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Left at the altar? Termination provisions in M&A transactions

An empirical study of the rationales and premium effects of target and reverse termination fees among strategic and financial acquirers

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NORWEGIAN SCHOOL OF ECONOMICS

Preface

This thesis concludes our Master of Science in Economics and Business Administration with a major in Financial Economics at the Norwegian School of Economics (NHH).

We want to express our gratitude to our supervisor, Professor Karin S. Thorburn. Although we have not had the pleasure of taking any of her courses, we were well aware of her contributions to existing research on M&A, as well as her previous supervision of theses covering topics highly similar to what we had in mind. Therefore, the decision to reach out to her for supervision was an easy one to make. We are thankful for her invaluable insights in the process of formulating our hypotheses, for constructive feedback throughout the process, as well as for sharing her comprehensive expertise in the broader realm of M&A. We would also like to thank Associate Professor Alexander M. Sandvik for valuable discussions on approaches to econometric challenges in our model building process.

We hope the insights from our thesis contribute meaningfully to existing termination provision and M&A literature, and motivate others to further research, both the provisions and the distinction between strategic and financial acquirers.

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Abstract

This thesis examines rationales behind, and premium implications of, target and reverse termination fees (TTFs and RTFs) in M&A transactions. Our main innovation is to distinguish between strategic and financial acquirers and how their rationales and premium implications of TTF/RTF usage differs. Through an elaborate data collection process that culminates in manually retrieving data from SEC takeover filings, we nuance and build on the extant literature by correcting biases in existing research and by employing variables not previously utilized in TTF/RTF research.

Our six hypotheses are built on the *efficiency* and *insurance* propositions first put forward by Bates and Lemmon (2003) and Officer (2003). Under the efficiency proposition, TTFs compensate bidders for i) revealing valuable private information, and ii) incurring negotiation and valuation costs. Under the insurance proposition, RTFs "insure" *targets* against bid value and deal closing risk, and provide *bidders* with an abandonment option.

We find no differences in TTF incidence between strategic and financial deals; however, we *do* find that TTF incidence is growing in the percentage of stock in the deal payment in strategic deals. We argue that this is because TTFs and stock offers both reflect uncertainty of target/synergy valuation. We also find support for RTFs being more prevalent in financial deals, growing in the share of stock used in the deal payment, and less prevalent in tender offers than in merger offers. The value of the RTF being higher to financial acquirers leads to higher RTF incidence in financial deals. Stock offers reflect greater valuation uncertainty and entail greater uncertainty of bid value, providing both bidders and targets with incentives for RTFs. Tender offers also involve fewer RTFs because such offers allow avoiding negotiations with the target management; a prerequisite for negotiating contractual provisions. However, the difference in RTF incidence between offer types is lower for financial than strategic acquirers, possibly due to the abandonment option's higher value to such acquirers. Finally, we find no evidence for any effect of RTFs on deal premia, even after controlling for differences between acquirer types.

Keywords *– M&A, TTF, RTF, Deal premium, Acquirer type, Stock offer, Tender offer*

Contents

1 Introduction

Termination provisions are contractual provisions used in M&A transactions that impose a cash fee upon one of the deal's parties if a proposed transaction fails to complete. With such provisions having been employed in transactions since at least the 1980s (Officer, 2003; Afsharipour, 2010), one would expect their coverage in the literature − and our knowledge about them − to be substantial. However, while *target*-payable termination fees (TTFs) are almost ubiquitous[1] and *reverse* (bidder-payable) termination fees (RTFs) have seen an increase in usage after the financial crisis[2], their coverage in the financial literature has been relatively sparse.

Indeed, two of the first major contributions to termination provision research in the financial literature were only made in the early 2000s, with the concurrent papers of Bates and Lemmon (2003) and Officer (2003). Using data from SDC Platinum, these researchers find that TTF incidence can be explained by an *efficiency proposition*, under which TTFs are used to incentivize bidders to enter into the negotiation process. The researchers argue that this is because TTFs compensate bidders for i) the revelation of valuable private information, and ii) negotiation and valuation costs incurred during the negotiation process. While Officer (2003) focuses solely on TTFs, Bates and Lemmon (2003) also consider RTFs and find that their use relates to an *insurance proposition*, under which RTFs compensate targets in deals where closing risk and bid value uncertainty is high. Afsharipour (2010) and Chen, Mahmudi, Virani and Zhao (2018) supplement these *target*-side rationales with *bidder*-side rationales by arguing that RTFs can also be used by bidders as abandonment/"financing out" options to step away from unfavorable deals.

However, given the lack of attention such provisions have received in the financial literature, there are still many unanswered questions with respect to why they are used and how their use affects deal premia. One important reason for this is that these provisions are negotiated outside of the public eye, before any bid is made public. For the prospective researcher, this results in an increased difficulty in identifying and testing variables relating to termination provision rationales and outcomes. The fact that this entire pre-public,

[1] See e.g. Bates and Lemmon (2003); Officer (2003); Boone and Mulherin (2007a); Jeon and Ligon (2011)

[2] See e.g. Afsharipour (2010)

"private" negotiation phase is unobservable is an issue that M&A researchers have been grappling with for decades, and knowledge on it is so scarce that it is often compared to a "black box" (Liu and Officer, 2019).

One avenue that is often pursued in attempts to study the phase includes the retrieval of takeover filings from the United States Security and Exchange Commission's (SEC) Electronic Data Gathering, Analysis and Retrieval (EDGAR) database. In one of the landmark papers in M&A research over the past two decades, Boone and Mulherin (2007b) demonstrate how such filings contain detailed information on the private negotiation phase and may be used to nuance existing research. This opens up for a myriad of previously unavailable research opportunities. Using the takeover filings as a data source, Boone and Mulherin (2007a) also document the existence of bias in SDC Platinum termination provision data, and use this to point out earlier authors' (e.g. Coates and Subramanian (2000); Bates and Lemmon (2003); Officer (2003)) error of concluding that judicial decisions in the 1990s significantly increased the use of TTFs. Despite this, SEC filings remain underutilized in (financial) termination provision research. Not only have there been few innovations with respect to which variables are included in such research since Boone and Mulherin (2007a)'s paper, but researchers (such as Chen et al. (2018)[3]) have also persisted in employing biased SDC Platinum data.

We believe this underutilization, together with the biases documented with respect to Bates and Lemmon (2003) and Officer (2003)'s data sources, yield compelling reasons to revisit and nuance these authors' findings, which is the overall goal of our thesis. Most significantly, this thesis innovates by explicitly considering differences between strategic and financial acquirers and how these impact TTF/RTF incidence and deal premia. Such acquirers have different sources of value from their takeovers − while strategic acquirers usually pursue synergies through vertical or horizontal takeovers, financial acquirers generally profit through acquiring undervalued and/or underperforming targets. We believe these differences in sources of value (and, conversely, risks) should lead to significant differences in TTF/RTF usage rationales, as both provision types create incentives for the bidder. We innovate further by employing control variables novel in termination provision research (such as credit spreads, cross-border deals, and deal initiation), in addition to developing and testing a new proxy for antitrust risk. Finally, we employ data from SEC filings to

[3]While Chen et al. (2018) *acknowledge* the bias, they do not make any attempts to correct it

identify and correct biases in data on termination fees, payment structure, and offer type.

Thus, by using newer data, a wider set of variables, and accounting for the biases present in existing research, this thesis investigates how TTF and RTF incidence varies between such acquirer types, payment structures, offer types, and how the provisions impact deal premia. Our analyses are based on a sample of 451 merger and tender offers on U.S. public targets from between 2003 and 2019, containing data from four different databases combined with hand-gathered data from SEC filings. Although the data gathering process is complex, the resulting sample is very detailed and robust to known concerns with biases in SDC data. We believe this allows us to assign a relatively high degree of confidence to our results[4], which we evaluate by formulating and testing the following six hypotheses:

H1: *TTF incidence is more likely in financial than in strategic deals*

H2: *In strategic deals, TTF incidence is growing in the percentage of bidder stock used in the deal payment*

H3: *RTF incidence is more likely in financial than in strategic deals*

H4: *In strategic deals, RTF incidence is growing in the percentage of bidder stock used in the deal payment*

H5: *RTF incidence is more likely in merger offers than in tender offers in both strategic and financial deals*

H6: *The effects of RTF inclusion on deal premia are different in strategic and financial deals*

As explained previously, explicitly considering acquirer type in TTF/RTF research is novel to this thesis. Under H1, we argue that TTF incidence is more likely in financial than in strategic deals, because the cost of revealing private information is higher in such deals. As explained by Eckbo, Malenko and Thorburn (2019), financial acquirers have a higher degree of commonality in their sources of value than strategic acquirers. This increases the costs of revealing private information through bidding (Berkovitch, Bradley and Khanna, 1989). Since Bates and Lemmon (2003) argue, under the efficiency

[4]The obvious drawback in our data is the relatively small sample size compared to Bates and Lemmon (2003) and Officer (2003) (who both have over 2,000 observations), which is caused by missing data across databases and SEC filings reducing the initial SDC query sample by almost 90%. While this might induce sampling bias to our dataset, we do not believe this bias to significantly affect the validity of our results

proposition, that TTFs compensate bidders for revealing such information that competing bidders can free-ride on, TTF incidence should be higher in financial deals. Although our results yield no support for this hypothesis, we also find no evidence for the existence of the free-rider problem it is based on.

With respect to payment structure, we nuance (and explain) the established finding that stock deals are associated with higher TTF incidence. Under H2, we argue that TTF incidence is *growing* in the percentage of stock used by the bidder in the deal payment, as using stock reflects the presence of target/synergy valuation uncertainties that increase the incentives to employ TTFs. Our results support this claim and Bates and Lemmon (2003)'s explanation (under the efficiency proposition) that TTFs are used to incentivize bids in deals where the bidder faces high negotiation and valuation costs.

We make the same predictions for RTFs and acquirer type/payment structure, but for different reasons. H3 argues that RTF incidence is more likely in financial deals. This is because the value of the "financing out" provided by the RTF is higher to financial acquirers, who are more dependent on raising sufficiently cheap debt to profit from deals. H4 argues that in strategic deals, RTF incidence is growing in stock percentage because stock bids are associated with greater incentives for RTFs for both the bidder and target. For the bidder, using stock reflects uncertainty in the valuation of target and synergies, thus increasing the value of an abandonment option (which the RTF provides). For the target, stock deals are associated with higher bid value uncertainty, which increases targets' incentives to use RTFs as insurance. We find strong support for both hypotheses.

H5 considers offer types and argues that there should be a *negative* relationship between tender offers and RTF incidence instead of the *positive* relationship that is found in the literature (e.g. Bates and Lemmon (2003)). Since the possibility of avoiding negotiations with target management is one of the advantages of tender offers over merger offers, we expect the incidence of contractual provisions that must be agreed with said management − such as RTFs − to be lower in tender offers. We find strong support for this argument in our regressions, and also nuance this finding by showing that the difference in incidence between the offer types is lower for financial than strategic acquirers. We argue that this is because the value of the RTF is higher to financial acquirers; thus, they have fewer incentives to bypass negotiations with target management.

With respect to deal premia effects, under H6, we also investigate whether the established finding that RTF provision incidence does not affect deal premia is valid when also controlling for acquirer type. As explained previously, we believe the value of the RTF to differ systematically between strategic and financial acquirers. Given the theoretical expectation that deal premia should be adjusted as compensation for termination provision inclusion[5], we therefore expect the effects of RTF inclusion on deal premia to be different between deal types. Although we find no support for this notion, we argue that this might be because the deal parties do not in fact adjust deal premia to compensate for changes in relative expected value caused by RTF inclusion. Similarly to Chen et al. (2018), we find that over 21% of the deals with RTFs in our sample contain an equal-sized reciprocal TTF − a finding Chen et al. (2018) argue to be irrational and indicative of mispricing.

1.1 Structure of the thesis

The rest of this thesis is structured as follows. In Section 2, we review the literature on termination provisions and rationales for their inclusion as well as deal premia. Our hypotheses, and the rationales behind them, are presented in Section 3. In Section 4, we present our data and variables, before subsequently describing the methodology by which we perform analyses on these in Section 5. Section 6 presents our analyses and results, before the robustness of these are assessed in Section 7. Finally, in Section 8, we present our conclusions and outline avenues for future research.

2 Literature review

In this section, we create the theoretical foundation on which our hypotheses and the rest of our thesis is built. First, we present termination provisions and briefly describe the mechanisms by which they work. Next, we review the existing literature on these provisions to gain a better understanding of why they are used and how their use impacts deal premia. Finally, we supplement the core insights on termination provisions through further review of literature on other factors we believe could help explain termination provision use and outcomes.

[5]See e.g. Coates and Subramanian (2000); Bates and Lemmon (2003); Officer (2003)

2.1 What are termination provisions?

A termination provision, also called a breakup provision, is a contractual provision used in M&A transactions. It imposes a cash fee paid by one party to the other if the first party does not consummate the proposed transaction (Officer, 2003). Termination provisions usually appear in two complementary forms. The first is called the *target termination fee* (TTF), in which the target commits to paying the bidder a fee if the target dissolves the deal agreement (Officer, 2003). The second is called a *reverse termination fee*[6] (RTF), in which the fee commitment is imposed on the bidder, payable to the target if the bidder does not go through with the deal (Officer, 2003).

TTFs are used in most M&A transactions. RTFs, while not as common as their target-payable counterpart, also occur in many deals. Boone and Mulherin (2007a) note that in their sample, around 90% of deals have a TTF. Afsharipour (2010) supports this, arguing that the vast majority of deals include a TTF, and also explains that RTFs have been popular in PE deals since the 1980s, and nearly omnipresent after the financial crisis.

2.2 Termination fee rationales and premium effects

2.2.1 Target termination fees (TTFs)

Bates and Lemmon (2003) and Officer (2003) find that TTF usage can enable the target to commit to a bidder to induce that bidder to reveal valuable private information. Bidders are hesitant to publicly reveal certain information (e.g. sources and magnitude of takeover gains or plans for the target's assets) if other bidders can "free-ride" on such information and submit a higher bid. As Berkovitch et al. (1989) suggest, the expected cost of such free-riding is higher to the first bidder and is a positive function of the information revealed by the bid. Thus, the more informational asymmetry between bidders, the greater the cost of bidding first. A TTF effectively forces competing subsequent bidders to pay for the information revealed by the first bidder. Hence, the fee can internalize the public good component that the revelation of such information would entail, incentivizing bidding.

Bates and Lemmon (2003) also argue that TTF usage is related to uncertainty. Bidders

[6] In the literature, and in practice, these are sometimes also called bidder/acquirer termination fees

bear bidding/negotiation and valuation costs that are positively correlated with information acquisition (Fishman and Hagerty (1989) and Jennings and Mazzeo (1993)). Therefore, more uncertain deals (i.e. deals with larger informational asymmetries between the bidder and target) will have larger expected costs because such deals involve a greater degree of information acquisition. Because TTFs promise the bidder a payment, such provisions may create incentives for bidders to enter into negotiations by serving as compensation for information acquisition costs that would be otherwise wasted if the bidder does not win the target. Bates and Lemmon (2003) find empirical support for a greater degree of uncertainty positively impacting the probability of a TTF being negotiated. They conclude that uncertainty, together with the risk of information expropriation, support an "efficiency hypothesis" (hereafter referred to as the efficiency *proposition* to avoid confusion with our own hypotheses) as the main drivers of TTF inclusion. These findings are also supported by Officer (2003), who finds similar evidence.

With respect to deal premia, both Bates and Lemmon (2003) and Officer (2003) initially find that deal premia offered to target shareholders are higher in deals where the winning bidder possesses a TTF. Bates and Lemmon (2003) and Officer (2003) follow Coates and Subramanian (2000) in explaining that this represents a "payment" from the bidder to the target to compensate the target for the TTF. However, after controlling for the endogeneity caused by the simultaneous determination of TTFs and deal premia[7], Bates and Lemmon (2003) find no significant premium effect stemming from TTF usage. However, Officer (2003), making use of the same procedure as Bates and Lemmon (2003), finds the original effect to hold. Although their samples are very similar, with both using data from SDC which covers roughly the same time period and with large sample sizes, the authors use different control variables. Consequently, the evidence on the effect of TTFs on premia is somewhat inconclusive.

2.2.2 Reverse termination fees (RTFs)

Bates and Lemmon (2003) find that RTF incidence appears to be positively correlated with uncertainty, negotiation costs, and deal complexity. Because an RTF effectively acts as insurance for the target shareholders by “locking in” some of the expected gains from

[7]Both Bates and Lemmon (2003) and Officer (2003) also test the opposite; the effect of *premia* on *TTFs*. Neither researcher find any significant relationship

the deal, they are more likely to be employed in deals where the deal payoff uncertainty is high. Tucker and Yingling (2008) enriches this "insurance proposition" by arguing that RTFs are used to mitigate antitrust risk − their inclusion give targets a promised compensation if the prospective acquirers fail to attain antitrust approval. Thus, for the target, RTFs act as insurance for uncertainty in deal value and closing risk.

From the acquirer's perspective, Chen et al. (2018) claim that RTFs represent a real option for the bidder on the target firm's assets; the value of which lies in being able to terminate sub-optimal deals. These findings are consistent with Afsharipour (2010), who argues that RTFs are often used as a "financing out" provision − that is, an option to abandon the deal if sufficiently cheap funding cannot be raised to pay for the target. Afsharipour (2010) finds this rationale to be more commonly employed by financial acquirers than by strategic ones: it is the most common trigger of RTFs in financial deals, but only the 7th most common in strategic deals. Thus, for the bidder, RTFs also act as insurance for uncertainty in target/synergy by allowing the bidder to abandon the deal.

The sparse existing evidence on the premium effects of RTF inclusion is somewhat inconclusive. Bates and Lemmon (2003) find initial evidence for *lower* deal premia in deals where RTFs are present, and argue, similarly to for TTFs, that this represents compensation; in this case to the bidder for agreeing to negotiate an RTF upon itself. However, this relationship becomes insignificant once accounting for the simultaneous determination of *TTFs* and premia. Chen et al. (2018) provide an alternative view, focusing on the combined gain of targets and acquirers under RTF inclusion. They find a *positive* relationship between wealth gains and RTFs when a reciprocal TTF is included and is of a different size than the RTF itself. This supports Bates and Lemmon (2003)'s findings that RTFs are more prevalent in deals where a TTF is already present (and vice versa). In turn, this suggests that the inclusion of a reciprocal TTF (RTF) is an alternative to adjusting the deal premium as compensation for the potential transfer of value represented by the RTF (TTF).

2.2.3 Summary on TTF and RTF rationales and premium effects

The main rationale behind using TTFs appear to be mitigation of informational asymmetries to make bidding more efficient (the efficiency proposition). This is reflected

in TTFs being used more often in deals with large informational asymmetry between bidders (resulting in increased costs and likelihood of free-riding), and bidder and target (resulting in increased bidding/negotiation and valuation costs). Thus, TTF incidence is primarily driven by bidder-side incentives.

The main rationale behind using RTFs appear to be akin to creating a form of insurance (the insurance proposition) for either (or both) the target or the bidder[8]. Thus, unlike TTFs, RTF incidence is driven by both target- and bidder-side incentives. From the target's perspective, they allow for "locking in" prospective takeover gains and are consequently used more often in deals where there is a larger degree of uncertainty in the deal payment to the target or higher deal closing risk. In such cases, the RTF is sometimes accompanied by a reciprocal TTF, which the acquirer negotiates as "payment" for agreeing to impose a termination fee upon itself. From an acquirer's perspective, RTFs represent a financing out/an option to abandon suboptimal deals − the possibility of terminating the transaction if the bidder cannot receive sufficient financing or desires to abandon the deal.

Regarding both TTFs and RTFs, some evidence of a positive effect of inclusion on deal premia exists. While the notion that the inclusion of both provision types simultaneously increase premia is somewhat counterintuitive, some researchers find that any positive effects are invalidated after controlling for endogeneity[9] (see e.g. Bates and Lemmon (2003), Officer (2003), and Chen et al. (2018)). However, given that none of the authors' findings are consistent between articles, the evidence suggests that the effect of TTFs and RTFs on premia is likely contingent on which control variables are included and cannot be explained solely by the inclusion of the provisions themselves.

The efficiency and insurance propositions consequently make up the basis of our theoretical understanding of the rationales behind TTF and RTF usage. With respect to premium implications, on the other hand, there does not seem to exist similar clear-cut relationships between the provisions and how much acquirers pay. The next sub-sections supplement these two propositions and premium implications with additional insights on other factors and how they relate to termination fee provisions. The subsections establish insights we

[8]The "original" insurance proposition first put forward by Bates and Lemmon (2003) only includes target-side insurance rationales, but as the acquirer-side rationales argued by Afsharipour (2010) and Chen et al. (2018) can also essentially be interpreted as insurance, our definition combines the two

[9]The literature usually assumes that there are no significant endogeneity problems between deal premia and RTFs, and that such problems are limited to concerning premia and TTFs

apply in the formulation of our hypotheses and help ensure that we include the necessary control variables in our regressions.

2.3 Acquirer types − commonality, information asymmetry, initiation, and premia

Our thesis focuses on termination provisions in a context separating acquirers with strategic and financial rationales. To formalize this separation more explicitly and explain how we expect the two types to differ with respect to concerns with information asymmetry, deal initiation, and deal premia, we turn to Bulow, Huang, and Klemperer (1999).

Bulow et al. (1999) separate bidders into two categories that are analogous to strategic and financial acquirers, respectively. *Private-value bidders* − usually companies in the same or an adjacent industry to the target; each of whom may have different sources of gains and different uses for the target's assets − are more likely to have strategic motivations for the takeover, such as realization of synergies. *Common-value bidders* − usually PE firms, who generally have the same sources of takeover gains − are more likely to have financial motivations, such as buying out underpriced and/or underperforming companies, instituting operational and managerial improvements, and selling them for a profit. As a corollary, the relevance of asymmetric information should be positively correlated with the degree of target commonality to multiple bidders, as bidders indirectly signal information about their valuation through their bids. Consequently, a second bidder's willingness to pay should be affected by the signal of the initial bidder if it uncovers an additional value source initially unidentified by the second bidder. However, if this information reveals a source of value that the bidder cannot exploit, the information (and thus any free-rider problems) will be of diminished value to the bidder.

Eckbo et al. (2019) show that strategic acquirers tend to bid for targets with a significantly lower common component than their financial counterparts. Accordingly, all else equal, one would expect the relative value of asymmetric information to be higher for financial than strategic bidders as such bidders have more commonality in their sources of value. Based on the arguments of Bulow et al. (1999), Officer (2003) argues that the value of private information should be positively associated with the propensity to negotiate TTFs.

Gorbenko and Malenko (2019) also use the private/common values framework to show that the degree of commonality in bidders' valuations is a key determinant of deal initiation. If the *common* value component of valuations is sufficiently high, the auction should never be bidder-initiated, but if the *private* value component is sufficiently high, both bidder- and seller-initiated auctions can occur. Because financial bidders should have a higher degree of commonality in their valuations, one would consequently expect deals with financial bidders to be more frequently initiated by the target. However, few bidders are likely to have either completely common or private values. Both these points are confirmed empirically by Fidrmuc, Roosenboom, Paap, and Teunissen (2012), who find that 40% of strategic deals are seller-initiated, compared to 65% for financial bidders.

Because this higher degree of commonality is caused by lack of synergies, financial acquirers, all else equal, should have lower upside than strategic acquirers in an average acquisition. Indeed, Bargeron, Schlingemann, Stulz, and Zutter (2008) find that financial acquirers pay significantly lower premia than strategic acquirers. However, it is likely that at least some of this difference can be explained by systematic differences in which targets financial and strategic acquirers approach. Fidrmuc et al. (2012) and Gorbenko and Malenko (2014) find that, after controlling for the fact that financial acquirers generally seek out mature targets with poor financial performance, there are no significant differences between premia paid by the different acquirer types. Any lower premia paid by financial acquirers are argued to stem at least partly from self-selection effects.

2.4 Deal characteristics and termination provision use

2.4.1 Stock offers

In perfect capital markets, the decision on whether to issue equity as part of the deal payment should be a pure capital structure decision (Berk and DeMarzo, 2017). If so, TTF and RTF incidence should be independent of payment structure concerns.

However, the fact that prospective bidders do not have perfect information on the target (and vice versa) subjects the payment structure decision to uncertainties and therefore creates incentives for termination provisions. Eckbo, Makaew, and Thorburn (2018) explain that payment methods in merger negotiations are chosen following "an extensive

period of information exchange, valuation estimation, and bargaining".

Bates and Lemmon (2003) find that deals involving stock are more likely to include both TTFs and RTFs and argue that this is because stock deals reflect increased costs of negotiation and valuation (e.g. costs related to the price discovery process). Since stock payments condition the value of the offer on the realized deal value ex-post (Eckbo et al., 2018), paying in stock allows the bidder to mitigate uncertainty surrounding target and synergy valuation stemming from informational asymmetry. As such uncertainties entail larger negotiation and valuation costs (Bates and Lemmon, 2003), the presence of uncertainty incentivizes stock usage for the bidder. Since TTF incidence is positively related to uncertainty (and the increased costs it entails) under the efficiency hypothesis, one would expect to find a positive relationship between stock payments and TTFs. Bates and Lemmon (2003) also explain that determining the ex-post deal value might require the bidder to disclose more information about synergies to the target than in an all-cash offer, thus further increasing risks of information expropriation. In turn, following the efficiency proposition, this incentivizes TTF inclusion for bidders. This is because the TTF acts as compensation in the event of such expropriation leading to a competing bidder submitting a higher, winning bid. Simultaneously, the fact that the deal payment in stock offers is conditional on the ex-post deal value increases the uncertainty of bid value to the target, relative to a fixed cash offer where there is no such uncertainty. Thus, under the insurance proposition, including stock in the deal payment also create incentives for targets to negotiate RTFs.

Furthermore, offering stock will in itself increase uncertainty of bid value for the target through exchange rate risk in cases where the acquirer's stock is denominated in another currency than the target's stock (as opposed to a fixed cash bid paid in the target's currency, where currency risk is shifted to the acquirer). In cross-border deals, under the insurance proposition, targets should therefore have greater incentives to negotiate RTFs; protecting a portion of the expected deal gain from unfavorable exchange rate movements.

While Chen et al. (2018) also find support for RTFs being significantly more prominent in all-stock deals (relative to all-cash and mixed-payment deals), Boone and Mulherin (2007a), using a smaller and older sample than Bates and Lemmon (2003), find no correlation.

Although the fluctuations caused by stock price movements impact the final deal value in

stock deals, the evidence is mixed with respect to whether stock deals entail higher or lower premia above and beyond such fluctuations. Eckbo (2009) conducts a large-scale review of evidence primarily from the 1980s to the late 2000s. While there are many facts that dictate the effects of stock payments on deal premia, Eckbo (2009) generally concludes that premia are greater in all-cash deals than in all-stock deals. However, evidence from literature where TTFs/RTFs are also controlled for is more ambiguous. While Officer (2003) fails to establish any relationship between payment structure and deal premia, Bates and Lemmon (2003) find a *positive* correlation between stock offers and premia.

2.4.2 Tender offers

When attempting to acquire a company, bidders can approach a potential target through two primary mechanisms: a merger offer, or a tender offer. In a merger offer, a bidder approaches a target with a proposition to acquire its outstanding shares. A merger requires negotiation with the target management. A tender offer, however, is a takeover offer directly to the target's shareholders.

Although tender offers are generally less common than merger offers[10], Betton, Eckbo, and Thorburn (2008) note that structuring the deal as a tender offer provides bidders with two primary advantages. First, tender offers are generally faster to execute. This is also confirmed by Offenberg and Pirinsky (2015), who find that unconditional tender offers on average take 73 days fewer to complete than mergers. Second, they do not explicitly require (but still often involve) contact and negotiations with the target management. Betton et al. (2008) argue that the choice of offer structure should be driven by the target's expected willingness to negotiate ex-ante. If so, all else equal, both TTFs and RTFs should be less likely in tender offers than in merger negotiations because agreeing on termination fees requires negotiation with the target management.

Despite this, Bates and Lemmon (2003) find that tender offers are associated with *higher* TTF and RTF incidence, and Officer (2003) reports similar results in his TTF-focused paper. However, three things should be noted with respect to their results. First, the (relative) fraction of tender offers have increased in recent decades. While Bates and Lemmon (2003) and Officer (2003) report that 21% and 19% of the deals in their samples

[10]See e.g. Bates and Lemmon (2003), Officer (2003) and Betton et al. (2008)

are structured as tender offers, 26% of Boone and Mulherin (2007a)'s deals are tender offers. 33% of the deals in Offenberg and Pirinsky (2015)'s sample are tender offers; in our own sample, where the bulk of data is newer than in all the aforementioned papers, 35% of all deals are structured as tender offers. Second, Officer (2003) notes that SDC flags all deals *involving* tenders as a tender offer, irrespective of the number of shares involved. Thus, a deal structure in which the bidder first performs a tender offer and acquires a portion (e.g. 5%) of the target's outstanding shares, but in which the remaining shares required for majority ownership are acquired through a merger offer, the deal is coded as a tender offer. Third, Boone and Mulherin (2007a) demonstrate that the TTF and RTF data from SDC that Bates and Lemmon (2003) and Officer (2003) base their empirical research on are biased[11].

Although Boone and Mulherin (2007a) do not test the relationship between tender offers and TTF/RTF incidence, this implies that Bates and Lemmon (2003) and Officer (2003)'s results could be inaccurate. Chen et al. (2018), using more recent data, find no significant relationship between RTF incidence and offer type. Offenberg and Pirinsky (2015) find that tender offers are related to lower TTF and RTF *sizes*, but do not test *incidence*.

Considering deal premia, the established literature is inconclusive. While some (e.g. Bates and Lemmon (2003) and Officer (2003)) find a positive relationship between tender offers and deal premia, others (e.g. Betton, Eckbo, and Thorburn (2009)) find the opposite effect to hold. Offenberg and Pirinsky (2015), using more recent data, find that tender offers are associated with higher premia, however, and argue this is related to takeover speed. By choosing a tender offer the bidder signals, through its "preference for immediacy", an increased demand for the target. This leads the target to raise its reservation price.

2.4.3 Deal competition − negotiations versus auctions

In the M&A literature, it is common to distinguish between deals involving only one bidder and deals involving multiple bidders. The first type is often called a negotiation, as the deal only involves bilateral negotiations between the bidder and the target, while the second is called an auction (Bulow and Klemperer, 1994). Boone and Mulherin (2007a) extend the definitions to include the signing of a confidentiality agreement: in negotiations,

[11] We quantify how this also applies in our dataset in Table A3.7

the target only contacted one bidder and signed one confidentiality agreement; in auctions, multiple bidders were contacted and multiple agreements were signed.

Both Bates and Lemmon (2003) and Officer (2003) argue that since TTFs can considerably increase the cost of acquiring the target to a second bidder, TTFs could deter competing bids. If the second bidder has a greater willingness to pay than the first, but the TTF is large enough to successfully deter competition[12], this would result in a net loss of wealth to the target's shareholders. Both Bates and Lemmon (2003) and Officer (2003) find that TTFs are associated with reduced public, post-announcement competition. These findings are nuanced by Boone and Mulherin (2007a), who find that TTFs promote *pre-public* deal competition through acting as a mechanism by which the target can commit to the end of bidding[13]. Boone and Mulherin (2007a) conclude that TTFs do not limit competition, but instead culminate the takeover process. Jeon and Ligon (2011) further nuance these findings by showing that any positive effect on competition is reversed for large fees[14].

Although standard economic theory implies that takeover deal premia should be growing in the number of bidders, the literature is somewhat ambiguous regarding the effect of competition on deal premia. Betton and Eckbo (2000) find that the expected payoff to targets is increasing in competition after the first public bid. However, other empirical studies report less conclusive results. Neither Officer (2003), studying the public negotiation phase, nor Boone and Mulherin (2007b) and Aktas, de Bodt, and Roll (2010), studying the private phase[15], find auctions to have significantly higher premia than negotiations.

2.4.4 Antitrust risk

Antitrust laws aim to preserve "free and unfettered competition as the rule of trade" (FTC, 2020b). Healthy competition among businesses is generally seen as desirable as it leads to a more efficient allocation of goods and services. Hence, regulators (primarily the Federal Trade Commission (FTC) and Antitrust Division of the Department of Justice

[12]Economically, one would expect this to happen if the fee is larger than the difference between the bidders' willingness to pay

[13]Here, Boone and Mulherin draw on Klemperer (1998), who argues bidders will bid less aggressively if they do not see the bidding process ending

[14]Jeon and Ligon (2011) divide their sample into three equal parts, based on TTF over deal value (DV). Their findings suggest that a TTF-to-DV ratio above the 66th percentile (i.e. 3-4%) truncate the pre-public competition phase

[15]Aktas et al. (2010) use different sets of proxies for private competition, rather than an auction indicator based on information from SEC filings

(DOJ) in the U.S.) actively monitor deals that may entail adverse effects on markets.

Because larger deals, all else equal, are more likely to involve firms representing larger market shares, antitrust risk should be growing in deal size. Exactly how large a deal must be to assume antitrust risk is governed in the U.S. by the FTC which, under the Hart-Scott-Rodino (HSR) Act, revises "size thresholds" annually. If neither the target or bidders' sizes nor the transaction value of the deal exceed the thresholds set by the FTC, the deal is not subject to antitrust scrutiny[16].

If termination fee clauses are present in deals disallowed by regulators, the courts often still require the fee to be paid, contingent on the specific details set forth in the takeover agreement (Tucker and Yingling, 2008). An illustrative example is the failed Halliburton-Baker Hughes deal, in which the parties had negotiated a $3.5bn RTF. Because the merger would essentially cause a duopoly in many oilfield service markets, regulators disallowed the deal, forcing Halliburton to pay Baker Hughes the $3.5bn fee (Stone, 2016).

As mentioned in Section 2.2.2, Tucker and Yingling (2008) argue that RTFs can help shift antitrust risk between the involved parties and that their inclusion gives targets some leverage if prospective acquirers abort the proposed deal. Thus, in deals with higher antitrust risk, targets have higher incentives to negotiate RTF provisions.

3 Hypotheses

This section presents our hypotheses. After having carefully reviewed the literature in the previous section, we formulate six hypotheses taking a point of departure in the efficiency and insurance propositions.

While the extant TTF/RTF literature primarily employs SDC as a data source, certain variables from this database have been proven to be biased (Boone and Mulherin, 2007a). We believe that this literature (e.g. Bates and Lemmon (2003), Officer (2003), Chen et al. (2018)) does not sufficiently account for this inaccuracy. Using more recent data as well as new data sources allows us to mitigate bias[17] in existing research as well as explore previously untested relationships. The hypotheses and subsequent analyses innovate by

[16]See Section A3.6 for more details on the process and the thresholds

[17]We correct known biases in our treatment variables using SEC filings. See Section A3.7 for an overview of the specific variables we gather from SEC and their corresponding deviation in SDC

focusing on TTFs/RTFs and how their incidence (where we nuance based on payment structure and offer type) and deal premium effects differ between strategic and financial acquirers. H1 and H2 relate to TTF incidence; H3-H5 to RTF incidence; and H6 to premium effects of RTF usage. The hypotheses are presented below.

H1: *TTF incidence is more likely in financial than in strategic deals*

As detailed in Section 2.3, bidders whose motives are primarily financial are more likely to have a greater degree of commonality in their valuations of a given target because their sources of takeover gains are similar, relative to bidders with strategic motives. Further, the value of informational asymmetries one bidder possesses over another is higher if the information is valuable to the second bidder. Consequently, the higher the degree of commonality in bidders' valuations, the larger the value of asymmetric information. The expected cost of free-riding on information revealed by a bidder is a positive function of the information revealed by the bid (Berkovitch et al., 1989). Thus, the expected cost of revealing information should be higher for bidders in bidding contests where bidders have greater degrees of commonality in their valuations.

Since TTFs directly counteract the free-rider problem and reduce the costs of revealing private information, and financial bidders have a higher degree of commonality in their valuations, we hypothesize TTFs to be more prevalent in financial than in strategic deals. To our knowledge, we are the first to explicitly test systematic differences in TTF use among strategic and financial acquirers.

H2: *In strategic deals, TTF incidence is growing in the percentage of bidder stock used in the deal payment*

As described in Section 2.4.1, including stock in the deal payment structure allows the bidder to share valuation uncertainty caused by informational asymmetry between the bidder and target. Such uncertainty leads to increased negotiation and valuation costs for the bidder, for instance related to increased information acquisition costs in the price discovery process (Bates and Lemmon, 2003). Under the efficiency proposition, this implies that stock offers are more likely to include TTFs. This is because such provisions compensate bidders for the negotiation and valuation costs − caused by the uncertainty reflected through stock inclusion − if the deal fails. Stock offers may also require the

bidder to divulge more private information than in an all-cash offer, increasing the risk of information expropriation (Bates and Lemmon, 2003). This gives bidders further incentives to negotiate TTFs in stock deals.

Although most researchers covering termination fees include a variable that differentiates cash offers from stock offers, the standard in the financial literature is to control for the *presence* of stock[18]. However, bidders should have larger incentives to use more stock in the deal payment when larger uncertainties are present, because larger uncertainties entail larger negotiation, valuation, and information expropriation costs, all else equal. Therefore, we argue that there should be a positive relationship between the *percentage* of stock used in the deal payment and TTF incidence.

Additionally, the literature does not explicitly control for differences between strategic and financial acquirers when assessing the relationships between termination fees and stock offers. Strategic acquirers can pay in either cash, stock, or a mix of both; financial acquirers are restricted to cash payments. As a result, to get an unbiased interpretation of the effect of stock payments on termination provisions, it is necessary to control for the fact that financial acquirers cannot use stock in the deal payment.

Consequently, we hypothesize that in strategic deals, TTF incidence is growing in the percentage of bidder stock used in the deal payment. As far as we are aware, we are the first to assess the effect of the *percentage* of stock on TTF incidence while also explicitly controlling for the fact that financial acquirers cannot pay in stock.

H3: *RTF incidence is more likely in financial than in strategic deals*

Under H1, we argue that *TTF* incidence is more likely in financial deals. We believe the same to be true with respect to *RTF* incidence, although for slightly different reasons. Here, we nuance more clearly between target- versus bidder-side concerns and how these differ in the average strategic and financial deal.

When comparing strategic and financial acquirers with respect to RTFs and the insurance proposition, target-side concerns should be similar regardless of whether the acquirer has strategic or financial rationales. While the average strategic and financial deal may vary

[18]See e.g Bates and Lemmon (2003), Officer (2003), Boone and Mulherin (2007a), Jeon and Ligon (2011), and Chen et al. (2018)

systematically among many dimensions[19], once these are controlled for, the deal *rationale* itself should not affect the target's incentives to negotiate RTFs.

However, with respect to bidder-side concerns, the literature suggests that on average, financial acquirers should have greater incentives than strategic acquirers to negotiate RTFs. As discussed in Section 2.2.2, RTFs provide acquirers with an option to abandon the deal. Afsharipour (2010) argues that because RTFs allow the bidder to "pay their way" out of deals in which sufficient financing cannot be attained, lack of financing is the most prevalent trigger of RTFs in financial deals. Financial acquirers depend on the availability of financing to a larger extent than strategic acquirers. This is because their sources of value are financial in nature and generally not caused by synergies independent of interest rates and other financial concerns[20]. Thus, we expect financial acquirers to have larger incentives for the inclusion of a financing out. Other motivations for the bidder to use the abandonment option, such as allowing the bidder to walk away from overpriced deals, should not vary systematically between acquirer types, all else equal.

Consequently, since RTFs provide acquirers with financing outs, we hypothesize RTF incidence to be higher in financial than in strategic deals. While Afsharipour (2010) indicates that RTFs *should* be more prevalent in financial deals, her data is based on practitioner interviews and not tested empirically. Therefore, similarly to in H1 for TTFs, we believe we are the first to *test* for differences in RTF incidence between acquirer types.

H4: *In strategic deals, RTF incidence is growing in the percentage of bidder stock used in the deal payment*

Under H2, with respect to TTFs, bidder-side rationales are the primary drivers of our hypothesized relationship between TTF incidence and stock. Under H4, we argue that both bidder- and target-side rationales incentivize RTF usage in stock deals.

First, the *bidder*'s incentives for RTF inclusion should be dependent on the value of the abandonment option the provision creates, which in turn is driven by the uncertainties reflected by stock payment. The value of the abandonment option should be positively correlated with target/synergy valuation uncertainty. Additionally, as explained in Section

[19]For instance, antitrust and financing risk as well as payment structure

[20]As a case in point, Axelson, Jenkinson, Strömberg, and Weisbach (2013) quote Guy Hands, a founding partner of the PE firm Terra Firma, in explaining that "We buy stuff with cheap debt and arbitrage on the difference with equity markets."

2.4.1, deals where such uncertainty is high create incentives for the bidder to issue stock as part of the deal payment (Eckbo et al., 2018). Accordingly, the presence of uncertainty, which drives the value of the RTF, is reflected in the stock issued by the bidder. Thus, we believe there should be a positive relationship between stock offers and RTF incidence.

Furthermore, stock offers increase the uncertainty of bid value for *targets* because of the bid value's contingency on the realization of deal value ex-post and potential exchange rate fluctuations, as discussed in Section 2.4.1. Compared to a cash offer, where bid value is fixed, the payoff to the target in stock offers is uncertain. In line with the insurance proposition, this creates incentives for the target to preemptively capture a part of the takeover gains using an RTF. We argue that based on this, in addition to the bidder-side incentives discussed previously, stock offers are associated with higher RTF incidence.

As in H2 (for TTFs), we argue that the relationship is positive not only for the *presence* of stock, but that RTF incidence is growing in the *percentage* of stock used in the deal payment. Larger uncertainties in target/synergy valuation increase the value of the RTF as an abandonment option and create greater incentives for the bidder to pay using more stock. Using more stock also increases the uncertainty of the bid value to the target. Thus, the larger the fraction of stock in the deal payment, the larger the incentives for both bidders and targets to include an RTF.

H5: *RTF incidence is more likely in merger offers than in tender offers in both strategic and financial deals*

As discussed in Section 2.4.2, tender offers have two main advantages over merger offers for bidders: faster completion time and the option to avoid negotiations with the target management (Betton et al., 2008). Logically, faster completion time should not affect neither the bidder nor the target's incentives to negotiate an RTF since this in itself does not reduce uncertainty or negotiation costs (in line with the insurance proposition). However, the option to avoid negotiations with target management affects RTF negotiation directly. Avoiding negotiations with target management nullifies the possibility of negotiating termination provisions. Thus, given that this advantage yields a valid incentive to the bidder to choose a tender offer over a merger offer, we hypothesize that merger offers should be associated with more RTFs than tender offers, irrespective of acquirer type.

While Bates and Lemmon (2003) find that tender offers are associated with *higher* RTF incidence, we believe this relationship to be spurious and caused by bias and miscategorization in SDC. In Section 2.4.1, we detailed three reasons as to why we expect such offers to entail *lower* RTF incidence: an increase in the relative fraction of tender offers in recent years, bias in SDC RTF data, and miscategorization[21] and bias in SDC tender offer data. In addition, Bates and Lemmon (2003) do not explicitly control for differences between strategic and financial deals. While we believe tender offers of both acquirer types to be related to lower RTF incidence than corresponding merger offers, we do not expect the differences to be identical given the relatively higher value of the RTF to financial acquirers. Separating strategic and financial acquirers allows for greater nuance and for investigating potential differences in tender offer effects on RTF incidence between the two deal types.

H6: *The effects of RTF inclusion on deal premia are different in strategic and financial deals*

Bates and Lemmon (2003) argue that because an RTF insures the target's takeover gains, it is also associated with lower deal premia as a form of compensation to the bidder for agreeing to negotiate an RTF upon themselves. The researchers imply that the deal premium should be adjusted to compensate for relative changes in the parties' expected transaction value caused by RTF inclusion. After controlling for simultaneity concerns, however, Bates and Lemmon (2003) find no evidence for RTFs affecting deal premia, but argue that "it is not clear that we have fully accounted for all of the factors that affect both bid premiums and the decision to incorporate [RTFs]".

We believe one such factor could be that the RTF also provides value to bidders[22], and that this value varies between acquirer types, which Bates and Lemmon (2003) do not account for. The relative change in expected transaction value to the bidder from RTF inclusion will vary between deals, depending on the relative value of the target's insurance and the bidder's option value. This relative value should be determined by the value of insuring against bid value uncertainty and closing risk relative to protecting against uncertainty in valuation of target/synergies. As these are deal-specific, it is unlikely that

[21] See Section 4.2.4.4 for details on our preferred method of categorization

[22] This effect is only covered in later research by Afsharipour (2010) and Chen et al. (2018), discussed in Section 2.2.2

the relative change in expected transaction value from RTF inclusion systematically favors one party over the other. Therefore, RTFs should have no aggregate (over acquirer type) net effect on premia; something Bates and Lemmon (2003)'s findings support.

However, following logically from our argumentation under H3, while the target's insurance value should be independent of acquirer type, the bidder's option value should be systematically higher for financial than for strategic acquirers, all else equal. This is because such acquirers are more sensitive to financing conditions and thus place a higher value on the financing out RTFs provide. Thus, the change in expected transaction value to the bidder from RTF inclusion should be higher in financial than in strategic deals, all else equal. As the deal premium should be adjusted to compensate for the changes in relative expected value caused by RTF inclusion, we therefore argue that the effects of RTF inclusion on deal premia are different in strategic and financial deals.

4 Data, variables and descriptive statistics

4.1 Sample creation

In the process of creating a dataset suitable to test our hypotheses, we collect data from five different databases. First, we use SDC Platinum to identify all relevant M&A deals with public U.S. targets, and information pertaining to the deal, target, and acquirer. We pair this data with information on stock prices, financial performance and financial statement data provided by CRSP and Compustat, before adding ownership information from Orbis and additional deal-specific information from SEC filings. The process is described in the following subsections, and a summary is given in Table 4.1.

Table 4.1: Deal count by step

Step	Description	Deal count after step
1	Initial data retrieval from SDC[a]	3,930
2	Adding CRSP stock price data	3,481
4	Adding Compustat financial data	1,278
5	Deals with available SEC EDGAR filings[b]	849
6	Merging dataset with Orbis ownership data	496
7	Reading through SEC filings	451

a) See Table A1.1 for a more detailed overview of the SDC data retrieval process
b) We retrieve DEFM14A, PREM14A, SC14D9 and SC14D9-A from EDGAR

4.1.1 Databases

4.1.1.1 SDC Platinum

SDC Platinum serves as a basis for deal identification. We identify all merger and tender offers on public U.S. targets between 2000 and 2019 with an announced deal enterprise value in excess of $10m. Our sample is limited to only include deals where the announced acquirer held less than 50% of outstanding shares prior to the offer and sought 100% ownership following deal completion. Lastly, we exclude financial targets based on 4-digit SIC codes[23]. This is done to filter out "financial" deals that are, in fact, strategic by nature − such as one bank acquiring another. The SDC query returns 3,930 deals.

4.1.1.2 CRSP

Our initial sample is paired with data from CRSP, which we use to attain reliable target stock price information. The CRSP dataset is matched with the SDC Platinum dataset through 6-digit CUSIP codes[24]. This process reduces the dataset from 3,930 to 3,481 observations due to stock price data unavailability for certain target companies.

4.1.1.3 Compustat

Compustat is employed to gather financial statement data on targets. This data allows us to control for informational asymmetry and uncertainty as detailed under the efficiency and insurance propositions. The limited availability[25] of data on target financial statements in the Compustat database reduces the dataset to 1,278 observations.

4.1.1.4 Merger and tender offer filings in SEC EDGAR

A typical M&A transaction includes a suite of contractual agreements, often detailed in multiple SEC filings (Coates, 2015). We utilize SEC filings to collect a wide range of variables. For mergers, where available, we utilize the DEFM14A filing, a definitive

[23] 4-digit SICs in the intervals 6000-6411 and 6700-6799 are excluded

[24] The 6-digit CUSIP is an identifier for US companies. While CRSP reports the 8-digit CUSIP, SDC reports the 6-digit version. The last two digits in the 8-digit CUSIP represents a *company specific* issue number (issue number = 10 equals the initial issue). Thus, removing the last two digits in the 8-digit CUSIP will allow us to match perfectly on a company level (CUSIP Global Services, 2010)

[25] Ideally, we would have liked to have included financial data on acquirers as well as targets, but this is problematic because most of our financial acquirers are privately owned. Such information is unavailable for these. Accordingly, demanding financial statement data availability for acquirers would truncate our financial acquirer sample to the point where empirical analysis would be infeasible

proxy statement filed in connection with shareholder voting on a merger agreement. In cases where a DEFM14A is unavailable, we employ PREM14A (a preliminary version of DEFM14A, excluding SEC comments). For tender offers, we use Schedule 14D9(A) filings. This process reduces our sample to 849 deals.

4.1.1.5 Orbis Bureau van Dijk

Lastly, we add information on target ownership one month prior to deal announcement[26] from Orbis. The rationale is to create a "shareholder database" where we can match qualitative information[27] on shareholder voting agreements (SVAs) from SEC filings with quantitative information from Orbis. Deals are excluded if we are unable to associate ownership and target, which further reduces the dataset from 849 to 496 observations.

To create our final sample, we go through the relevant SEC filings and gather data on variables for each of these 496 deals. Deals in which the information is missing or is ambiguous (sometimes the case for certain qualitative variables, such as when the number of confidentiality agreements are not explicitly stated, or in some cases when the deal is third-party initiated) are removed. This step concludes our data collection process and reduces our final sample to 451 deals, from *2003*-2019.

4.2 Variables

This section details the variables used in our analyses and explains the rationales for their inclusion, where necessary. For a list of all variables in our dataset, see Table A3.2[28].

4.2.1 Dependent variables

4.2.1.1 Termination fees

Our dataset includes three variables on termination fees. First, we create TTF and RTF indicator variables, which serve as dependent variables testing H1-H5, and as independent

[26]If ownership one month prior to deal announcement is unavailable, we iterate backwards up to a maximum of three months prior to deal announcement

[27]In most cases, the SEC filings indicate the percent of outstanding shares with voting rights controlled by the parties entering into shareholder voting agreements, but in some cases, only the *names* of these entities are reported. In such cases, we use the Orbis data to match these names to share ownership

[28]For examples of classifications on variables based on SEC filings, see Section A3.7. This section also outlines differences in the *Financial*, *TTF/RTF*, *Tender* and *Stock pct.* variables between SDC and SEC

variables in H6. The indicators take the value of 1 if the deal includes the corresponding termination fee, and 0 otherwise. Second, to test H6, we include a variable indicating whether the deal has equally-sized TTFs and RTFs, to control for whether reciprocal fees in deals skew deal premia. While Bates and Lemmon (2003) and Officer (2003) use SDC to gather data on TTFs and RTFs, Boone and Mulherin (2007a) show that this data is biased. Thus, we follow the latter in employing SEC filings and manually collecting data on TTFs/RTFs. When comparing SEC data to SDC data, we see that SDC fails to report TTF and RTF data in 14.41% and 10.42% of deals in our sample, respectively.

4.2.1.2 Deal premium

The deal premium is the offered price per share (PPS) relative to the trading PPS. Following Bates and Lemmon (2003) and Officer (2003), we define the deal premium at t = the time of deal announcement as

$$premium_t = \frac{PPS_{bid,t}}{PPS_{market,t-d}} - 1 \tag{4.1}$$

where $PPS_{bid,t}$ denotes the offered price per share at day t, and $PPS_{market,t-d}$ denotes the closing price d = 42 days in advance, based on SDC and CRSP, respectively. We calculate the deal premium based on the stock price 42 days prior to deal announcement to mitigate any issues with deal rumors driving the target stock price upwards. This mitigates challenges in distinguishing between the target's stand-alone value and its value after incorporating takeover rumors (Betton, Eckbo, Thompson, and Thorburn (2014).

4.2.2 Acquirer characteristics

4.2.2.1 Financial acquirer

We define acquirers as being strategic or financial based on the merger rationale, determined by reading SEC filings[29]. The variable takes the value 1 if the acquirer is financial (defined as when a financial party, e.g. a PE firm, makes a stand-alone acquisition with no intention of integrating the target into existing business or acting as a financial sponsor for a strategic third-party), and 0 otherwise (when the acquirer is classified as strategic).

[29]In our dataset, collecting data from SEC filings reveals that 5.99% of deals are incorrectly classified in SDC, usually misclassified as *financial* when their true rationale is *strategic*

4.2.2.2 Toehold

A bidder possesses a toehold in the target if it owns target shares before launching a bid. Betton et al. (2009) argue that toeholds may antagonize certain targets (because toeholds impede other bidders' ability to compete). As a result, toeholds limit a bidder's ability to negotiate TTFs, the exclusion of which represents an opportunity loss to the bidder. Accordingly, as toeholds and TTFs are substitutable (Officer, 2003), we include the variable to control for such substitutability.

With respect to deal premia, there is a general consensus in the existing literature of a negative relationship with toeholds (see e.g. Betton and Eckbo (2000), Bates and Lemmon (2003), and Officer (2003)). Toeholds reduce rival bidders' willingness to bid as they guarantee the toehold bidder a part of the deal premium if a competing bidder wins. This advantage prevents the bidder with the highest willingness to pay from competing effectively, resulting in lower premia and lower wealth gains to target shareholders.

The variable takes the value of 1 if the bidder owns shares in the target at the announcement date, irrespective of when these were acquired, and 0 otherwise. As all toeholds in our sample are acquired more than 6 months prior to deal announcement, we do not follow Betton et al. (2009) in distinguishing between short- and long-term toeholds.

4.2.2.3 Shareholder voting agreements (SVAs)

An SVA, in the context of merger and tender offers, is a contractual obligation to vote in a predetermined manner on a corporate decision requiring a shareholder vote. Boone and Mulherin (2007a) hypothesize that SVAs function as substitutes for TTFs, and test this empirically. They find a significant negative relationship between TTFs and SVAs[30].

Our SVA variable is included to control for substitutability with TTFs. We read merger and tender offer[31] filings in order to determine the percentage of the target's shares bound to such agreements. In most of the cases where we cannot find information on the *number*

[30]It should be noted that Boone and Mulherin combine SVAs and *affiliated ownership*, representing the share of target stockholders that has a long-time affiliation with the bidder, together into one variable called *affiliated/agreement*. We are unable to retrieve data on affiliation with the bidder, and therefore drop this part of the variable. We are aware that this may cause us to attain different results compared to Boone and Mulherin (2007a), but given that both effects should be similar directionally, we would expect this to affect coefficient *size* to a larger degree than its *sign*

[31]In tender offers, SVAs are usually called "tender and support agreements"

of shares in the SEC filings, we cross-reference the *names* with our shareholder database.

4.2.3 Target characteristics

4.2.3.1 Target size

Following Bates and Lemmon (2003), Officer (2003), and Chen et al. (2018), we use target size as a proxy for uncertainty and antitrust risk. As takeover bids are usually preceded by large target stock price runups (Betton et al., 2014), we define the target's size as its market value of equity d = 42 days prior to deal announcement. This is calculated as the product of the number of outstanding shares and PPS; both reported by CRSP.

$$Equity_{MV,t-d} = outstanding\_shares_{t-d} \cdot PPS_{t-d} \tag{4.2}$$

4.2.3.2 Target book debt/equity ratio

Bates and Lemmon (2003) and Chen et al. (2018) find that the target firm's book leverage is negatively correlated with deal premia, and the former also finds that there is a positive relationship between target D/E and TTF incidence. As seen in Eq. 4.3, we follow these researchers, and calculate the book value of debt over the book value of equity in the fiscal year prior to the deal announcement (y=1) to control for target leverage in our regressions, based on data from Compustat.

$$D/E\_ratio_{t-y} = \frac{Debt_{BV,t-y}}{Equity_{BV,t-y}} \tag{4.3}$$

Additionally, although Bates and Lemmon (2003) do not test the effect of leverage on RTF incidence, we believe RTF incidence should increase in the target's D/E ratio. All else equal, higher target D/E ratios entail higher bankruptcy risks and financing costs for the target. This increases the importance of receiving funds through the acquisition or being compensated through the RTF payment if the deal fails.

4.2.3.3 Target market-to-book ratio of assets

Following Bates and Lemmon (2003) and Officer (2003), we calculate the target's market-to-book (M/B) ratio of assets at the end of the last fiscal year (y=1) as a proxy for

uncertainty in the market valuation of the target. The M/B ratio is calculated as

$$M/B\_ratio_{t-y} = \frac{Debt_{BV,t-y} + Equity_{MV,t-y}}{Assets_{BV,t-y}} \tag{4.4}$$

based on data from CRSP (market values) and Compustat (book values).

4.2.4 Deal characteristics

4.2.4.1 Auction

Following Boone and Mulherin (2007a) and the discussion on auctions in Section 2.4.3, we control for deal competitiveness (which should impact both the likelihood of negotiating TTFs/RTFs and deal premia) using an auction variable. The auction variable is binary, taking the value of 1 if more than one bidder signed confidentiality agreements with the target (as detailed in SEC filings), and 0 otherwise.

4.2.4.2 Stock percentage in the deal payment

We include a stock percentage variable to test and control for the relationships described in Section 2.4.1. The variable indicates the share of deal value paid in stock, as detailed in SEC filings. We employ SEC filings rather than SDC, as SDC misclassifies 15.30% of deals as either all-cash deals or mixed/all-stock deals, and reports the wrong share of stock used in deal payments in 22.62% of deals.

4.2.4.3 Same industry indicator

Bates and Lemmon (2003) and Chen et al. (2018) use a same industry variable to proxy informational asymmetry between the target and acquirer. Chen et al. (2018) also use it as a proxy for antitrust risk. We follow the former and define the variable to take the value of 1 if the target and acquirer have the same 4-digit SIC code, and 0 otherwise.

While neither Bates and Lemmon (2003) nor Chen et al. (2018) find this variable to have a significant effect on neither TTF nor RTF incidence, we include it for two main reasons. First, we believe it is a valid proxy for informational asymmetry (due to industry-specific knowledge, parties in same industry deals should be able to value each other more accurately, all else equal). Second, all else equal, as same industry deals should be more

prone to antitrust risk (because such deals are more likely to affect competition), we include it while testing H3-H5 to also control for such risk.

Additionally, for deal premia, as deals between same industry parties share more potential synergies, we expect same industry deals to have higher premia. We include this variable while testing H6 to control for this effect.

4.2.4.4 Tender offer indicator

Following the discussion in Section 2.4.2, we include a tender offer indicator to assess the effect of deal structure on TTF and RTF incidence.

As discussed in Section 2.4.2, in SDC, any deal structure containing a tender offer will be coded as a tender offer, irrespective of the fraction of shares acquired in this way. We believe this is inaccurate. SEC filings contain information on how many of the target's outstanding shares are offered through both merger and tender offers, which enables us to more accurately determine which offer type is the primary mechanism in the deal. Thus, we define the variable to take the value of 1 if a 14D9(A) exists and covers more shares than any DEFM14A/PREM14A pertaining to the same deal, and 0 otherwise.

This process, combined with the pre-existing bias in SDC data, reveals that in our sample, SDC (surprisingly) *underreports* tender offers. Based on data from SEC filings, we find that a total of 6.40% of the deals in our sample are misclassified, with 13.90% of tender offers classified as mergers, and 2.40% of mergers classified as tender offers.

4.2.4.5 Seller initiation indicator

In Section 2.3, we noted that financial deals are more likely to be seller-initiated (Fidrmuc et al. (2012); Gorbenko and Malenko (2019)). Boone and Mulherin (2007b) also notes that auctions are more common for seller or third-party initiated deals. We include the seller initiation indicator variable to control for these factors.

Additionally, we believe the seller initiation variable conveys information about the bidder's willingness to enter into negotiations and should thus impact the decision to negotiate a TTF. As the main role of the TTF under the efficiency proposition is to incentivize bids, TTF incidence should be lower in bidder-initiated deals because the (first) bidder has already entered negotiations in such deals. The variable takes the value of 1 if the

information found in SEC filings indicate that the deal was initiated by the seller or a third party employed by the seller, and 0 if the deal was bidder-initiated.

4.2.4.6 Hostile deal indicator

We define hostile deals as those reported by SDC as having a "hostile" deal attitude[32]. As argued by Burch (2001) and Bates and Lemmon (2003), TTF/RTF incidence is less likely in hostile deals. This is both because a hostile bidder would be less likely to be able to negotiate any favorable provision, and because hostile deals are more often likely to be tender offers, in which negotiations with the target can be bypassed completely. Following Bates and Lemmon (2003), the variable is binary, taking the value of 1 if the deal is hostile or unsolicited, and 0 otherwise (friendly or neutral).

4.2.4.7 Cross-border deal indicator

A cross-border deal is a deal where the nationalities (per SDC) of the acquirer and the target differ. Because cross-border deals, all else equal, are more complex and risky (due to the exchange rate risk discussed in Section 2.4.1, as well as higher costs of information acquisition and negotiation), we also expect them to be significantly different from domestic deals with respect to TTF and RTF incidence. Additionally, as shown by Faccio and Masulis (2005), cross-border deals are associated with significantly less stock in the deal payment. Faccio and Masulis (2005) argue this to be primarily driven by the exchange rate risk involved in the relative company valuation. Since our hypotheses involve testing the share of stock on termination fees, controlling for cross-border deals are important so as to avoid omitting variables. The cross-border deal indicator takes a value of 1 if the parties' nationalities differ, and 0 otherwise. To our knowledge, we are the first to investigate the effect of cross-border deals on TTFs/RTFs.

4.2.4.8 HSR filing indicator

As established in Section 2.4.4, antitrust risk is a major risk source in any large deal. Under the HSR Act, the FTC revises "size thresholds" annually to determine which deals

[32]While the "Background of the Merger" section of takeover filings also yield enough information to determine deal attitude, we are not confident enough in our own categorization based on these filings to make use of them. These sections are sometimes somewhat ambiguous, and we do not feel familiar enough with the corporate lingo and expressions used to be certain that our categorization is correct

are obliged to file pre-merger filings to the FTC and DOJ (FTC, 2020c).

SEC DEFM14A and SC 14D9(A) filings contain discussions on any antitrust considerations the deal is expected to be subject to, and also explicitly states whether the parties have made antitrust filings. The HSR filing indicator variable is 1 if the deal's parties report that they intend to file, or have filed, such antitrust filings, and 0 otherwise.

This variable (and an interaction variable between it and target size) is included as a proxy for antitrust risk, which should be positively related to RTF incidence. Although the variable by itself might not necessarily capture *nuances* in antitrust risk well, it should be able to capture the *presence* of such risk. By interacting it with the target size variable, it is expected to be a better measure of antitrust risk than just target size alone, as deals that do not make HSR filings should not be subject to antitrust risk, regardless of size. To our knowledge, we are the first to include such a variable in financial research.

4.2.5 Market characteristics

4.2.5.1 Credit spread

This variable is included for three reasons. First, the credit spread variable allows us to proxy for market uncertainty. A higher credit spread is associated with higher uncertainty. Second, the credit spread variable also helps control for the effect of the availability of cheap financing on RTFs. In light of Afsharipour (2010)'s arguments on bidders using RTFs as a financing out, higher credit spreads indicate greater difficulties in raising funds for a deal, especially for financial bidders. Third, Axelson et al. (2013) find that financial bidders overpay when cheap debt is accessible, and Du and Gerety (2018) find a negative relationship between credit spreads and premia. Thus, the variable helps control for factors that may impact RTF usage and deal premia, especially for financial bidders. Following Gorbenko and Malenko (2014), we define the credit spread as the difference between the yield of 10-year Baa-rated corporate bonds[33] and 10-year US treasury bonds, based on data from FRED[34]. To our knowledge, we are the first to measure the effect of credit spreads on TTF and RTF incidence.

[33]Moody's Baa rated bonds, Baa1, Baa2, and Baa3, are characterized as lower medium grade, corresponding to BBB+, BBB and BBB- for S&P and Fitch ratings

[34]fred.stlouisfed.org/series/BAA10Y

4.3 Descriptive statistics

This section presents descriptive statistics for our dataset. Our final sample consists of 451 deals, with 376 (83.4% of total) being classified as strategic and 75 (16.6% of total) as financial. In this section, we present an overview of the variables used in our dataset and how these vary between strategic and financial deals. We also briefly discuss differences in means and medians with respect to our dependent variables. Table 4.2 shows an overview of all variables, split by acquirer type, showing differences in their means and medians.

Table 4.2: Overview of all variables by acquirer type

	Total *N=451*		**Strategic** *N=376*		**Financial** *N=75*		**Difference** *Strat. minus Fin.*	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Dependent variables								
TTF_I	0.951	1.000	0.952	1.000	0.947	1.000	0.005	
RTF_I	0.357	0.000	0.298	0.000	0.653	1.000	-0.355***	
Deal premium	47.382	36.34	50.037	37.863	34.07	26.437	15.967***	11.426***
Acquirer characteristics								
Toehold	0.029	0.000	0.016	0.000	0.093	0.000	-0.077**	
SVA	0.107	0.010	0.103	0.010	0.122	0.014	-0.019	-0.004
Target characteristics								
Equity(MV)	2272.9	607.0	2530.8	661.8	979.6	423.7	1551.3***	238.1**
D/E ratio	0.749	0.636	0.813	0.603	0.427	0.780	0.386	-0.177*
M/B ratio	3.389	2.509	3.324	2.699	3.713	1.930	-0.389	0.769**
Deal characteristics								
Auction	0.687	1.000	0.646	1.000	0.893	1.000	-0.247***	
Stock pct.[a]	0.111	0.000	0.133	0.000	n.m.	n.m.		
Same ind.	0.541	1.000	0.646	1.000	0.013	0.000	0.633***	
Tender	0.350	0.000	0.383	0.000	0.187	0.000	0.196***	
Seller init.	0.477	0.000	0.441	0.000	0.653	1.000	-0.212***	
Hostile	0.044	0.000	0.045	0.000	0.040	0.000	0.005	
Cross-border	0.224	0.000	0.253	0.000	0.080	0.000	0.173***	
HSR filing	0.925	1.000	0.947	1.000	0.813	1.000	0.134***	
TTF=RTF	0.118	0.000	0.120	0.000	0.107	0.000	0.013	
Market characteristics								
Credit spread	0.026	0.026	0.026	0.026	0.025	0.025	0.001	0.001

a) Financial acquirers cannot pay in stock
Test for diff. in means: t-test (controlling for diff. in variances with F-tests for variances)
Test for diff. in medians on continuous variables: Wilcoxon rank-sum test
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Source: SDC, SEC, CRSP, Compustat, Orbis, FRED

With respect to our dependent variables, we see that 95.2% of the strategic and 94.7% of the financial deals in our dataset include a TTF[35]. The former is slightly higher than what

[35]For an overview of how this incidence varies over time (for both TTFs and RTFs) throughout our sample, please see Table A3.1

we would expect based on the literature (Bates and Lemmon, 2003; Officer, 2003; Boone and Mulherin, 2007a; Jeon and Ligon, 2011), while the latter is lower than we expected. We see that there is, in fact, no significant difference in the means of TTF incidence in strategic and financial deals. However, this difference does not account for the fact that the rationales for TTF inclusion likely differ between acquirer types. The two acquirer types also have different tools available to mitigate the uncertainty that incentivizes TTF incidence (e.g. that strategic acquirers can employ stock in the deal payment).

We see that RTFs are more frequent in financial deals than in strategic deals, with a difference in means of 0.355, significant at the 1% level. This is consistent with Afsharipour (2010), who argues that such incidence has been higher in financial deals than in strategic deals since the 1980s.

Finally, the differences in *Deal premium* means and medians indicating that strategic acquirers pay higher premia are in line with Bargeron et al. (2008). While this is intuitive, it should be noted that these figures do not take into account the self-selection effects described in Section 2.3. The different acquirer types normally pursue different deals, and thus generally do not bid for the same targets.

5 Empirical methodology

This section presents the different empirical methods and models that are employed in the process of testing our six hypotheses. We utilize probit models to test H1-H5 and OLS/2SLS models to test H6. The following paragraphs present these models. For a review of the primary assumptions on which the models rely, refer to Section A4.

5.1 Modeling TTF/RTF incidence − probit

We test differences in TTF/RTF incidence between acquirer types (H1 and H3), the effect of payment method on TTF/RTF incidence in strategic deals (H2 and H4), and the effect of tender offers on RTF incidence in strategic and financial deals (H5) using probit models.

Aldrich, Nelson, and Adler (1984) explain that the probit estimation method models a dependent variable taking one of two mutually exclusive and collectively exhaustive values. The output, $P[y = 1|X]$, is a continuous estimate of y, interpreted as the probability of

y taking the value of 1 (Aldrich et al., 1984). Accordingly, the probit model allows for regression on a binary dependent variable such as TTF or RTF incidence. An estimate of zero indicates no such provision, and the closer the estimate is to 1, the greater the likelihood of TTF/RTF incidence.

In its general form, a model estimated by probit is given by

$$P[y = 1|X] = G(\beta_0 + \sum_{i=1}^{k} \beta_i \cdot x_i) + \epsilon \tag{5.1}$$

where G follows the cumulative normal distribution[36], which ensures that
$0 \leq P[y = 1|X] \leq 1$. X is a set of exogenous treatment and control variables.

We employ probit models with treatment variables pertaining to our hypotheses as well as a variety of control variables used to isolate the effect of the treatment on termination fee incidence. Assuming that the model assumptions hold, we interpret our results as the ceteris paribus effect on the probability of termination fee incidence given one-unit changes in our treatment variables while keeping other control variables at their means.

5.2 Modeling deal premia − OLS and 2SLS

We test for differences in the effect of RTF incidence on deal premia between strategic and financial deals (H6) with regressions estimated by OLS and 2SLS. OLS and 2SLS are employed to assess a continuous dependent variable (e.g. deal premia) when all regressors are strictly exogenous (OLS) and when at least one regressor is endogenous (2SLS) (Wooldridge, 2012).

A well-formulated regression system by OLS or 2SLS enables an unbiased ceteris paribus assessment of a given treatment variable on the dependent variable y. As with the probit models, we create an array of models including control variables to isolate the effect of RTF inclusion on the deal premium.

[36] $G(z) = \Phi(z) \equiv \int_{-\infty}^{z} \phi(v)dv \ \ \wedge \ \ \phi(v) = (2\pi)^{-1/2} \cdot e^{-\frac{1}{2}z^2}$

5.2.1 The OLS model

In its most general form, a model estimated by OLS is given by Eq. 5.2.

$$y_1 = \beta_0 + \sum_{i=1}^{k} \beta_i \cdot x_i + \epsilon_1 \tag{5.2}$$

where y_1 is the dependent variable, x_i are treatment and control variables, and the error term ϵ_1 is normally distributed with expectation zero and a constant variance. Under OLS, the entire set of regressors should be exogenous. In cases where at least one regressor is endogenous, the zero conditional mean (ZCM) assumption of OLS is violated (see section A4.1). The researcher can mitigate endogeneity problems (such as simultaneity) by utilizing 2SLS (Wooldridge, 2012).

5.2.2 2SLS and endogeneity mitigation

In its most general form, a model estimated by 2SLS is given by Eq. 5.3.

$$y_1 = \beta_0 + \gamma_1 \cdot y_2 + \sum_{i=1}^{k} \beta_i \cdot z_i + \epsilon_1 \tag{5.3}$$

where y_1 (in this case, the deal premium) is the dependent variable, y_2 (in this case, TTF inclusion) is an endogenous regressor[37] and z_i are exogenous treatment and control variables.

Angrist and Pischke (2015) describe the logic of 2SLS as a "chain reaction" in which an instrumental variable (IV) affects the dependent variable y_1 through the independent variable y_2. If the IV has a causal effect on the independent variable (captured through a "first-stage" regression, see Eq. 5.4), and the instrument only affects the dependent variable through the independent variable and is uncorrelated with the error term, then the fitted values from the first-stage regression $\hat{y}_2$ is a valid IV for y_2[38]. This IV can then be used in a "second-stage" regression of y_1 on $\hat{y}_2$ and exogenous treatment control variables (Eq. 5.3). By using the IV ($\hat{y}_2$) in the second-stage regression and omitting the

[37]Endogeneity in an explanatory variable formally implies that $corr[x_i, \epsilon] \neq 0$, which in this case is caused by the simultaneous determination of y_1 (the deal premium) on y_2 (TTF inclusion), violating standard OLS assumptions. Omitting the endogenous variable causes omitted variable bias if it is correlated with the dependent and at least one independent variable

[38]See section A4.3.3 for a more comprehensive discussion on the assumptions for IV validity

endogenous variable (y_2), we mitigate the endogeneity while simultaneously controlling for the omitted variable bias caused by the exclusion of the endogenous variable.

Thus, we employ IVs to mitigate endogeneity between the deal premium and TTF inclusion. The first-stage regression is given by Eq. 5.4.

$$\hat{y_2} = P[y_2 = 1|Z] = G(\theta_0 + \sum_{j=1}^{l} \theta_j \cdot z_j) + \epsilon_2 \tag{5.4}$$

where Z is a set of exogenous treatment and control variables for y_2. Note that in our case, the first-stage regression is estimated by probit, as y_2, *TTF inclusion*, is binary. We use the "optimal" model from our TTF regressions (see Table 6.1 in Section 6), based on our model selection criteria outlined in the next subsection, as the first-stage regression in our 2SLS regressions. The fitted values are then used in Eq. 5.3.

5.3 Model selection criteria

To conclude this section, we briefly present our model selection criteria. After creating multiple models, we require a structured process to select appropriate models to analyze our hypotheses. While the process and criteria are outlined in detail in section A2.1, we limit ourselves to a brief summary here.

First, we consider the economic and statistical intuition of the model, and whether the variables hypothesized to affect the dependent variable are accounted for. Second, we consider model fit, multicollinearity, and compliance with model assumptions (formally outlined in Section A4). For the probit specifications, we determine fit through the Hosmer-Lemeshow test (HL test), Akaike's Information Criteria (AIC) and log-likelihood (ln(L)). For our linear models, we evaluate fit using RESET tests. For all of our models, we evaluate multicollinearity using VIF tests. Lastly, heteroscedasticity problems are remedied using heteroscedasticity-robust standard errors throughout specifications.

6 Analysis

This section is organized into three separate subsections. The first two discuss determinants of TTF and RTF inclusion, as hypothesized under H1-H2 and H3-H5, respectively. The

third analyzes H6; the effects of RTF inclusion on deal premia. We test the hypotheses using t- and F-tests on our regression model output. For each section and their corresponding models, we start by briefly discussing control variables, including our novel ones, before moving on to discuss the hypotheses.

Our main innovation throughout this thesis is to consider the distinction between strategic and financial bidders with respect to TTFs and RTFs. This impacts H1 and H3 directly and the remainder of our hypotheses indirectly. As argued in Section 4 and as shown in Section A3.7, we also exploit the fact that previous research is based on biased data and inaccurate variable definitions to re-test and nuance this research. Correcting biases in stock percentage and tender offer data in SDC allows us to verify existing research using more accurate data under H2 and H4, and leads to findings that are opposite of extant literature under H5. We also attempt to nuance the explanation on the effects of RTF incidence on premia under H6.

To test our hypotheses, we create regression models in a stepwise fashion, following the processes of Bates and Lemmon (2003) and Officer (2003). After starting with simple models exclusively including treatment variables, we re-specify these with additional control variables − some already employed in the literature, some not − before re-specifying the models according to our model selection criteria outlined in Sections 5 and A2.1.

6.1 Determinants of TTF incidence

In this subsection, we test H1 and H2, which are built on insights from the efficiency proposition established in the literature (see Section 2.2.1). H1 is built on the view of TTFs functioning as a way of mitigating the proposed information asymmetry free-rider problem between bidders. H2 is based on TTFs providing bidders with incentives to enter into negotiations in deals where target/synergy valuation uncertainty is high by acting as compensation for incurred bidding and negotiation costs. H1 and H2 are tested using probit models regressing TTF incidence on our treatment variables along with different sets of control variables.

Table 6.1 provides an overview of our regression results. Variables are grouped based on their purpose in our regressions. We group the variables we are interested in testing under H1 and H2 as *Treatment variables*. Our control variables are divided into two main groups,

depending on their purpose. The first group, *Efficiency proposition*, includes variables related directly to the efficiency proposition. The remaining control variables are grouped under *Other control variables*. The sign and significance of the treatment variables are discussed under their corresponding hypotheses (H1 and H2 for *Financial* and *Stock pct*, respectively), while the control variables are briefly covered below.

With respect to differences between models, Model 1 only includes our treatment variables for H1-H2, and Model 2 adds variables pertaining to the efficiency proposition covered in the literature. Model 3 adds other control variables, along with our novel variables. The remaining specifications are used to find the optimal models, in accordance with our model selection criteria.

Table 6.1: H1-H2: TTF regression models

	Dependent variable: P(TTF included)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Treatment variables							
Financial	0.017	0.039	−0.198	−0.162	−0.066	−0.317	0.019
	(0.266)	(0.501)	(0.767)	(0.547)	(0.501)	(0.595)	(0.476)
Stock pct.	0.843	2.966*	3.474*	3.067*	3.395**	3.436**	3.091*
	(0.612)	(1.728)	(2.083)	(1.707)	(1.676)	(1.660)	(1.676)
Efficiency proposition							
ln(Equity(MV))		0.023	0.053	0.068			
		(0.095)	(0.160)	(0.102)			
M/B ratio		0.001	0.0003	0.0002			
		(0.010)	(0.013)	(0.012)			
Same industry		−0.017	0.069	−0.141			
		(0.328)	(0.512)	(0.350)			
D/E ratio			−0.003	−0.007			
			(0.023)	(0.025)			
Cross-border			−0.281	−0.292			
			(0.489)	(0.349)			
Seller initiated			0.900*	0.713*	0.661*	0.654*	
			(0.489)	(0.370)	(0.357)	(0.360)	
Other control variables							
RTF_I		0.481	0.489	0.515	0.533	0.533	0.484
		(0.429)	(0.545)	(0.429)	(0.428)	(0.437)	(0.427)
Auction		−0.546	−1.444*	−0.752*	−0.720*	−0.752*	−0.541
		(0.391)	(0.740)	(0.430)	(0.418)	(0.423)	(0.389)
Toehold		−2.418***	−2.838***	−2.506***	−2.412***	−2.386***	−2.408***
		(0.593)	(0.926)	(0.624)	(0.600)	(0.591)	(0.586)
SVA		2.782	5.634*	2.624	2.507	2.563	2.708
		(1.740)	(2.937)	(1.887)	(1.762)	(1.791)	(1.686)
Hostile		−2.392***	−3.340***	−2.426***	−2.460***	−2.485***	−2.401***
		(0.439)	(0.896)	(0.456)	(0.447)	(0.446)	(0.436)

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	Dependent variable: P(TTF included)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Tender		−0.982***	−1.809***	−1.063***	−1.000***	−1.119***	−0.982***
		(0.370)	(0.687)	(0.404)	(0.385)	(0.422)	(0.369)
Financial*Tender						1.359	
						(1.637)	
Constant	1.596***	2.672***	1.992	2.543***	2.760***	2.878***	2.814***
	(0.117)	(0.792)	(1.322)	(0.841)	(0.542)	(0.573)	(0.516)
N	451	451	451	451	451	451	451
Year effects	No	No	Yes	No	No	No	No
AIC	179.054	110.743	120.123	111.689	102.893	104.009	104.814
ln(L)	−86.527	−43.371	−29.061	−40.845	−41.446	−41.005	−43.407
HL test	0.983	0.635	0.956	0.974	0.710	0.988	0.998
Precision	0.951	0.969	0.982	0.971	0.969	0.969	0.969

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
See table A3.2 for variable definitions

6.1.1 Control variables in the TTF regressions

From Table 6.1 we can see that neither of the two control variables argued by Bates and Lemmon (2003) to explain the free-rider problem under the efficiency proposition − the target's market value of equity and M/B ratio − are significant. Of our two novel variables, only the seller initiation variable is significant; with a positive sign and at the 10% level across all specifications. As argued in Section 4.2.4.5, we believe this is due to the fact that the incentives provided by TTFs are weaker in bidder-initiated deals as the bidder already has shown willingness to negotiate. Although we find no support for the existence of a free-rider problem, the significance on the seller initiation variable yields weak support to the notion of TTFs being used as incentives to entice bidders to enter into negotiations with the target. This is in line with the efficiency proposition.

With respect to other control variables, we find weak evidence for private-phase auctions being related to lower TTF incidence. This is incongruent with Boone and Mulherin (2007a), who find that the variable is *positive*. Toeholds are found to be associated with lower TTF incidence; a relationship that is strongly significant and in line with earlier research on the subject (e.g. Betton and Eckbo (2000), Bates and Lemmon (2003), and Officer (2003)). The effect of SVAs on TTF incidence, on the other hand, is not found to be significantly different from zero except for in Model 3, where it is positive − a finding that contradicts Boone and Mulherin (2007a)'s argument that SVAs are substitutes for TTFs. Our finding that hostile deals are associated with lower TTF incidence is also

as expected based on extant literature, but our findings on the effect of tender offers are incongruent with Bates and Lemmon (2003) and Officer (2003), who find a positive relationship. However, TTFs being more prevalent in tender offers does not make intuitive sense, as one of the advantages of tenders over mergers is the possibility of avoiding negotiations with the target management. Since TTFs need to be negotiated with the target, our finding that their incidence is *lower* in tender offers is more in line with intuition. We nuance this finding in Model 6 by showing that the effect is not significantly different depending on acquirer type using the interaction between *Financial* and *Tender*.

6.1.2 H1: TTF incidence and deal type

Testing H1 entails establishing whether there are any significant differences in TTF incidence between strategic and financial deals. To test this hypothesis, we test the following set of null and alternative hypotheses:

H1*$_0$*: *There is no difference in TTF incidence between strategic and financial deals*

H1*$_A$*: *TTF incidence is more likely in financial than in strategic deals*

As seen in Table 6.1, the coefficient on the financial indicator variable is insignificant across all our specifications. Consequently, we cannot reject the null hypothesis that there is no difference in TTF incidence between strategic and financial deals.

We test the robustness of our conclusion by omitting the *Seller initiated* variable in Model 7. As mentioned in Section 2.3, Fidrmuc et al. (2012) find that financial deals are significantly more likely than strategic deals to be seller-initiated[39]. Still, omitting the variable does not significantly affect the coefficient on the financial indicator, indicating that our results (and our failure to reject the null) are robust to such concerns.

A possible explanation for the lack of support for our hypothesis is based on Boone and Mulherin (2007a) and Jeon and Ligon (2011). Our hypothesis is based on insights on the proposed free-rider problem under the efficiency proposition. However, as previously explained, the samples used to establish this proposition may be biased. Boone and Mulherin (2007a) argue that more specifically, the bias in SDC data is related to target size − deals involving smaller targets are more likely to involve incorrect omissions of

[39]Additionally, our tests in Table 4.2 indicate significant differences in the means of the seller initiation variable between strategic and financial acquirers

termination fee data in SDC. Jeon and Ligon (2011) point out that if this is the case, the positive relationship between target size and TTF incidence − one of the relationships used in establishing the free-rider problem − might be a direct consequence of SDC's incorrect omissions of TTFs from small deals, rather than a true relationship. While Jeon and Ligon (2011) do not test the effect of target size on TTF incidence, Boone and Mulherin (2007a) find no support for any relationship between the two variables.

Like Boone and Mulherin (2007a), we are unable to find a significant relationship between target size and TTF incidence. We also find no support for the target M/B ratio having a significant effect on TTF incidence. While both of these variables are central to Bates and Lemmon (2003) in establishing the logic behind the free-rider problem, we find no support for either of them affecting TTFs. Consequently, the fact that our hypothesis is based on the free-rider problem − which we find no support of in our sample − might help explain why we fail to establish any relationship between financial acquirers and TTF incidence in our sample.

6.1.3 H2: TTF incidence and stock payments

Under H2, we are interested in the relationship between the percentage of bidder stock used in the deal payment (in strategic deals) and TTF incidence. Testing the hypothesis involves testing the following set of null and alternative hypotheses:

H2*$_0$*: *In strategic deals, there is no effect of the share of bidder stock used in deal payment on TTF incidence*

H2*$_A$*: *In strategic deals, TTF incidence is growing in the percentage of bidder stock used in the deal payment*

The models from Table 6.1 show that the stock percentage variable is significantly different from zero. With coefficients that are positive and significant across specifications, we reject the null hypothesis of no difference and conclude that there is evidence to suggest that TTF incidence is growing in the percentage of bidder stock used in the deal payment[40].

Our findings are in line with the intuition established in Section 3. We argued that TTF

[40]The stock percentage variable can be interpreted directly as the effect of stock in strategic deals because the financial(/strategic) indicator is a dummy variable, and financial acquirers cannot pay in stock. Indeed, attempting to create a variable interacting a *strategic* indicator and the stock percentage variable leads to Stata omitting the interaction term due to perfect collinearity

incidence should be growing in the percentage of bidder stock used in the deal payment. This is because stock payments reflect the same target/synergy valuation uncertainty that, under the efficiency proposition, creates incentives for negotiating TTFs to entice the bidder to enter into negotiations despite the prospect of high valuation costs and uncertain payoffs. TTFs compensate the bidder for incurring such costs in the case of deal failure. The results presented in Table 6.1 support this intuition as well as earlier research that stock payments act as a proxy for uncertainty and thus are related to higher TTF incidence. However, our findings also nuance this research by showing that there is a positive relationship between the *percentage* of stock used in the deal payment and the propensity to negotiate TTFs.

6.2 Determinants of RTF incidence

In this subsection, we test H3, H4, and H5, which are built on insights from the insurance proposition established in the literature (see Section 2.2.2). H3 is based on the fact that RTFs should be more valuable to financial bidders, arguing that RTF incidence should be higher in such deals. H4 argues that stock offers reflect increased incentives for RTF incidence for both the target and the bidder, which are growing in the *percentage* of stock. H5 is based on the fact that earlier research employs data suspected to be biased along with insights on the advantages of tender offers to argue that RTFs should be less frequently used in tender offers than in merger offers. H3-H5 are tested using probit models regressing RTF incidence on our treatment variables along with different sets of control variables.

Table 6.2 provides an overview of our regression results. Similar to our TTF regressions, variables are grouped according to their purpose, and Model 1 includes only treatment variables related to our hypotheses. Model 2 adds variables pertaining to the insurance proposition discussed in the literature, and Model 3 adds other control variables, along with our novel variables. The remaining specifications are used to find the optimal models, in accordance with our model selection criteria.

Table 6.2: H3-H5: RTF regression models

	Dependent variable: P(RTF included)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Treatment variables							
Financial	0.935***	1.204***	1.376***	1.214	1.526**	1.163***	1.162***
	(0.174)	(0.193)	(0.223)	(1.151)	(0.649)	(0.216)	(0.216)
Stock pct.	0.756***	0.703***	0.926***	0.764***	0.767***	0.768***	0.768***
	(0.230)	(0.237)	(0.260)	(0.245)	(0.245)	(0.245)	(0.244)
Tender	−1.052***	−1.058***	−1.136***	−1.202***	−1.203***	−1.193***	−1.194***
	(0.156)	(0.165)	(0.177)	(0.186)	(0.186)	(0.186)	(0.186)
Financial*Tender				0.989**	0.987**	0.911**	0.917**
				(0.457)	(0.456)	(0.445)	(0.443)
Insurance proposition							
ln(Equity(MV))		0.165***	0.107**	0.132***	0.137***	0.109	0.137***
		(0.042)	(0.051)	(0.047)	(0.045)	(0.221)	(0.045)
Financial*ln(Equity(MV))				0.041			
				(0.127)			
M/B ratio		−0.026***	−0.025**	−0.027***	−0.027***	−0.027***	−0.027***
		(0.010)	(0.011)	(0.010)	(0.010)	(0.010)	(0.010)
D/E ratio		0.035**	0.037**	0.036***	0.036***	0.036***	0.036***
		(0.014)	(0.015)	(0.014)	(0.014)	(0.014)	(0.014)
Cross-border			0.302*	0.280*	0.281*	0.282*	0.283*
			(0.179)	(0.170)	(0.170)	(0.170)	(0.169)
Same industry		0.261*	0.307*	0.274*	0.273*	0.274*	0.274*
		(0.152)	(0.162)	(0.154)	(0.154)	(0.154)	(0.154)
Credit spread		22.304**	76.565***	25.258*	25.617*	21.045*	21.251*
		(11.325)	(24.414)	(13.630)	(13.636)	(11.698)	(11.587)
Financial*Credit spread				−12.692	−15.054		
				(26.227)	(25.214)		
HSR filing			0.519	0.488	0.529*	0.418	0.536*
			(0.325)	(0.331)	(0.310)	(0.977)	(0.311)
HSR filing*ln(Equity(MV)):						0.029	
						(0.225)	
Other control variables							
TTF incidence			0.427				
			(0.531)				
Hostile			0.210				
			(0.462)				
Auction			0.276*				
			(0.168)				
Seller initiated			−0.190				
			(0.152)				
Constant	−0.330***	−2.055***	−5.470***	−2.436***	−2.513***	−2.300**	−2.415***
	(0.092)	(0.440)	(1.124)	(0.569)	(0.525)	(1.036)	(0.500)
N	451	451	451	451	451	451	451
Year effects	No	No	Yes	No	No	No	No
AIC	491.357	474.027	485.776	474.200	472.308	472.646	470.662
ln(L)	−241.679	−228.014	−211.888	−223.100	−223.154	−223.323	−223.331
HL test	0.999	0.029**	0.297	0.498	0.294	0.069*	0.116
Precision	0.725	0.729	0.765	0.761	0.758	0.761	0.758

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
See table A3.2 for variable definitions

6.2.1 Control variables in the RTF regressions

As seen in Table 6.2, all non-interaction variables related to the insurance proposition are significant at various significance levels throughout specifications, with the exception of our novel HSR filing variable. RTF incidence is found to be growing in target size and declining in M/B ratio, congruent with Bates and Lemmon (2003)'s findings. However, with respect to target size, the effect is not found to be significantly different between acquirer types. Our novel (in this context) D/E ratio and cross-border variables, as well as the same industry variable, are also positively related to RTF incidence. RTF incidence is also higher in deals with higher financing risk, as proxied by the (also in this context) novel credit spread variable, but there is no significant difference in how credit spreads affect RTF incidence between strategic and financial deals. We find weak support for the significance of our novel antitrust variable, *HSR filing*, but only at the 10% level and depending on which other variables are included. The interaction of this variable with our target size variable is also insignificant. With respect to our other control variables, only *Auction* is significant. When moving from Model 3 to Model 4, making use of the selection criteria developed in Section 5, we discover that this significance is lost when removing insignificant control variables. Thus, the variable is excluded from further specifications.

6.2.2 H3: RTF incidence and deal type

Similar to in H1 (for TTFs), under H3 we are interested in examining whether there are significant differences in RTF incidence between strategic and financial deals. We test H3 through the following null and alternative hypotheses:

H3$_0$***:*** *There is no difference in RTF incidence between strategic and financial deals*

H3$_A$***:*** *RTF incidence is more likely in financial than in strategic deals*

Table 6.2 shows that the financial acquirer indicator is consistently positive and strongly significant across specifications (except for in Model 4 where insignificant interaction variables are included, inflating the variance of the *Financial* indicator). Thus, there is strong evidence to suggest that RTF incidence is more likely in financial than in strategic deals. Accordingly, we reject the null of no difference in favor of the alternative hypothesis.

These findings are as expected based on the intuition established when formulating this

hypothesis. While target-side RTF incentives should *not* be systematically different in strategic and financial deals, bidder-side incentives should be larger for financial bidders. This is because the primary reason for the bidder to use an RTF − the financing out/abandonment option − is a more important driver of RTF inclusion in financial deals than in strategic deals. To profit from their deals, financial acquirers are more dependent on cheap debt, making them more sensitive to debt conditions and giving them larger incentives to protect themselves from unfavorable developments in such conditions by using RTFs. Furthermore, financing concerns are also exacerbated generally by the fact that financial acquirers cannot use stock to finance deals (a notion we control for here and discuss more explicitly under H4). The results in Table 6.2 support this intuition.

The fact that the financial indicator also retains its significance after controlling for credit spread is supportive of H3 because it supports the notion that, for any level of cheap financing available, financial acquirers use RTFs more often than strategic acquirers. The credit spread variable *itself* being (weakly) significant and positive simply provides some evidence that using RTFs is more likely when loans are more expensive. This is in line with Afsharipour (2010) and Axelson et al. (2013).

6.2.3 H4: RTF incidence and stock payments

As alluded to when testing H3, and similarly to in H2 (for TTFs), H4 involves testing the relationship between the percentage of bidder stock included in the deal payment and RTF incidence. To do so, we test the following null and alternative hypotheses:

H4*$_0$*: *In strategic deals, there is no effect of the share of bidder stock used in deal payment on RTF incidence*

H4*$_A$*: *In strategic deals, RTF incidence is growing in the percentage of bidder stock used in the deal payment*

From Table 6.2, we can see that the stock percentage variable is positive and significant at the 1% level across our specifications. Thus, our regression results provide strong support in favor of H4. Consequently, we reject the null hypothesis and conclude that RTF incidence indeed appears to be growing in bidder stock.

As argued in Section 3, paying in stock reflects increased uncertainties in the bidder's

valuation of target and synergies, which in turn increases the bidder's incentives for RTF inclusion. Greater uncertainty in valuation increases the value of the abandonment option, as the probability of the bidder wanting to walk away from the deal should be growing in its valuation uncertainty. Furthermore, including stock in the deal payment also increases the bid value uncertainty to the *target*. Whereas an all-cash offer provides certainty of value[41] to the target shareholders, the value of stock offers fluctuate based on the value of this stock post-acquisition (which depends on realized deal value ex-post). The value of the stock is also affected by changes in currency exchange rates if the acquirer's stock is denominated in another currency than the target's stock. Thus, since the RTF both provides the *bidder* with an abandonment option and creates insurance for the *target*, RTF incidence is growing in the percentage of bidder stock in the deal payment.

6.2.4 H5: RTF incidence in merger and tender offers

Under H5, we investigate whether there are systematic differences in RTF incidence between merger and tender offers for both strategic and financial deals. Doing so involves testing the following null and alternative hypotheses:

H5*$_0$*: *There is no difference in RTF incidence between merger and tender offers in strategic and financial deals*

H5*$_A$*: *RTF incidence is more likely in merger offers than in tender offers in both strategic and financial deals*

Table 6.2 shows that the tender offer indicator is negative and strongly significant in all specifications it is included in. Thus, even after controlling for differences among strategic and financial acquirers, there seems to be a negative relationship between tender offers and RTF incidence, supporting H5. Accordingly, we reject the null hypothesis and conclude that RTF incidence is more likely in merger offers than in tender offers − opposite of what is found by Bates and Lemmon (2003).

As discussed in Section 3, we believe Bates and Lemmon (2003)'s findings to be spurious and caused by bias and miscategorization in SDC data. Instead, we argue that RTF

[41] This "certainty of value" is frequently cited by target management (and/or the target's investment bank) in the takeover filings of friendly all-cash offers as a reason for why target shareholders are encouraged to vote in favor of the takeover. Given the RTF's role of insuring the target against adverse changes in bid value, our results support this notion empirically

incidence should be *lower* in tender offers because tender offers allow the bidder to avoid negotiations with the target management. Since the target needs to agree to the size of the fee and the conditions under which the fee payments triggers, not engaging with the target management makes it impossible to negotiate RTFs. The coefficient of the *Tender* variable supports this argument.

To ensure that this finding holds for both strategic and financial acquirers, we add an interaction between the financial and tender offer indicators and report this in Models 4-7. The coefficient on this variable is positive and significant at the 5% level, but with a lower absolute value than that of the tender offer variable itself. Thus, these two variables together show that the effect of tender offers on RTF incidence in financial deals is *negative*, but greater than in strategic deals[42]. Therefore, we conclude that although tender offers contain fewer RTFs than mergers in both strategic and financial deals, the difference between the deal structure types is greater than in strategic deals. Thus, we reiterate our conclusion that tender offers are associated with lower RTF incidence for *both* strategic and financial acquirers.

One potential explanation for the observed sign and size of the interaction variable is that the value of RTFs should be higher to financial acquirers, and that this makes the decision to negotiate RTFs less dependent of offer type. Financial acquirers value protection against unfavorable changes in credit conditions (the financing out) higher. The tender offer's advantage of being able to avoid negotiations with the target management is thereby less valuable to such acquirers, as they should place a larger value on negotiating an RTF, all else equal. Negotiating an RTF necessitates negotiations with target management, thus nullifying this advantage. Therefore, their decision to negotiate RTFs is less dependent of offer type, relative to strategic acquirers. Accordingly, while tender offers are associated with lower RTF incidence for both acquirer types, our results suggest that the difference between merger and tender offers is lower for financial acquirers.

[42]The effect for strategic acquirers is given by the *Tender* indicator itself. For financial acquirers, the interaction term must also be taken into account

6.3 Deal premium effects of RTFs

This subsection investigates H6 - whether the effects of RTFs on deal premia differ between strategic and financial acquirers.

Testing H6 involves estimating linear regression models investigating the relationship between the deal premium and RTF incidence for strategic and financial acquirers, controlling for a wide range of variables. These results are presented in Table 6.3. Model 1 is estimated using OLS and tests only treatment variables, before Models 2-4 supplement these with control variables. Finally, Models 5, 6, and 7 are estimated using 2SLS[43] in an attempt to mitigate problems caused by the simultaneous determination of TTFs and deal premia, as discussed by Bates and Lemmon (2003) and Officer (2003).

Table 6.3: H6: Deal premium regression models

	Dependent variable: Deal premium (p.p.)						
	OLS				2SLS *(IV: TTF_I)*		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Treatment variables							
RTF_I	-17.77***	-7.051	-3.052	-2.880	-1.171	-1.029	-5.963
	(5.640)	(6.657)	(6.261)	(6.159)	(7.356)	(7.147)	(5.225)
RTF*Financial	12.84	0.924	9.852	12.98	8.733	7.822	10.76
	(13.143)	(14.817)	(12.461)	(11.345)	(12.546)	(12.273)	(12.146)
Financial	-18.03	-34.79**	-41.21**	-16.65*	-60.22***	-69.14***	-69.17***
	(11.100)	(14.908)	(17.820)	(10.035)	(22.017)	(22.529)	(22.701)
Deal characteristics							
TTF_I		-15.87	-18.05	-17.13	-40.18	-37.40	-12.77
		(19.760)	(20.283)	(14.321)	(44.797)	(39.431)	(23.588)
TTF*Financial		27.27	28.02		48.18*	57.36**	57.06**
		(19.529)	(21.324)		(26.771)	(26.500)	(26.568)
Tender		19.82***	13.61**	13.71**	13.11**	13.39**	13.66**
		(5.158)	(5.301)	(5.323)	(5.601)	(5.482)	(5.424)
Toehold		-12.30	-8.948	-12.96	-8.844		
		(8.000)	(10.126)	(10.601)	(15.778)		
Hostile		-2.004	3.962				
		(20.871)	(19.263)				
Auction		-1.783	-4.752	-5.261	-4.693	-4.789	-4.648
		(4.764)	(4.725)	(4.934)	(4.882)	(4.791)	(4.811)
Seller initiated		-0.234	-1.793		-1.533		
		(4.738)	(4.339)		(4.378)		
TTF = RTF		-11.31	-17.25*	-17.53*	-25.73	-25.06	
		(6.979)	(9.500)	(9.271)	(20.283)	(18.912)	

Continued on the next page

[43]We use the regression from Model 5 from Table 6.1 as the first stage-regression. Here, *hostile* functions as an instrument for TTF inclusion, which appears to satisfy the required assumptions for IVs. See Section A4.3.3 for these requirements, and a more elaborate discussion on the model's compliance with them in Section 7

Continued from the previous page

	Dependent variable: Deal premium (p.p.)						
	OLS				2SLS *(IV: TTF_I)*		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Valuation/financing uncertainty							
Stock pct.			5.681	5.677	8.433	7.911	1.047
			(14.523)	(14.488)	(15.877)	(15.351)	(12.940)
ln(Equity(MV))			-8.120***	-8.047***	-8.207***	-8.144***	-7.881***
			(1.589)	(1.597)	(1.689)	(1.702)	(1.586)
D/E ratio			-1.398**	-1.415**	-1.404**	-1.400**	-1.400**
			(0.568)	(0.562)	(0.566)	(0.563)	(0.573)
M/B ratio			0.551	0.562	0.537	0.532	0.576
			(0.400)	(0.400)	(0.396)	(0.396)	(0.419)
Same industry			9.747**	9.847**	9.619**	9.812**	10.04**
			(4.566)	(4.549)	(4.539)	(4.547)	(4.565)
Credit spread			11.01**	10.87**	10.93**	11.17**	11.36**
			(5.315)	(5.298)	(5.460)	(5.369)	(5.365)
Constant	55.33***	62.55***	85.64***	84.30***	107.9**	103.2**	76.48**
	(2.940)	(19.181)	(24.667)	(22.210)	(54.721)	(48.915)	(32.100)
N	451	451	451	451	451	451	451
R^2	0.039	0.080	0.206	0.204	0.201	0.202	0.197
Adj. R^2	0.032	0.057	0.175	0.178	0.172	0.176	0.174
RESET p-value	0.205	0.186	0.001***	0.001***	0.131	0.116	0.048**

IV for TTF_I in 2SLS models: Hostile. We use Model 5 in Table 6.1 as the first stage regression
Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
See table A3.2 for variable definitions

6.3.1 Control variables in the deal premium regressions

In Table 6.3, with respect to deal characteristics, we see that while we find no evidence for TTF inclusion leading to changes in premia in *strategic* deals, there is some evidence to suggest that TTFs are related to significantly higher premia in *financial* deals. Furthermore, tender offers appear to be associated with higher premia, as suggested by Bates and Lemmon (2003), Officer (2003), and Offenberg and Pirinsky (2015), but contrary to the findings of Betton et al. (2009).

With respect to factors controlling for valuation and financing uncertainty, we see that larger targets receive significantly lower premia, in line with Bates and Lemmon (2003), Officer (2003) and Chen et al. (2018). Additionally, the target's D/E ratio is negatively correlated with premia. This notion is supported by Bates and Lemmon (2003) and Chen et al. (2018), who suggest that the D/E ratio is a proxy for uncertainty, which should reduce the bidder's willingness to pay high premia. Same industry deals are associated with significantly higher premia, likely at least partly due to higher synergies. Finally, we find, counterintuitively, that higher credit spreads are related to higher premia. This

goes against the findings of Axelson et al. (2013) and Du and Gerety (2018), but is in line with Jæger and Ramsnes (2019), who find similar evidence in a dataset sampled using a similar procedure[44] to ours.

6.3.2 H6: Deal premium effects of RTFs

To examine the relationship between deal premia and RTFs in strategic and financial deals, we test the following null and alternative hypotheses:

H6*$_0$*: *There is no difference in the effects of RTF inclusion on deal premia between strategic and financial acquirers*

H6*$_A$*: *The effects of RTF inclusion on deal premia are different in strategic and financial deals*

The results are shown in Table 6.3. We find a significant relationship between RTFs and deal premia in Model 1. However, once adding control variables (Model 2-4) and controlling for simultaneity in the determination of TTFs and premia (Model 5-7), these results become insignificant. Accordingly, as expected based on the discussion in Section 3, RTF inclusion does not appear to have any aggregate effects on deal premia. We *do* find evidence for financial acquirers paying premia significantly different to strategic ones. However, based on the insignificance of the *RTF_I*Financial* variable, our regressions consistently indicate that there are no differences in the *effects of RTFs* on premia *between* acquirer types. Thus, we cannot reject our null hypothesis of no difference and conclude that there is no evidence in favor of any differences in premium effects of RTFs between acquirer types. Accordingly, we are unable to nuance Bates and Lemmon (2003)'s findings by explicitly controlling for differences between acquirer types.

Based on our discussion in Section 3, we argued that the value to the bidder and the target created by RTFs vary between deals, and that we therefore do not expect RTF inclusion to systematically affect the deal premium in one direction (thus an insignificant *RTF_I* variable). However, we had argued that the RTF's option value to the bidder should be higher for financial than for strategic acquirers. This is because the value of the financing

[44] Our sampling process has more steps and covers a wider sampling period, but both samples are based on similar SDC Platinum criteria and culminate in enriching the dataset with information from takeover filings

out provided by the RTF is higher to financial acquirers. Because the deal premium should be adjusted to compensate for the relative change in expected transaction value, the higher option value should result in a different premium effect from RTF inclusion for a financial deal than for a strategic deal, all else equal. However, the insignificant interaction variable yields no support for such a notion.

Our lack of support for this hypothesis could potentially be explained by the fact that our underlying assumptions are too strict. H6 argues that premia should be adjusted to compensate for relative changes in expected deal value from RTF inclusion. It thereby presupposes that both parties are able to recognize the provision's value to both itself and the other party. One could argue this assumption to be unrealistic: it is unlikely, for instance, that targets have perfect information on the acquirer's financing risk. Thus, the "true" shift in the parties' relative expected deal value caused by RTF inclusion is not fully recognized and deal premia are not adjusted sufficiently. If this is the case, we should expect to see some evidence of mispriced RTFs in our data. Chen et al. (2018) argue the relative size of TTFs and RTFs to potentially be indicative of such mispricing: since TTFs and RTFs address different issues and compensate for different risks, they should rarely be exactly equal in terms of size. However, reciprocal, equal-fee RTFs and TTFs occur in 11.80% of all deals and in 21.11% of deals with RTFs in our sample. Both occurrences are much higher than one would expect if the deal parties indeed price the provisions according to how they change expected deal value. However, the *TTF=RTF* variable in our regressions do not appear to significantly affect the deal premia nor the *RTF*Financial* interaction after controlling for endogeneity. Thus, although we do not draw explicit conlusions from this finding, we note that the assumption of both parties being able to perfectly value the RTF might be unreasonable.

7 Limitations and weaknesses of the analysis

Although our findings are mostly in line with our expectations, we believe our regression models may be suffering from certain limitations and weaknesses. These are presented in the next subsections − first those pertaining to our sample, then those pertaining to variables, and finally, concerns with respect to model validity.

7.1 Sample

We believe it is likely that our dataset suffers from some extent of sampling bias, which would invalidate the assumption of random sampling for our models (see Section A4). While we follow established literature in creating our sample, some steps might induce biases to our data. First, because the sample is somewhat small (N = 451) and only contains 22 non-TTF deals (4.87% of total), our results might be sample-specific, and thus invalid for inference. This could help explain why our findings under H1 with respect to the free-rider problem differs from those in the literature[45]. Conversely, because only 20 of the deals in our sample are hostile (4.43% of total), the same sampling bias concerns apply here and increases the risk of *Hostile* being a weak instrument[46]. This would bias the estimators in the deal premium regressions.

With respect to our sampling process, we also note that retrieving data in Compustat reduces the sample size by 70%, significantly skewing our sample towards larger deals[47]. Second, we only consider deals reaching a stage where making takeover filings with the SEC is required. Therefore, our results can only be expected to be valid for deals reaching a level of advancement such that, at the minimum, a preliminary takeover agreement was reached. Lastly, as data gathering from SEC filings is subjective by nature, our data may be biased due to human error[48].

7.2 Variables

Regarding our variables, we are aware of some factors that could potentially weaken their validity and invalidate the ZCM assumption[49]. Most of the literature on termination provisions (that does not explicitly consider financial acquirers) also includes financial statement data on acquirers. With respect to TTFs, it should be noted that both Bates and Lemmon (2003) and Officer (2003) include additional metrics to control for relative bargaining power (such as relative size) and informational asymmetry (such as

[45]Both Bates and Lemmon (2003) and Officer (2003) have more than 2,000 observations in their sample

[46]In this case, this could happen because the significant relationship between *Hostile* and TTF_I is spurious, thus violating the relevance condition of IVs

[47]We test this by using a Wilcoxon rank sum test to test differences in deal size before and after adding data from Compustat. The test indicates significant differences between the samples

[48]For examples of how we interpret and categorize variables based on these filings, see Section A3.7

[49]This assumption is inherently untestable. See Section A4 for a formal discussion of this assumption

the *acquirer's* M/B ratio), which is generally unavailable for most financial acquirers[50].

On the RTF side, most notably, we are unable to control for the ratio between the acquirer and target's asset volatilities, which Chen et al. (2018) find to be a significant driver of RTF incidence. Additionally, based on its lack of significance in the RTF regressions, the HSR filing variable appears to be an imperfect antitrust risk proxy.

Concerning deal premia, Officer (2003) finds acquirer size to be significantly correlated with premia. This is something we are unable to control for, which could cause omitted variable bias in our regressions. We also note the unexpected sign on the credit spread variable in the deal premium regressions, which contradicts Offenberg and Pirinsky (2015) and Du and Gerety (2018). Although Jæger and Ramsnes (2019) find a similar relationship, we do not think this finding is intuitive and are unable to explain it. This could be indicative of the fact that we, similarly to Bates and Lemmon (2003), have not been able to account for all the factors affecting both deal premia and our independent variables.

7.3 Robustness − model fit and multicollinearity

To more formally assess the robustness and validity of our results, we close this subsection by performing robustness checks on our models[51]. The following paragraphs cover our models' compliance with the assumptions outlined in Section A4. We cover the TTF and RTF models together as they rely on the same underlying assumptions, before covering the premium regressions separately. Note that as discussed in Section 5.3, the residuals in all our models exhibit heteroscedasticity, confirmed formally using a Breusch-Pagan test. Consequently, we employ heteroscedasticity-robust standard errors in all specifications.

7.3.1 TTF/RTF probit model specifications

Regarding the TTF and RTF probit models, beyond the potential bias caused by omitted variables (covered in Section 7.2), our main concerns relate to obtaining satisfactory model fit and avoiding multicollinearity.

With respect to the former, we see that the TTF models generally have HL test statistics

[50]We find such data to be unavailable for 55 out of 75 financial acquirers, most of which are private companies. Thus, we refrain from including such data in our sample to maintain a healthy sample size

[51]The output of our formal robustness tests are shown in Section A2

close to 1 (except for Models 2 and 5), which might suggest overfitting. This indicates that the results in H1 and H2 might be sample specific. The RTF models show no signs of misspecification based on the HL test, except for in Models 2 and 6, where the test statistic is significant. However, the results of these models (with respect to variable significance) are largely in agreement with the remainder of models included in the output.

Further, with respect to model precision (Tables A2.1 and A2.3), the TTF models almost perfectly predict TTF inclusion (≈100% precision); a much higher precision than the RTF models (≈75% precision). Rather than this suggesting that the RTF models are *imprecise*, this is more likely a case-in-point of the TTF models overfitting our sample: 95.1% of the deals in our sample include a TTF; and one would thus expect high precision here. As we can see from Table A2.1, the TTF models poorly predict the *absence* of TTFs, with precisions ranging from 0.0% to 63.6% between models.

Moreover, we see an improvement in AIC when adding control variables which the established literature hypothesizes to be related to TTF/RTF incidence and that are significant in our regressions. It also improves when removing non-significant variables. Since AIC is a measure of fit penalizing the inclusion of superfluous variables, an improvement in AIC over the specifications increases our confidence in our models. From Tables 6.1 and 6.2, we see that we attain the best AIC in our latter specifications.

Lastly, none of our models appear to suffer from issues with multicollinearity, as indicated by the VIF scores in Tables A2.2 and A2.4. We see that all models have VIF scores below 10, beneath Wooldridge (2012)'s suggested threshold.

7.3.2 Deal premia model specifications

Considering our 2SLS models, as with the TTF and RTF probit models, our main concerns beyond omitted variables pertain to model fit and avoiding multicollinearity.

We see that our models appear to be specified well with respect to functional form (tested using RESET tests; see Table A2.6) when controlling for simultaneity between TTFs and premia, as well as equally-sized TTFs and RTFs (Models 5 and 6). With respect to multicollinearity (Table A2.7), none of the models exhibit concerning VIF scores.

Additionally, we believe there is still room for improvement and that more econometrically

experienced researchers could employ methods that better deal with simultaneity problems between premia and TTF inclusion than what 2SLS does. For example, it is likely that re-testing H6 with system equations (as described by Maddala (1983) and employed by Bates and Lemmon (2003) and Officer (2003), but with more recent data accounting for new insights on factors affecting deal premia) would yield more robust results.

7.4 Summary on limitations and robustness

All models appear to suffer from similar concerns with random sampling (Section 7.1) and omitted variables which may invalidate the ZCM assumption (Section 7.2).

With respect to model fit in the probit models (Section 7.3.1), we are somewhat cautious about interpreting the TTF models; primarily due to concerns about overfitting. The RTF models, on the other hand, appear robust to such concerns. The low calibration errors, combined with improving AIC scores in our respecified models and satisfactory precision, yield credible models with intuitive results. Thus, we conclude that while the TTF models may be unable to credibly fit our data, the RTF models appear reasonable (at least with respect to variable sign and significance).

As the OLS models likely suffer from issues with simultaneity (Section 7.3.2), we attempt to mitigate this by employing 2SLS. This improves the model fit, but does not change the conclusions of our analysis. Additionally, the fact that some variables yield coefficients that explicitly go against earlier findings underpins our earlier caution that there are important relationships in our model we have been unable to account for. Thus, we conclude that caution is required when interpreting results based on our linear models.

8 Conclusion and avenues for future research

8.1 Conclusion

Throughout this thesis, we investigate drivers and premium effects of TTFs and RTFs in merger and tender offers. We take a point of departure from the *efficiency* and *insurance* propositions developed in the literature. These predict that TTFs incentivize bids through compensating bidders for information expropriation and negotiation/valuation costs, and

that RTFs compensate *targets* for uncertainty in the deal payoff and allowing *bidders* to abandon suboptimal deals. Through the use of newer data, novel variables, and the correction of biases identified in earlier research, we test predictions on how TTFs and RTFs relate to acquirer type, payment structure, offer type, and deal premium.

Although we introduce several variables that are novel in termination provision research, our main innovation is based on explicitly considering differences between strategic and financial acquirers. We gather information on these variables by reading SEC DEFM/PREM14A and SC 14D9(A) filings, and combine these with data from 4 different databases. Albeit time-consuming, this process allows us to investigate relationships that previous researchers have been unable to. These acquirer types usually have different sources of value from their deals, and different opportunities with respect to how to mitigate the costs and uncertainties that incentivize TTFs/RTFs. Additionally, through using these filings, we are able to detect and correct biases in SDC data pertaining to TTF/RTF incidence, stock percentage, and tender offers − all of which are key variables in testing our hypotheses.

In total, we test six hypotheses: two on TTFs, three on RTFs, and one on the effect of RTFs on deal premia. Our first hypothesis is based on TTFs mitigating adverse effects of information expropriation and argues that TTF incidence should be higher in financial than in strategic deals. Bates and Lemmon (2003) argue for the existence of an informational asymmetry problem that allows subsequent bidders to "free-ride" on the information revealed by the first bidder. Eckbo et al. (2019) argue that financial bidders should have higher degrees of commonality in their sources of value, and the cost of information expropriation should therefore be higher for such bidders. Consequently, we argue that TTFs should be more common in financial deals because these provisions compensate bidders for the revelation of private information. However, we find no support for this hypothesis, nor for the existence of the free-rider problem upon which it is based.

We find support for our second hypothesis; namely, that in strategic deals, TTF incidence is growing in the share of stock used in the deal payment. Since strategic bidders can use stock to mitigate uncertainty in the valuation of target/synergies, and these uncertainties increase costs of negotiation and valuation to the bidder, TTF incentives are stronger in stock deals because such deals reflect higher uncertainty.

Furthermore, we test three hypotheses with respect to RTF incidence. First, we find that RTF incidence is higher in financial deals than in strategic deals and argue that this is because the value of the abandonment option the RTF provides is higher to financial bidders. Since these bidders are dependent on the ability to raise sufficiently cheap financing, they place a higher value on the option to abandon the deal.

Second, we also find that RTF incidence is growing in strategic payment in stock. Since stock payments reflect increased uncertainties in target/synergy valuation to the bidder, stock deals reflect deals in which the value of an abandonment option is higher. Stock deals also add uncertainty of bid value for the target, yielding targets incentives to "insure" their takeover gains using an RTF.

Third, we find that tender offers are associated with significantly lower RTF incidence. This contradicts earlier findings demonstrating *higher* RTF incidence in tender offers than in merger offers. We show that these findings are based on miscategorization of tender offers in SDC, and by recategorizing using SEC filings, we find strong evidence in favor of the opposite. We argue that this is because making use of one of the advantages of tender offers − the ability to avoid negotiations with target management − rules out the option of negotiating RTFs. We also find that the difference in RTF incidence between tender and merger offers is greater in strategic than in financial deals. We argue this is because of differences in the likelihood of making use of the option of avoiding negotiations with the target. All else equal, since RTFs are more valuable to financial acquirers, and because these need to be agreed with the target management, the value of avoiding negotiations is lower to such acquirers.

Finally, we test RTF effects on premia. While we agree with prior research finding that RTF incidence itself should have no *aggregate* effect on premia, we believe there should be differences with respect to how RTFs affect premia between strategic and financial deals. The literature (e.g. Coates and Subramanian (2000), Bates and Lemmon (2003), and Officer (2003)) has argued that the party which receives the net gain from RTF inclusion should compensate the other party through an adjustment of the premium. Although we believe we cannot generalize about the sign and magnitude of the net gain to the acquirer versus the target, we believe financial acquirers, on average, have higher net gains from RTF inclusion than strategic acquirers. Again, we explain this by the fact that RTFs

should be more valuable to financial acquirers, all else equal. Thus, one would expect to see the effects of RTFs on premia being different in financial and strategic deals. However, we find no support for this intuition in our data.

8.2 Avenues for future research

While we believe our thesis has contributed to the existing literature, there are some topics we have not been able to investigate as closely as we would have preferred. In light of our results and renewed understanding, we conclude our thesis with the following suggestions for how our results can be improved and/or built upon.

First of all, we would like to see someone re-test our findings with respect to the free-rider problem, potentially working closely with legal scholars in the process. The fact that this proposition is based on data that is both biased and over 20 years old leads us to the following inquisitions: Are our results driven mainly by this bias (or the weaknesses in our own analysis)? Or are they caused by the fact that rationales behind TTF usage have changed? Similarly to how the use of lockup options disappeared after the FASB prohibited the pooled accounting method (Jeon and Ligon, 2011), is it possible that such a change is driven by regulatory changes? Legal scholars should be inherently more knowledgeable than most financial researchers on the judicial opportunities and limitations of TTF usage. Therefore, we would like to see financial and legal scholars joining forces to re-investigate the rationales behind TTF usage. Doing so would help paint an even more accurate picture of why they are used.

Second, we would like to see more research on the premium effects of both TTFs and RTFs. Earlier researchers (Coates and Subramanian (2000), Bates and Lemmon (2003), and Officer (2003)) argue that the inclusion of TTFs/RTFs should lead to adjustments in premia, but our regressions yield no support for this. We also find that the size of the TTF and RTF is equal in 21% of all deals in our sample containing both provision types. This indicates that it is unlikely that the fees exactly represent each party's gain in expected value from their inclusion, and Chen et al. (2018) argue that it may reflect mispricing. Therefore, we would encourage researchers who are more experienced than us to re-visit the effects of TTF/RTF inclusion on premium effects, as there does not appear to be much conclusive evidence here today.

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Appendix

A1 Sample creation

Table A1.1: Deal count by step

Step	Description	Deal count after step
SDC Deal sampling		
0.1	Mergers of public targets between 2000 and 2019	19,067
0.2	Bidder holding $< 50\%$ of shares prior to announcement	18,876
0.3	Bidder seeking to acquire 100% of shares upon deal completion	6,568
0.4	Only completed and withdrawn deals	6,347
0.5	Deals with sufficient information on industry	4,656
0.6	Deals with sufficient information on price and acquirer nation	3,930
Adding information from additional databases		
1	Initial data retrieval from SDC	3,930
2	Adding CRSP stock price data	3,481
4	Adding Compustat financial data	1,278
5	Deals with available SEC EDGAR filings[a]	849
6	Merging dataset with Orbis ownership data	496
7	Reading through SEC filings	451

a) We retrieve DEFM14A, PREM14A and SC 14D9(A) filings from EDGAR

A2 Models

A2.1 The model selection process

As seen in Tables 6.1, 6.2 and 6.3, we create multiple specifications in the process of selecting the optimal model. This section describes our model selection criteria in more detail.

A2.1.1 Probit models

Our model selection framework is based on the following criteria, presented in order of importance:

1. **Economic and statistical intuition**

   First, we consider the economic intuition of the variables included in the models. If there is no good economic explanation behind why an independent variable should

have a causal effect on the dependent variable, it is not included. Variables found to be significant in earlier research, but not in our regressions, are included if they are economically intuitive and improve model fit.

2. **Model fit: the Hosmer Lemeshow test for calibration error (HL test) and model precision**

   Second, to assess model fit, we consider the HL test and model precision. Failure to reject the null in the HL test is an indication of satisfactory fit (but not proof against existence of a more precise model attained by adding/removing variables and changing the functional form of the specification) and consequently serves as a first line of defense against misspecification. Accordingly, we employ the HL test statistic to avoid inherently misspecified models (Anderson and Burnham, 2002). Conversely, we are careful in the interpretation of models with a very high HL test p-value (close to 1) as such values indicate close to perfect fit to our sample (overfitting). As a separate measure for overfitting, we also consider model precision (i.e. the share of correctly predicted fitted values), distinguishing between provision inclusion *and* exclusion. Unreasonably high precision should also indicate overfitting.

3. **Akaike's Information Criteria (AIC) and log-likelihood (ln(L))**

   Third, we minimize AIC and maximize ln(L) to compare fit *between* models. As AIC is a function of ln(L), these tend to favor the same models. However, AIC penalizes the addition of insignificant variables, enabling more nuanced model selection amongst models with relatively fewer degrees of freedom (Murphy, 2012). Thus, under more complex specifications, the selection criteria might yield ambiguous conclusions. In such cases, AIC is preferred to ln(L) to avoid preferring overspecified models.

4. **The VIF test**

   Fourth, we reject models with VIF scores in excess of 10 for either key treatment variables or for the model on aggregate, following Wooldridge (2012)[52]. Such scores do not bias estimators, but indicate inflated standard errors. Thus, specifications with high VIF scores suggests that the underlying model might be invalid for inference and significance testing.

[52] Although Wooldridge (2012) argues that setting a threshold is somewhat arbitrary, he notes that 10 is a commonly selected threshold

A2.1.2 OLS/2SLS models

Similar to the process with probit models, we formalize the process of deal premium model selection by employing multiple selection criteria:

1. **Economic and statistical intuition**

   As with the probit regressions, we discard models with lack of economic intuition, as well as models with serious violations of linear model assumptions (as detailed in Section A4). In our case, this implies rejection of models with endogenous estimators, caused e.g. by a failure to account for the simultaneity of premium negotiations and the decision of TTF provision inclusion.

2. **The Ramsey Regression Equation Specification Error Test (the Ramsey RESET test)**

   The Ramsey RESET test is our main test for misspecification in our linear models. Failure to reject the null in the Ramsey RESET test indicates the model specification is not missing additional any non-linear relationships in the variables already included in the specification. Consequently, the test helps guard against model underspecification.

3. **The VIF test**

   As for the probit models, we reject linear models with VIF scores in excess of 10 for either key treatment variables or for the model on aggregate.

A2.2 Model robustness

A2.2.1 H1-H2: Probit regressions on TTF incidence

Table A2.1: H1-H2: share of TTF incidence correctly calculated

	Share correctly calculated						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Deals with TTF	1.000	1.000	1.000	0.993	0.991	0.991	0.991
Deals without TTF	0.000	0.000	0.636	0.545	0.545	0.545	0.545
Total	0.951	0.951	0.982	0.971	0.969	0.969	0.969

Table A2.2: H1-H2: variance inflation factors for all TTF models

	Probit						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Treatment variables							
Financial	1.015	1.159	2.348	1.531	1.292	1.693	1.693
Stock pct.	1.015	1.033	2.552	1.429	1.250	1.248	1.248
Efficiency proposition							
ln(Equity(MV))		1.038	2.284	1.353			
M/B ratio		1.799	2.207	1.604			
Same industry		1.156	1.711	1.256			
D/E ratio		1.787	1.945	1.622			
Cross-border			1.445	1.186			
Seller initiated			1.403	1.178	1.102	1.097	1.097
Other control variables							
RTF_I			1.502	1.232	1.207	1.215	1.215
Auction			2.527	1.558	1.500	1.519	1.519
Toehold			3.174	1.883	1.712	1.724	1.724
SVA			1.823	1.170	1.055	1.054	1.054
Hostile			4.000	1.540	1.490	1.492	1.492
Tender			3.314	1.537	1.427	1.678	1.678
Financial*Tender						1.195	1.195
Announcement year			27.610				
Mean	1.015	1.329	3.990	1.434	1.337	1.391	1.391

See Table A3.2 for variable definitions

A2.2.2 H3-H5: Probit regressions on RTF incidence

Table A2.3: H3-H5: share of RTF incidence correctly calculated

	Share correctly calculated						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Deals with RTF	0.441	0.528	0.609	0.590	0.596	0.609	0.602
Deals without RTF	0.883	0.841	0.852	0.855	0.848	0.845	0.845
Total	0.725	0.729	0.765	0.761	0.758	0.761	0.758

Table A2.4: H3-H5: variance inflation factors for all RTF models

	Probit						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Treatment variables							
Financial	1.049	1.220	1.495	44.292	14.191	1.571	1.569
Stock pct.	1.061	1.073	1.209	1.119	1.119	1.119	1.118
Tender	1.019	1.073	1.152	1.276	1.278	1.272	1.264
Financial*Tender				1.591	1.593	1.507	1.491
Insurance proposition							
ln(Equity(MV))		1.097	1.496	1.343	1.243	30.054	1.242
Financial*ln(Equity(MV))				19.728			
M/B ratio		2.106	2.209	2.044	2.037	2.025	2.024
D/E ratio		2.100	2.264	2.025	2.018	2.008	2.008
Cross-border			1.164	1.093	1.092	1.094	1.093
Same industry		1.168	1.237	1.177	1.178	1.178	1.178
Credit spread		1.079	4.764	1.500	1.499	1.101	1.083
Financial*Credit spread				16.333	15.215		
HSR filing			1.317	1.457	1.268	12.454	1.267
HSR filing*ln(Equity(MV))						54.792	
Other control variables							
TTF_I			1.614				
Hostile			1.620				
Auction			1.197				
Seller initiated			1.177				
Announcement year			9.232				
Mean	1.043	1.365	2.210	7.306	3.644	9.181	1.394

See Table A3.2 for variable definitions

A2.2.3 H6: Linear regressions on deal premium

Table A2.5: H6: P-values of t and F-tests for key treatment variables

	OLS				2SLS		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
RTF_I (t-test)	0.002***	0.291	0.626	0.640	0.874	0.886	0.254
RTF_I & RTF_I*Financial (F-test)		0.528	0.713	0.520	0.784	0.814	0.445

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2.6: H6: Ramsey RESET test p-values

	OLS				2SLS		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
RESET p-value	0.205	0.186	0.001***	0.001***	0.131	0.116	0.048**

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2.7: H6: Variance inflation factors

	OLS				2SLS		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Treatment variables							
RTF_I	1.316	1.708	1.788	1.781	1.923	1.908	1.630
RTF*Financial	3.127	3.540	3.616	3.33	3.652	3.600	3.588
Financial	2.642	21.501	21.845	3.147	35.908	28.406	28.411
Deal characteristics							
TTF_I		2.154	2.219	1.732	4.094	3.392	1.305
TTF*Financial		23.147	23.306		38.196	30.48	30.438
Tender		1.228	1.318	1.310	1.391	1.360	1.352
Toehold		1.290	1.297	1.195	1.828		
Hostile		1.473	1.484				
Auction		1.134	1.154	1.093	1.146	1.085	1.086
Seller initiated		1.104	1.139		1.155		
TTF=RTF		1.612	1.764	1.741	3.45	3.227	
Valuation/financing uncertainty							
Stock pct.			1.245	1.243	1.397	1.359	1.15
ln(Equity(MV))			1.157	1.135	1.163	1.145	1.132
D/E ratio			1.952	1.943	1.955	1.952	1.952
M/B ratio			1.962	1.954	1.965	1.964	1.957
Same industry			1.350	1.346	1.351	1.344	1.344
Credit spread			1.085	1.070	1.094	1.080	1.078
Mean VIF	2.362	5.445	4.099	1.716	6.354	5.879	5.879

See Table A3.2 for variable definitions

A3 Variables

A3.1 TTF/RTF incidence by year

Table A3.1: Deal overview by type and inclusion of termination fees over time

	Total *N=451*			**Strategic acquirers** *N=376*			**Financial acquirers** *N=75*		
	N	TTF	RTF	N	TTF	RTF	N	TTF	RTF
2003	12	0.667	0.083	10	0.700	0.100	2	0.500	0.000
2004	17	0.941	0.353	17	0.941	0.353	0	n.m.	n.m.
2005	4	0.750	0.000	4	0.750	0.000	0	n.m.	n.m.
2006	15	1.000	0.133	13	1.000	0.154	2	1.000	0.000
2007	32	0.938	0.469	21	0.952	0.333	11	0.909	0.727
2008	29	0.828	0.310	25	0.880	0.280	4	0.500	0.500
2009	12	1.000	0.333	8	1.000	0.250	4	1.000	0.500
2010	28	0.893	0.286	26	0.885	0.308	2	1.000	0.000
2011	10	0.900	0.500	7	0.857	0.286	3	1.000	1.000
2012	20	1.000	0.350	16	1.000	0.250	4	1.000	0.750
2013	35	1.000	0.457	27	1.000	0.333	8	1.000	0.875
2014	41	0.976	0.439	37	0.973	0.405	4	1.000	0.750
2015	54	0.963	0.315	49	0.959	0.265	5	1.000	0.800
2016	54	0.963	0.333	46	0.957	0.304	8	1.000	0.500
2017	32	1.000	0.344	26	1.000	0.269	6	1.000	0.667
2018	29	1.000	0.483	22	1.000	0.455	7	1.000	0.571
2019	27	1.000	0.370	22	1.000	0.227	5	1.000	1.000
Total	**451**	**0.951**	**0.357**	**376**	**0.952**	**0.298**	**75**	**0.947**	**0.653**

TTF and RTF columns indicate share of deals including the respective fee type
Source: SDC Platinum, SEC

A3.2 Information on all variables

Table A3.2: Variables: description and source

Variable *(type)*	Description	Source
Dependent variables		
TTF_I *(I)*	An indicator of whether the deal contains a TTF	SEC
RTF_I *(I)*	An indicator of whether the deal contains an RTF	SEC
Deal premium *(C)*	Authors' calculation of the deal premium, given as percent above market value of the stock $d = 42$ days prior to deal announcement $$Deal\ premium_t = \frac{PPS_{bid,t}}{PPS_{market,t-d}} - 1$$	SDC CRSP
Acquirer characteristics		
Financial *(I)*	An indicator of whether the deal is financial (=1) or strategic (=0) based on the deal rationale	SEC
Toehold *(I)*	An indicator of whether the acquirer owns shares in the target before bid announcement	SDC
Target characteristics		
Equity market value *(C)*	Authors' calculation of the target's market value of equity d = 42 days prior to deal announcement $$Equity_{MV,t-d} = outstanding\_shares_{t-d} \cdot PPS_{t-d}$$	CRSP
D/E ratio *(C)*	Authors' calculation of the D/E ratio at the end of the last fiscal year (y = 1) $$D/E\_ratio_{t-y} = \frac{Debt_{BV,t-y}}{Equity_{BV,t-y}}$$	Compustat
M/B ratio *(C)*	Authors' calculation of the M/B ratio at the end of the last fiscal year (y = 1) $$MB\_ratio_{t-y} = \frac{Debt_{BV,t-y} + Equity_{MV,t-y}}{Assets_{BV,t-y}}$$	CRSP Compustat
Deal characteristics		
Auction *(I)*	An indicator of whether multiple confidentiality agreements were signed (=1) or not (=0)	SEC
Stock pct. *(U)*	The percentage of the deal payment in stock	SEC

Variable type; ***I****: indicator.* ***C****: continuous,* ***U****: unit interval (*$\in [0, 100]$*)*
t: time of deal announcement, d/y: days/years prior to deal announcement
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Variable *(type)*	Description	Source
Same industry deal *(I)*	An indicator of whether the deal parties are in the same industry, based on matching 4-digit SIC codes	SDC
Tender *(I)*	An indicator of whether the deal was (primarily) structured as a tender offer (=1) or as a merger offer (=0)	SEC
Seller initiated *(I)*	An indicator of whether the deal was seller initiated (=1) or buyer initiated (=0)	SEC
Hostile *(I)*	An indicator of deal attitude (hostile or unsolicited deal = 1 neutral or friendly deal = 0)	SDC
Cross-border *(I)*	An indicator of whether the acquirer is a non-U.S. entity	SDC
SVA *(U)*	The percent of shares being contractually obliged to vote in favour of the deal through shareholder voting agreements	SEC
HSR filing *(I)*	An indicator of whether the parties need to make filings with the FTC and the Antitrust Division of the Department of Justice as part of the deal	SEC
TTF=RTF *(I)*	An indicator of whether the deal contains equal-sized TTFs and RTFs	SEC
Market characteristics		
Credit spread *(C)*	The difference between the yield on Baa corporate bonds and the 10 year treasury yield at the day of deal announcement $$Credit\_spread_t = YTM_{Baa,t} - YTM_{USGOV10Y,t}$$	FRED

Variable type; ***I****: indicator.* ***C****: continuous,* ***U****: unit interval (*$\in [0, 100]$*)*
t: time of deal announcement, d/y: days/years prior to deal announcement

A3.3 Extended summary statistics of all variables

Table A3.3: Summary of all variables among financial and strategic acquirers

Type	N	Median	Mean	St. Dev.	Min	Max	Pctl(25)	Pctl(75)
TTF_I								
Strategic	376	1.000	0.952	0.214	0.000	1.000	1.000	1.000
Financial	75	1.000	0.947	0.226	0.000	1.000	1.000	1.000
Total	451	1.000	0.951	0.216	0.000	1.000	1.000	1.000
RTF_I								
Strategic	376	0.000	0.298	0.458	0.000	1.000	0.000	1.000
Financial	75	1.000	0.653	0.479	0.000	1.000	0.000	1.000
Total	451	0.000	0.357	0.480	0.000	1.000	0.000	1.000
Deal premium								
Strategic	376	37.863	50.037	49.262	-39.759	459.951	23.325	64.955
Financial	75	26.437	34.070	43.483	-7.293	269.697	12.135	38.503
Total	451	36.340	47.382	48.668	-39.759	459.951	21.188	60.473
Toehold								
Strategic	376	0.000	0.016	0.125	0.000	1.000	0.000	0.000
Financial	75	0.000	0.093	0.293	0.000	1.000	0.000	0.000
Total	451	0.000	0.029	0.167	0.000	1.000	0.000	0.000
Equity (MV) ($m)								
Strategic	376	661.8	2,530.8	5,809.8	11.355	47,867.9	201.4	2,121.0
Financial	75	423.7	979.6	1,453.4	8.884	6,878.2	140.9	927.5
Total	451	607.0	2,272.9	5,367.5	8.884	47,867.9	200.0	1,974.0
D/E ratio								
Strategic	376	0.603	0.813	8.117	-81.671	72.357	0.264	1.229
Financial	75	0.780	0.427	7.770	-62.885	15.994	0.391	1.424
Total	451	0.636	0.749	8.053	-81.671	72.357	0.308	1.299
M/B ratio								
Strategic	376	2.699	3.324	11.777	-111.967	96.635	1.584	4.738
Financial	75	1.930	3.713	9.757	-27.492	73.958	1.339	3.480
Total	451	2.509	3.389	11.457	-111.967	96.635	1.500	4.558
Auction private								
Strategic	376	1.000	0.646	0.479	0.000	1.000	0.000	1.000
Financial	75	1.000	0.893	0.311	0.000	1.000	1.000	1.000
Total	451	1.000	0.687	0.464	0.000	1.000	0.000	1.000
Stock pct.								
Strategic	376	0.000	0.133	0.300	0.000	1.000	0.000	0.000
Financial	75	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	451	0.000	0.111	0.278	0.000	1.000	0.000	0.000
Same industry								
Strategic	376	1.000	0.646	0.479	0.000	1.000	0.000	1.000
Financial	75	0.000	0.013	0.115	0.000	1.000	0.000	0.000
Total	451	1.000	0.541	0.499	0.000	1.000	0.000	1.000

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Type	N	Median	Mean	St. Dev.	Min	Max	Pctl(25)	Pctl(75)
Tender								
Strategic	376	0.000	0.383	0.487	0.000	1.000	0.000	1.000
Financial	75	0.000	0.187	0.392	0.000	1.000	0.000	0.000
Total	451	0.000	0.350	0.478	0.000	1.000	0.000	1.000
Seller initiated								
Strategic	376	0.000	0.441	0.497	0.000	1.000	0.000	1.000
Financial	75	1.000	0.653	0.479	0.000	1.000	0.000	1.000
Total	451	0.000	0.477	0.500	0.000	1.000	0.000	1.000
Hostile								
Strategic	376	0.000	0.045	0.208	0.000	1.000	0.000	0.000
Financial	75	0.000	0.040	0.197	0.000	1.000	0.000	0.000
Total	451	0.000	0.044	0.206	0.000	1.000	0.000	0.000
Cross-border								
Strategic	376	0.000	0.253	0.435	0.000	1.000	0.000	1.000
Financial	75	0.000	0.080	0.273	0.000	1.000	0.000	0.000
Total	451	0.000	0.224	0.417	0.000	1.000	0.000	0.000
SVA								
Strategic	376	0.010	0.103	0.152	0.000	0.763	0.000	0.182
Financial	75	0.014	0.122	0.169	0.000	0.720	0.000	0.201
Total	451	0.010	0.107	0.155	0.000	0.763	0.000	0.186
HSR filing								
Strategic	376	1.000	0.947	0.225	0.000	1.000	1.000	1.000
Financial	75	1.000	0.813	0.392	0.000	1.000	1.000	1.000
Total	451	1.000	0.925	0.264	0.000	1.000	1.000	1.000
TTF = RTF								
Strategic	376	0.000	0.120	0.325	0.000	1.000	0.000	0.000
Financial	75	0.000	0.107	0.311	0.000	1.000	0.000	0.000
Total	451	0.000	0.118	0.322	0.000	1.000	0.000	0.000
Credit spread								
Strategic	376	0.026	0.026	0.006	0.015	0.059	0.022	0.029
Financial	75	0.025	0.025	0.007	0.016	0.056	0.020	0.028
Total	451	0.026	0.026	0.006	0.015	0.059	0.021	0.029

See Table A3.2 for variable definitions
Note: CRSP and Compustat data refers to last completed fiscal year
Source: Compustat, CRSP, SDC Platinum, SEC, FRED

A3.4 Correlation matrix for all variables

Table A3.4: Correlation matrix for variables

	Deal prem.	TTF_I	RTF_I	Financial	Stock pct.	Hostile	Tender	Equity (MV)	M/B ratio	D/E ratio	Same ind.	Toehold	SVA	Seller init.	Credit spread	Cross-border	HSR filing	Auction	TTF = RTF
Deal prem.	1.00																		
TTF_I	-0.03	1.00																	
RTF_I	-0.17	0.10	1.00																
Financial	-0.12	-0.01	0.28	1.00															
Stock pct.	-0.02	0.07	0.16	-0.18	1.00														
Hostile	0.02	-0.55	-0.05	-0.01	-0.03	1.00													
Tender	0.24	-0.18	-0.37	-0.15	-0.17	0.14	1.00												
Equity(MV)	-0.07	-0.04	0.11	-0.11	0.11	0.05	-0.08	1.00											
M/B ratio	-0.04	0.00	-0.05	0.01	-0.01	0.01	0.06	0.04	1.00										
D/E ratio	-0.15	0.00	0.05	-0.02	0.04	0.03	-0.07	0.02	0.67	1.00									
Same ind.	0.11	0.00	-0.11	-0.47	0.17	0.00	0.13	0.15	0.01	0.01	1.00								
Toehold	-0.06	-0.33	-0.02	0.17	0.01	0.16	-0.02	0.06	0.00	0.01	-0.11	1.00							
SVA	0.11	0.13	0.03	0.05	0.05	-0.12	0.09	-0.14	-0.01	-0.01	-0.08	-0.08	1.00						
Seller init.	-0.01	0.11	-0.02	0.16	-0.06	-0.08	-0.01	-0.17	0.04	0.02	-0.14	-0.06	0.05	1.00					
Credit spread	0.21	-0.07	0.01	-0.02	0.01	-0.01	0.17	0.07	-0.04	-0.06	0.01	-0.01	0.03	-0.06	1.00				
Cross-border	0.07	-0.08	0.01	-0.15	-0.13	0.04	0.03	0.00	-0.06	-0.03	0.13	-0.06	-0.06	-0.08	0.00	1.00			
HSR filing	-0.08	0.13	0.07	-0.19	0.03	-0.02	-0.04	0.11	0.01	-0.01	0.14	-0.15	0.02	-0.08	-0.13	0.03	1.00		
Auction	-0.02	0.07	0.06	0.2	-0.14	-0.11	0.01	-0.12	-0.01	-0.06	-0.07	-0.11	0.06	0.25	0.04	0.03	0.04	1.00	
TTF = RTF	-0.08	-0.52	0.22	-0.02	0.25	0.36	-0.04	0.03	-0.08	-0.02	0.02	0.18	0.00	-0.09	0.05	0.07	-0.10	-0.08	1.00

Source: Compustat, CRSP, SDC Platinum, SEC, FRED

A3.5 Deal initiation

Following the brief discussion in Section 2.3, we include a table showing how financial and strategic deals tend to be more frequently seller and buyer initiated, respectively.

Table A3.5: Deal initiation

Deal nature	Buyer initiated	Seller initiated	Share of deals
Strategic deal	0.559	0.441	0.834
Financial deal	0.347	0.653	0.166

All figures indicate share of deals

P-value of chi-squared test for dependency: 0.00125. This indicates that in our sample, financial deals are seemingly more frequently seller-initiated than strategic deals

Source: SDC Platinum, SEC

A3.6 Tests for HSR filing exemption

As explained in Sections 2.4.4 and 4.2.4.8, we use the *HSR filing* variable as a proxy for antitrust risk (i.e. the risk of a deal not being completed after an initial takeover agreement has been signed because of antitrust concerns). The variable indicates whether the parties claim to have filed, or intend to file, a *pre-merger notification* with the FTC and the Antitrust Division of the DOJ to gain deal approval prior to completing the takeover. We gather information on the variable from SEC filings, as discussed in Section 4.2.4.8. See Section A3.7.3 for examples of categorizations based on SEC filings.

To determine which deals are exempt from making such filings, the FTC (2020a) defines three tests (the Commerce Test, the Size of Transaction Test, and the Size of Persons Test). If *all* three tests are met, the parties must file a pre-merger notification filing and wait until the statutory waiting period (usually 30 days in merger offers) has expired before consummating the deal. The waiting period allows the reviewing agency to analyze information and consider whether any appropriate action needs to be taken before the deal is consummated.

1. **The Commerce Test**

   The test is met if either party is engaged in commerce or in any activity affecting commerce

2. **The Size of Transaction Test - SoT**

   The SoT test is met if;

   (a) if the transaction is in excess of $200m, as adjusted[53]

   (b) if the transaction value is in excess of $50m (as adjusted), but below $200m (as adjusted), the transaction only requires a filing if the size of persons test is met

3. **The Size of Persons Test - SoP**

   The SoP test is met if:

   (a) requirement (a) of the SoT test is met

   (b) either party has sales or assets of as least $100m (as adjusted) and the other party has sales or assets of as least $10m (as adjusted), *and* requirement (b) of

[53] *"As adjusted"* refers to annual GDP-adjusted thresholds, as detailed in Table A3.6

the SoT Test is met

Further, the FTC has a wide array of exemptions to the requirement of filing a premerger notification form. These are in sum too extensive to be included here, but those which particularly relate to our thesis are the following (not exhaustive, please refer to FTC (2008)): i) real assets, ii) mergers of parties in regulated industries whose competitive effects falls outside FTC's jurisdictions, iii) investments into unproductive assets, e.g. real property, offices, residential buildings and hotels.

Table A3.6: Size thresholds per year in the HSR

	SoT threshold		SoP threshold	
Year	Lower	Upper	Lower	Upper
2003	50.000	100.000	10.000	200.000
2004	50.000	100.000	10.000	200.000
2005	53.075	106.150	10.615	212.300
2006	56.700	113.400	11.340	226.800
2007	59.800	119.600	11.960	239.200
2008	63.075	126.150	12.615	252.300
2009	65.200	130.400	13.040	260.800
2010	63.400	126.800	12.680	253.600
2011	66.000	132.000	13.200	264.000
2012	68.200	136.400	13.640	272.800
2013	70.900	141.800	14.180	283.600
2014	75.900	151.800	15.180	303.600
2015	76.300	152.600	15.260	305.200
2016	78.150	156.300	15.630	312.600
2017	80.750	161.500	16.150	323.000
2018	84.400	168.800	16.880	337.600
2019	90.000	180.000	18.000	360.000

All threshold figures are measured in $m
Source: FTC

A3.7 SEC data retrieval

Table A3.7: Difference in SEC and SDC variables

Variable	Deals where variable > 0			Misclassified	
	SEC	SDC	Difference	Number of deals	Share
Financial	100	75	25	27	5.987%***
TTF_I	429	374	55	65	14.412%***
RTF_I	161	130	31	47	10.421%***
Tender	158	143	15	29	6.430%***
Stock pct.	373	368	5	69[a]	15.299%

a) Note that 33 additional deals have an incorrect stock share reported in SDC. This difference is significant at the 1% level when tested with a t-test

For the variables *Seller initiated, SVA, Auction and HSR filing*, there is no comparable variable available in SDC or any other data source

Test for diff. in means: t-test (controlling for diff. in variances with F-tests for variances)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: SDC Platinum, SEC

In the following, we present some examples of how we have interpreted a variety of wordings from SEC filings. The rationale is to give the reader an understanding of how we have gone about in the indisputably subjective task of interpreting these filings.

A3.7.1 Example variable 1: Financial acquirer

Exhibit 1 Ann. date: 2014-02-20 CIK: 1001604 Target: Emeritus Corporation

Excerpt from DEFM14A: Each of Brookdale and Emeritus believes that the Merger will enhance shareholder value through, among other things, enabling Brookdale and Emeritus to capitalize on the following strategic advantages and opportunities: Produces Positive Accretion and Enhances Opportunities to Increase Operating Efficiency; Synergies. The Merger is expected to produce an increase to CFFO in excess of 0.40 per share in the third year of combined operations. The parties expect to achieve significant synergies resulting from the greater scale of the combined companies, which is expected to result in an increase in cash flow of up to 55 million annually. The Merger is expected to produce ongoing opportunities to achieve economies of scale for purchases of items such as insurance, food and benefits and to reduce other general and administrative expenses.

Conclusion: the acquirer has strategic motives.

Exhibit 2 Ann. date: 2006-05-22 CIK: 914373 Target: Jameson Inns

Excerpt from DEFM14A: Argila, LLC is an affiliate of JER. JER is the investment arm of the J.E. Robert Companies, which over the last 25 years has developed a reputation as one of the premier real estate investment and asset management firms. Since launching its real estate investment program 15 years ago, JER, together with its financial partners, has acquired over 14,000 assets with a gross investment in excess of 14 billion. JER has built a global presence, with offices in the United States and Europe, and has completed investments in ten countries worldwide.

Conclusion: the acquirer has financial motives.

A3.7.2 Example variable 2: Seller initiation

Exhibit 3 Ann. date: 2019-07-26 CIK: 1385292 Target: Monotype Imaging

Excerpts from DEFM14A: **[1]** [...] the Board also reviewed the strategic alternatives that may be available to the Company, including the potential risks and benefits of separating one or more of these businesses or a possible merger or sale of the Company, with a view towards maximizing value for the Company's stockholders. **[2]** In August 2017, the Board discussed with representatives of J.P. Morgan Securities LLC (referred to as "J.P. Morgan") the Company, its future prospects and the possibility of J.P. Morgan acting as its financial advisor in evaluating strategic alternatives that might be available to the Company in light of the risks and challenges facing the Company described above. **[3]** From May 2018 through March 2019, in accordance with the directives of the Board, representatives of J.P. Morgan had discussions with or responded to unsolicited interest from eight additional parties, consisting of three strategic parties and five financial sponsors, regarding interest in an acquisition of the Company or part of its business.

Conclusion: the deal was initiated by the target (i.e. the seller)

Exhibit 4 Ann. date: 2016-04-28 CIK: 1011835 Target: Medivation Inc

Excerpts from SC 14D9: **[1]** On March 22, 2016, Olivier Brandicourt, Chief Executive Officer of Sanofi, contacted David Hung, M.D., President and Chief Executive Officer of Medivation, on an unsolicited basis, and requested a telephone discussion. **[2]** On March 25, 2016, Drs. Brandicourt and Hung had an initial telephone discussion during which Dr. Brandicourt expressed interest in pursuing a possible strategic transaction. Dr. Brandicourt did not indicate a potential price or range of prices for any such transaction.

Dr. Hung told Dr. Brandicourt that he would report Sanofi's interest to the Medivation board of directors. **[3]** On April 15, 2016, Dr. Hung received an unsolicited letter, dated April 13, 2016, from Dr. Brandicourt, setting forth a non-binding proposal from Sanofi to acquire Medivation for $52.50 per share of Medivation's Common Stock, subject to the completion of due diligence, the negotiation and execution of definitive agreements, and the approval of Sanofi's board of directors.

Conclusion: the deal was initiated by the acquirer

A3.7.3 Example variable 3: HSR filing

Exhibit 5 Ann. date: 2009-12-28 CIK: 1028584 Target: Amicas Inc

Excerpts from DEFM14A: **[1]** Under the Hart-Scott-Rodino Antitrust Improvements Act of 1976, as amended (the "HSR Act"), and the rules promulgated thereunder by the Federal Trade Commission ("FTC"), the Merger may not be completed until notification and report forms have been filed with the FTC and the Antitrust Division of the Department of Justice ("DOJ"), and the applicable waiting period has expired or been terminated. **[2]** AMICAS and Newco filed notification and report forms under the HSR Act with the FTC and the Antitrust Division of the DOJ on January 7, 2010

Conclusion: the parties are not exempt from any notifications or reporting to the FTC

Exhibit 6 Ann. date: 2003-10-14 CIK: 108079 Target: Wolohan Lumber Co

Excerpt from DEFM14A:The Merger will not require a filing or approval under the Hart-Scott-Rodino Antitrust Improvements Act of 1976, as amended.

Conclusion: the parties are exempt from any notifications or reporting to the FTC

A4 Methodology

A4.1 Assumptions of linear models

We employ models estimated by both probit and OLS/2SLS to analyze our hypotheses. OLS/2SLS is linear by nature. Probit models are inherently linear, before being bounded between 0 and 1 by a link function (the cumulative normal distribution). However, both OLS/2SLS and the underlying function in the probit model rely on the same underlying assumptions to determine whether the coefficients are unbiased and consistent.

The assumptions are presented below. Under assumptions 1 through 4, an estimator is unbiased and consistent. Such estimators yield reliable point estimates. However, unless they are also efficient, the estimator's standard errors are biased and cannot be employed for statistical inference. For cross-sectional data, Wooldridge (2012) outlines on additional assumption − homoscedastic residuals − for the estimators to be BLUE[54]. Under assumptions 1 through 5, the estimator is BLUE and allows for valid statistical inference on the dependent variable (Wooldridge, 2012).

1. **Linearity in parameters**. We are able to describe the relationship between the dependent variable and the independent variables linearly.

2. **Random sampling**. The sample is randomly drawn from the population. A non-random sample entails biased estimators as the sample is no longer representative of the population it is drawn from, violating statistical inference.

3. **No perfect collinearity** between independent variables:

$$x_i \neq c \ \forall \ i \tag{A.1}$$

$$corr[x_i, x_j] \neq \pm 1 \ \forall \ i \neq j \tag{A.2}$$

4. **Zero conditional mean (ZCM)**. The expected value of the residuals are equal to zero, implying no endogenous regressors. Invalidation of the ZCM assumption is indicative of omitted variable bias, a key concern in our regressions. The ZCM

[54]BLUE refers to the model being both unbiased, consistent and efficient ("best"). Consequently, a BLUE estimator is the **b**est **l**inear **u**nbiased **e**stimator of the relationship between y and X (Wooldridge, 2012)

assumption is formalized as follows:

$$E[\epsilon|x_i] = 0 \ \forall \ i \tag{A.3}$$

5. **Homoscedastic residuals**. The residuals should be homoscedastic, implying that they exhibit a constant variance.

$$Var[\epsilon|x_i] = \sigma_\epsilon^2 \ \forall \ i \tag{A.4}$$

That is, the variance of the residuals are constant throughout the sample. Wooldridge (2012) argues that this is satisfied in probit models when the models are estimated by maximum likelihood. Further, with respect to our OLS/2SLS models, the presence of heteroscedasticity can be formally tested through the Breusch-Pagan test (Wooldridge, 2012). In such cases, we remedy the presence of heteroscedastic residuals by employing heteroscedasticity-robust standard errors, as suggested by Long and Ervin (2000).

A4.2 The probit regression model

A4.2.1 Probit model setup

$$P[y = 1|X] = G(\beta_0 + \sum_{i=1}^{k} \beta_i \cdot x_i) + \epsilon \tag{A.5}$$

where

$$G(z) = \Phi(z) \equiv \int_{-\infty}^{z} \phi(v)dv \tag{A.6}$$

$$\phi(v) = (2\pi)^{-1/2} \cdot e^{-\frac{1}{2}z^2} \tag{A.7}$$

A4.3 The OLS/2SLS models

A4.3.1 The OLS model setup

$$y_1 = \beta_0 + \sum_{i=1}^{k} \beta_i \cdot x_i + \epsilon_1 \tag{A.8}$$

A4.3.2 The 2SLS model setup

$$y_1 = \beta_0 + \gamma_1 \cdot y_2 + \sum_{i=1}^{k} \beta_i \cdot z_i + \epsilon_1 \tag{A.9}$$

where y_2 is endogenous, implying that $corr[y_2, \epsilon_1] \neq 0$. Thus, we create an IV, $\hat{y}_2$ for y_2:

$$\hat{y_2} = P[y_2 = 1|Z] = G(\theta_0 + \sum_{j=1}^{l} \theta_j \cdot z_j) + \epsilon_2 \tag{A.10}$$

A4.3.3 Assumptions of IVs in the 2SLS model

In addition to the assumptions put forward on linear models in the previous subsection, we further require the *relevance condition* and *exogeneity condition* to hold for the IVs in models estimated by 2SLS (Wooldridge, 2012).

1. **Relevance**. The *(assumed)* exogenous regressors in Eq. A.10 are significantly correlated with y_2, formally $\theta_j \neq 0 \ \forall \ j$. Additionally, as a sub-condition, the instrument cannot be correlated with y_1 directly, only indirectly through its correlation with y_2 (known as an exclusion restriction)

2. **Exogeneity**. The regressors in Eq. A.10 are truly uncorrelated with the error term; $corr[z_j, \epsilon_2] = 0$. A well-specified instrument (i.e. when the number of IVs are equal to the number of endogenous regressions) cannot be formally tested for endogeneity. Therefore, Wooldridge (2012) advises the researcher to exhibit caution and use common sense when estimating an IV