. $\ln \overline{\lambda}$ and $\ln N$ are demeaned for regressions with the interaction term in Column (4) and (5).

	Dependent Variable: Number of Deals				
	(1)	(2)	(3)	(4)	(5)
$\ln \overline{\lambda}$	0.158***		0.015	0.173*	0.173*
	(2.55)		(0.23)	(1.89)	(1.88)
$\ln N$		1.407***	1.476***	1.553***	1.390***
		(16.73)	(16.35)	(16.43)	(13.72)
$\ln \overline{\lambda} \times \ln N$				-0.140***	-0.145***
				(-2.67)	(-2.79)
Size					0.226***
					(3.80)
Market-to-Book					0.038***
					(2.98)
Capital Structure					-0.189
					(-0.37)
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
N of Obs	5,806	5,902	5,806	5,806	5,806
N of Groups	215	215	215	215	215
Wald Chi-Squared	184.34	480.77	473.94	487.96	537.30
Prob > Chi-Squared	0.0000	0.0000	0.0000	0.0000	0.0000

A Appendix

A.1 Mathematical Appendix

PROOF OF PROPOSITION 2:

(i) The combined value of the two firms declines after the merger if and only if

$$2\frac{N-1}{N} > \frac{H'(1+H)^2}{H(1+H')^2}. \tag{22}$$

We have already shown that this is true if $\lambda = 0$, since in that case the expression simplifies to $N^2 > 2N+1$, which holds for $N = 2$ but not $N > 2$. To show that it also holds for $\lambda > 0$, we just need to show that $\frac{H'(1+H)^2}{H(1+H')^2}$ is non-increasing in λ. For this, we need to show that the increase in $H'/(1+H')^2$ when λ increases is lower (not strictly) than the increase in $H/(1+H)^2$ when λ increases. Since $H'/(1+H')^2$ is the same as $H/(1+H)^2$ evaluated at $N-1$ instead of N, this is the same as showing that $\frac{\partial^2 H/(1+H)^2}{\partial\lambda\partial(1/N)}$ is non-positive. We can show this to be true by taking the derivative of the log of this expression, since the sign of the two derivatives has to be the same. We start by taking the derivative with respect to λ, and then we take the derivative with respect to $1/N$:

$$\frac{\partial \log\left[H/(1+H)^2\right]}{\partial\lambda} = \frac{1-1/N}{H} - 2\frac{1-1/N}{1+H}. \tag{23}$$

$$\frac{\partial^2 \log\left[H/(1+H)^2\right]}{\partial\lambda\partial(1/N)} = \frac{-H-(1-1/N)(1-\lambda)}{H^2} - 2\frac{-(1+H)-(1-1/N)(1-\lambda)}{(1+H)^2} \tag{24}$$

$$= -\frac{1}{H^2} + \frac{4}{(1+H)^2} \tag{25}$$

$$= \frac{4H^2-(1+H)^2}{H^2(1+H)^2} \tag{26}$$

$$= \frac{3H^2-2H-1}{H^2(1+H)^2}. \tag{27}$$

The quadratic in the numerator has roots at $H = -1/3$ and $H = 1$, and therefore the expression

is non-positive for all $H \in [0,1]$. Therefore, the inequality holds not just for $\lambda = 0$ but also for $\lambda > 0$.

[Note that going from (A.3) to (A.4) we use that $(1-1/N)(1-\lambda) = 1-H$.]

(iii) We need to show that $H/(1+H)^2$ is non-decreasing in $1/N$. To see this, we can take the derivative of $\log\left[H/(1+H)^2\right]$ with respect to $1/N$:

$$\frac{\partial \log\left[H/(1+H)^2\right]}{\partial(1/N)} = \frac{1-1/N}{H} - 2\frac{1-1/N}{1+H} \tag{28}$$

$$= (1-1/N)\left[\frac{1}{H} - \frac{2}{1+H}\right] \tag{29}$$

$$= (1-1/N)\,\frac{1+H-2H}{H(1+H)} \tag{30}$$

$$= (1-1/N)\,\frac{1-H}{H(1+H)} \geq 0. \tag{31}$$

The inequality is strict except in the case of $\lambda = 1$.

(ii) This follows from (i) and (iii), since an increase in the value of the industry and a decline in the value of the merging firms implies an increase in the value of the rest of the industry firms. □

A.2 Additional Robustness Checks

Table A.1: **Return Comparisons using Historical COMPUSTAT 4-Digit SIC Codes**

The sample using historical COMPUSTAT SIC codes starts from 1986 to 2016. Horizontal deals are defined as deals in which acquirer and target have the same SIC codes. Bad horizontal deals are defined as horizontal deals with negative CAR(-1,+1). Following Harford, Jenter, and Li (2011), the acquirer CAR(-1,+1) is calculated using the market model with an estimation window of (-200, -60) prior to the announcement date. Return adjusted for target ownership is calculated as the net of gain/loss on acquirer stake and gain/loss on target stake, divided by the combined holding value in acquirer and target by the shareholder. Return adjusted to common ownership is calculated as the net of gain/loss on acquirer stake, gain/loss on target stake, and gain/loss on stake in industry rivals, divided by the combined holding value of these firms held by the shareholder. Average top 10 shareholders is the average of the sample with all top 10 shareholders of each acquirer. Average all shareholders is the sample with all acquirer shareholders, regardless of ownership percentage. *, **, and *** note significance at the 10%, 5%, and 1% level respectively.

Panel A. Returns for Largest Shareholders of Acquirers in All Horizontal Deals

Shareholder Rank in Acquirer		(1) Return on Acquirer	(2) Return on Target	**(3) Return on Rivals**	(4) Return Adj. Target Ownership	**(5) Return Adj. Target+Rival Ownership**
Rank	Obs	Mean	Mean	**Mean**	Mean	**Mean**
1	713	-0.0095***	0.0071***	**0.0023**	-0.0025	**-0.0001**
2	694	-0.0087***	0.0071	**0.0042**	-0.0015	**0.0026**
3	674	-0.0094***	0.0107***	**-0.0014**	0.0013	**-0.0001**
4	687	-0.0091***	0.0150***	**-0.0040**	0.0060	**0.0019**
5	679	-0.0099***	0.0119***	**0.0004**	0.0020	**0.0024**
6	670	-0.0099***	0.0116***	**0.0013**	0.0017	**0.0031***
7	658	-0.0116***	0.0098***	**0.0037**	-0.0018	**0.0020**
8	666	-0.0121***	0.0130***	**0.0010**	0.0009	**-0.0005**
9	644	-0.0108***	0.0156***	**-0.0020**	0.0048	**0.0019**
10	652	-0.0101***	0.0129***	**0.0014**	0.0027	**0.0041****
Avg. Top 10 Sh.	6,737	-0.0101***	0.0114***	**0.0007**	0.0013	**0.0020*****
Avg. All Sh.	41,935	-0.0126***	0.0144***	**-0.0000**	0.0018***	**0.0018*****

Panel B. Returns for Largest Shareholders of Acquirers in Bad Horizontal Deals

Shareholder Rank in Acquirer		(1) Return on Acquirer	(2) Return on Target	**(3) Return on Rivals**	(4) Return Adj. Target Ownership	**(5) Return Adj. Target+Rival Ownership**
Rank	Obs	Mean	Mean	**Mean**	Mean	**Mean**
1	391	-0.0590***	0.0148***	**0.0219*****	-0.0442***	**-0.0223*****
2	385	-0.0575***	0.0165***	**0.0230*****	-0.0411***	**-0.0180*****
3	375	-0.0594***	0.0152***	**0.0257*****	-0.0442***	**-0.0184*****
4	384	-0.0578***	0.0180***	**0.0214*****	-0.0398***	**-0.0184*****
5	377	-0.0596***	0.0179***	**0.0242*****	-0.0417***	**-0.0176*****
6	375	-0.0569***	0.0172***	**0.0242*****	-0.0397***	**-0.0155*****
7	376	-0.0578***	0.0180***	**0.0237*****	-0.0398***	**-0.0161*****
8	377	-0.0585***	0.0175***	**0.0249*****	-0.0410***	**-0.0160*****
9	362	-0.0582***	0.0169***	**0.0252*****	-0.0412***	**-0.0160*****
10	366	-0.0579***	0.0175***	**0.0273*****	-0.0403***	**-0.0131*****
Avg. Top 10 Sh.	3,768	-0.0583***	0.0169***	**0.0241*****	-0.0413***	**-0.0172*****
Avg. All Sh.	23,837	-0.0578***	0.0198***	**0.0208*****	-0.0380***	**-0.0172*****

Table A.2: **Return Comparisons using Hoberg and Phillips Industry Classification.**

The sample using Hoberg&Phillips industry codes starts from 1996 to 2016. Horizontal deals are deined as deals in which acquirer and target have the same H&P codes. Bad horizontal deals are defined as horizontal deals with negative CAR(-1,+1) which results in a loss for acquirer shareholders. Following Harford, Jenter, and Li (2011), the acquirer CAR(-1,+1) is calculated with the market model with an estimation window of (-200, -60) prior to the announcement date. Return adjusted for target ownership is calculated as the net of gain/loss on acquirer stake and gain/loss on target stake, divided by the combined holding value in acquirer and target by the shareholder. Return adjusted to common ownership is calculated as the net of gain/loss on acquirer stake, gain/loss on target stake, and gain/loss on stake in industry rivals, divided by the combined holding value of these firms held by the shareholder. Average top 10 shareholders is the average of the sample with all top 10 shareholders of each acquirer. Average all shareholders is the sample with all acquirer shareholders, regardless of ownership percentage. *, **, and *** note significance at the 10%, 5%, and 1% level respectively.

Panel A. Returns for Largest Shareholders of Acquirers in All Horizontal Deals

		(1)	(2)	**(3)**	(4)	**(5)**
Shareholder Rank in Acquirer		Return on Acquirer	Return on Target	**Return on Rivals**	Return Adj. Target Ownership	**Return Adj. Target+Rival Ownership**
Rank	Obs	Mean	Mean	**Mean**	Mean	**Mean**
1	706	-0.0238***	0.0125***	**0.0055****	-0.0113***	**-0.0057*****
2	690	-0.0232***	0.0131***	**0.0049****	-0.0101***	**-0.0052****
3	690	-0.0240***	0.0140***	**0.0068*****	-0.0100***	**-0.0032***
4	689	-0.0241***	0.0149***	**0.0061*****	-0.0092***	**-0.0031**
5	687	-0.0239***	0.0158***	**0.0062****	-0.0081**	**-0.0019**
6	682	-0.0244***	0.0133***	**0.0059****	-0.0112***	**-0.0052*****
7	675	-0.0253***	0.0145***	**0.0085*****	-0.0108***	**-0.0023**
8	668	-0.0244***	0.0138***	**0.0089*****	-0.0106***	**-0.0017**
9	658	-0.0233***	0.0155***	**0.0043***	-0.0078**	**-0.0035****
10	658	-0.0235***	0.0153***	**0.0043**	-0.0081**	**-0.0039****
Avg. Top 10 Sh.	6,803	-0.0240***	0.0143***	**0.0062*****	-0.0097***	**-0.0036*****
Avg. All Sh.	42,225	-0.0220***	0.0160***	**0.0045*****	-0.0060***	**-0.0015*****

Panel B. Returns for Largest Shareholders of Acquirers in Bad Horizontal Deals

		(1)	(2)	**(3)**	(4)	**(5)**
Shareholder Rank in Acquirer		Return on Acquirer	Return on Target	**Return on Rivals**	Return Adj. Target Ownership	**Return Adj. Target+Rival Ownership**
Rank	Obs	Mean	Mean	**Mean**	Mean	**Mean**
1	444	-0.0640***	0.0146***	**0.0273*****	-0.0494***	**-0.0221*****
2	435	-0.0631***	0.0167***	**0.0261*****	-0.0464***	**-0.0203*****
3	434	-0.0641***	0.0180***	**0.0297*****	-0.0461***	**-0.0164*****
4	437	-0.0631***	0.0189***	**0.0278*****	-0.0442***	**-0.0164*****
5	433	-0.0639***	0.0179***	**0.0310*****	-0.0460***	**-0.0149*****
6	433	-0.0637***	0.0170***	**0.0277*****	-0.0467***	**-0.0190*****
7	427	-0.0660***	0.0187***	**0.0323*****	-0.0473***	**-0.0150*****
8	425	-0.0628***	0.0170***	**0.0326*****	-0.0458***	**-0.0132*****
9	417	-0.0622***	0.0181***	**0.0286*****	-0.0441***	**-0.0156*****
10	416	-0.0628***	0.0186***	**0.0286*****	-0.0442***	**-0.0155*****
Avg. Top 10 Sh.	4,301	-0.0636***	0.0176***	**0.0291*****	-0.0460***	**-0.0169*****
Avg. All Sh.	26,254	-0.0613***	0.0200***	**0.0261*****	-0.0413***	**-0.0152*****

Table A.3: **Wealth Improvement on Bad Horizontal Deals for Acquirer Shareholders based on Alternative Industry Classifications.**

This table presents the results of the same analysis conducted in Table 6 using historical COMPUSTAT 4-digit SIC codes in Panel A and Hoberg & Phillips industry codes in Panel B. Bad horizontal deals are defined as deals in which acquirer and target have the same industry codes, with negative acquirer CAR(-1,+1) which results in a loss for acquirer shareholders. Dollar value losses on acquirer stake are reported for the top 10 largest shareholders of the acquirers respectively as well as all acquirer shareholders in the whole sample. We also report the percentage of deals in which the acquirer dollar value losses are offset with target ownership or common ownership (ownership of target and industry rivals combined) by none, more than 50%, or more than 100%. Target ownership compensation is based on how much gain on target stake compensates for loss on acquirer stake. Common ownership compensation is based on how much gain on target stake, combined with gain/loss on rival stake, compensates for loss on acquirer stake. All gains and losses are calculated for the (-1,+1) window. Average top 10 shareholders is the average of the sample with all top 10 shareholders of each acquirer. Average all shareholders is the sample with all acquirer shareholders, regardless of ownership percentage.

Panel A: Horizontal Bad Deals based on Historical COMPUSTAT SIC Codes

Shareholder Rank in Acquirer		Loss on acquirer stake (in millions)		Deals in which target ownership compensates for given % of loss on acquirer stake			Deals in which target and rival ownership compensates for given % of loss on acquirer stake		
Rank	Obs	Mean	Median	None	> 50%	> 100%	None	> 50%	> 100%
1	391	-32.24	-4.30	60%	15%	10%	55%	30%	24%
2	385	-18.92	-2.58	61%	21%	15%	55%	33%	28%
3	375	-18.12	-2.33	59%	21%	16%	57%	31%	27%
4	384	-12.61	-1.86	61%	18%	11%	57%	33%	26%
5	377	-10.82	-1.60	64%	19%	12%	57%	31%	27%
6	375	-9.41	-1.46	64%	17%	11%	58%	32%	28%
7	376	-8.92	-1.27	65%	18%	13%	60%	30%	26%
8	377	-7.86	-1.19	65%	19%	13%	56%	33%	28%
9	362	-8.95	-1.11	67%	17%	12%	59%	32%	26%
10	366	-7.02	-0.98	64%	20%	15%	55%	36%	31%
Top 10 Shareholders	3,768	-13.61	-1.77	63%	18%	13%	57%	32%	27%
All Shareholders	23,837	-5.27	-0.60	71%	19%	14%	58%	33%	28%

Panel B: Horizontal Bad Deals based on Hoberg&Phillips Industry Classification

Shareholder Rank in Acquirer		Loss on acquirer stake (in millions)		Deals in which target ownership compensates for given % of loss on acquirer stake			Deals in which target and rival ownership compensates for given % of loss on acquirer stake		
Rank	Obs	Mean	Median	None	> 50%	> 100%	None	> 50%	> 100%
1	444	-38.40	-4.32	62%	14%	9%	56%	32%	27%
2	435	-25.18	-2.99	60%	19%	13%	57%	34%	29%
3	434	-21.05	-2.25	63%	19%	13%	59%	34%	29%
4	437	-15.44	-1.77	60%	19%	12%	58%	34%	30%
5	433	-13.45	-1.59	66%	16%	11%	57%	36%	31%
6	433	-11.63	-1.50	67%	17%	10%	57%	33%	30%
7	427	-10.88	-1.24	64%	16%	11%	58%	32%	29%
8	425	-9.77	-1.19	65%	17%	11%	59%	33%	30%
9	417	-10.00	-1.05	71%	15%	11%	59%	32%	28%
10	416	-8.88	-0.99	70%	15%	10%	58%	35%	31%
Top 10 Shareholders	4,301	-16.60	-1.69	65%	17%	11%	58%	34%	29%
All Shareholders	26,254	-5.95	-0.55	71%	18%	13%	58%	34%	29%

Table A.4: **Return Comparions using Fama-French Three Factor Model.**

This table presents the results of analyses conducted in Table 4 and 5 using the Fama-French three factor model instead of the market model. Horizontal deals are defined as deals in which acquirer and target have the same H&P codes. Bad horizontal deals are defined as horizontal deals with negative CAR(-1,+1). The acquirer CAR(-1,+1) is calculated with the Fama-French three factor model with an estimation window of (-200, -60) prior to the announcement date. Return adjusted for target ownership is calculated as the net of gain/loss on acquirer stake and gain/loss on target stake, divided by the combined holding value in acquirer and target by the shareholder. Return adjusted to common ownership is calculated as the net of gain/loss on acquirer stake, gain/loss on target stake, and gain/loss on stake in industry rivals, divided by the combined holding value of these firms held by the shareholder. Average top 10 shareholders is the average of the sample with all top 10 shareholders of each acquirer. Average all shareholders is the sample with all acquirer shareholders, regardless of ownership percentage. *, **, and *** note significance at the 10%, 5%, and 1% level respectively.

Panel A. Returns for Largest Shareholders of Acquirers in All Horizontal Deals

Shareholder Rank in Acquirer		(1) Return on Acquirer	(2) Return on Target	**(3) Return on Rivals**	(4) Return Adj. Target Ownership	**(5) Return Adj. Target+Rival Ownership**
Rank	Obs	Mean	Mean	**Mean**	Mean	**Mean**
1	1,175	-0.0147***	0.0099***	**0.0023**	-0.0048**	**-0.0025****
2	1,141	-0.0134***	0.0109***	**0.0022**	-0.0025	**-0.0002**
3	1,148	-0.0139***	0.0100***	**0.0040****	-0.0039*	**0.0000**
4	1,124	-0.0140***	0.0113***	**0.0033****	-0.0028	**0.0005**
5	1,121	-0.0147***	0.0099***	**0.0046*****	-0.0049**	**-0.0003**
6	1,108	-0.0153***	0.0099***	**0.0047*****	-0.0054***	**-0.0007**
7	1,091	-0.0162***	0.0123***	**0.0041****	-0.0039*	**0.0002**
8	1,097	-0.0148***	0.0105***	**0.0043*****	-0.0043**	**0.0001**
9	1,076	-0.0151***	0.0124***	**0.0022**	-0.0028	**-0.0005**
10	1,067	-0.0157***	0.0131***	**0.0041****	-0.0026	**0.0015**
Avg. Top 10 Sh.	11,148	-0.0148***	0.0110***	**0.0036*****	-0.0038***	**-0.0002**
Avg. All Sh.	67,841	-0.0144***	0.0121***	**0.0028*****	-0.0023***	**0.0004*****

Panel B. Returns for Largest Shareholders of Acquirers in Bad Horizontal Deals

Shareholder Rank in Acquirer		(1) Return on Acquirer	(2) Return on Target	**(3) Return on Rivals**	(4) Return Adj. Target Ownership	**(5) Return Adj. Target+Rival Ownership**
Rank	Obs	Mean	Mean	**Mean**	Mean	**Mean**
1	717	-0.0540***	0.0117***	**0.0225*****	-0.0423***	**-0.0198*****
2	687	-0.0532***	0.0134***	**0.0244*****	-0.0398***	**-0.0154*****
3	691	-0.0544***	0.0117***	**0.0285*****	-0.0427***	**-0.0142*****
4	684	-0.0532***	0.0141***	**0.0251*****	-0.0391***	**-0.0140*****
5	682	-0.0543***	0.0114***	**0.0279*****	-0.0429***	**-0.0150*****
6	676	-0.0534***	0.0130***	**0.0264*****	-0.0404***	**-0.0140*****
7	673	-0.0545***	0.0152***	**0.0262*****	-0.0393***	**-0.0131*****
8	670	-0.0530***	0.0126***	**0.0270*****	-0.0403***	**-0.0134*****
9	654	-0.0543***	0.0148***	**0.0244*****	-0.0394***	**-0.0151*****
10	655	-0.0537***	0.0161***	**0.0253*****	-0.0376***	**-0.0123*****
Avg. Top 10 Sh.	6,789	-0.0538***	0.0134***	**0.0258*****	-0.0404***	**-0.0147*****
Avg. All Sh.	40,843	-0.0521***	0.0156***	**0.0224*****	-0.0365***	**-0.0141*****

Table A.5: **Wealth Improvement on Bad Deals for Acquirer Shareholders based on Fama-French Three Factor Model.**

This table presents the results of the same analysis conducted in Table 6 using the Fama-French three factor model for all bad deals in Panel A and only bad horizontal deals in Panel B. Bad horizontal deals are defined as deals in which acquirer and target have the same industry codes, with negative acquirer CAR(-1,+1) which results in a loss for acquirer shareholders. Dollar value losses on acquirer stake are reported for the top 10 largest shareholders of the acquirers respectively as well as all acquirer shareholders in the whole sample. We also report the percentage of deals in which the acquirer dollar value losses are offset with target ownership or common ownership (ownership of target and industry rivals combined) by none, more than 50%, or more than 100%. Target ownership compensation is based on how much gain on target stake compensates for loss on acquirer stake. Common ownership compensation is based on how much gain on target stake, combined with gain/loss on rival stake, compensates for loss on acquirer stake. All gains and losses are calculated for the (-1,+1) window. Average top 10 shareholders is the average of the sample with all top 10 shareholders of each acquirer. Average all shareholders is the sample with all acquirer shareholders, regardless of ownership percentage.

Shareholder Rank in Acquirer		Loss on acquirer stake (in millions)		Deals in which target ownership compensates for given % of loss on acquirer stake			Deals in which target and rival ownership compensates for given % of loss on acquirer stake		
Rank	Obs	Mean	Median	None	> 50%	> 100%	None	> 50%	> 100%
1	717	-24.88	-2.54	67%	14%	9%	55%	29%	24%
2	687	-17.71	-1.82	65%	16%	10%	54%	36%	29%
3	691	-14.14	-1.29	69%	14%	11%	54%	36%	30%
4	684	-10.73	-1.03	67%	15%	10%	54%	35%	31%
5	682	-9.34	-0.92	68%	14%	10%	57%	35%	30%
6	676	-9.06	-0.84	71%	14%	11%	53%	36%	31%
7	673	-7.64	-0.78	70%	17%	12%	53%	37%	32%
8	670	-6.81	-0.69	72%	15%	10%	56%	35%	30%
9	654	-7.41	-0.67	70%	17%	13%	56%	36%	30%
10	655	-5.89	-0.61	71%	15%	12%	55%	36%	32%
Avg. Top 10 Sh.	6,789	-11.49	-1.04	69%	15%	11%	55%	35%	30%
Avg. All Sh.	40,843	-4.36	-0.36	76%	16%	12%	56%	35%	31%