Are bidder-initiated takeovers opportunistic?*

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Abstract

A synergistic acquirer may opportunistically time a stock-financed takeover bid to coincide with private information that its shares are overvalued. We use this self-selection to test whether opportunism is more likely in takeovers initiated by bidders rather than by targets. Conditional on the initiating party, measures of information asymmetry are used to nest and contrast opportunism with traditional efficiency arguments (adverse selection and liquidity constraints) for the use of stock as acquisition payment. Reduced-form tests using these conditional measures reject bidder opportunism and favor efficiency. Furthermore, structural estimation produces negligible efficiency losses fro m opportunism regardless of who initiates the deal.

JEL classifications: G3, G34
Keywords: Deal initiation, opportunism, efficiency loss, adverse selection, cash payment, stock payment, liquidity constraint, structural estimation

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"[The AOL TimeWarner deal] was done on terms that were insane ... AOL stock was ridiculously overvalued ... [AOL's CEO Steve Case] chose the moment, almost to the day, when his stock was most valuable and then used it as currency."
—Geoffrey Colvin, *Fortune*, February 3, 2003.

1 Introduction

Bidder opportunism refers to attempts by a bidder to pay for the target firm with overvalued shares. Successful opportunism raises the concern that the most overvalued, not the most efficient, bidder may win the auction for the target, potentially distorting the disciplinary role of the market for corporate control. Moreover, should the opportunistic bidder fail to win, it may still impose a negative externality on the winning bidder by driving up the offer price. We present new and relatively powerful empirical tests of this important and controversial issue that exploit a potential synergistic bidder's endogenous decision to initiate the takeover process. Ours is the first study to require bidders to have *self-selected* the timing of the takeover transaction before inferring whether it exploits price-sensitive inside information about market overpricing. Naturally, this requirement increases the test power whether the ensuing sales process is an open auction or a negotiation.

We also contribute by nesting our reduced-form tests of opportunism with alternative propositions in which bidders prefer to use shares as acquisition currency for efficiency reasons. As summarized in Table 1, the theoretical literature has produced a number of rational equilibrium outcomes that are all highly relevant for this debate. However, with the exception of Eckbo, Makaew, and Thorburn (2018) and Li, Taylor, and Wang (2018), a direct horse race between efficiency and opportunism has eluded much of the empirical debate over 'market-driven acquisitions' (Shleifer and Vishny, 2003). Filling this empirical gap is important in light of the widespread use of bidder shares in deal payments.[1]

We note at the outset that the auction-theoretic sales process that underlies models such as those in Table 1 are quite realistic. Perhaps most important, the federal Williams Act of 1968 and

[1] Of the 6,200 public bidders in Eckbo, Makaew, and Thorburn (2018), two-thirds involve payment with at least some bidder shares.

its 1970 Amendment provide the target with both time and information to evaluate competing bids—much as in a formal auction setting.[2] Also, the Revlon duty from 1986 requires target boards to protect its shareholder by selling to the highest bidder.[3] Empirically, as documented here as well, both the public and private phases of the total sales process tend to attract multiple offers (Betton and Eckbo, 2000; Boone and Mulherin, 2007), where the bids in the private phase likely help the target to determine a reserve price for what may be a final public bidding round (Hansen, 2001).

The auction settings in Table 1 are also useful because they impose explicit rationality constraints on bidders and the target. Of particular importance for our empirical setting is the classical no-trade theorem (Milgrom and Stokey, 1982): a zero-sum stock swap between the two parties would be irrational if it were based solely on relative mispricing. Hence, the theories in Table 1 all presume the existence of synergy gains—even if some bidders may also get away with selling overpriced shares to the target. Empirically, this presumption is supported by large-scale studies documenting a significantly positive value-weighted sum of abnormal announcement returns to bidders and targets (Alexandridis, Antypas, and Travlos, 2017; Dessaint, Eckbo, and Golubov, 2025). After conditioning on bidder initiation, we confirm this finding also in our sample below.

Furthermore, for a bidder to optimally initiate the takeover, the synergy value must be sufficiently bidder specific not to be dissipated by competition from potential rival bidders (Gorbenko and Malenko, 2024). The risk free-riding by rival bidders is also addressed by standard deal protection devices in merger contracts. Examples are confidentiality agreements, stand-still and non-compete provisions, breakup fees, insiders' tender-precommitment, material adverse conditions (MAC) clauses, "drop dead date" (restricting the negotiation period) and "no shop" provisions (discouraging the target to solicit additional offers). A strategy of purchasing target shares (a toe-

[2]Pub. L. No. 90-439, 82 Stat. 454 (July 29, 1969) and Pub. L. No. 91-567, 84 stat. 1497 (December 22, 1970)). See Jarrell and Bradley (1980) for a discussion of the Williams Act, and Betton, Eckbo, and Thorburn (2009) and Chen and Wang (2023) for dynamic models of the "shadow" auction that exist in the period between the signing of a negotiated merger agreement and the target shareholder vote on that agreement.

[3]Revlon v. MacAndrews and Forbes Holdings, 506 A.2d 173 (Del 1986). This duty arises when the actions of the target board indicate that it has abandoned a strategy of operating as a stand-alone company (Gilson and Kraakman, 1990).

hold) in the open market prior to initiating a takeover bid may also help to protects the bidder's first-mover advantage (Betton, Eckbo, and Thorburn, 2009).

Bidder initiation with an offer to pay with bidder shares raises an adverse selection problem on both sides of the transaction when the true target value is known only to the target (two-sided information asymmetry). For the bidder, the efficient (equilibrium) solution is to pay with shares rather than cash unless the target substantially discounts the share value. The efficiency arises because, unlike a cash offer, the share payment causes the target as a co-owner of the merged firm to condition its accept/reject decision on its own true value. On the other hand, the target's concern with bidder adverse selection may cause it to discount the value of the bidder shares too much. This pushes the bidder towards paying with cash and establishes cash as a costly signal of bidder true value. Such discounting may also occur when the target's true value is known to the bidder (one-sided information asymmetry), but the target confuses a stock offer that is driven by a (unobservable) bidder cash constraint with bidder opportunism.[4]

As argued by Eckbo, Makaew, and Thorburn (2018) (henceforth EMT), takeover models have in common that the bidder's incentive to pay with shares is increasing in the precision of the target's prior beliefs about the bidder's true value. The greater is this precision, the lower is the likelihood that the target undervalues the bidder while, at the same time, maintaining the benefit of bidder shares as a hedge against target adverse selection. At the same time, since greater target precision makes it more difficult to opportunistically pay with overpriced bidder shares, the competing efficiency and opportunism hypotheses have direct opposite implications for the likelihood of observing bidder shares in the deal payment.

Our main empirical contribution is twofold. First, we augment the reduced-form test developed by EMT with the additional information that the bidder self-selects the timing of the deal. This substantially increases power to test bidder opportunism since the initiation decision itself is nec-

[4]In Table 1, rational equilibrium models with with two-sided information asymmetry include Hansen (1987), Fishman (1989), Eckbo, Giammarino, and Heinkel (1990), Rhodes-Kropf and Viswanathan (2004), and Liu and Bernhardt (2021). Moreoevr, Gorbenko and Malenko (2018) and Li, Taylor, and Wang (2018) present models with one-sided information asymmetry, where bidder cash constraints play an key role. See also DeMarzo, Kremer, and Skrzypacz (2005) for generalizations and Dasgupta and Hansen (2007) and Skrzypacz (2013) for reviews.

essary to identify situations where an otherwise synergistic bidder may attempt to put overpriced shares to the target. Also important, since the endogenous initiation decision occurs prior to the start of the sales process itself, the increased test power necessarily holds across a broad set of specific auction settings. Hence, if a bidder's initiation decision does reflect (temporary) private information about market overpricing, our conditioning of the EMT's reduced-form regression test increases our chance of detecting successful opportunism in the data.

Second, using structural estimation, we examine empirically the impact of adding bidder-initiation information on the likelihood of opportunism in the partially revealing equilibrium model of Li, Taylor, and Wang (2018) (henceforth LTW). As in Rhodes-Kropf and Viswanathan (2004) and Gorbenko and Malenko (2018) as well, an equilibrium outcome with partial revelation of the bidder's true value leaves the target with a residual risk of *unknowingly* accepting overpriced bidder shares.[5] In LTW, the target confuses an opportunistic stock-financed offer with one that is correctly priced but where the bidder pays for the deal with shares due to lack of access to cash (a bidder liquidity constraint that is unobservable to the target). We address this potential for bidder opportunism by replicating the structural estimation in LTW with our sample and additional information on the initiating party. When benchmarked against their model-generated counterfactual of zero opportunism, we argue that the expected model-specific efficiency loss should be higher for bidder-initiated than for target-initiated takeovers.

Our empirical analysis is based on a total sample of almost 3,000 successful acquisitions of publicly listed targets by US-domiciled bidders in manufacturing industries from 2000 through 2020. Identifying the initiating party requires sufficient background information on the merger, available in filings with the Securities and Exchange Commission (SEC schedules DEFM14A, Schedule T/O, and S4). While ours is not the first study to focus on takeover initiations, our sample is the largest in the literature and the first to use the initiation information to test for bidder opportunism. We also provide uniquely granular information on the private part of the sales process, which extends from the time of the deal initiation to the announcement of the first

[5]This is in contrast to the behavioral model of Shleifer and Vishny (2003), where target management by assumption knowingly accepts overpriced bidder shares.

public bid.

Our main empirical conclusion is that the data fails to support bidder opportunism, both unconditionally and *a fortiori* after conditioning on the takeover being initiated by the bidder. We proceed in four steps to show why this important conclusion holds. we begin by verifying that the total expected synergy gains, measured by the value-weighted sum of the cumulative abnormal announcement returns to the bidder and target (their combined CAR), are positive in our sample, as required by rational traders. Second, we investigate whether the market reacts to deal announcements by lowering the value of the bidders' close industry, which is a possible equilibrium outcome of the partially revealing equilibrium with rational agents developed by Rhodes-Kropf and Viswanathan (2004). In their model, targets are unable to fully deduce whether a high stock-offer reflects high synergies or market overpricing, where the latter may be either firm- or sector-specific. While Rhodes-Kropf, Robinson, and Viswanathan (2005) suggest that both these two sources of overpricing may be present in the data,[6] we instead document a *positive* and significant peer-firm wealth affect of the deal announcements. This positive industry wealth effect rules out sector-specific overpricing. A competing opposite explanation may be that that the information in the deal announcements on average signals the potential for valuable acquisition projects also for the bidder's close peers.

Third, as the positive industry wealth effect does not rule out the possibility of firm-specific overpricing, we turn to firm-specific determinants of the likelihood that the deal is paid with bidder shares. Here, we first show that the average deal payment has *fewer* shares when the bidder rather than the target initiates the deal—not more shares as expected with bidder opportunism. We then reject bidder opportunism in favor of efficiency arguments in tests that mimic EMT in using information proxies to identify targets that are relatively informed about the bidder.

In general, it is more difficult to sell overpriced bidder shares to targets with more precise priors about the true value of those shares. Hence, as developed by EMT, bidder opportunism predicts less use of bidder shares as acquisition currency for better informed targets. Instead we

[6] "Acquirers with high firm-specific error use stock to buy targets with relatively lower firm-specific at times when both firms benefit from positive time-series sector error" (p.601).

find the opposite: higher values of our target information proxies *increase* rather than decrease the likelihood of including bidder stock as part of the deal payment. Of the several information proxies that we use for this test, the most important is the degree of operational overlap between the bidder and target firms using the similarity scores of Hoberg and Phillips (2010). While inconsistent with opportunism, this test supports the efficiency argument (target adverse selection) for the observed use of bidder shares as the method of payment.

Finally, we turn to the structural model developed by LTW to simulate the potential for inefficiency caused by bidder opportunism. Their setting is a sealed-bid second-price auction with two synergistic bidders with independent private valuations of the target. The target, whose true value is common knowledge in this model (one-sided information asymmetry), ranks the two competing bids based on the bidders' pre-auction market value, the offer premium, and the combination of cash and stock in the offer. From the target's perspective, however, a high fraction of shares in the offer may be driven either by market overvaluation of the bidder shares or by a bidder cash constraint, both of which are unobservable to the target. The resulting confusion implies that that target will occasionally (unknowingly) accept the most overpriced rather than the most efficient (highest-synergy) offer.

We follow LTW and structurally estimate both the fraction of the sample deals that the model classifies as inefficient, where the overvalued bidder wins over a more efficient rival, and the corresponding synergy loss. Without conditioning on the party that initiates the auction process, LTW report that opportunistic bidders crowd out high-synergy bidders in 7% of the simulated transactions, resulting in an average synergy loss equal to 9% of the target's pre-bid value in these inefficient deals. Moreover, the synergy loss is 0.63% when averaged across their total sample of takeovers.

Using LTW's own computer program (generously supplied to us by the authors), we first confirm these simulated quantities using our own sample to generate the data moments. More importantly, we then show that the percentage of inefficient deals and average synergy loss remain largely *unchanged* after conditioning the structural estimation on the auction process being bidder-initiated. This finding therefore fails to support the hypothesis that bidder-initiated deals have a higher risk of including overpriced bidder shares than target-initiated ones. Our structural estimation therefore further supports our conclusion from the more generic reduced-form test results, which directly exploit the underlying information asymmetry between initiating bidders and their respective targets.

2 Who initiates takeovers?

2.1 Identifying the initiating party

We first select completed takeovers of US public targets from the SDC Platinum database from 2000–2020 to identify the initiating party. We can locate an SEC takeover filing, such as DEFM14A, PREM14A, and S4, for 3,353 targets. For each transaction, we carefully read the "background of the merger" section and classify the initiating party and other aspects of the sales process.[7] This allows us to identify the initiating party for 2,968 public targets. The bidder is also a publicly listed firm in 1,845 of these deals. Much of the analysis requires bidder characteristics and will therefore be limited to our subset of public-to-public deals.

Our initiation classification is as follows: The takeover is classified as *target initiated* if the SEC documents reveal that the target board began the sales process by directly contacting a potential buyer or hiring an investment bank to find possible acquirers (sometimes after pressure from its shareholders). Even if an acquirer subsequently approaches the target, we classify the deal as target-initiated as long as the target board has previously started a sales process that puts the target firm in play (which, as mentioned above, also triggers the target director's "Revlon duty" to sell to the highest bid).

Second, the takeover is classified as *bidder initiated* if it is started by a potential acquirer approaching the target. Note that the initiating bidder need not be successful: the initiation may

[7] This manual process was carried out by numerous students from Dartmouth College, with Presidential Scholar status and NHH Norwegian School of Economics. For robustness, each case was cross-checked by different research assistants.

be followed by a rival bidder that ends up acquiring the target. For our purposes, the important fact is that regardless of who eventually wins the target, the deal is initiated by a bidder with the potential for being opportunistic.

Third, the takeover is classified as *jointly initiated* if the initiation occurs through joint discussions between a bidder and the target, and there is no indication that either party initiated or was a driving force behind the transaction. About ten percent of the jointly initiated transactions are described as a "merger of equals", where the acquirer and the target firm are of similar size and market value.[8]

Figure 1 shows the breakdown of our initiation sample into four different parties, which results in the three core initiation categories above. Panel A shows that, in the full sample of deals by public and private bidders, 57% are bidder-initiated (45% by the winning bidder and 12% by a rival bidder), while 34% are target-initiated. The remaining 8% are jointly initiated. Panel B, which limits the sample to public bidders, shows that the sample initiation proportions are about the same also after considering public-to-public takeovers only. Also, Figure 2 shows how the deals and their three main categories of initiation (bidder, target, and jointly) are distributed over the sample period.[9]

2.2 Auction characteristics classified by initiating party

Betton and Eckbo (2000) are the first to present systematic evidence evidence on the number of bids and bid jumps in the public phase of the auction process, which begins with the first public offer announcement. In their sample of 1,353 public tender offers for US listed targets from 1971–1990, the targets receive a total of 2,335 publicly announced bids with an average of 1.8 bids per target. However, subsequent research has shown that targets on average attract an even greater

[8]Merger of equals are typically structured as stock swaps and leadership roles (board seats and executive positions) are often divided between the two firms to maintain a balance of power.

[9]While this paper is the first to use initiation data to address bidder opportunism, our finding that about one-third of the deals are target initiated is consistent with a growing literature documenting initiation frequencies: Target initiates 41% of 1,774 takeovers (1994–2007) in Aktas, de Bodt, and Roll (2010); 35% of 1,268 deals (1997–2012) in Masulis and Simsir (2018); 34% of 388 deals (1981–2014) in Liu and Mulherin (2018); 44% of 1,098 takeovers (2005-2011) in Fidrmuc and Xia (2019); 32% of 1,821 deals (1981–2020) in Brown Jr., Liu, and Mulherin (2023); and 43% of 4,787 takeovers (1996–2014) in Eckbo, Norli, and Thorburn (2023).

number of competing bids when also accounting for the "private" sales period that typically takes place prior to the first public bid announcement.[10]

Our auction data presented in Table 2 both confirms and extends information on the "private" part of the bidding process. We record the dates and prices of all bids reported with a bid price (cash value or exchange ratio in stock swaps) or as an offer premium. The bid prices may be an exact value (e.g., $80.00) or a price range ($80.00-$82.00). We also record the payment method (all-cash, all-stock, or mixed cash-stock offers) and whether the bid is binding or non-binding, verbal, written, or a tender offer, and note the date of the signed merger agreement (if any).

The table summarizes key features of the auction process conditional on initiation type. Focusing on the subsample of public bidders in Panel B, the private phase of the auction features on average 3.5 bids, with multiple bids in 74% and multiple bidders in 31% of the deals. This evidence is consistent with Boone and Mulherin (2007), who find that about half of all deals involve some form of private competition, even when rival bids do not materialize. The table further reports an average bid jump (incremental increase in the bid) of 4.7%. This is somewhat lower than Boone, Maeseneire, Dereeper, Luypaert, and Thuy (2024), who document an average increase of 9.6% between the first and second bids in the private phase of the auction. The difference is consistent with bidders making increasingly smaller bid jumps as the auction progresses.

Surprisingly, bidder-initiated deals tend to involve a somewhat more competitive bidding process than do target-initiated deals: the mean number of bids and fraction of auctions with multiple bids are 3.7 and 0.80, respectively, for bidder-initiated transactions and 3.1 and 0.65, for target-initiated deals. The differences, which are statistically significant, challenge the notion that target-initiated processes are systematically more competitive. Moreover, the percentage of stock payment and the fraction of all-stock deals are consistently *lower* for bidder-initiated deals, with 36% vs. 49% of the offer paid in stock and 19% vs. 30% of the offers paid in stock only. This pattern resurfaces repeatedly in our regressions below.

Table 3 shows bidder and target characteristics for the subsample of deals where both parties

[10] For details of the private period, see, e.g., Boone and Mulherin (2007), Liu and Mulherin (2018), and Boone, Maeseneire, Dereeper, Luypaert, and Thuy (2024).

are publicly listed and compares them across initiation types. Acquirers in bidder-initiated deals tend to be larger, with total assets averaging \$14.4 billion vs. \$ 9.1 billion in target-initiated transactions, and a larger fraction pay dividends. However, the average acquirer has similar cash holdings, R&D levels, and M/B ratios across initiation types, undermining the notion that bidder-initiated deals are systematically driven by overvalued equity. As shown in Panel B, the targets, on average, are substantially smaller than their public acquirers (\$1.9bn vs. \$13.2bn), have lower M/B (2.86 vs. 4.23), and are less levered. However, there is no statistically significant difference in these target characteristics across bidder- and target-initiated deals.

2.3 Relative market-to-book ratios

The relative M/B has been a popular but controversial metric to capture potential market misvaluation of bidder firms in takeovers (see, e.g., Shleifer and Vishny, 2003; Rhodes-Kropf, Robinson, and Viswanathan, 2005; Dong, Hirshleifer, Richardson, and Teoh, 2006).[11] On the other hand, Harford (2005) concludes that merger waves are driven not by M/B but by changes in the real interest rate and access to investment funding (liquidity). Furthermore, while a higher M/B increases the likelihood that the payment method includes bidder shares (which also appears in our Table 8 below), EMT shows that instrumenting exogenous variation in bidder M/B with large mutual fund outflows removes this empirical relationship.

While we do not debate the reliability of relative M/B ratios as a precise mispricing metric in this paper, Panel A of Figure 3 presents an interesting observation of relevance for the opportunism debate. It plots the time series of the median ratio of bidder-to-target M/B for our sample of public acquirers, split into bidder- and target-initiated deals. First, the figure shows that bidders typically have higher M/B than targets (on average 1.5), and the median ratio is relatively stable over the

[11] In January 2000, the technology company AOL (America Online) announced it would acquire Time Warner in a stock-swap merger valued at about \$165 billion (the largest merger in U.S. history at the time). In March of that year, the stock market "technology bubble" burst and lowered the market value of the merged firm by more than \$100 billion. With the pre-merger M/B ratios of the two merging firms in mind, Shleifer and Vishny (2003) comments that "[T]he central feature of [the AOL TimeWarner] acquisition is not technological synergies, but rather the attempt by the management of the overvalued AOL to buy the hard assets of Time Warner to avoid even worse returns in the long run."—a quote that is strikingly similar to the statement by Geoffrey Colvin of *Fortune* quoted at the top of this paper.

sample period. Second, consistent with Table 3, the figure shows that "high typically buys low" in terms of M/B, whether the deal is bidder- or target-initiated. Third, and most importantly, it makes little difference for the relative M/B whether the deal is bidder- or target-initiated. This further suggests that the relative M/B is not a reliable metric for bidder overpricing in takeover transactions.[12]

Furthermore, Panel B of Figure 3 plots the median ratio of acquirer cash holdings to total assets over the sample period. Confirming the evidence reported in Panel A of Table 3, there is no noticeable difference between the acquirer's cash holdings in bidder- and target-initiated deals. Moreover, their cash holdings are relatively stable over time. Hence, the typical cash holdings do not help to explain the lower fraction of stock used in bidder-initiated takeovers. we return to the potential role of bidder cash holdings as a measure of bidder liquidity in Section 5 below.

Next, we begin our analysis of the potential for bidder opportunism. We start with the information in deal announcement returns as a check on the existence of positive total synergies and sector-specific information externalities. We then perform cross-sectional tests-(both reduced-form and structural) where we condition on the initiating party.

3 Total deal synergies and sector-specific externalities

3.1 Total expected deal synergies

In this section, we estimate the average combined short-term abnormal stock returns to bidders and targets—and to the bidders' close industry peers—caused by the first public deal announcement. Note that this evidence does not condition on the party that initiates the deal. This is because the initiation information is unlikely to have been made public at that point (other than through hard-to-verify rumors). However, regardless of who initiates, the announcement returns provide

[12] Also, Fu, Lin, and Officer (2013) conclude that a high relative bidder M/B before the merger announcement tends to disappear by the deal completion date. One interpretation is that targets of bidders with exceptionally high M/B are particularly concerned with bidder adverse selection (opportunism) and can successfully reverse engineer this information during the price-discovery process.

important information on two questions of relevance for rational equilibria with the potential for bidder opportunism. The first is whether our sample deals satisfy the rationality constraint of the "no-trade" theorem (Milgrom and Stokey, 1982) that underlies all of the theories in Table 1. The second is whether the information in the deal announcements indeed signals the type of industry-specific overvaluation suggested by the empirical analysis of Rhodes-Kropf, Robinson, and Viswanathan (2005).

Table 4 reports average cumulative abnormal returns (CAR) for the acquirer (columns 1-2), the target (columns 3-4), and their value-weighted combined CAR (columns 5-6). As is common in the M&A literature, we use the latter as our measure of the total expected synergy gains from the takeover. Using the two event windows (-1, 3) and (-1, 6) relative to the M&A announcement date (day 0), the daily abnormal return is estimated as $R_{it} - \hat{R_{it}}$, where $\hat{R_{it}}$ is the expected return estimated from the Market Model, $R_{it} = \alpha_i + \beta_i R_{mt} + \epsilon_{it}$. R_{mt} is the CRSP value-weighted market return, and the estimation period is day -297 through -43.

Panel A of Table 4 shows the average CAR for the total sample of 1,447 takeovers where both the bidder and the target are public companies. Confirming extant evidence based on much larger sample sizes (Dessaint, Eckbo, and Golubov, 2025), the average bidder CAR is negative and significant ($\approx -1.5\%$), while the target CAR is large and significant ($\approx 28\%$). As discussed in the literature, a negative short-term bidder announcement return is discussed using alternative hypotheses ranging from an adverse-selection adjustment of the bidder's stand-alone value when the deal payment contains bidder shares, to merger arbitrage activity involving short-selling of bidder shares and market disagreement over the expected deal synergies (Eckbo, Malenko, and Thorburn, 2025).

More importantly for the theoretical focus of this paper, Panel A of Table 4 shows in columns (5) and (6) that the value-weighted sum of the two firms' CAR-values is positive and statistically significant ($\approx 2\%$). Moreover, the combined CAR in these two columns are positive and significant also in Panel B, where the dealpayment involves bidder stock. In other words, conditional on a deal being successfully completed, the expected gain from trade is viewed as positive by the market.

This supports the notion that bidders who face target adverse selection may finance the expected overpayment cost of the target shares from the joint synergy gains.

The evidence in Panel C shows that the deal-synergy estimates in columns (5) and (6) no smaller after conditioning on the ex post information that the takeover is bidder-initiated (while not shown, a result that repeats itself also when conditioning on target-initiation). As mentioned above, this lack of impact of the deal initiation on the market's perception of expected total synergy gains shown in Table 4 likely means that this information is absent from the market's information set at that point in the deal process.

We next turn to the potential for the deal announcements to contain economic information that is relevant not only for the deal partners but also for the bidder's close industry peers.

3.2 Sector-specific information externalities

In the model of Rhodes-Kropf and Viswanathan (2004), the bidder and targets act rationally while market prices contain both firm-specific and sector-specific mispricing components. The latter reflects excessive optimism or pessimism by investors about the bidder firm's industry sector. As the deal parameters presented to the target are insufficient to fully deduce this mispricing, targets sometime (inadvertently) accept overpriced bidder shares. When market (or sector) misvaluation is high, the target is nevertheless willing to accept the acquirer's stock bid because the target rationally places some positive probability on a high stock-bid reflecting high synergies rather than the market overvaluation.

Using both market and accounting information, Rhodes-Kropf, Robinson, and Viswanathan (2005) pursue the above mispricing argument by decomposing bidder M/B into firm- and sector-specific components. The latter is a sector-average valuation multiple estimated using cross-sectional regressions of firm market values on accounting variables (book equity, net income, leverage) within industries. For the purpose of this paper, we are particularly interested in their conclusion that sector-level merger intensity appears to be higher when sectors are more overvalued (i.e., high time-series sector error).

In Table 5, we complement the approach of Rhodes-Kropf, Robinson, and Viswanathan (2005) by instead identifying the potential for sector overvaluation using the valuation impact of our deal announcements on the bidder's close peers (a test statistic that does not require accounting information). We argue that, if the source of the putative overvaluation at least in part represent market mispricing of the bidder's main industry sector, then investors will react to the deal announcement by *lowering* the value of the bidder firm's peers.

To test this general valuation implication, Table 5 follows the same CAR estimation procedure as in Table 4, but this time for portfolios of firms in the industry sectors of the bidder. The peer firms included in these portfolios are the five firms with the highest proximity to the bidder firm in terms of what we call "H-P industry relatedness". As also defined in Table 7 below, industry is based on the TNIC-3 industry classification from Hoberg and Phillips (2016). The TNIC-3 database provides a firm-by-firm pairwise similarity score based on product descriptions from the firms' 10Ks. The database covers firm pairs whose similarity score (SS) is above a threshold that matches the coarseness of the three-digit Stardard Industrial Classification (SIC). We assign a relatedness score of zero to firm pairs that are not in the TNIC-3 database.

In columns (1) and (2) of Table 5, the five firms in the portfolios under "All rivals" are selected from the intersection between the full Compustat population of US-domiciled companies and the firms in the TNIC-3 industry classification. The five-firm portfolios under "Same 3-Digit SIC" further restricts the Compustat population to firms in the bidder's 3-digit SIC industry while in columns (5) and (6) the requirement is for the peers to be in the same 4-digit SIC industry. If the number of listed firms in a specific SIC industry is less than five (which happens only rarely in our sample), we use the actual number of listed peers.

For each bidder, we use two sets of peer-firm portfolio weights: equal-weighted and relatedness-weighted. In the latter, each of the five firms is given a weight equal to the firm's SS value divided by the sum of the five firms' SS scores. The results in Panel A of Table 5 show a pervasive and statistically significant *positive* peer announcement effect of the deal announcements. In the smaller sample in Panel B, the industry wealth effect turns statistically insignificant after conditioning on the deal payment involving at least some bidder stock. Moreover, in Panel C, which is again shown just for completeness since it conditions on the deal being bidder initiated (information that is most likely not yet publicly available to the market), also shows a statistically insignificant industry announcement effect.

Contrary to the M/B-driven conclusion of Rhodes-Kropf, Robinson, and Viswanathan (2005), the evidence in Table 5 fails to support the hypothesis that takeovers tend to pay with shares due to market overvaluation of the bidder's main industry sector. Rather, a consistent interpretation of the total-sample estimates in Panel A is that the market believes that one or more of the five peer firms themselves may earn synergistic industry rents from engaging in future sector-specific takeover bids.

4 Do uninformed targets drive stock offers?

The previous section concludes with positive and significant weighted average total synergy gains to the deal partners (Table 4), and with a less significant but still positive average relatedness-weighted wealth effect to the bidder's industry peers (Table 5). In this section, we go an important step further and test whether the synergistic bidders tend to use shares as acquisition payment to take advantage of private information about *firm-specific* market mispricing.

4.1 Theoretical motivation: Efficient payment design

Hansen (1985, 1987) present the first analysis of the use of bidder shares as acquisition currency under two-sided information asymmetry and with independent bidder private valuations of the target (see DeMarzo, Kremer, and Skrzypacz, 2005, for generalizations). That is, while the cash payment conditions only on what the bidder knows about the target ex ante, the value of the comparable stock payment effectively also conditions on the target's information as it depends on the ex post realization of the value of the merged firm. Hence, stock offers can lead to more efficient accept/reject decisions by the target. Fishman (1989) achieves this efficiency by assuming that the bidder pays for the target in debt instruments secured in the target's assets and therefore has a value known to the target.[13]

In Eckbo, Giammarino, and Heinkel (1990), the bidder has private information about its assets in place and synergies (a single random variable drives both), while the target has private information about its reservation value. Different types of bidders fully separate by choosing different combinations of cash and stock in the offer, with higher types including relatively more cash in the mix.[14] To illustrate, let $\Omega_j \equiv b_j + s_j$ denote the with-synergy value of bidder j, where b_j and s_j are, respectively, the bidder's standalone value and the bidder's takeover-induced synergy gain. Moreover, assume for simplicity that the target type t may be either high or low ($t_i, \in \{l, h\}$). The bidder's prior beliefs about target type are $\hat{t} \equiv f(t_l)t_l + f(t_h)t_h$, where $f(.)$ is the prior density function. The bidder presents mixed cash-stock offer of $Z_j \equiv (z_j, c_j)$ to maximize its expected residual claim to combined firm:

$$E(v_j) \equiv \sum_{i \in \{l,h\}} \pi_i (1 - z_j)(\hat{t}_i + \Omega_j - c_j) + (1 - \pi_i) b_j, \tag{1}$$

where c_j is the amount of cash in the deal, z_j is a fraction of the equity in the merged firm, and π_i is the probability that a target of type i will accept the offer. The offer causes the target to first update its beliefs (using Bayes' rule) to $\hat{\Omega}_j$ and select a value of π_i so as to maximize

$$E(v_i) \equiv \pi_i [c_j + z_j(t_i + \hat{\Omega}_j - c_j)] + (1 - \pi) t_i, \tag{2}$$

and then to accept the bid if and only if $E(v_i) \geq t_i$.

Eckbo, Giammarino, and Heinkel (1990) focus on pure strategy sequential equilibria that meet the Cho and Kreps (1987) 'intuitive' refinement criteria, in which the target accepts with

[13] In Fishman (1989), cash has the additional advantage of signaling the bidder's strong valuation of the target, which deters some rival bidders from paying the cost of finding out their own valuation and entering the auction. Hence, the highest-valued bidders make offers in cash.

[14] They also examine their model empirically and find that deal announcement returns are broadly consistent with this equilibrium implication: Bidder abnormal announcement returns are on average highest in all-cash offers, lowest in all-stock offers, and with mixed cash-stock offers in between.

probability one ($\pi_i = 1$). This simplification means that the bidder must present an offer that is acceptable to the highest-valued target t_h, i.e., $z_j = (t_h - c_j)/(t_h + \hat{\Omega}_j - c_j)$. Given the adverse selection (the target that accepts may be of the low type), they prove that the use of mixed cash-stock offers is consistent with a fully separating equilibrium in which the fraction of the deal paid in cash signals the true bidder type:

$$\frac{c_j}{t_h} > \frac{c_k}{t_h} \longrightarrow \Omega_j > \Omega_k. \tag{3}$$

As predicted by the above model framework, they also present empirical evidence that takeover-induced bidder abnormal stock returns are increasing in the cash portion c_j/t_h.

Using the above framework, EMT shows that a bidder will not use cash if its value is known to the target (a non-informative pooling equilibrium). EMT extends this intuition by focusing on how well informed the target is about the bidder value—the precision of the target's prior beliefs $\hat{\Omega}_j$—across targets. As in Eckbo, Giammarino, and Heinkel (1990), a bidder minimizes the signaling cost by offering, in a mixed cash-stock offer (z_j, c_j), the lowest value of c_j necessary to achieve full revelation of its true value. EMT show formally that the more precise the target's belief $\hat{\Omega}$, the lower will be the minimum c_j required to signal Ω_j. In other words, the better informed the target is about the bidder's true valuation, the lower is c_j and the greater is the fraction of stock in the offer that the bidder optimally selects.

Proposition 1 extends the above logic to a situation where the bidder self-selects to initiate the sales process:

Proposition 1 (efficient payment design):

(i) *With rational agents, synergistic bidders concerned with target adverse selection are more likely to offer payment in bidder shares, the better informed the target is about bidder value. For the same reason, better-informed targets are more likely to accept payment in bidder shares.*

(ii) The adverse-selection-induced positive relation between the target's information about the

bidder and the use of stock as deal payment holds a fortiori when the bidder initiates the deal.

As explained in Section 4.1 above, the better informed the target, the lower minimum cash portion of the deal payment (c_j/t_j) the bidder can offer to signal its true value credibly. Hence, more informed targets allow the bidder to use a greater fraction of stock in the deal payment. Moreover, precisely because better-informed targets are more able to detect bidder overvaluation, opportunistic use of bidder stock as acquisition currency is less likely the more the target knows about the bidder.

Our contribution is to condition the theoretical relation under (i) on the bidder's initiation decision in (ii). A synergistic bidder receiving private information that its shares are temporarily overpriced by the market may have an extra incentive to initiate the deal and offer its shares in the deal payment. On the other hand, since the target observes who initiates the deal, it rationally updates its prior beliefs about the bidder's true value with this additional information. The target's Bayesian updating results in a posterior distribution over Ω_j that has both a lower mean and standard deviation (increased precision), which in turn further restricts the bidder's opportunity to use shares as deal payment when initially overpriced.

4.2 Bidder initiation and the likelihood of stock payment

We start the empirical analysis with unconditional regression evidence. Table 6 shows the coefficient estimates from probit estimations of the likelihood of an all-stock bid and Tobit estimation for the fraction of stock in the deal payment in the subsample of public bidders. The explanatory variable is a dummy for bidder-initiated deals. The regressions contain an intercept, which is not tabulated. Notably, bidder initiation is associated with a statistically and economically significant reduction in the likelihood and extent of stock usage: the probit coefficient is –0.367 (t = 5.66), and the Tobit coefficient is –0.478 (t = 5.67). The results hold when limiting the sample to bidder- and target-initiated deals (columns 2 and 5) and bidder- and jointly-initiated deals (columns 3 and

6). The negative relationship between bidder initiation and the use of stock payment is surprising. It directly contradicts the core implication of bidder opportunism and is instead consistent with theories of rational contract design under asymmetric information (Eckbo, Giammarino, and Heinkel, 1990).

To further test Proposition 1, Table 8 presents conditional estimates of the likelihood of stock payment after adding the firm-level controls and information variables defined in Table 7 to the regressions in Table 6. Columns (1) and (5) list the baseline model coefficients, including acquirer and target-industry characteristics. Larger bidders are less likely to use stock, while large relative deal size increases stock usage. These relationships are intuitive: larger firms tend to have more internal financing, while large deals may require equity financing. Moreover, in line with earlier studies, bidders with a relatively high M/B ratio tend to use stock. As shown by EMT, competition from private bidders in the target industry increases the use of cash payments.

Columns (2) and (6) add four target information proxies from EMT. These variables capture how well-informed the target is about acquirer valuation. Three of the four information variables enter with a positive and significant sign: *Local Deal*, *H-P Industry Relatedness*, and *Recent SEO*. Targets geographically close to the bidder (within 5 miles), operating in similar markets, measured by the Hoberg and Phillips (2010) similarity score, or that recently sold shares to the public, are more likely to accept stock payment. These findings echo EMT and align with the prediction from rational equilibrium models that well-informed targets are more willing to accept bidder shares, while rejecting the notion of bidders opportunistically paying with stock.

Columns (3) and (7) of Table 8 add a dummy for bidder initiation, confirming the results in Table 6 that bidder-initiated deals tend to contain less stock. The following two columns interact the dummy for bidder-initiation with the target information proxies and the M/B ratio. If mispricing drives the decision to pay with stock, this effect should be strongest when the bidder can time a temporary market misvaluation and initiate the takeover. Again, the likelihood of an all-stock payment is lower when the bidder initiates the transaction. More importantly, none of the interaction variables are significant. For example, the interaction variable *Local Deal x Bidder*

Initiated takes a value of 0.134 with a t-value of 0.60. The insignificance of the interaction variable indicates that bidder-initiation does not amplify the role of target information about the bidder or the potential misvaluation.

In sum, the empirical results in Table 8 (columns 2 and 3 for the all-stock probability and columns 6 and 7 for the fraction stock in the deal payment) show that the main conclusion in EMT—that bidders use more stock when targets know more about the bidder—holds *a fortiori* after conditioning on the takeover being bidder-initiated. It strongly suggests that the bidder's concern with adverse selection on the target's side of the deal is more important than the target's concern about bidder opportunism.[15]

We next turn to the structural model of LTW, which uses a different underlying form of information asymmetry to quantify the potential for allocation inefficiency due to opportunism.

5 Quantifying potential inefficiencies

5.1 Theoretical motivation: Opportunism with confused targets

In this section, we turn to rational equilibrium theories where the target's true value is known to all takeover participants (one-sided information asymmetry). In these models, the target does not have sufficient information to infer the true value of the bids and, hence, may unknowingly accept payment in overvalued bidder shares. To motivate our empirical Proposition 2 below, we focus on the model of LTW. In that model, the target firm remains uncertain about the true bid value even after observing the offer premium and the cash portion. The reason is that a high stock bid may reflect combinations of high takeover synergies, a bidder's cash constraint, and bidder misvaluation (opportunism).[16]

[15]Kim, Luu, and Xu (2025) suggest that the institutional ownership of the target firm represents an additional information channel taken into account by bidders and that further supports the efficient payment design hypothesis of EMT.

[16]In Rhodes-Kropf and Viswanathan (2004), which we return to in the empirical analysis of Section **??** below, bidders do not face liquidity constraints. Instead, targets may confuse a higher bidder value as reflecting high synergy gains rather than market overvaluation.

More specifically, the LTW model the takeover process as a sealed-bid, second-price auction in which two acquirers optimally bid their independent private valuations of the target by submitting bids composed of some combination of cash and bidder stock. For bidder j, the target observes c_j, z_j, and j's standalone (pre-offer) market value M_j standardized by the commonly known target value. When valuing j's observed offer $Z_j(c_j, z_j, M_j)$, the target rationally accounts for the following three unobservables, for which it only knows the respective probability distributions: the synergy s_j, the market's misvaluation ϵ of M_j, and the bidder's cash constraint k_j (possibly driven by expected future funding needs).[17]

Importantly, the three unobservables imply that the target cannot perfectly infer whether a bid with a high stock component z_j is the result of high synergy, market overvaluation of the bidder ($\epsilon_j > 0$), or that the bidder is cash-constrained. For example, an overvalued bidder with a low synergy component s_j may bid the same as a more efficient high synergy bidder. Also, an all-stock bid may reflect a binding cash constraint k_j rather than market overvaluation. As the target remains confused this way, there is some positive probability that it will accept an opportunistic bid ($\epsilon_j > 0$) that is scored as the most valuable for the wrong reason.[18]

Next, we summarize the above intuition in Proposition 2, where we also add general implications of the takeover being initiated by the bidder. Moreover, we quantify the potential for inefficiency by structurally estimating the model of LTW after conditioning on the initiating party.

5.2 Structural estimation: Fraction inefficient takeovers

Proposition 2 below applies the general property that an acquirer in a bidder-initiated transaction is more likely to have received private information that its shares are (temporarily) overpriced by the market.

Proposition 2 (opportunism):

[17]We refer to the extensive discussion in LTW for a detailed motivation of these uncertainties.

[18]As LTW carefully explain in their Online Appendix, after the scoring the winner, the payment is adjusted via a second-price settlement rule: Holding c_j constant, z_j is lowered to the point where the target deems the winning bid to be equal in value to the second-highest (losing) offer.

(i) *Market misvaluation of bidder shares can create both a crowd-out and redistribution effect. Crowding out occurs when an overvalued bidder wins the target after defeating a more efficient (high-synergy) but less overvalued rival bidder. Redistribution occurs when an overvalued bidder loses the target to a rival bidder after forcing the rival to pay a higher premium.*

(ii) The inefficient outcome in (i) will occur with a higher frequency among takeovers initiated by a bidder versus the target.

When testing part (ii) of Proposition 2, we treat the initiation decision as exogenous to the LTW model for three reasons. First, adding the bidder's initiation decision to the model increases the bidder's independent private valuation of the target without changing the optimal bid strategy. Second, while the bidder's initiation decision is observable to the target and, therefore, increases the target's estimated likelihood that M_j is overpriced, endogenizing the initiation decision into the target's bid-scoring rule cannot lead to a *lower* probability of opportunism relative to a target-initiated auction. In other words, treating the initiation decision as exogenous to the model may bias upwards the structurally estimated fraction of inefficient deals, with the fraction conditional on target initiation being a lower bound. Third, and most importantly, by preserving both LTW's original model and estimation procedure, we can directly compare our findings with theirs.

Like LTW, we estimate their model using Simulated Method of Moments (SMM).[19] The simulation uses eight data moments, listed in Table 10: the mean and conditional variance of *Offer premium* and *Fraction of bid in cash* (panels A and B, respectively), the mean of *Acquirer announcement return* (Panel C), and three slope coefficients resulting from regressing these three variables on relative acquirer size (the log of market value of acquirer-to-target equity M). For example, for the offer premium, the slope coefficient shown in Panel A of Table 10 is β estimated cross-sectionally as follows:

$$Offer\ premium_j = \alpha + \beta log(M_j) + \gamma Controls_j + u_j, \quad j = 1, ..N, \tag{4}$$

[19]We thank LTW for generously providing us with their programming code. As a result, any difference in our findings is driven by sample differences and/or differences directly related to our information on bidder initiations. We separate these two effects below.

and where the vector *Controls* is the same for all three dependent variables.[20]

The eight observable moments in Table 10 exactly identify the eight unobservable model parameters used to generate a bidder's synergy, cash constraint, and misvaluation. That is, the dispersion in offer premiums is used to match the dispersion across estimates of bidder synergies. In contrast, the dispersion in observed cash holdings is used to match the dispersion in bidder cash constraints. The unobservable dispersion in misvaluation is also assessed using the empirical regularity of a positive correlation between bidder announcement returns and the fraction of cash in the payment (Betton, Eckbo, and Thorburn, 2008). As discussed above, since using cash tends to signal bidder undervaluation, it helps to identify the unobservable misvaluation in the LTW model.

Table 10 compares the empirical moments with those implied by the model to assess how well the model fits the data. As is the case for the data in LTW, Table 10 shows that the model closely matches empirical moments from our sample. What is new here is our breakdown of the total sample into bidder-initiated and target-initiated subsamples in columns (4) and (5). As shown, this breakdown shows very similar magnitudes for the offer premiums (Panel A) and for the fraction of the bid paid in cash (Panel B). The mean offer premium is 46.3% in our total sample,compared to 43.7% in LTW. Moreover, the estimated model predicts a mean offer premium of 49.9% for our full sample, while it is 44.2% as reported by LTW. For our bidder-initiated and target-initiated subsamples, the offer premiums average 47.5% and 44.3%, respectively. As expected, the offer premium exhibits a strong positive correlation with the relative size of the acquirer (M), with a slope coefficient of 0.033 in our sample (model prediction of 0.023), compared to 0.030 (0.033) in LTW.

While the average and predicted offer premiums in Panel A are similar across the two studies, the fraction of the bid paid in cash (Panel B) and the acquirer announcement return (Panel C)

[20]The vector *Controls* includes variables that are outside the structural model: year indicators, targets' Fama–French 48 industry indicators, and the five target characteristics logarithm of market capitalization, market leverage, market-to-book ratio of equity, return on assets, and cash-to-assets ratio. As LTW point out (their footnote 6, p.274), they reach similar conclusions without including *Controls* when measuring the moments. The primary advantage of dealing with heterogeneity this way is that it is computationally feasible (since the model does not have a closed-form solution).

differ substantially. The average fraction paid in cash is 30.6% in LTW (with a model-predicted fraction of 30.8%), while the average and model prediction are higher in our sample: 64.4% and 63.1%, respectively. This discrepancy likely reflects differences in sample periods: our data are dominated by cash-financed bids, whereas the earlier study includes a larger share of takeovers from the 1990s, when stock-based deals were more prevalent (see also the payment-method time series in Eckbo, Makaew, and Thorburn, 2018). Also, as shown earlier in Table 3, as well as in the time series in Panel B of Figure 3 that covers our sample period (2000–2020), the median ratio of cash holdings to total assets is relatively small for both our bidder-initiated and target-initiated deals ($\approx$ 8%). For our purpose, however, the important message from Panel B is that, within our sample, bidder-initiated deals have a somewhat *higher* fraction of cash in the deal payment than do target-initiated transactions: 69.9% versus 56.4%, respectively, with the slope on log(M) also being slightly higher for target-initiated deals (0.11 v. 0.13).

Turning to the acquirer announcement returns in Panel C of Table 10, this return averages -1.5% for our total sample, versus -2.3% in LTW. This difference may also in part be driven by our higher average fraction of the bid that is paid in cash. Again, for our purpose, the main point of interest is that the average bidder announcement return is also lower (-1.1%) for bidder-initiated deals than for target-initiated transactions (-2.1%).

Next, we turn to the percent of the simulated deals that result inefficient outcomes. In the LTW model with two competing bidders, a deal outcome is inefficient when the low-synergy bidder wins the auction. This happens when the target erroneously scores that bidder's higher stock offer as reflecting the highest synergy value of the two bidders. The target's confusion arises because it is unclear whether a high fraction stock in the offer reflects a bidder cash constraint or market overpricing (which is private bidder information).

The simulation results are shown in Table 11 for the total sample, and in Table 12 after breaking the total sample into bidder-initiated and target-initiated, respectively. Starting with Panel A of Table 11, it shows the percent of the simulated deals that result in inefficient outcomes. The inefficient deal outcome in our sample on average occurs in only 6.10% of the simulations.

This is close to the 7.01% reported by LTW which, for expositional simplicity, are copied here from their table 5.

Moreover, panels B and C of Table 11 quantify the average synergy loss due to opportunism. Computing the synergy loss in a given inefficient deal amounts to creating the counterfactual outcome after restricting the acquirer's market-valuation error term (the parameter ϵ in Section 5.1 above) to be zero. With this restriction, the offer premium and fraction cash in the deal payment are sufficient for the target to score the highest synergy bidder as the winner. In both panels, we show the distribution of the synergy loss (the difference between the synergy of the winning and the losing bidder) either as a percent of the target's pre-takeover (standalone) market value or the losing bidder's higher synergy.

Again, notwithstanding the different sample periods, the total sample results in panels B and C of Table 11 are similar across the two studies. Specifically, Panel B shows that the simulated synergy loss in efficient deals averages 10.10% of the target size and 19.20% of the highest synergy. The corresponding percentages in LTW are 9.02% and 15.79%, respectively. Moreover, in Panel C, where the loss is computed as a percent of all deals, the average loss is 0.62% of te target size and 1.17% of the highest synergy, which compares to the 0.63% and 1.14% reported by LTW. As shown, the distributions of these losses are also similar across our sample and that of LTW.

Turning to Proposition 2, recall that, due to the self-selection, inefficient outcomes are more likely among takeovers initiated by a bidder than by the target. Since endogenous self-selection occurs prior to the start of he deal process, the proposition holds across a wide variety of specific sales processes (not just the one used by LTW). The sales process only affects the extent to which the target detects the putative bidder mispricing (if any). We therefore benchmark the risk of accepting overpriced bidder shares with the deal outcome in target-initiated deals. This benchmark provides a lower bound on the likelihood of opportunism in bidder-initiated deals.

While the statistics in Table 12 are defined as in Table 11, the sample is now split in to bidder-initiated and target-initiated deals. Notice first that, while the subsample results are all close to the full-sample, the average percent of inefficient deals is, if anything, *lower* in bidder-initiated transactions than in target-initiated ones: 6.27% versus 7.37%, respectively. Similarly, the average simulated loss in inefficient deals is somewhat lower (and never higher) for bidder-initiated transactions than in target-initiated ones. These estimates strongly suggest that bidders use stock as acquisition currency primarily for efficiency reasons rather than to get away with selling overpriced shares to the target.

6 Conclusion

Firms from time to time receive information that outside investors misprice the company's shares. While it is illegal for insiders to anonymously trade on such price-sensitive information, it may increase the incentive for an "opportunistic" acquirer to lawfully initiate an otherwise synergistic takeover transaction and use its shares as acquisition currency. Of course, given the extensive due diligence process prior to deal completion, it is far from clear that the acquirer's private information about mispricing is likely to survive merger negotiations. Moreover, several auction-theoretic takeover models point to the possibility that rational targets may use deal terms such as the offer premium and method of payment to successfully reverse engineer the bidder's private information, leaving efficiency reasons for why acquirers decide to pay for the target with their own shares.

The main contribution of this paper is to provide some first empirical tests of bidder opportunism after restricting the takeover process to be initiated by the acquirer itself. Just as in studies attempting to identify private gains from insider trading, requiring the timing of the transaction to be self-selected by the informed party substantially enhances test power. Moreover, we systematically explore implications of equilibrium models with rational agents that allow us to pitch opportunism against traditional efficiency arguments—such as bidder concern with target adverse selection and cash constraints and—for paying with bidder shares. By nesting such mutually exclusive hypotheses under the same empirical test statistic, we are also able to infer more precisely whether the data supports bidder opportunism.

Our evidence is based on 2,968 successful takeovers for U.S. public targets that took place over the period 2000 through 2020—the hitherto largest sample of takeovers in the literature for which there is also information on who initiates the deal process. The winning bidder initiates 45% of these takeover contests, while a rival bidder initiated another 12%. The remaining 43% are target-initiated (34% by the target board or a large shareholder and another 8% are initiated jointly). At the start, it is noticeable that the number of bids (including written bids) and average bid jumps are surprisingly similar across bidder- and target-initiated auctions. Moreover, firm characteristics such as M/B, R&D, and operating efficiency are also similar regardless of the initiating party. Also intriguing, the likelihood of observing bidder shares as all or part of the deal payment is *lower* for bidder-initiated than for target-initiated transactions.

Our main empirical test exploits the simple and intuitive notion that a target that is particularly well informed about the bidder is also better able to value the bidder shares. Since it is harder to sell overpriced to this target, bidder opportunism should be *less likely*. Conversely, when the target is better able to price the bidder shares, a bidder concerned with target adverse selection is *more likely* to use shares as payment. To discriminate between these two opposing hypotheses, we use simple but powerful proxies for how informed the target is about the bidder. These proxies capture the two firms' industry relatedness, closeness in geographical location, as well as public information disclosures associated with recent seasoned equity offerings and acquisitions by the bidder. We also emphasize that, unlike much of the extant literature, our information-based tests do not require the inclusion of an explicit asset pricing model for the potential mispricing of the bidder.

Interestingly, we find that public bidders systematically use *more* stock in the deal payment when the target knows more about the bidder (as measured by our information proxies), and that this positive relationship does not change when we condition on the deal being bidder initiated. While inconsistent with bidder opportunism, this is consistent with the hypothesis that bidders use stock as deal payment to minimize the risk of target adverse selection, but only when the target knows enough about the bidder not to substantially undervalue the shares. Our reduced-form tests control for capital structure factors as well as external competitive pressures from unlisted rival bidders (who themselves are often forced to pay with cash given the illiquid nature of their own shares).

Using the model of LTW, we also perform a structural estimation of the likelihood that an opportunistic (inefficient) bidder will win the auction for the target. The simulated structural model has the advantage of identifying the counterfactual world with zero chance of opportunism. As LTW, we find that the model estimation identifies a low percentage as being inefficient (our 6.10% to their 7.01% with only a small associated synergy loss (0.62% v. 0.63%, respectively, when measured in percent of the target size across all deals). More importantly, these percentages are virtually unchanged when we repeat the structural estimation using our separate samples of bidder-initiated and target-initiated deals. In other words, while our initiation-based data moments are in a far better position to capture bidder opportunism should it exist, the associated model outcome is the same whether the bidder or the target initiates the transaction.

Finally, we confirm that the takeover deals in our sample are on average synergistic (not zero-sum games)—a necessary condition for deals among rational agents to be initiated in the first place. Also interesting, we show that bidder-initiated deals on average cause investors to increase also the market value of the bidder's closest industry peers. In other words, rather than signaling to investors that the bidder's industry sector may be overpriced (and, hence, the bidder's own shares also overpriced), the market draws the opposite inference: that there may exist synergistic takeover opportunities also for the bidder's close industry peer.

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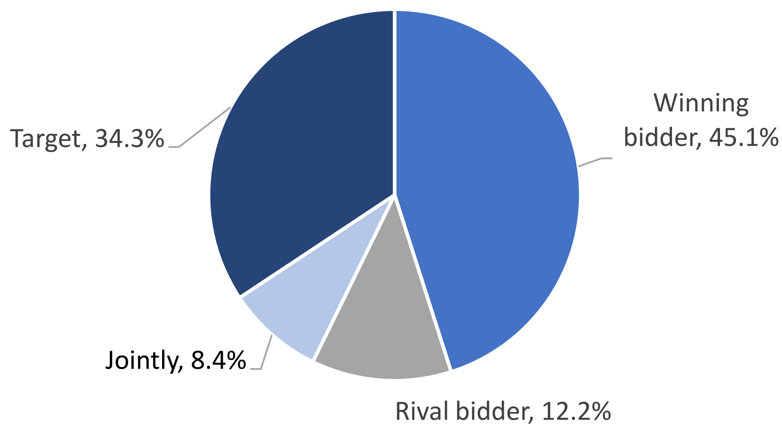
Figure 1
Sample proportions by initiation

The figure shows the sample proportions by deal initiation for the full sample of 2,968 public and private bidders (Panel A) and the subsample of 1,845 publicly traded bidders (Panel B). Deals can be initiated by the winning bidder, a rival bidder, the target firm, or the target and the bidder jointly. The sample consists of completed takeovers of US public targets by US bidders, 2000–2020.

Panel A: Full sample of public and private bidders (N=2,968)



Panel B: Subsample of public bidders (N=1,845)

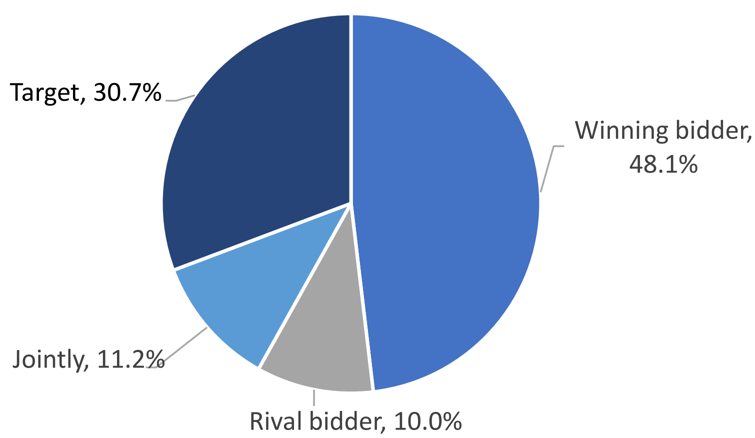


Figure 2
Sample of takeover initiations over time, 2000-2020

The figure shows the annual number of deals initiated by a bidder, the target, and jointly by the target and the

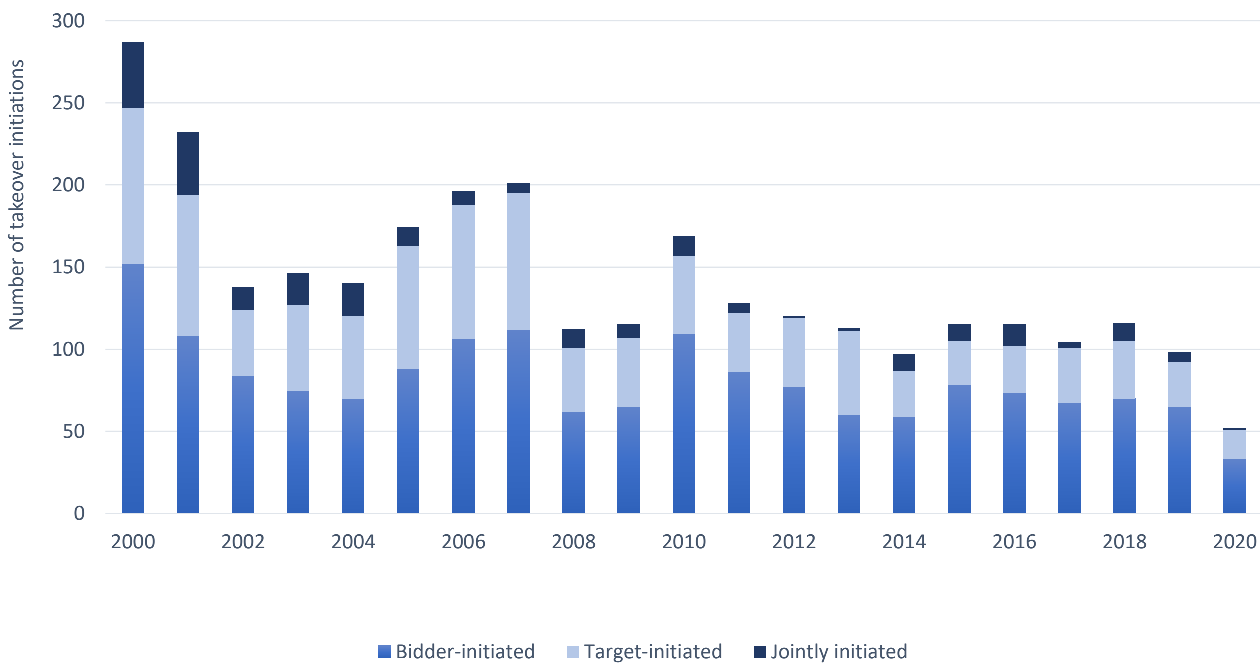
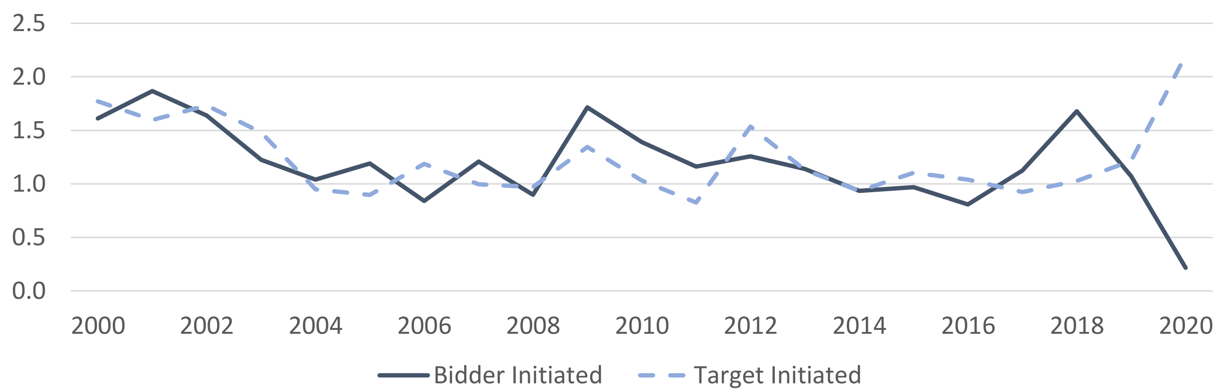


Figure 3

Bidder and target relative market-to-book ratio and bidder cash holdings, 2000-2020

Panel A shows the annual median ratio of the bidder and target market-to-book (M/B), and Panel B the median cash holdings to total assets, split by bidder- and target-initiated deals. The sample comprises 1,845 completed takeovers of US public targets by US public bidders, 2000–2020.

Panel A: Median ratio of bidder to target M/B



Panel B: Median ratio of cash holdings to total assets

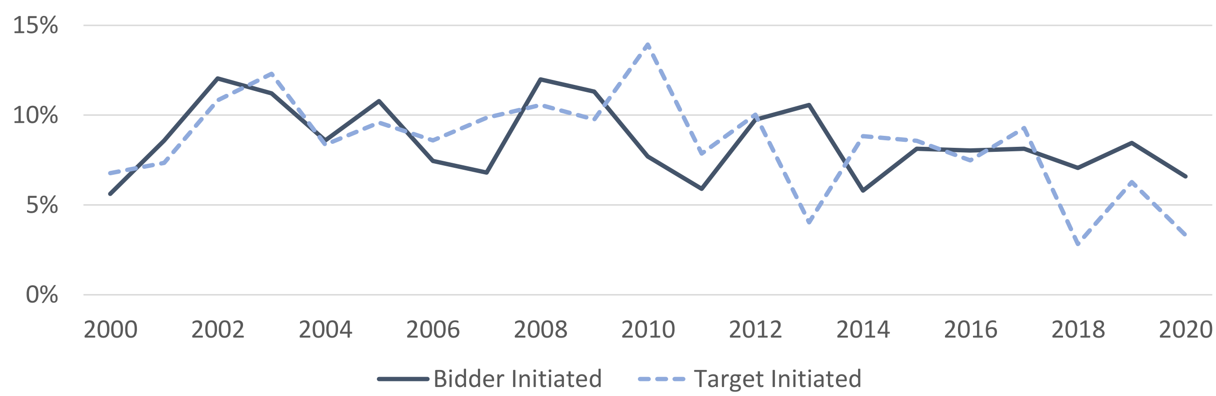


Table 1
Takeover models with rational expectations (RE) equilibria

Publication	Innovation	Initiation decision	Information asymmetry	Type of RE equilibrium
Hansen (1985,1987)	Introduces the contingent nature of a stock payment in takeovers	Exogenous	Two-sided	Fully revealing. Highest quality bidder signal with all-cash, all others pay with all-stock.
Fishman (1989)	Introduces how payment method impacts bidder competition and target acceptance	Exogenous	Initially two-sided	Fully revealing. Bidder pays with debt secured in target assets, which converts to one-sided information asymmetry.
Eckbo, Giammarino and Heinkel (1990)	Introduce equilibria with mixed cash-stock offers, with cash a costly signal	Exogenous	Two-sided	Fully revealing. Fraction cash in deal payment signals bidder type.
Rhodes-Kropf and Viswanathan (2004)	Introduce market mispricing may cause some targets to unknowingly accept overpriced bidder shares as payment	Exogenous	Two-sided	Partially revealing. Target sometimes unknowingly accepts overpriced bidder shares.
Li, Taylor and Wang (2018)	Introduce how targets may confuse market mispricing and bidder cash constraints with high-synergy stock offers	Exogenous	One-sided (target value known to all)	Partially revealing. Target sometimes unknowingly accepts overpriced bidder shares.
Gorbenko and Malenko (2018)	Introduce strategic initiation by a financially constrained bidder weighing the option of delaying a synergistic takeover.	Endogenous	One-sided	Fully revealing. Fraction cash in deal payment signals bidder type.
Liu and Bernhardt (2021)	Introduce rent extraction by initiating targets when synergies are concave in bidder standalone values	Endogenous	One-sided	Fully revealing. Fraction cash in deal payment signals bidder type.
Gorbenko and Malenko (2024)	Introduce strategic initiation that signal private information and induce rival bidder competition	Endogenous	Two-sided	Fully revealing based on the initiation signal. Payment in cash only.

Table 2
Auction characteristics

The table reports mean and median characteristics of the auction process (columns 1-3), split by bidder-initiated (columns 4-6) and target-initiated (columns 7-9) deals. Columns 10 and 11 report the difference in mean (columns 5 and 8) and its significance, respectively. Panel A shows the full sample of 2,971 completed takeovers of US public targets by US public and private bidders, 2000–2020, while Panel B shows the subsample of 1,845 takeovers by public bidders. (d) indicates a binary variable. ***, **, and * denotes significance at the 1%, 5%, and 10% level, respectively.

	Full Sample			Bidder-Initiated			Target-Initiated			Bidder-Target Init.	
Variable	N	Mean	Median	N	Mean	Median	N	Mean	Median	Δ Mean	t-stat.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Panel A: Full sample of public and private bidders											
No. of Bids	2,968	4.16	3	1,699	4.26	4	1,269	4.03	3	0.23	(1.80)*
Multiple Bids (d)	2,968	0.80	1	1,699	0.84	1	1,269	0.75	1	0.10	(6.61)***
No. of Written Bids	2,968	2.23	1	1,699	2.22	1	1,269	2.25	1	-0.03	(0.32)
Multiple Written Bids (d)	2,968	0.48	0	1,699	0.49	0	1,269	0.47	0	0.02	(0.99)
No. of Unique Bidders	2,968	2.06	1	1,699	2.02	1	1,269	2.11	1	-0.09	(1.21)
Multiple Bidders (d)	2,968	0.40	0	1,699	0.40	0	1,269	0.40	0	0.00	(0.17)
No. of Financial Bidders	2,968	0.52	0	1,699	0.51	0	1,269	0.55	0	-0.04	(0.77)
Duration (days)	2,968	210.88	163	1,699	206.72	159	1,269	216.45	168	-9.74	(1.51)
Average Bid Jump (%)	2,057	4.07	2.28	1,268	4.37	2.62	789	3.57	1.86	0.80	(2.12)**
Frac. Stock Payment	2,798	0.27	0	1,612	0.24	0	1,186	0.31	0	-0.07	(4.53)***
All-Stock Payment (d)	2,968	0.15	0	1,699	0.12	0	1,269	0.19	0	-0.06	(4.82)***
Panel B: Subsample of public bidders											
No. of Bids	1,845	3.46	3	1,072	3.69	3	773	3.14	3	0.55	(3.85)***
Multiple Bids (d)	1,845	0.74	1	1,072	0.80	1	773	0.65	1	0.15	(7.33)***
No. of Written Bids	1,845	1.76	1	1,072	1.81	1	773	1.70	1	0.11	(1.00)
Multiple Written Bids (d)	1,845	0.40	0	1,072	0.42	0	773	0.38	0	0.04	(1.59)
No. of Unique Bidders	1,845	1.72	1	1,072	1.76	1	773	1.68	1	0.08	(1.06)
Multiple Bidders (d)	1,845	0.31	0	1,072	0.33	0	773	0.29	0	0.04	(1.70)*
No. of Financial Bidders	1,845	0.14	0	1,072	0.14	0	773	0.14	0	0.00	(0.06)
Duration (days)	1,845	196.08	146	1,072	191.77	140	773	202.06	153	-10.29	(1.28)
Average Bid Jump (%)	1,079	4.72	2.87	714	4.90	3.07	365	4.35	2.58	0.60	(1.06)
Frac. Stock Payment	1,753	0.41	0.26	1,023	0.36	0.00	730	0.49	0.48	-0.13	(6.02)***
All-Stock Payment (d)	1,845	0.24	0	1,072	0.19	0	773	0.30	0	-0.11	(5.74)***

Table 3
Bidder and target characteristics by initiation

The table reports mean and median bidder and target characteristics in Panels A and B, respectively. Columns 1-3 use the full sample, while columns 4-6 limit the sample to bidder-initiated deals, and columns 7-9 to target-initiated deals. Columns 10 and 11 report the difference in mean (column 5 vs. 8) and its significance, respectively. The sample comprises completed takeovers of US public targets by US public bidders, 2000-2020. All variables are defined in Table 7. ***, **, and * denotes significance at the 1%, 5%, and 10% level, respectively.

	Full Sample			Bidder-Initiated			Target-Initiated			Bidder-Target Init.	
Variable	N	Mean	Median	N	Mean	Median	N	Mean	Median	Δ Mean	t-stat.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Panel A: Public bidder characteristics											
Total Assets	1,574	13,190	2,581	926	15,264	3,526	648	10,227	1,548	5,037	(4.17)***
Leverage	1,543	0.11	0.12	907	0.12	0.12	636	0.11	0.12	0.00	(0.26)
Cash Holding	1,551	0.13	0.08	913	0.13	0.08	638	0.14	0.08	-0.01	(1.66)*
M/B	1,545	4.23	2.71	911	4.19	2.79	634	4.28	2.64	-0.09	(0.25)
Dividend Dummy	1,575	0.48	0.00	926	0.51	1.00	649	0.44	0.00	0.07	(2.62)***
R&D	1,575	0.05	0.02	926	0.05	0.02	649	0.06	0.02	-0.01	(1.93)*
Asset Tangibility	1,564	0.44	0.30	920	0.43	0.30	644	0.45	0.30	-0.02	(1.17)
Operating Efficiency	1,370	1.94	1.39	802	1.94	1.38	568	1.93	1.42	0.01	(0.02)
Panel B: Target characteristics (of public bidders)											
Total Assets	1,430	1,924	258	835	2,139	337	595	1,622	170	517	(1.64)
Leverage	1,414	0.04	0.00	823	0.03	0.00	591	0.04	0.01	0.00	(0.21)
Cash Holding	1,422	0.18	0.12	827	0.18	0.12	595	0.18	0.11	0.00	(0.30)
Market to Book Equity	1,405	2.86	2.00	823	2.99	2.14	582	2.67	1.87	0.33	(1.05)
Dividend Dummy	1,432	0.29	0.00	835	0.29	0.00	597	0.29	0.00	0.00	(0.08)
R&D	1,432	0.09	0.02	835	0.09	0.02	597	0.09	0.02	0.00	(0.36)
Asset Tangibility	1,418	0.46	0.31	829	0.46	0.30	589	0.48	0.34	-0.02	(0.84)
Operating Efficiency	1,243	1.99	1.60	725	1.90	1.52	518	2.13	1.77	-0.23	(0.51)

Table 4
Average expected synergies as combined bidder and target announcement returns

The table reports average cumulative abnormal returns (CAR) for the acquirer (columns 1-2), the target (columns 3-4), and the market-value weighted combined acquirer and target return (columns 5-6). CAR is reported over the two event windows relative to the M&A announcement date (day 0): (-1, 3) and (-1, 6). CAR is computed as $R_{it} - \hat{R_{it}}$, where $\hat{R_{it}}$ is the expected return estimated from the Market Model, $R_{it} = \alpha_i + \beta_i R_{mt} + \epsilon_{it}$, estimated over the window (-297, -43). R_{mt} is the CRSP value-weighted market return. The sample comprises completed takeovers of US public targets by US public bidders, 2000-2020. t-values are in parentheses. ***, **, and * denotes significance at the 1%, 5%, and 10% levels, respectively.

	Bidder CAR		Target CAR		Combined CAR	
	CAR(-1,3)	CAR(-1,6)	CAR(-1,3)	CAR(-1,6)	CAR(-1,3)	CAR(-1,6)
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Full sample of public-to-public takeovers						
CAR	-0.015	-0.018	0.284	0.283	0.023	0.022
	(5.64)***	(6.00)***	(31.56)***	(30.82)***	(8.09)***	(6.72)***
N	1,447	1,447	1,324	1,324	1,031	1,031
Panel B: Takeovers with bidder shares as part or all of the deal payment						
CAR	-0.034	-0.038	0.204	0.201	0.013	0.011
	(7.91)***	(8.14)***	(19.83)***	(18.96)***	(2.79)***	(2.13)**
N	794	794	696	696	554	554
Panel C: Bidder-initiated takeovers with shares as part or all of the payment						
CAR	-0.029	-0.034	0.239	0.236	0.025	0.022
	(5.59)***	(5.85)***	(16.47)***	(15.80)***	(4.50)***	(3.33)***
N	427	427	374	374	298	298

Table 5
Average announcement-induced sector-specific wealth effects

The table reports average cumulative abnormal returns (CAR) for the acquirer's industry peers over two event windows relative to the M&A announcement date (day 0): (-1, 3) and (-1, 6). CAR is computed as $R_{it} - \hat{R_{it}}$, where $\hat{R_{it}}$ is the expected return estimated from the Market Model, $R_{it} = \alpha_i + \beta_i R_{mt} + \epsilon_{it}$, estimated over the window (-297, -43). R_{mt} is the CRSP value-weighted market return. Columns 1-2 identify peers using the five closest firms based on Hoberg and Phillips (2016) industry-relatedness scores. Columns 3-4 and 5-6 further restrict peers to those within the same 3-digit and 4-digit SIC codes, respectively. CARs are equally weighted (Equal Weighted) or weighted by the relative H-P relatedness score (Relatedness Weighted). The sample comprises completed takeovers of US public targets by US public bidders, 2000-2020. t-values are in parentheses. ***, **, and * denotes significance at the 1%, 5%, and 10% levels, respectively.

	All rivals		Same 3-Digit SIC		Same 4-Digit SIC	
Rival weighting	CAR(-1,3) (1)	CAR(-1,6) (2)	CAR(-1,3) (3)	CAR(-1,6) (4)	CAR(-1,3) (5)	CAR(-1,6) (6)
Panel A: Full sample of public-to-public takeovers						
Equal Weighted	0.583	0.605	0.595	0.510	0.598	0.381
	(3.86)***	(3.26)***	(3.45)***	(2.41)**	(3.07)***	(1.63)
Relatedness Weighted	0.795	0.808	0.697	0.622	0.713	0.485
	(4.62)***	(3.92)***	(3.68)***	(2.70)***	(3.35)***	(1.94)*
N	1,387	1,387	1,207	1,207	1,024	1,024
Panel B: Takeovers with shares as part or all of the payment						
Equal Weighted	0.384	0.233	0.469	0.243	0.421	0.145
	(1.71)*	(0.83)	(1.75)*	(0.73)	(1.48)	(0.41)
Relatedness Weighted	0.506	0.323	0.591	0.351	0.517	0.212
	(2.07)**	(1.07)	(2.05)**	(1.00)	(1.79)*	(0.59)
N	755	755	662	662	565	565
Panel C: Bidder-initiated takeovers with shares as part or all of the payment						
Equal Weighted	0.229	0.111	0.648	0.468	0.290	0.086
	(0.77)	(0.31)	(1.66)*	(1.01)	(0.71)	(0.18)
Relatedness Weighted	0.467	0.341	0.821	0.605	0.409	0.169
	(1.36)	(0.85)	(1.91)*	(1.23)	(0.99)	(0.34)
N	410	410	353	353	302	302

Table 6
Stock payment and initiation, unconditional

The table reports the coefficient estimates from probit regression for the likelihood of an all-stock bid (columns 1-3) and Tobit regressions for the fraction of stock in the deal payment (columns 4-6). The explanatory variables are a dummy indicating that the deal is bidder-initiated and an intercept (not tabulated). Columns (1) and (4) use the full sample. Columns (2) and (5) restrict the sample to bidder- and target-initiated deals, and columns (3) and (6) to bidder- and jointly-initiated deals. The sample comprises completed takeovers of US public targets by US public bidders between 2000 and 2020. t-values are in brackets. ***, **, and * denotes significance at the 1%, 5%, and 10% level, respectively.

	Probit (y = All-stock)			Tobit (y = Fraction of stock)		
	All deals	Bidder and target init.	Bidder and jointly init.	All Deals	Bidder and target init.	Bidder and jointly init.
	(1)	(2)	(3)	(4)	(5)	(6)
Bidder Initiated	-0.367	-0.152	-0.875	-0.478	-0.178	-1.179
	(5.66)***	(2.08)**	(8.93)***	(5.67)***	(1.95)*	(9.13)***
Pseudo R-squared	0.02	0.00	0.06	0.01	0.00	0.04
N	1,845	1,639	1,278	1,753	1,552	1,224

Table 7
Variable definitions

Variable name	Variable definition and data source
Deal characteristics	
Large Deal	Dummy = 1 if the ratio (deal value/bidder total assets) is in the top quartile, SDC.
All-Stock	All-stock payment (consideration structure = shares), SDC.
Bidder-Initiated	Dummy = 1 if the bidder initiated the takeover, SDC.
Bidder capital structure	
Size	Natural log of total assets, Compustat.
Leverage	Total debt / total assets, Compustat.
Cash Holding	Cash / total assets, Compustat.
M/B	Market-to-book equity ratio = (year-end closing price * number of shares outstanding) / (total assets - total liabilities), Compustat.
Dividend Dummy	Dummy = 1 if total dividends > 0, Compustat.
R&D	Research and development expense / total assets, Compustat.
Asset Tangibility	Property, plant, and equipment / total assets, Compustat.
Operating Efficiency	(Cost of goods sold + selling, general and administrative expense) / (property, plant, and equipment + total current assets - cash - total current liabilities), Compustat.
Target's information about bidder value	
Local Deal	Dummy = 1 if the bidder and the target are located within 30 miles. The distance is computed using the spherical law of cosines formula: Distance = arccos(sin(lat1).sin(lat2)+cos(lat1).cos(lat2).cos(long2-long1)), where R = radius of the earth = 3963 miles, (lat1,long1) = bidder coordinate (latitude,longtitude) in radians, and (lat2,long2) = target coordinate in radians. Firm location data are from the zip codes in SDC and their coordinates (lat,long) are from 1987 US Census Gazetteer Files.
H-P Industry Relatedness	Measure based on the TNIC-3 industry classification from Hoberg and Phillips (2016). The TNIC-3 database provides a firm-by-firm pairwise similarity score based on product descriptions from the firm 10Ks. The database covers firm pairs whose score is above a threshold matching the coarseness of three-digit SIC. We assign the relatedness score of zero to firm pairs that are not in the TNIC-3 database.
Recent SEO	Dummy = 1 if the bidder issued stock within 18 months prior to the bid, SDC.
Recent Acquirer	Dummy = 1 if the bidder announced another merger bid within 18 months before the sample bid, SDC.
Target industry characteristics	
Private Bidder Competition	Fraction of all merger bids in the target's Fama and French 49 (FF49) industry and year in which the bidder is private, SDC.
High-Tech Dummy	Dummy = 1 if the bidder is in a high-tech industry covering 47 four-digit Standard Industrial Classification (SIC) codes in the two-digit industries 28, 35, 36, 38, 48, and 73, American Electronic Association.

Table 8
Determinants of stock consideration conditional on target information proxies and bidder-initiation

The table reports the coefficient estimates from probit regressions for the likelihood of all-stock payment (columns 1-4) and Tobit regressions for the fraction of stock (columns 5-8). Columns 1 and 5 show the baseline regressions, columns 2 and 6 add information variables, and the remaining add bidder initiation. The sample comprises completed takeovers of US public targets by US public bidders, 2000–2020. All variables are defined in Table 7. An intercept is included but not reported. t-values are in brackets. ***, **, and * denotes significance at the 1%, 5%, and 10% level, respectively.

	Probit (y = all-stock)				Tobit (y = fraction of stock)			
Variable	Baseline (1)	Information (2)	Initiation (3)	Interaction (4)	Baseline (5)	Information (6)	Initiation (7)	Interaction (8)
Controls								
Size	-0.181 (7.38)***	-0.195 (7.36)***	-0.186 (6.95)***	-0.188 (6.99)***	-0.233 (8.30)***	-0.248 (8.39)***	-0.240 (8.04)***	-0.242 (8.09)***
Large Deal	0.220 (2.41)**	0.174 (1.89)*	0.174 (1.88)*	0.174 (1.89)*	0.660 (7.07)***	0.596 (6.52)***	0.596 (6.54)***	0.594 (6.56)***
Leverage	0.037 (0.25)	0.006 (0.04)	-0.011 (0.08)	-0.019 (0.13)	0.117 (0.65)	0.065 (0.37)	0.057 (0.32)	0.053 (0.30)
Cash Holding	0.241 (0.64)	0.117 (0.31)	0.114 (0.30)	0.092 (0.24)	0.269 (0.64)	0.083 (0.20)	0.090 (0.22)	0.065 (0.15)
M/B	0.014 (2.59)***	0.015 (2.60)***	0.015 (2.61)***	0.005 (0.63)	0.011 (1.71)*	0.011 (1.71)*	0.011 (1.70)*	-0.002 (0.14)
M/B x Bidder Initiated				0.018 (1.59)				0.02 (1.58)
Dividend Dummy	0.025 (0.26)	0.061 (0.64)	0.058 (0.60)	0.057 (0.59)	-0.092 (0.93)	-0.056 (0.58)	-0.060 (0.61)	-0.065 (0.66)
R&D	0.629 (1.09)	0.503 (0.89)	0.458 (0.81)	0.487 (0.87)	0.604 (0.94)	0.385 (0.62)	0.333 (0.54)	0.348 (0.57)
Asset Tangibility	0.159 (1.43)	0.139 (1.23)	0.125 (1.09)	0.128 (1.13)	0.540 (4.83)***	0.500 (4.49)***	0.487 (4.38)***	0.494 (4.45)***
Operating Efficiency	0.001 (0.15)	0.001 (0.13)	0.001 (0.14)	0.002 (0.23)	0.001 (0.12)	0.001 (0.18)	0.001 (0.21)	0.003 (0.37)
High-Tech Dummy	-0.117 (1.17)	-0.085 (0.83)	-0.086 (0.84)	-0.093 (0.91)	-0.204 (1.96)**	-0.161 (1.55)	-0.162 (1.57)	-0.165 (1.59)
Private Bidder Competition	-0.736 (2.62)***	-0.682 (2.41)**	-0.673 (2.37)**	-0.9 (2.02)**	-0.835 (2.96)***	-0.753 (2.70)***	-0.747 (2.68)***	-0.737 (1.55)
Priv. Bid. Comp. x Bidder-Ini.				0.402 (0.70)				-0.029 (0.05)
Target information proxies								
Bidder Initiated			-0.202 (2.45)**	-0.362 (2.31)**			-0.161 (1.89)*	-0.255 (1.51)
Local Deal		0.325 (2.93)***	0.328 (2.94)***	0.258 (1.52)		0.338 (2.86)***	0.338 (2.86)***	0.189 (0.99)
Local Deal x Bidder Ini.				0.134 (0.60)				0.257 (1.07)
H-P Industry Relatedness		0.856 (2.07)**	0.888 (2.13)**	0.597 (1.00)		2.000 (4.66)***	2.010 (4.67)***	1.500 (2.25)**
H-P Industry Rel. x Bidder Ini.				0.460 (0.56)				0.746 (0.87)
Recent SEO		0.205 (2.36)**	0.210 (2.41)**	0.216 (1.65)*		0.288 (3.25)***	0.287 (3.24)***	0.355 (2.49)**
Recent SEO x Bidder Initiated				-0.008 (0.05)				-0.111 (0.64)
Recent Acquirer		-0.046 (0.37)	-0.047 (0.37)	0.003 (0.01)		0.031 (0.25)	0.031 (0.26)	0.029 (0.15)
Recent Acquirer x Bidder Ini.				-0.1 (0.42)				0.001 (0.01)
Pseudo R-squared	0.10	0.11	0.12	0.12	0.10	0.12	0.12	0.12
N	1,349	1,341	1,341	1,341	1,285	1,277	1,277	1,277

Table 9
Determinants of bidder announcement CAR

The table reports OLS coefficients estimates of bidder CAR(-1,3). CAR is computed as $R_{it} - \hat{R_{it}}$, where $\hat{R_{it}}$ is the expected return estimated from the Market Model, $R_{it} = \alpha_i + \beta_i R_{mt} + \epsilon_{it}$, estimated over the window (-297, -43). R_{mt} is the CRSP value-weighted market return. Columns 1-4 restrict the analysis to completed takeovers of US public targets by US public bidders, 2000-2020. Columns 5-8 implement a Heckman (1979) two-step procedure, with the first-stage selection probit estimated on the full Compustat universe and controlling for firm Size, Leverage, Cash Holding, M/B, Dividend Dummy, R&D, Asset Tangibility, and Operation Efficiency. Columns 1 and 5 present baseline regressions; columns 2 and 6 add information variables; the remaining columns include a bidder initiation indicator and its interactions. All variables are defined in Table 7. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	OLS				Heckman regression (2nd stage)			
	Baseline	Information	Initiation	Interaction	Baseline	Information	Initiation	Interaction
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Controls								
Size	0.003	0.001	0.001	0.001	-0.103	-0.047	-0.044	-0.048
	(1.62)	(0.39)	(0.28)	(0.36)	(0.64)	(0.58)	(0.54)	(0.58)
Large Deal		-0.041	-0.041	-0.04		-0.041	-0.041	-0.04
		(5.04)***	(5.01)***	(4.98)***		(6.08)***	(6.05)***	(6.03)***
Leverage	0.016	0.022	0.023	0.022	0.153	0.085	0.082	0.087
	(0.81)	(1.16)	(1.17)	(1.20)	(0.73)	(0.78)	(0.75)	(0.79)
Cash Holding	-0.008	0.021	0.021	0.021	0.139	0.089	0.084	0.09
	(0.20)	(0.51)	(0.50)	(0.50)	(0.58)	(0.73)	(0.70)	(0.73)
M/B	-0.001	-0.001	-0.001	-0.001	-0.007	-0.003	-0.003	-0.003
	(2.23)**	(1.06)	(1.05)	(0.56)	(0.81)	(0.71)	(0.68)	(0.71)
M/B x Bidder Initiated				0.000				0.000
				(0.04)				(0.04)
Dividend Dummy	0.000	-0.001	0.000	-0.001	0.067	0.029	0.027	0.03
	(0.01)	(0.10)	(0.08)	(0.14)	(0.65)	(0.57)	(0.53)	(0.57)
R&D	-0.056	-0.005	-0.004	-0.004	-0.479	-0.197	-0.184	-0.201
	(0.80)	(0.07)	(0.05)	(0.06)	(0.74)	(0.59)	(0.56)	(0.60)
Asset Tangibility	-0.008	-0.01	-0.01	-0.01	0.139	0.055	0.051	0.057
	(0.98)	(1.26)	(1.23)	(1.20)	(0.62)	(0.49)	(0.46)	(0.50)
Operating Efficiency	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.68)	(0.80)	(0.80)	(0.84)	(0.55)	(1.13)	(1.15)	(1.19)
High-Tech Dummy		-0.018	-0.018	-0.019		-0.018	-0.018	-0.018
		(2.52)**	(2.51)**	(2.62)***		(2.55)**	(2.55)**	(2.64)***
All-Stock		-0.032	-0.032	-0.029		-0.032	-0.032	-0.029
		(3.64)***	(3.62)***	(2.04)**		(4.63)***	(4.55)***	(3.05)***
All-Stock x Bidder Ini.				-0.005				-0.005
				(0.30)				(0.39)
Target information proxies								
Bidder Initiated			0.005	-0.005			0.005	-0.005
			(0.85)	(0.48)			(0.83)	(0.53)
Local Deal		0.004	0.004	0.004		0.005	0.005	0.004
		(0.46)	(0.45)	(0.21)		(0.54)	(0.54)	(0.29)
Local Deal x Bidder Ini.				0.001				0.001
				(0.05)				(0.07)
H-P Industry Relatedness		-0.017	-0.017	-0.04		-0.016	-0.017	-0.037
		(0.44)	(0.45)	(0.54)		(0.53)	(0.54)	(0.85)
H-P Ind. Rel. x Bidder Ini.				0.042				0.037
				(0.50)				(0.61)
Recent SEO		-0.014	-0.014	-0.026		-0.014	-0.014	-0.027
		(2.19)**	(2.21)**	(2.31)**		(2.38)**	(2.40)**	(2.96)***
Recent SEO x Bidder Ini.				0.02				0.021
				(1.64)				(1.81)*
Recent Acquirer		-0.011	-0.011	-0.011		-0.01	-0.01	-0.01
		(1.64)	(1.64)	(1.58)		(1.24)	(1.26)	(1.21)
Inverse Mill's Ratio					-0.572	-0.258	-0.241	-0.264
					(0.66)	(0.59)	(0.55)	(0.59)
R-squared/Chi-squared	0.02	0.08	0.08	0.08	3.82	96.95	97.95	102.04
N	1,233	1,228	1,228	1,228	119,632	119,627	119,627	119,627

Table 10
Observed data moments

The table reports the eight observed data moments targeted in the simulated method of moments (SMM). Panel A shows the mean and conditional variance of the offer premium and its slope on relative acquirer size (log market value ratio, M). Panel B presents the mean fraction of cash and its slope on firm size. Panel C reports the mean bidder announcement return (CAR(-1,3)) and its slope on the cash share. Columns 1–5 show observed moments from 1,000 samples of 500 deals each; Columns 6–8 show corresponding moments from Li et al. (2018), Table 3 Panel A. Columns 4 and 5 split the sample by bidder- and target-initiated deals, respectively. Standard errors and t-statistics for the difference between the model and data are in parentheses. The sample includes 1,845 completed takeovers of US public targets by US public bidders (2000–2020).

	Our sample					Li et al. (2018)'s sample		
	Full sample			Bidder ini.	Target ini.	Full sample		
	Data	Model	Diff.	Data	Data	Data	Model	Diff
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Offer premium								
Mean	0.463	0.499	-0.04	0.475	0.443	0.437	0.442	0.006
	(0.015)		(TBA)	(0.012)	(0.011)	(0.016)		(0.351)
Conditional variance	0.102	0.089	0.01	0.100	0.106	0.085	0.088	0.004
	(0.012)		(TBA)	(0.009)	(0.009)	(0.006)		(0.594)
Slope on log(M)	0.033	0.023	0.01	0.035	0.030	0.033	0.033	0.000
	(0.014)		(TBA)	(0.014)	(0.010)	(0.004)		(-0.041)
Panel B: Fraction of bid in cash								
Mean	0.644	0.631	0.01	0.699	0.564	0.306	0.308	0.002
	(0.019)		(TBA)	(0.015)	(0.013)	(0.028)		(0.081)
Conditional variance	0.139	0.132	0.01	0.135	0.141	0.119	0.120	0.001
	(0.010)		(TBA)	(0.008)	(0.007)	(0.007)		(0.179)
Slope on log(M)	0.121	0.043	0.08	0.110	0.127	0.050	0.052	0.001
	(0.013)		(TBA)	(0.013)	(0.009)	(0.009)		(0.149)
Panel C: Acquirer announcement return								
Mean	-0.015	-0.011	0.00	-0.011	-0.021	-0.023	-0.024	-0.001
	(0.005)		(TBA)	(0.003)	(0.004)	(0.004)		(-0.334)
Slope on Cash Frac.	0.051	0.038	0.01	0.039	0.066	0.031	0.032	0.001
	(0.017)		(TBA)	(0.013)	(0.014)	(0.005)		(0.228)

Table 11
Structural estimations of efficiency loss due to opportunism

The table shows simulated efficiency losses from the model. Panel A reports average synergy loss in inefficient deals-—where the lower-synergy bidder wins-—expressed as a percentage of the target's pre-deal market value or the highest synergy. Panel B reports average efficiency loss across all deals. For comparison, we include corresponding losses from Li et al. (2018), Table 5. Standard errors are estimated via Monte Carlo simulation (1,000 samples of 500 draws each), with model parameters drawn from a multivariate normal distribution using the SMM-estimated mean and covariance. The sample includes 1,845 completed US public takeovers (2000–2020). Standard errors in parentheses.

	Our sample						Li et al. (2018)'s sample					
		Percentile						Percentile				
	Mean	10	25	50	75	90	Mean	10	25	50	75	90
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A: Percent of deals that are inefficient (lower-synergy bidder wins)												
% inefficient deals	6.10%						7.01%					
Panel B: Average synergy loss in inefficient deals												
% of target size	10.10	1.03	2.74	6.72	13.73	23.85	9.02	1.09	2.99	6.78	12.9	20.01
% of synergy	19.20	1.82	5.02	12.17	26.62	47.18	15.79	1.93	5.29	11.95	22.05	36.37
Panel C: Average synergy loss in all deals												
% of target size	0.62	0.06	0.17	0.41	0.84	1.45	0.63	0.08	0.21	0.47	0.90	1.40
% of synergy	1.17	0.11	0.31	0.74	1.62	2.88	1.14	0.14	0.37	0.84	1.54	2.55
	(TBA)						(0.31)					

Table 12
Simulated efficiency losses across bidder- and target-initiated transactions

Table reports mean and median inefficiency from simulations of the model in Li et al. (2018), based on 1,000 samples of 500 observations using baseline parameter estimates from Table 11. Results are shown for the full sample (columns 1–2), bidder-initiated (columns 3–4), and target-initiated contests (columns 5–6). The sample comprises 1,845 completed US public takeovers (2000–2020). The corresponding values reported by Li, Taylor, and Wang (2018) in their table 5 are shown in square brackets.

	Full sample		Bidder-initiated		Target-initiated	
	Mean	Median	Mean	Median	Mean	Median
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Percent of deals that are inefficient (lower-synergy bidder wins)						
% inefficient deals	6.10		6.27		7.37	
	[7.01]					
Panel B: Average synergy loss in inefficient deals						
% of target size	10.10	6.72	10.65	6.92	11.48	7.67
	[9.02]					
% of synergy	19.20	12.17	19.34	12.39	21.81	14.67
	[15.79]					
Panel C: Average synergy loss in all deals						
% of target size	0.62	0.41	0.67	0.43	0.85	0.56
	[0.63]					
% of synergy	1.17	0.74	1.21	0.78	1.61	1.08
	[1.14]					