

The Intangibles Song in Takeover Announcements: Good Tempo, Hollow Tune

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Abstract

Mergers and acquisitions are often motivated by the intention of creating value from intangible assets. We develop a novel word list of intangibles and apply it to takeover announcements. The value of these deals to the acquirer, as shown by abnormal announcement returns, is questionable: One standard deviation more in intangibles talk lowers returns by 0.50 percentage points. Agency problems explain little of these results. Rather, the crosssection of announcement returns, payment mode choices, and insider trades suggest that intangibles talk reflects managerial overoptimism. In sum, takeover announcements reveal important information regarding the quality of deals.

Keywords: Corporate announcements, intangible assets, intangibles talk, mergers and acquisitions, takeovers, textual analysis

JEL Classifications: G14, G34, G41

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Abstract

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1 Introduction

On July 20, 2011, Minnesota-based Ecolab Inc., a producer of cleaning and sanitizing products, announced it was acquiring Nalco Holding Co., a maker of chemicals used in industrial water treatment, energy and air applications. The transaction was valued at \$8.1 billion, including the assumption of \$2.7 billion in Nalco net debt. In the acquisition announcement, Ecolab's management identified *innovation, processes, customers, markets, technology know-how, team and corporate culture* as the key assets relevant for the deal. Ecolab's CEO is cited as stressing the importance of Nalco's *expertise, services, efficiency, and market*.¹ The business press picked up this storyline.² In short, Ecolab tried hard to convince investors that Nalco offered a richness in intangible assets. However, investors were not convinced. Ecolab's stock price fell sharply on the announcement day, closing 7.4% below the previous day's closing price. This is substantially larger than the median bidder price reaction to acquisitions of public chemicals companies over the 2002 to 2019 period, which was -1.4%. Ecolab's share price recovered mildly the following day, but then drifted down further. It ended the 10-day post-announcement period 10.6% below the pre-announcement day. Despite the negative market reaction, the deal went forward and Ecolab acquired Nalco.

This paper assesses whether this pattern – even if extreme – is typical. Does a strong use of “intangibles talk” in a takeover announcement usually go hand-in-hand with a negative (abnormal) investor reaction to the announcement? We find that the answer is yes. Further tests reveal that this relation is likely due to managerial overconfidence about deal quality. Agency issues (such as private benefits of managing a larger company) seem to play a far less pronounced role. Overall, our paper provides new evidence of the role of corporate communication and managerial motives in corporate transactions.

Our study is motivated by the great importance of takeovers and the rising relevance of intangible assets. Takeovers are major corporate actions; they substantially impact the future of

¹Douglas M. Baker, Jr., Ecolab's Chief Executive Officer commented on the target, saying “*Nalco is the global leader with deep expertise in programs and services to enhance water process efficiency, extend asset life, and improve their customers' end products. Nalco's water and oil and gas services end markets in particular represent excellent long term growth potential as the world deals with the quality, cost and availability of those key natural resources. Further, its geographic exposure to high-growth emerging markets offers terrific future potential for the combined companies.*” – https://www.sec.gov/Archives/edgar/data/31462/000104746911006458/a2204877zex-99_1.htm

²“*We've long admired Nalco's capabilities, know-how and management team for years,*” said Ecolab Chief Executive Doug Baker in an interview. – The Wall Street Journal, July 20, 2011.

the acquiring company. Takeover announcements attract keen attention of investors and often significantly move the stock price. Abnormal stock returns around the announcement date are sizable. They range from rather negative to highly positive returns depending predictably on target and deal characteristics (see [Moeller et al., 2004, 2007](#); [Bargeron et al., 2008](#); [Betton et al., 2008](#); [Savor and Lu, 2009](#); [Officer et al., 2009](#); [Schneider and Spalt, 2021](#)). While positive market reactions cause no controversy, negative returns have triggered a wide debate. Two major explanations have evolved. The first explanation relies on the agency theory of [Jensen and Meckling \(1976\)](#) and attributes negative returns to distorted managerial objectives (see [Jensen, 1986](#); [Morck et al., 1990](#); [Grinstein and Hribar, 2004](#)), such as “empire building” and other private agency benefits. The second explanation draws on managers’ behavioral biases, in particular overoptimism and overconfidence (see [Roll, 1986](#); [Malmendier and Tate, 2008](#); [Ferris et al., 2013](#)). Given the overall importance of takeovers and their impact on stock prices, it is crucial to understand whether takeover announcement content delivers valuable information to investors and whether it indicates the causal factors underlying the deal.

A successful acquisition requires a plausible valuation of the deal – but such valuations are arguably particularly challenging in the presence of intangible assets. Intriguingly, [Lev \(2012\)](#) documents a 50% decline of the ability of accounting data to explain share price differences across companies over 1975-2006. Casual observation also suggests that acquirers often refer to intangible assets in takeover announcements. This paper analyzes what market participants can and do infer from this intangibles talk. Are frequent references to intangibles just inconsequential managerial guff? Or do such references actually reveal something about the deal over and above other observables?

To conduct a systematic analysis, we begin by tallying the extent of intangibles talk in takeover announcements. To do this, we develop a word list to assess this quantity. Drawing on the strategy and business literature ([Hall, 1992](#); [Lev, 2005, 2012](#)), we compile a dictionary of 213 words that indicate intangible assets. (We also conduct robustness checks with alternative lists.) For example, each of the words highlighted in Ecolab’s takeover announcement above is on that list. “Intangibles talk” then is the frequency of words associated with intangible assets.

Between 2002 and 2019, the median (average) U.S. takeover announcement contains about 2.3% (2.4%) words that are closely related to intangible assets. Important for this study, there is substantial variation in that frequency across announcements. That variability enables

this analysis. Ecolab's announcement has 2.3%, what is considerably larger than the median of 1.4% for acquisitions of public targets that operate in the chemicals industry.

If intangibles talk merely reflected intangible capital of the bidder or the target, it would correlate perfectly with these measures. We do find that intangibles talk bears some relationship to the size of the bidder's intangible capital (measured in different ways), but this relation vanishes once one controls for industry fixed effects. The target's intangible capital (available in the subsample of publicly listed targets) is also uncorrelated with intangibles talk. The main determinants of intangibles talk are the target industry, relative size of bidder and target, and public/private status. Managerial skill and background are not systematically related to intangibles talk.

One possible reason for a degree of disconnect between intangibles talk and intangible assets is that managers refer more frequently to intangibles when they are disclosing advantageous private information regarding the intangible value the deal offers, rather than merely repeating what is readily visible. We would thus expect a positive relation between intangibles talk and market reactions. The data reject this idea. On average, the market reacts negatively to intangibles talk in the takeover announcements. Greater use of intangibles talk by one standard deviation results in 0.50 percentage points lower abnormal announcement returns.

There is no noticeable reversal of this response to intangibles talk. Indeed, the loss of returns is reinforced. After 30 days, that one standard deviation in intangibles talk results in 0.95 percentage points lower returns. Intangibles talk also (weakly) predicts a decrease in the operating performance measured by a change in return on assets over the next year. After greater intangibles talk, bidders record more goodwill on their balance sheets. Additionally, analysts decrease bidder stock recommendations following takeover announcements rich in intangibles talk. In short, by all measures we identified, greater intangibles talk was a negative. All these findings are robust to controlling for many other variables, such as the general disclosure quality of a company and the extent to which management typically uses intangibles talk on earnings conference calls, and to several other checks.

Given these results, we seek to explain why intangibles talk relates negatively to deal quality. First, it is possible that intangibles talk is a correlate of an agency problem. Thus, managers may use intangibles talk to project an excessively favorable image of the deal. Under

this explanation, we would expect the market reaction to intangibles talk to be particularly negative for acquiring firms with weak governance. We use six different standard proxies for corporate governance in search for evidence in favor of this prediction. None moderates the impact of intangibles talk.

By contrast, we do find evidence that intangibles talk is linked to overconfidence.³ Specifically, first, the reaction to intangibles talk is particularly negative when the announcement is complemented with optimistic language, and/or when bidder management teams typically use positive language to describe corporate news. Second, at least the medium-term reaction is more negative for CEOs recognizable as overoptimistic from their option holdings and/or their forecast behavior.

Third, acquirer insiders (CEOs, executives, and board members) are more likely to purchase stock when the takeover announcement features more intangibles talk. Acquiring managers appear to believe what they say when they spout on about intangibles, contrary to what one would expect under the agency hypothesis. Fourth, we draw on the insight of [Officer et al. \(2009\)](#) that rational, risk-aware acquirers should be more likely to use stock as the method of payment for hard-to-value targets. The reason is that buying such a company with cash puts all the risk on the bidder: If it turns out to be a bad deal, the bidders suffer, whereas the target shareholders received the cash. Indeed, we confirm that intangibles-heavy targets tend to be bought with stock. Agency-driven bidder managers would also arguably prefer stock as the payment mode so that they can retain a high cash balance with which they can consume perks. Empirically, intangibles-heavy targets tend to be bought with stock. However, deals described with lots of intangibles *talk* are more likely to be cash-paid deals than stock-swap deals. Overall, we interpret these combined pieces of evidence as showing that the acquirer managers' overoptimism shows in their choice of language.

Self-interested behavior by managers as agents and overoptimism are the two main hypotheses we test, although other explanations are evaluated. One possibility is that intangibles talk indicates that the deal is complex and/or entails high uncertainty. Either factor would result in lower announcement returns. However, if these factors were the central drivers, deals

³We use the terms overconfidence and overoptimism interchangeably. [Malmendier and Tate \(2005b\)](#) point out that “confidence” tends to focus on a bias in self-assessment, whereas “optimism” refers to a bias in beliefs about exogenous events.

where bidders talk more about intangible assets would be slower (because they would require more due diligence) and less likely to complete. We find the opposite: The time between the announcement and the effective date of the acquisition is shorter for deals announced with more intangibles talk, and these deals are more likely to complete. Moreover, indicators of a deal's complexity, such as whether it is a cross-border or cross-industry deal, do not affect the market's reaction to intangibles talk.

Overall, our results suggest that investors should be (and indeed are) careful when assessing an acquirer's proclamations of the intangible assets involved in a transaction. This is less so because of nefarious motives of self-interested managers who handwave as a means to push through value-destroying deals; rather, managers themselves often seem to believe in the value of deals they describe with intangibles talk.

The literature is paying burgeoning attention to the importance of qualitative aspects of corporate communication and media content. Existing studies of takeovers have mostly considered whether textual analysis of media coverage helps predict how likely a deal is to succeed. [Liu and McConnell \(2013\)](#) find that the probability of abandoning a deal after a negative stock price reaction at the announcement is related to the level and the tone of media attention it receives. [Buehlmaier and Zechner \(2017\)](#) find that media information released on the announcement day contains information not captured by announcement day stock returns. [Ahern and Sosyura \(2014\)](#) find that bidders manage media coverage during the private negotiation phase in stock acquisitions, and thereby produce a temporary increase in the acquirer's stock price. Merger announcements themselves have received little attention. [Kimbrough and Louis \(2011\)](#) study merger-related disclosure in conference calls and merger announcements. They show that managers use conference calls to signal information to the market. They do not study intangibles. [Dasgupta et al. \(2020\)](#) and [Hu et al. \(2021\)](#) also focus on conference calls and examine a broad range of topics covered in these calls, without explicitly considering intangibles. After completing the draft of this paper, we became aware of a study by [Filip et al. \(2017\)](#), who also analyze the description of intangibles in merger press releases, albeit in a much smaller sample. They also find that disclosures about intangible resources get a negative reception. We provide a more detailed analysis distinguishing various explanations for this reaction.

The paper also relates to the literature on managerial backgrounds and behavioral biases in the context of takeovers, focusing in particular on the roles of overoptimism and overconfi-

dence. In his seminal work, [Roll \(1986\)](#) offers an explanation of negative takeover announcement returns in the form of managerial overconfidence, the “hubris hypothesis.” [Malmendier and Tate \(2008\)](#) find that CEOs classified as overconfident are more likely to undertake an acquisition. Moreover, they document that overconfident CEOs overpay for target companies and undertake value-destroying mergers. [Ferris et al. \(2013\)](#) study international M&As and find that overconfident CEOs make more merger offers and prefer cash for acquiring targets. [Custódio and Metzger \(2013\)](#) show that when the acquirer’s CEO has experience in the target industry, the acquirer’s abnormal announcement returns are higher. [Aktas et al. \(2016\)](#) study acquirer and target CEO narcissism. We add to this literature by providing further evidence that over-optimistic CEOs may engage in value-destroying acquisitions, and that this may be revealed in the wording of the announcement.

There is growing research emphasizing the importance of intangible assets, as does this analysis, in corporate value in general and in corporate takeovers specifically. On the general level, the perception of firm value has evolved over time from a mostly real asset driven to intangible based valuation. This is analyzed in particular in the comprehensive work by [Lev \(2000\)](#), [Lev \(2005\)](#), and [Lev \(2012\)](#). Lev attributes the rising importance of intangibles to two major factors: the sharp growth in business competition and the commoditization of physical assets. On the more specific level of takeovers and R&D, [Phillips and Zhdanov \(2013\)](#) show that an active acquisition market affects firm incentives to innovate and conduct R&D. [Bena and Li \(2014\)](#) find that patent portfolios and R&D expenses determine whether a firm will be an acquirer or a target. They conclude that synergies obtained from combining innovation capabilities are important drivers of acquisitions. Intangible assets are in general difficult for outsiders to identify and value, so that they are associated with greater information asymmetries ([Hall et al., 2014](#); [Cohen et al., 2013](#); [Ewens et al., 2020](#)). [Chen et al. \(2020\)](#) show that a firm’s propensity to acquire another firm increases after a competitor wins an innovation award. [Denes et al. \(2018\)](#) establish the existence of patent expiration waves and show that these in turn trigger merger waves. Exploiting trademark data, [Hsu et al. \(2018\)](#) find that acquisitions provide opportunities for acquirers to optimize their product portfolio. More broadly on the topic of intangibles, [Lys and Yehuda \(2015\)](#) find that private takeover targets have significantly more intangible assets than do public targets. [John et al. \(2015\)](#) and [Tate and Yang \(2016\)](#) study the role of labor mobility in acquisitions, and [Ouimet and Zarutskie \(2016\)](#) use the appearance of references to skilled workers in 10-K statements. Their work shows that some firms pursue

mergers with an objective of securing employees from the target firm. [Li et al. \(2018b\)](#) measure organization capital by capitalized selling, general, and administrative (SG&A) expenses and show that it predicts superior deal performance. [Frésard et al. \(2017\)](#) show that localized intangibles explain acquisitions of foreign targets. We contribute to this literature by examining bidder communication regarding intangibles in the deal, and the market reaction to such communication.

Finally, this paper engages and bolsters the literature that uses textual analysis to provide insight on otherwise difficult to capture issues. For example, some work has established textual measures of financial constraints ([Buehlmaier and Whited, 2018](#); [Bodnaruk et al., 2015](#); [Hoberg and Maksimovic, 2015](#)). Others have used 10-Ks to investigate product market competition ([Hoberg and Phillips, 2010](#)). Moreover, a vast literature, surveyed in [Loughran and McDonald \(2016\)](#), has considered linguistic tone (which we control for). Our analysis shows that textual analysis provides a new view on intangibles.

The paper proceeds as follows. [Section 2](#) presents our methods. It details our sample selection and data and then discusses the textual analysis methodology and introduces the intangibles words dictionary. [Section 3](#) studies what explains intangibles talk. [Section 4](#) lays out four hypotheses that relate intangibles talk and deal quality. It then presents empirical results for how intangibles talk predicts market reactions and post-merger performance. [Section 5](#) develops and implements tests to understand which factors may contribute to the observed outcomes. A battery of robustness checks are the subject of [Section 6](#). [Section 7](#) concludes.

2 Data

2.1 Deals and takeover announcements

Our data set is composed of corporate takeover deals from 2002 to 2019, collected from SDC and matched to CRSP and COMPUSTAT data. We begin by downloading all announced acquisitions where the bidder is a public company domiciled in the United States, whether the

target is a public or private company.⁴ Following [Moeller et al. \(2004\)](#), we collect transactions with at least \$1 million deal value and 1% relative size (deal value to bidder market capitalization ratio).⁵ We exclude deals that are labeled as recapitalizations, repurchases, self-tenders, or exchange offers, as in [Bargeron et al. \(2008\)](#). We require that the bidder owns at least 80% of the target after the purchase in case of completed deals, and not more than 15% before the announcement ([Schneider and Spalt, 2021](#)). Following standard practice in the literature, we exclude from the sample bidders that operate in regulated utilities (SIC code 4900-4999) or in the financial industry (SIC code 6000-6999) and bidders with negative book equity. We further require each bidder to match on the CRSP and COMPUSTAT databases. We require that annual financial data for the calculation of the control variables (see below) are available in COMPUSTAT for each bidder, and that the [Peters and Taylor \(2017\)](#) data on intangible capital (see below) are available on WRDS. We extract data for the most recent annual report that is filed not more than a year before the announcement.

The corresponding takeover announcements, filed as 8-K forms, are then downloaded from the EDGAR platform, the Electronic Data Gathering, Analysis, and Retrieval system, which performs automated collection and distribution of data and public filings by companies required by law to file forms with the SEC. Public companies must file an 8-K form with the SEC within four business days to announce material events that shareholders should know about. Form 8-K is a “current report.” It is not filed in the regular time intervals, but is triggered by a significant event like a CEO departure or an M&A. Only 8-Ks filed no later than 4 business days after the announcement date of the deal are used in the analysis.⁶ [Table SA.1](#) summarizes the sample construction. The final takeover sample consists of 3,698 deals.

Several databases provide additional data needed for testing our hypotheses. The number of analysts covering a company and analyst stock buy-sell recommendations are from I/B/E/S (Recommendations - Summary Statistics section). Insider trading data are from Thom-

⁴Bidders labeled as government, investor, joint venture, mutually owned, subsidiary, private, or have unknown public status are excluded from the sample. The same restrictions apply to targets except for private status.

⁵In light of overall increasing market capitalizations and inflation, a minimum deal value of \$2 million may be more appropriate for our sample period. The results are overall stronger with this deal size requirement.

⁶The download and announcement identification procedure is described in Supplementary Appendix [Section D.1](#). EDGAR and SDC do not have a linking identifier. SDC, however, provides 6-digit CUSIPs that can be used to link SDC to CRSP to obtain PERMNOs, which in turn provide a link to COMPUSTAT that gives us CIK codes. These CIK codes can be used to download 8-K filings that contain announcements from EDGAR. There are 95 deals with a missing CIK in the sample. We find the missing identifiers in EDGAR using the bidder name reported by SDC.

son Reuters Insider Filings. Managerial incentives are computed as in [Core and Guay \(2002\)](#) and [Coles et al. \(2006\)](#), following code kindly provided by Lalitha Naveen on her website. Institutional investor (13F) stock holdings are downloaded from Thomson Reuters. Data items that are used to construct disclosure quality (as in [Chen et al., 2015](#)) and operating cash flows (following [Lang et al., 1991](#); [Li et al., 2018a](#)) are from Compustat. The measure of anti-takeover defenses (following [Gompers et al., 2003](#); [Peters and Wagner, 2014](#)) is constructed using data from RiskMetrics. Executive compensation data, used to calculate the longholer measure (as in [Malmendier and Tate, 2008](#); [Otto, 2014](#)), are from Execucomp. We extend the high forecaster measure ([Otto, 2014](#)) kindly provided by Clemens Otto. Managerial ability data, as in [Demerjian et al. \(2012\)](#), is drawn from Peter Demerjian’s website. Earnings call transcripts are from Refinitiv Company Events Coverage (formerly Thomson Reuters Street Events).

2.2 Textual analysis of takeover announcements

2.2.1 8-K parsing

We analyze announcements following a common practice in the textual analysis literature, a “bag of words” approach. This approach is based on parsing announcement files into vectors of words and word counts. We exclude footers (the material starting with the forward-looking disclaimer) as they commonly contain template language that is not useful in measuring text variables of interest. We split words by space and delete all leading and trailing non-alphabetical characters using regular expressions. This procedure automatically removes numbers. Finally, the parsed text is matched to dictionaries to obtain word frequencies.

2.2.2 Intangibles talk dictionary

Our focus is to evaluate the effect of what bidder executives disclose about intangible assets in takeover announcements. We opt for a simple and replicable approach in this analysis, a word counting approach, using a list of relevant words. The extant literature on textual analysis in finance stresses the importance of using word lists that reflect financial jargon ([Loughran and McDonald, 2016](#)). To our knowledge, there is no such a list for intangibles talk measurement.

To develop our word list, we draw on a number of studies on the role of intangible assets and firm capabilities (Hall, 1992; Lev, 2005, 2012). These papers do not offer well-defined sets of intangibles words, but they are all rich in describing and listing various types of these assets. Hall (1992) lists *Trade-marks, Patents, Copyright, Registered designs, Contracts, Trade secrets, Reputation, Networks, Know-how, and Culture* as general intangible categories, with several examples within each category. The author explains that the analysis of intangible assets should play a major role in the strategic management process and highlights the link between competitive advantage, capability differentials and intangible resources. Lev (2005) splits intangibles assets in four general categories (*Products/Services, Customer Relations, Human Resources, and Organizational Capital*) and presents examples within each category pointing out growing importance of intangibles assets. Lev (2012) emphasizes voluntary disclosure about intangibles to address the shrinking relevance of accounting information.

In compiling the word list, we start with the categories that are identified in the above-cited papers as well as all intangible assets listed as examples and keywords regularly used within each category. Following Loughran and McDonald (2011), we add the plural form of nouns, and the simple past tense, the past participle, gerund and the third person present tense for verbs.⁷ For example, once we include word *patent*, we add *patents, patented and patenting* as well. Furthermore, we add words that are either synonyms or have a very similar meaning in the financial jargon as the words from the studies. For instance, in addition to the word *networks*, we include *alliances, relations, relationships, and connections*. The final list contains 213 words and phrases in total; see Table 1. For the purpose of robustness analysis, we construct alternative (extended or shortened) lists below.

We did not reverse engineer or “optimize” the word list. Indeed, we will see below that our word list gives plausible results in a cross-industry comparison, but there are also some weaknesses. Future work may profitably adjust the list. We also recognize that more sophisticated methods, such as artificial intelligence, are likely to do a superior job at capturing intangibles talk.

Loughran and McDonald (2016) suggest to check word frequency when constructing a dictionary since words tend to follow a power law distribution – a distribution that features

⁷Adverbs and adjectives are not included. However, we find qualitatively similar results if we include them in the word list.

a small number of high-frequency words and a large number of low-frequency words. This phenomenon is known as Zipf’s law and it raises concerns that certain words can potentially have a large impact on the results. The word frequencies in [Figure 1](#) seem to be intuitive and show no signs of any obvious misclassifications. The 3 most frequent intangibles words (1% of words from our list), *services*, *solutions*, and *customers*, account for 17% of the intangibles word count across all acquisition announcements in the sample (21% when also counting their singular forms). This is significantly smaller than the 44% that [Loughran and McDonald \(2016\)](#) find for the top 1% of negative words in the sample of 10-K/Q filings.

[[Table 1](#) AND [Figure 1](#) ABOUT HERE]

We use the standard approach of proportional weighting, that is word list counts divided by the total number of words in the analyzed text. Accordingly, we define *% Intangibles talk* as the number of intangibles words divided by the total number of words in announcement i , expressed as a percentage:

$$\%Intangibles\ talk_i = \frac{Intangibles\ words_i}{Total\ words_i} \cdot 100. \quad (1)$$

2.2.3 Other textual variables

We expect announcements to be fairly positive and definitive overall, but there may still be informative variation across announcements. Negative words may be interpreted as reflecting a degree of cautiousness. Employing the [Loughran and McDonald \(2016\)](#) word list, we compute positive and negative word frequencies to measure the linguistic tone of the announcement, *% Positive* and *% Negative*. We define (net) *Negativity* of announcement i as:

$$Negativity_i = \frac{Negative\ words_i - Positive\ words_i}{Negative\ words_i + Positive\ words_i + 1}. \quad (2)$$

% Uncertainty and *% Strong modal* variables are the percentages of uncertain and strong modal words. We also control for *Text length*, the (natural logarithm of the) number of words in the announcement. In the robustness checks, we also use other textual variables, such as average sentence length.

2.3 Main deal and firm variables

Table 2 defines all main variables. Our main dependent variables are the announcement return and the medium-term return; the change in operating performance of the combined entity one to three years after the transaction; analyst responses; insider trades; payment mode; an indicator for whether the acquisition was completed; and the days to completion. These variables are standard (but we describe them in greater detail below as we go through the analysis).

[Table 2 ABOUT HERE]

Our controls for bidder, target and deal characteristics are also standard. The set of bidder control variables include market-to-book ratio, market capitalization and return on assets (ROA). The main target control variables are its public status, deal relative size, defined as deal size as a fraction of bidder market capitalization, and intangible assets. As deal characteristics we use payment method, tender offer, cross-industry, multiple bidder, cross-border, and friendly deal dummies. Cross-industry deals involve targets with a two-digit SIC code other than that of the bidder. When we analyze deal completion probability, we include two additional dummy variables, indicating the existence of target termination fees and acquirer termination fees. Additionally, we include year and industry fixed effects in all regression specifications to control for common time trends and unobservable industry heterogeneity. All continuous control variables (ROA, market-to-book ratio, market capitalization, relative size, deal size, intangible assets and their relative size) are winsorized at the 1st and 99th percentiles.

We will begin the analysis by testing whether bidder management talks more about intangibles when the bidder or the target has more intangible assets. Measuring those assets directly is challenging, and we use three proxies (all of which are only available for public companies). For each of them, we use the ratio of intangible assets to the book value of total assets (IA/AT), what we refer to as *intangible asset intensity*. Very similar qualitative inferences hold also when using the log value of intangible assets.

Our primary measure of intangible assets ($Intan. assets_{PT}$) is the estimated replacement cost of the target's intangible capital (Peters and Taylor, 2017). These authors recognize that the major part of intangibles arise from expensed activities, for example, a firm's spending to

develop knowledge, patents, and software, advertising to build brand capital or employee training to build human capital. They, therefore, define intangible assets as the sum of the firm's externally purchased and internally created intangible capital. Externally purchased intangible capital is measured as the book value of intangible assets. Internally created intangible capital is computed as the sum of the replacement cost of the firm's knowledge capital, which is the portion of intangible capital that comes from research and development (R&D), and the replacement cost of the firm's organization capital, the portion of intangible capital that comes from selling, general, and administrative (SG&A) expenses.⁸ The Peters and Taylor (2017) measure is available in WRDS through 2017 and the authors have kindly made updated data available to us.

Second, another widely used measure is the book value of intangible assets (*Intan. assets_{bv}*), which is available in COMPUSTAT. The book value of intangible assets does not fully reflect their real size as accounting systems generally do not keep track of internally generated intangible assets.⁹ Third, we compute target intangible assets as deal size minus tangible assets, which in turn are calculated as total assets minus the book value of intangible assets. The constructed variable (*Intan. assets_{acq}*) essentially quantifies the bidder's estimate of the target intangible assets in the context of the specific deal. This measure has the advantage that it uses current information and captures internally generated intangibles, but it has the disadvantage that, apart from target intangible assets, it also captures synergies and possible over- or underpayment. By construction, this measure is not available for bidders.

2.4 Summary statistics

Table 3 presents summary statistics. On average, 2.40% of takeover announcements' words come from the intangibles words list, with substantial variation across announcements. Interestingly, the distribution is not heavily skewed, as also seen in the median value of 2.31%. (We study industry variation, time trends, and other determinants of intangibles talk below.)

⁸This latter part of the Peters and Taylor (2017) of intangible capital is similar to the Li et al. (2018b) measure of organizational capital, which they compute by cumulating the deflated value of SG&A expenses.

⁹Under U.S. GAAP, ASC 350-20-25-3 states, "Costs of internally developing, maintaining, or restoring intangible assets (including goodwill) that are not specifically identifiable, that have indeterminate lives, or that are inherent in a continuing business and related to an entity as a whole, shall be recognized as an expense when incurred." – <https://www.fasb.org/resources/ccurl/731/820/fas142.pdf>

As would be expected in the description of a major corporate investment, the announcements are dominated by positive words (1.44%) relative to negative words (0.34%), resulting in average negativity of -0.56. Words that might carry a negative message, such as strong modal and uncertainty words, are also not so frequent, namely 0.19% and 0.42% respectively.

[Table 3 ABOUT HERE]

The sample has a positive event period bidder cumulative abnormal return (CAR) of 0.63% on average (0.37% median CAR). As is usual, in public deals, bidders reap significantly negative returns on average (-1.47%), in contrast to what happens in private deals (1.51%).¹⁰ The target CAR, by contrast, is significantly positive, with a mean (median) value of 24.2% (19.9%).¹¹ In our sample, 91% of deals are completed, which is somewhat more than is typically the case.¹² The average (median) time from the announcement to the deal completion is about 55 (34) days. The average abnormal increase in operating performance (Δ ROA) following the acquisition is 0.88% over one year and 0.66% over three years.

The size of intangible assets varies substantially depending on the measure we use. The book value is the smallest, followed by the Peters and Taylor (2017) measure, and, where available, the measure that proxies for the size of acquired intangibles using actual deal size.¹³

¹⁰Moeller et al. (2004) report average bidder CARs of 1.496% for private deals and -1.022% for public deals. In a more recent study, Schneider and Spalt (2021) compute bidder CARs of 1.44% for non-public and -1.39% for private deals, respectively.

¹¹Similarly, Barger et al. (2008) find that shareholders of firms acquired by public firms gain 29.5% on average over the 3 days around the announcement of the acquisition.

¹²For the 1979–2003 period, Officer (2007) reports that 95% of 2,829 offers in SDC for unlisted stand-alone targets for are successful versus 77% of 4,559 offers for publicly traded targets. This combines to an 84% overall completion rate. In our sample, 94% of 2,599 offers for private targets and 84% of 1,099 offers for publicly traded targets are completed. The difference between the full sample statistics can, therefore, be attributed to the relatively higher proportion of private targets and the higher completion rate of public target deals in our sample. The latter is likely due to relatively smaller number of hostile deals in our sample, which were more common during the “corporate raiders” era in the 1980s.

¹³Table SA.2 reports the correlation between the measures of target intangible assets. The correlation coefficients for the measures of absolute intangible asset size (Panel A) are all positive and significant. The smallest coefficient (57.9%) is the one between the book value and the estimate of acquired intangibles, and the largest one is between the book value and the PT measures (88.2%). However, the relative measures (Panel B) are not significantly correlated, with the exception of the correlation between the ratios using the estimate of acquired intangibles and the PT measures, which is statistically different from zero, but still small in magnitude (15%).

3 Which announcements feature intangibles talk?

We begin our analysis by analyzing intangibles talk over time, across industries, and across deals. [Figure 2](#) plots the time series of intangibles talk in the full sample and for private and public target deal announcements separately. There is little discernible variation in intangibles talk over time, though there appears to exist a modest downward trend over time, particularly among public deals (which exhibit less intangibles talk, as detailed further below).

[[Figure 2](#) ABOUT HERE]

Next, [Figure 3](#) shows, as expected, that the magnitude of bidder management talk about intangibles depends on the industry sector of the acquirer and the target. For example, the highest intangibles talk industries among the Fama-French 48 industries, *Aircraft*, *Business services*, and *Computers* are nearly three times richer in intangibles talk than are the lowest three, *Precious metals*, *Petroleum and natural gas*, and *Non-Metallic and Industrial Metals*. The latter three indeed heavily rely on tangible assets in contrast to the ones at the top of the intangibles talk list which, as one would expect, are technology intensive industries. As such, our classification captures plausible variation. We acknowledge that the classification is not perfect. For example, acquisition announcements in the *Pharma* industry use relatively few of our intangibles words, even though one might expect these deals to involve a high percentage of intangibles. More sophisticated and perhaps industry-specific classification methods could yield further insights here, but would raise concerns about data mining.

[[Figure 3](#) ABOUT HERE]

Our main interest is in the variation of intangibles talk among deals. For a simple theoretical benchmark, consider an acquirer who is making an offer to acquire a target. The deal contains some intangible value. Suppose this value is correctly captured by the measured intangible assets of the bidder or the target or a combination of the two. Additionally, assume a fully rational CEO acting in the interest of shareholders and honestly reporting intangible value. This would imply the benchmark hypothesis that intangibles talk correlates perfectly with observable measures of intangible assets.

This benchmark, while simple, is an important test because it also holds implications for the study of the relation of intangibles talk and deal quality. If intangibles talk merely represents what can be measured about intangibles, then intangibles talk is expected to not correlate with deal quality, controlling for intangible assets. Conversely, if it deviates from measured intangible assets, there may be extra (positive or negative) information in it.

Columns (1) and (2) in Panel A of [Table 4](#) show that bidder intangible assets (whether measured by the [Peters and Taylor \(2017\)](#) method or by book value) are indeed significantly positively related with intangibles talk. However, once we control for industry fixed effects in columns (3) and (4), firm-specific intangible assets do not offer further explanatory power. This is particularly striking because [Figure 3](#) shows that intangibles talk varies widely within industries. Industry and year fixed effects alone explain 21% of the variation in intangibles talk. (All results in the paper are identified from variation within industries and years.) Columns (5) and (6) reveal that deal size and the target public status dummy explain an additional 9% of the variation (31% in total). Both variables enter negatively and significantly. This is consistent with the intuition that private and small firms, such as start-ups, rely more heavily on intangible assets, for example innovation potential.¹⁴

In additional, untabulated analysis, we also investigate whether deal characteristics correlate with intangibles talk. We do not find much significant variation (except that intangibles talk is more prevalent when the payment mode is cash, a theme we pick up further below). In any case, we control for a range of deal variables in the further analysis. We also find that takeover announcements with more intangibles talk use more positive and fewer negative words, as well as more strong modal words. We control for these additional linguistic features in what follows.

In additional checks, we also examine the role of other variables such as general disclosure quality and managerial ability. There is some tendency for firms with better disclosure quality and for more capable managers to use less intangibles talk. Because adding either of these controls reduces the sample size, we do not include them in the main regressions, but repeat all analysis with them in the robustness analysis in [Section 6](#), with unchanged inferences.

¹⁴Indeed, [Lys and Yehuda \(2015\)](#) find that private takeover targets have significantly more intangible assets than do public targets. Moreover, [Phillips and Zhdanov \(2013\)](#) present evidence of a negative relation between firm size and the innovation process.

[Table 4 ABOUT HERE]

In Panel B, we focus on public targets. For these firms we have accounting information not available for private firms. Specifically, we consider three measures of target intangible assets: the estimated replacement cost of the target's intangibles (Peters and Taylor, 2017), the book value, and the estimate of the acquired intangibles.¹⁵ Strikingly, again only without industry fixed effects is there a positive correlation, but none of the specifications yields significant coefficients once industry fixed effects are included.

Overall, these results suggest that while intangibles talk predictably varies with industry characteristics, the relative importance of target intangible assets in the target's total assets does not explain the use of intangibles talk, and neither do the bidder's intangible assets (beyond their correlation with industry). These results beg several questions: Is intangibles talk just managerial guff? Or do these results mean that there is new and valuable information in the announcements? That is, do managers perhaps reveal insights into the value of a deal that would not be seen in observables? Do investors respond to intangibles talk? We turn to these questions next.

4 Intangibles talk and deal quality

Section 3 has shown that intangibles talk is unrelated to observable intangible assets, at least once industry is taken into account. This suggests that there may be relevant information in intangibles talk about the quality of deals, that is, about the target's intangible assets and/or about the combination of the acquirer's and the target's intangible assets. But it is not obvious what kind of information this might be. To structure the consequent tests, we proceed as follows. This Section 4 considers hypotheses and tests that concern the link between intangibles talk and deal quality, which we empirically measure in several ways, namely, announcement returns, operating performance changes, balance sheet consequences, and analyst reactions. The following Section 5 then expands the theoretical considerations to include completion speed and probability, payment choices, and insider trades, and it utilizes the cross-sectional variation in stock price reactions to intangibles talk to conduct further tests.

¹⁵We do not have these data for international targets.

4.1 Hypotheses

Consider a bidder management evaluating a potential deal. Proxies for the bidder and target intangible assets are observable (as are industry characteristics and other firm-specific variables). However, beyond what is observable, bidder management receives a noisy signal about the value of intangible assets that the target or the business combination offers. This value may be higher than the stand-alone value of the bidder's and target's intangible assets, making the deal potentially economically meaningful. For simplicity, posit that the value added from combining the tangible assets of the two companies is observed (or at least very precisely estimated).

Suppose as a baseline that bidder management acts on behalf of its shareholders, but the signal management receives about the intangibles is uninformative. Any communication about that signal in the form of intangibles talk will, therefore, also be uninformative. Thus, the baseline hypothesis is:

Null Hypothesis. *Intangibles talk contains no information about deal quality.*

Empirically, in the cross-section of deals, intangibles talk in the takeover announcement would be unrelated to shareholder reactions as well as to the actually realized performance changes.

Three alternative hypotheses derive from deviations from the baseline model assumptions. As a first possibility, consider the case where the bidder's signal about the deal's intangible value is fairly precise. Posit that bidder management acts faithfully on behalf of bidder shareholders. Thus, bidder management utilizes intangibles talk to reveal that they have found a deal offering significant added value. Therefore, we have:

Alternative Hypothesis 1A (Advantageous Information). *Intangibles talk indicates advantageous information.*

Because intangibles talk is, under the *Advantageous Information Hypothesis*, associated with higher deal quality, shareholders react positively to intangibles talk in the takeover announcement.

Second, consider the case where bidder management receives an informative signal but has motivations to go through with any deal, even a value-destroying one to some extent. That motivation may derive from a classic empire-building motive of the private benefits type,

perhaps enhanced by the prospect of receiving higher compensation when managing a larger company. Such agency-driven managers purposefully report an exaggerated quality of the intangibles in the deal. This implies lower expected cash flows than otherwise similar deals announced with less intangibles talk. Alternatively, or additionally, their intangibles talk makes the signal about the deal quality more noisy, which makes it harder for shareholders to assess the deal (and increases uncertainty). In sum:

Alternative Hypothesis 1B (Agency). *Intangibles talk reflects an agency problem.*

As a consequence, under the *Agency Hypothesis* more intangibles talk is associated with lower deal quality. Shareholders will take this into account and will react more negatively.

Third, consider the possibility of inaccurate CEO perceptions. Thus, posit that bidder managers report their true signal about the expected returns to intangibles of the deal, but that signal is biased. That is, bidder management is overly optimistic or pessimistic about the deal, but they are not aware of that bias. Optimism about returns to intangibles is plausible because, as [Hirshleifer et al. \(2012\)](#) note, “...people tend to be more overconfident about their performance on hard rather than easy tasks ([Griffin and Tversky, 1992](#)). Accordingly, we expect relatively overconfident CEOs to be especially enthusiastic about risky, challenging, and talent- and vision-sensitive enterprises.” Deals where the bidder management receives a low signal would not be announced, because in management’s view they would not create value. Therefore, deals announced with rich intangibles talk tend to overstate intangible values. In sum, this hypothesis holds:

Alternative Hypothesis 1C (Overoptimism). *Intangibles talk reflects managerial overoptimism.*

Under the *Overoptimism Hypothesis* hypothesis, too, more intangibles talk is associated with lower deal quality and, consequently, with lower announcement returns.

Notice that under two of the three alternative hypotheses, intangibles talk is predicted to be negatively associated with deal quality. Therefore, we proceed in steps. First, we consider the relation of intangibles talk and deal quality. This battery of tests can, however, at most reject the *Null Hypothesis* and, if the relation is negative, the *Advantageous Information Hypothesis*. Conditional on those results, further analysis is needed to distinguish the other two hypotheses.

4.2 Is intangibles talk related to deal quality?

As proxies for deal quality, in line with the literature, we primarily use abnormal returns around the announcement and in the medium run. Moreover, we consider changes in operating performance and analyst responses after takeover announcements. The extent to which bidders record goodwill after the transaction provides additional information.

Abnormal returns

We measure bidder announcement returns as $CAR(-1,1)$, the 3-day cumulative abnormal returns for the bidder firm using the Carhart four-factor model, around the announcement. Model parameters are estimated over days $(-280, -31)$.¹⁶

Simple descriptive statistics and visual evidence are already telling. Recall that on average announcement returns are 0.63%. But there is great heterogeneity in these returns depending on intangibles talk. For example, in the top quintile of intangibles talk, announcement returns are roughly 0%, whereas in the lowest quintile, they are about 1%, a sizable spread around the average returns. Figure 4 presents binned scatter plots, adjusting for industry, year, and public target status. A clearly negative relation emerges.

[Figure 4 ABOUT HERE]

To formally investigate the relation between bidder returns and intangibles talk, we estimate the following regression:

$$CAR_i(-1, 1) = \alpha + \beta_1 IT_i + \sum_n \beta_n TV_{i,n} + \sum_m \beta_m CV_{i,m} + Ind + Yr, \quad (3)$$

where $CAR(-1,1)$ is the bidder announcement CAR, IT is intangibles talk, TV are other textual variables, and CV are deal, bidder and target control variables for deal i . We include 2-digit SIC bidder industry (Ind) and year (Yr) fixed effects. We cluster standard errors by the announce-

¹⁶We use the same interval to estimate the benchmark returns as Schneider and Spalt (2021). They use the market model instead of the Carhart four-factor model. Our results also hold when we use the market model or the three-factor Fama-French model.

ment year to capture the correlation between observations over time.¹⁷

Table 5 shows that intangibles talk enters negatively and significantly in both specifications. Because the standard deviation of intangibles talk is (very close to) one, regressions (1) and (2) imply that a one standard deviation higher intangibles talk results in 0.41 to 0.50 percentage points lower abnormal returns, a sizable effect.

[Table 5 ABOUT HERE]

These effects do not revert. Of course, it gets harder to significantly explain returns over longer time horizons due to the increased noise. However, as column (3) shows, after 30 days, high-intangibles talks firms still experience a discount in abnormal returns of -0.82% on average. The point estimate is similar, though a bit bigger at -0.96% , when including other textual variables in column (4).

The control variables have the usual signs. In addition, regression (2) shows that the other linguistic features of the announcement do not explain much of the announcement returns. In the full regressions shown, intangible assets of the bidder are not significantly associated with the market reaction in our sample.¹⁸

Overall, these results show that investors respond more negatively to acquisition announcements with more intangibles talk.

Post-acquisition performance

To assess further whether intangibles talk is related to actual deal quality, we look at the post-acquisition combined entity performance. We consider Return on Assets (ROA), defined as

¹⁷Alternatively, we cluster standard errors by 2-digit SIC industry. The results remain similar throughout the entire analysis. Yet alternatively, we use Fama-French 48 industries, with identical inferences. Very similar results obtain with target industry fixed effects. Finally, our results also remain robust when using industry-year fixed effects (which accounts for the possibility of industry-specific merger waves, for example).

¹⁸Li et al. (2018b) show that bidders with higher organizational capital secure higher announcement returns. We also find a positive, albeit insignificant association of intangible assets when not controlling for the announcement-level text variables and some other controls. While the Li et al. (2018b) measure of organizational capital is based on a similar logic as the Peters and Taylor (2017) measure of intangible capital that we use, there are important differences. For example, Peters and Taylor (2017) add the internally generated intangible capital to prior acquired intangible capital, and they use different depreciation rates for R&D expenses in different industries. In a sample of non-high-tech firms, where the latter difference is likely to play a smaller role, we also find a positive association of intangible asset intensity on announcement returns.

EBITDA over assets. We allow for performance to accrue over time as it may take time to generate value from intangible assets. Therefore, we examine ROA changes from year 0 to year 1, and from year 0 to year 3, where year 0 is defined as the year of acquisition. We follow [Frésard et al. \(2017\)](#) and address underlying industry trends by contrasting an acquirer's performance to that of its industry peers. For each acquirer, we construct a portfolio of peers that do not differ more than 50% in size from the acquirer, operate in the same 2-digit SIC industry, and are not involved in any acquisition during a six-year period surrounding the transaction. The benchmark is calculated as a mean performance of each portfolio, which is then subtracted from that of the acquirers.

[Table 6](#) reports the results of cross-sectional regressions for the post-acquisition change in performance. The regression coefficients of intangibles talk prove consistently negative for both 1-year and 3-year period. However, statistical significance obtains only for the 1-year window. Overall, the evidence is broadly consistent with the findings from the CAR analysis, that is, acquiring firms do not refer to intangibles to communicate advantageous private information about the target.

[[Table 6](#) ABOUT HERE]

Analyst stock recommendations

Do financial analysts respond to the information in takeover announcements? To answer, we compute the change in the median analyst recommendation and regress it on intangibles talk. The change is defined as a difference between the earliest available median recommendation that is calculated within the 7-60 days period after the takeover announcement and the most recent median recommendation calculated within the 7-60 days period before the takeover announcement. Thomson Reuters calculates median recommendations by assigning to each contributing analyst's recommendation an integer based on the standardized Thomson Reuters recommendation scale and calculating a real number median. The (inversed) scale is as follows: 5. Strong Buy, 4. Buy, 3. Hold, 2. Underperform, 1. Sell.

Column 3 of [Table 6](#) reports the results of the test. We find that the intangibles talk coefficient is negative and significant, meaning that takeover announcements rich in intangibles talk are related to the magnitude of stock recommendation downgrades. Finding even a small

effect in such an analysis is impressive, given that on average analysts are known to be reluctant to downgrade their recommendations (Conrad et al., 2006; Michaely and Womack, 1999).

Balance sheet consequences

For the recognition of intangibles on the balance sheet of acquirers, the Financial Accounting Standards Board (FASB) has laid out a distinction between separably identifiable intangible assets and goodwill. Separable in this case means that the acquirer is able to parse or divide the asset outside of the target business and potentially sell, rent, license, or exchange to another company or entity. Typical examples of such intangibles include patents, customer lists, employee non-compete agreements, or software code, even if it is not patented. The part of the purchase price that cannot be allocated to these separable assets is goodwill. It is easier and more tempting to be overoptimistic about intangible assets that are not concretely and separately specified. Therefore, under the *Overoptimism Hypothesis* we expect acquirers to recognize more goodwill if they engage in more intangibles talk in the announcement. Under the *Agency Hypothesis*, we also expect such a differential increase because the literature has shown that agency-motivated managers can have incentives to allocate a larger portion of the purchase price to goodwill (Shalev et al., 2013). There is no reason why under the *Advantageous Information Hypothesis* intangibles talk would imply systematically stronger increases of goodwill than the separably identifiable intangible assets.

We obtain quarterly balance sheet values of goodwill (henceforth GW) from Compustat (item GDWLQ). By deducting GW from the total book value of intangible assets (item INTANQ), we obtain a proxy for the separably identifiable intangible assets (henceforth SIA). Table 7 summarizes differences-in-differences regressions of GW and SIA (scaled by acquirer assets in the quarter before the transaction completes) for a symmetric window of 16 quarters around deal completion. *Post* is a binary indicator variable identifying observations in the 8 quarters after the deal completion. We interact this indicator with intangibles talk to capture the differential change in GW after deal completion for acquirers that use different degrees of intangibles talk. The first two regressions use the full sample, whereas the second two use only those deals where the acquirer did not acquire another company within a symmetrical window of 2 years before and after the announcement day. In both cases, the regressions show that GW

(SIA) increases more (less) after takeover announcements rich in intangibles talk.¹⁹ [Supplementary Appendix C](#) illustrates these findings graphically and in particular confirms common pre-acquisition trends of GW and SIA for high and low intangible-talk acquirers. Untabulated results similarly show that the change in GW as a fraction of deal size from before to after the quarter in which the acquisition completes is greater for takeovers with more intangibles talk.

Overall, these findings indicate that intangibles talk does come with balance-sheet consequences regarding intangibles, but it is often in the relatively fuzzy space of goodwill that acquirers choose to (or have to) recognize the acquisition. It is, therefore, perhaps not surprising that acquisitions rich in intangibles talk are less likely to lead to an increase in operating performance.²⁰

Summary

Overall, the evidence from each of these dependent variables – stock returns (both immediate and medium-term), operational performance changes, balance sheet consequences, and analyst recommendation changes – firmly rejects the *Null Hypothesis*. Moreover, the evidence suggests that when the bidder management team refers to intangible assets, it is not conveying advantageous private information to the investors. Which channel, agency or overoptimism, is more likely to explain these results? We turn to this question next.

5 Why does intangibles talk predict poor deal performance?

[Section 4.1](#) offers two main possibilities for why intangibles talk predicts poor deal performance: (1) agency problems, and (2) bidder overoptimism. The explanations are not mutually

¹⁹*Post* itself is not significant in these regressions because we also interact it with all deal characteristics to make sure that we do not associate any differential changes in goodwill with intangibles talk when in fact they are due to deal characteristics. A review of 10-K statements reveals that some firms recognize preliminary amounts of goodwill already in the quarter before deal completion, when certainty about the deal is sufficiently high. The inferences are unchanged if we omit that quarter from the analysis. The inferences are also similar if we additionally adjust for amortization of intangibles and goodwill impairment.

²⁰Goodwill is subject to annual impairment tests. While goodwill impairment is an indication of poor deal quality if it occurs, a large literature indicates that companies have and indeed exploit discretion in write-down choices because goodwill is inherently unverifiable (see, e.g., [Ramanna and Watts \(2012\)](#)). Public acquisitions are arguably under stronger scrutiny than private acquisitions. In results available on request, we indeed find that for acquisitions of public targets goodwill impairment is more likely to occur after intangibles talk.

exclusive and indeed it is challenging to tease them apart. To make some progress in discerning which, if any, of these two explanations is more convincing, we draw on cross-sectional variation in the market reactions, choices of payment modes, and insider trading choices. We also conduct consistency checks studying differences in completion speed and probability. By considering several dependent variables, we make it easy for the data to reject (or at least to fail to support) each of the two basic explanations.

5.1 Heterogeneity in stock price reactions

Testing for agency problems

The *Agency Hypothesis* posits that managers who expect to privately benefit (e.g., through an empire-building motive) from a takeover, even one that destroys value, will refer to intangible aspects in an attempt to justify a deal and bolster their private returns. The hypothesis implies that the negative effect of intangibles talk on announcement abnormal returns is stronger for bidders that have a more pronounced agency problem. To proxy for the extent of the agency problem we use several variables that measure the quality of corporate governance at a firm.

We present results for six different measures.²¹ (1) First, the likelihood that managers will announce a low quality takeover is expected to decrease with institutional stock ownership as these investors' incentives to monitor the managers increase with the stake.

(2) Second, executives whose wealth depends more on the share price are better aligned with shareholder welfare, which should lead them to seek out value-increasing takeovers and avoid value-destroying deals. A standard measure of executives incentives is "equity delta," the dollar change in executive wealth from stock and stock options per percent change of the share price, computed following [Core and Guay \(2002\)](#) and [Coles et al. \(2006\)](#). We sum delta of all disclosed executives to get a measure of the total management team's incentives. The data cover firms in ExecuComp, which cuts our sample approximately in half.

(3) Third, better governance is arguably related to disclosure quality because more detailed disclosure reduces information asymmetry and gives managers less possibilities to man-

²¹In unreported tests, we use a seventh measure, the entrenchment index (E-index) of [Bebchuk et al. \(2008\)](#), which we download from their website. The sample is reduced as their index stops before the end of the sample period. The inferences from this analysis are the same as those reported in this section.

age the reported numbers (Hirst et al., 2007; D'Souza et al., 2010). We proxy for disclosure quality using the measure of disaggregation quality computed as in Chen et al. (2015). This measure captures the level of disaggregation of accounting data through a count of nonmissing data items in firms' annual reports as reported by Compustat.

(4) Fourth, analysts decrease information asymmetry, increase transparency, and improve monitoring quality. Therefore, companies that are followed by more analysts are expected to have better governance and less pronounced agency problems. We use the natural logarithm of the number of analysts.

(5) Fifth, Jensen (1986) argues that managers are prone to investing cash at below the cost of capital and to wasting it on corporate inefficiencies. In particular, acquisitions by cash-rich acquirers tend to be value-destroying (Harford, 1999). To proxy for this governance feature, we define Operating CF/AT as operating cash flow scaled by book value of total assets when the acquirer's market-to-book ratio is not in the top quartile, and zero otherwise (following Lang et al., 1991; Li et al., 2018a).

(6) Finally, managers of firms that are better protected by anti-takeover provisions are less exposed to external disciplinary mechanisms, such as takeovers. Therefore these firms will likely have worse corporate governance. Gompers et al. (2003) introduce an index that captures the intensity of anti-takeover provisions. The original index is available only for the period 1990 to 2006. We extend it following Peters and Wagner (2014).

Then, we interact each of these measures with intangibles talk. The regression results are in Table 8.

[Table 8 ABOUT HERE]

Panel A presents results for initial reactions of the bidder's stock price. The results are mixed. None of the interaction effects are significant, and they imply different directional effects. For example, in firms where disclosure quality is better, the market reaction to intangibles talk is somewhat (though not significantly) more positive (in line with the agency story). By contrast, in firms where institutional investors own an important stake in the bidder or where the bidder executive team has strong incentives to increase the share price, there is a somewhat

(though not significantly) more negative reaction to intangibles talk (contrary to the agency story). These non-effects also obtain when looking at the 30-day stock price reactions, as seen in Panel B. Overall, we find no strong evidence in favor of the *Agency Hypothesis*.

Testing for overoptimism

What does the cross-section of stock price reactions suggest regarding the relevance of the *Overoptimism Hypothesis*? [Table 9](#) presents several tests for both the short-term (Panel A) and the medium term (Panel B).

First, we interact intangibles talk with the linguistic tone of the takeover announcement. If the market perceives intangibles talk as reflecting excessive optimism, then positive linguistic tone should lead to a particularly negative market response to intangibles talk. Columns (1) and (2) support this prediction, both with percent positive words and, for ease of interpretation, *minus* negativity.²²

Next, we use three measures of more general optimistic “style” or personality traits of CEOs. One measure is based on how firms typically communicate in other settings, namely, earnings conference calls. We compute the average of positivity in managerial communication on those calls. The idea is that while positivity will vary with current business conditions, an unconditionally high fraction of positive words provides a proxy for managerial optimism. To avoid reducing the sample sizes further, for firms for which we cannot find matching conference call transcripts we replace intangibles talk in conference calls with the average and include a dummy variable equal to 1 (and 0 elsewhere) to absorb the effect of this adjustment in our empirical specifications. Column (3) in Panels A and B shows that the interaction term of intangibles talk with positive talk in conference calls is negative, indicating that the market responds more negatively to intangibles talk by generally optimistically speaking managers. The initial effect is not significant on conventional levels, but over the 30-day window, the

²²In empirical research on linguistic tone, positive words are usually regarded as uninformative because they are used excessively ([Loughran and McDonald, 2016](#)). In our application, positive words are informative precisely because the goal is to identify potential overoptimism by management. The results with percent positive words do not depend on whether we control for negativity or not. If positive talk in the takeover announcement were additionally an indication that an agency-driven manager is attempting to push through a deal with positive language, the market should react to it more negatively when such agency problems are more likely to exist. Supplementary Appendix [Table SA.5](#) does not support this prediction, but even when we include the possibility of such differential effects, the results regarding the interaction of intangibles talk and positive talk continue to hold.

effect becomes highly significant.

Second, we use a standard measure of managerial overoptimism, the “longholder” variable established by [Malmendier and Tate \(2005a,b, 2008\)](#) and [Malmendier et al. \(2011\)](#).²³ As seen in column (4) of [Table 9](#)’s Panel A, the initial reaction does not appear to be strongly explained by this measure of CEO optimism. However, Panel B shows that over the medium run firms run by overoptimistic CEOs experience much lower returns after takeover announcements that feature much intangibles talk. (Additional tests show that this effect sets in already a few days after the immediate announcement window.)

Finally, we construct a variable that identifies bidders that are “High forecasters”. This measure, developed by [Otto \(2014\)](#), compares what firms forecast for their earnings with what they actually achieve. The idea is that if a management team consistently provides forecasts of which performance ends up falling short, this indicates managerial overoptimism. [Otto \(2014\)](#) assigns a time-invariant value to each firm-manager combination. We expand these data to include the recent years, and we then identify a CEO as a high forecaster when he is in the top quartile of this variable.²⁴ Even with this expansion through time, the sample size is very limited. Despite the small sample size, column (5) of [Table 9](#) shows that we obtain effects consistent with overoptimism. Specifically, when the bidder is classified as a “high forecaster”, in the medium run deals announced with more intangibles talk result in more critical shareholder responses.

[[Table 9](#) ABOUT HERE]

Other interpretations

In concluding the analysis of stock price reactions, we consider one additional possible explanation for the findings so far. In particular, could the negative market reactions to intangibles talk be explained by the market worrying about the complexity of the deal? Thus, even if expected cash flows from the deal are positive, higher discounting may lead to relatively less value gain for such deals. Relatedly, given that intangibles are harder to value, even if managers

²³We thank Clemens Otto for providing these data for the early years. Employing code kindly provided by Florian Peters we extend the data using the same method for later years. Despite the extension, this variable is available only for a limited sample (not least because it requires ExecuComp data).

²⁴Regressions with the continuous measure do not yield significant interaction terms.

truthfully and without overoptimism announce their signal, intangibles talk may be associated with overvalued deals. This explanation faces several empirical challenges. First, recall from [Table 4](#) that managers use less intangibles talk to describe larger deals, hardly what one would expect if more intangibles talk reflects greater complexity or higher signal uncertainty. Second, in Supplementary Appendix [Table SA.3](#) we find only limited evidence that the stock price reaction to intangibles talk is more pronounced in arguably more complex settings. Specifically, intangibles talk does not have noticeably different effects in absolutely or relatively large transactions (a proxy used for capturing complexity in, for example, [Grinstein and Hribar \(2004\)](#)) or in cross-industry or cross-country transactions. When interacting intangibles talk with the public target dummy, the interaction coefficient in the bidder CAR regression is negative and sizable, but not statistically significant.²⁵ Third, results on completion speed and probability, presented in the next subsection, also speak against this explanation.

Summary

In sum, the results on the cross-section of stock price reactions provide largely consistent support for the *Overoptimism Hypothesis*, and provide no explicit support for the *Agency Hypothesis*.

5.2 Completion speed and probability

An overoptimistic acquirer management will expend less effort on due diligence, making it more likely that the deal completes, and in a shorter time span. For example, in the model of due diligence of [Daley et al. \(2020\)](#), a manager who is ex ante very positive about a deal has little incentive to expend much effort to increase the posterior estimate of deal quality

²⁵A separate analysis, in Supplementary Appendix [Table SA.4](#), splits the sample and considers public deals separately. Consistent with the interaction analysis, we find a strongly negative effect of intangibles talk on announcement returns among public deals. That analysis also provides an opportunity to analyze target and combined returns. We find that intangibles talk is positively, but insignificantly associated with target abnormal returns. The net effect in the form of combined returns is still negative. For public targets we can also analyze the premium. Intangibles talk is not strongly related to the premium paid for the target, but this relationship is not particularly informative. Posit that the target does not really care to whom they are sold. There is just a fixed, given premium for a bidder wanting to take over that firm. Thus, any acquirer, including one run by overconfident managers, also pays that price; there is no reason to pay more. However, it may be a poor deal for that overconfident buyer. That is why the bidder returns are more informative than the target returns and the premium paid.

even further. Moreover, a manager who feels that he has better prospects to complete the deal may feel that he has some latitude to use intangibles talk. A self-interested, agency-driven manager might seek to complete the deal fast to avoid shareholder resistance. Because under the advantageous information hypothesis, intangibles talk describes deals adding more value, one would expect these deals to be completed more swiftly as well.

All three hypotheses, therefore, predict the same sign for the relation between intangibles talk and completion speed and probability. However, an analysis of completion speed is not only a useful consistency check for the candidate hypotheses, but it also helps rule out alternative interpretations. For example, if intangibles talk primarily captured complexity, we would expect deals described with lots of intangibles talk to be less likely to complete, and to complete more slowly. Similarly, if managers use intangibles talk when they perceive lower certainty about the deal quality, this would lead them to engage in more due diligence work which would again lead to slower deal completion.

Figure 5 presents graphical evidence employing binned scatter plots, adjusting for industry, year, and public target status. A clear pattern emerges in that deals announced with more intangibles talk appear to complete more often and faster.

[Figure 5 ABOUT HERE]

Formally, to explore whether the observed patterns are driven by bidder, target, or deal characteristics, we estimate probit regressions for deal completion probability and OLS regressions estimating the number of days between the announcement and completion dates for each deal. The latter analysis, obviously, examines only completed deals. The other variables remain as in the previous model.

Table 10 reports the regression results for the two models. They corroborate the graphical evidence. Specifically, regressions (1) and (2) imply that, even controlling for a rich set of bidder, target, and deal characteristics, there is a statistically and economically significant association between the extent of intangibles talk and the completion rate of deals. A one percentage point difference in intangibles talk implies a 1.5 to 2.3 percentage point greater completion probability. Similarly, specifications (3) and (4) show that the bidders who talk more about intangible assets in their announcements conclude a deal in a significantly shorter

time period, given that the target is acquired. One percentage point more in intangibles talk shortens the deal completion period by 3.1 to 3.9 days.

Uncertain words portend a somewhat lower completion rate, which supports the idea of using completion rates and speed as an inverse proxy for uncertainty of the deal. When announcements, which tend to be positive, are somewhat less positive, the completion probability is lower and completed deals take longer. The other control variables (not shown to conserve space) largely have signs in line with the existing literature.

[Table 10 ABOUT HERE]

Overall, the evidence strongly indicates that intangibles talk predicts faster and more likely deal completion. This finding is in line with the *Agency Hypothesis* and the *Overoptimism Hypothesis*.

5.3 Payment mode

The payment mode provides insights into the channels as well. In particular, we draw on the insights of [Officer et al. \(2009\)](#). They show that acquirer returns are significantly higher in stock-swap acquisitions of difficult-to-value targets (as measured, in their case, by R&D intensity and idiosyncratic return volatility). Following their logic, rational, risk-aware acquirers should be more likely to use stock as the method of payment for intangibles-heavy targets. Buying such a company with stock is a smart move from a risk-management perspective even if bidder management has advantageous information. If the deal does turn out to be worse than expected, then the target shareholders will also suffer. By contrast, buying a hard-to-value company with cash puts all the risk on the bidder. If it turns out to be a bad deal, the bidder shareholders suffer, whereas the target shareholders received the cash. Extending this logic, under the *Overoptimism Hypothesis*, we would expect that deals described with lots of intangibles talk are more likely to be cash-paid deals than stock-swap deals. Although our emphasis here is on deal-specific optimism, an additional contributing factor can be that generally overoptimistic managers consider their own stock undervalued and will, therefore, be reluctant to use it as a currency.

Table 11 shows that cash payment is more likely for deals announced with more intangibles talk, consistent with the *Overoptimism Hypothesis*. The table also confirms that bidders are less likely to use cash when they themselves are intangibles rich or when the target has high intangibles intensity.

[Table 11 ABOUT HERE]

These results are noteworthy because under the *Agency Hypothesis* managers would prefer to keep higher cash holdings as this allows them to consume other perks which cannot be bought with equity. Therefore, if intangibles talk signifies an agency problem, we would have expected such talk to be associated with a lower tendency of bidder management to pay with cash.

5.4 Insider trading

For our final test, we examine insider trading by CEOs, other top executives, and non-executive board members.²⁶ Under the *Overoptimism Hypothesis* and the *Advantageous Information Hypothesis*, we expect to observe bidder insiders to increase their stock holdings after the deal announcement. Under the *Agency Hypothesis*, by contrast, management using more intangibles talk should be less likely to increase their holdings, given that they expect the deal to be value-destroying.

We construct a trading window for each announcement that begins 2 days after the announcement and ends 30 days (or, in robustness checks, 60 days, following [Chung et al. \(2018\)](#)) after the announcement or the effective day if it comes first. We assign a positive sign to buy and negative to sell transactions, and then compute the total number of shares traded for each group. A group is labeled as a net buyer if the total number of shares traded over the analyzed window is positive, i.e., if the number of shares purchased exceeds the number of shares sold.

[Table 12 ABOUT HERE]

²⁶The top executives group include following roles: CFO (Chief Financial Officer), COO (Chief Operating Officer), CIO (Chief Investment Officer) and CTO (Chief Technology Officer).

We find that bidder CEOs, other top executives, and board members are more likely to purchase stock when a bidder talks more about intangible aspects in the takeover announcements. Columns (1) through (3) of [Table 12](#) shows baseline regressions for each group individually. For example, the average marginal effect on the probability of CEOs to buy stock associated with a one percentage point difference in intangibles talk is 2%. We also find a strongly significant effect when we combine the CEO and other top executives (column (4)), as well as for all insiders, i.e., executives and board members combined (column (7)). All regressions recognize that a possible explanation for why insiders buy shares after a takeover announcement with considerable intangibles talk is that they just respond to the stock price decrease. This story predicts a significant negative relation between the bidder CAR and propensity to buy for each individual group, and this is what we find. The intangibles talk coefficients are, however, practically not affected by including bidder abnormal returns (results without controlling for announcement returns are available on request).

Columns (5) and (8) include other deal characteristics and firm-level variables.²⁷ The effects are reduced in size, but the probability that in aggregate the group of insiders buy shares still increases by 1.8% with a one percentage point increase in intangibles talk, a sizable effect relative to the unconditional probability of 18%. For executives, the effect is borderline insignificant, but becomes highly significant when omitting the very few deals with less than USD 2 million deal size (not shown). Indeed, as a consistency check that the managerial actions are likely to be purposeful, we note that the relation between intangibles talk and insider trading is substantially stronger in larger deals, see columns (6) and (9).²⁸ Overall, these results on insider trading could indicate that managers are acting on advantageous information, but in light of the negative relation of intangibles talk with deal quality obtained earlier, the results are more in line with overoptimistic management employing intangibles talk.

²⁷We caution that board/corporate policies may explain the extent of insider trades. Adding governance characteristics does not affect the results, however.

²⁸For ease of interpretation, relative size is standardized in this regression, so that the coefficient on intangibles talk displays the effect for the deal of average size. For deals one standard deviation above average relative size, intangibles talk increases the probability of executive insider trades by 3.2% ($= 0.014 + 0.018$).

5.5 Summary

Table 13 summarizes all of the major tests conducted in the paper and compares them with the predictions of the three alternative hypotheses. This visual summary indicates that the evidence from deal quality, the cross-section of announcement returns, payment method choice, stock purchases by insiders, and completion speed and probability suggests that intangibles talk is indeed related to managerial overoptimism about the deal. By contrast, there is little evidence specifically in favor of the agency-based explanation.

[Table 13 ABOUT HERE]

6 Robustness

Table 14 reports several robustness tests. It first summarizes tests involving variations of the intangibles word list. First, to address the concern that our dictionary might be industry specific and captures mostly intangibles related to the technology sector, in Panel A we exclude all words that are tech specific (including plural forms and inflections).²⁹ The results remain robust with the exception of the regression of days of completion, where intangibles talk becomes border-line insignificant.

Second, anecdotal evidence suggests that firms often talk about “synergies” in the context of acquisitions. Synergies through combining entities can also be obtained for tangible assets and activities through cost savings, for example. As such, “synergies talk” may deserve a separate inquiry. We have constructed, again drawing on keywords appearing in the business literature, a preliminary word list aiming to capture such talk.³⁰ Intangibles talk and synergies talk are positively, but not very highly correlated (0.19). Panel B reports regression results

²⁹The omitted words are: *algorithm, data, database, design, internet activity, network, platform, process, program, service, site visits, software, solution, system, technology, tool, and website* (including plural forms and inflections). We omit 31 words and phrases in total.

³⁰The list comprises the following words: *alliance, collaborate, collaborated, collaborates, collaborating, collaboration, combination, combine, combined, combined effort, combines, combining, complement, complementary, complemented, complementing, complements, cooperate, cooperated, cooperates, cooperating, cooperation, fit, fits, fitted, fitting, joint, joint effort, match, matched, matches, matching, synergies, synergy, team effort, team work, together, and working together.*

when combining the list of intangibles words with the list of synergy words.³¹

Third, Panel C uses a shorter version of the word list that omits words that might be considered as too general and too strongly reflecting technological aspects only.³² The results remain robust and similar to those obtained using the main dictionary in the previous tables.

Next, companies operating in high-tech industries are by their nature innovative and rich in intangible assets. To address the concern that such companies drive our results, we exclude all deals that involve a target whose primary industry is: drugs (SIC codes 2833-2836), research and development services (8731-8734), programming (7371-7379), computers (3570-3577), or electronics (3600-3674), as in [Baginski et al. \(2004\)](#). The results withstand this test (Panel D).

The following panels include some additional control variables and conduct other checks. First, we control for disclosure quality (following [Chen et al. \(2015\)](#)), which we had previously used as a moderator for the stock returns analysis. Disclosure quality and intangibles talk are positively correlated, so potentially this could explain our findings. However, Panel E shows that intangibles talk remains significant in all our main regressions even after controlling for disclosure quality differences.

Second, intangibles talk could reflect the structure of the industry sector of the target. As the industry matures it becomes less dynamic and more concentrated, shifting focus from intangibles to tangible assets. We control for this factor with the Herfindahl–Hirschman Index (HHI), a widely used measure of market concentration. HHI is calculated by squaring the sales market share of each firm competing in the target 2-digit SIC industry and then summing the resulting numbers. Panel F shows that as expected deals take longer to complete in more concentrated target industries, HHI does not have a material effect on the coefficients of intangibles

³¹Supplementary Appendix [Table SA.6](#) separately includes the synergy list. It shows that while managerial talk about synergies does appear to predict higher likelihood of completing the deal and an increase in profitability, it is not a significant determinant of the other dependent variables. Intangibles talk remains significant throughout even controlling for synergies talk. The voluntary disclosure of actual operating efficiency gains (first studied by [Houston et al. \(2001\)](#) for bank mergers) is relatively rare. For example, [Bernile and Bauguess \(2014\)](#) document, using announcements hand-collected from Factiva, that such disclosures occur in about one quarter of public-target acquisitions. [Bernile and Lyandres \(2019\)](#) show that firms with otherwise high disclosure quality (firms providing earnings guidance) are more likely to provide such forecasts. While we do not have the actually disclosed synergies, our results hold controlling for disclosure quality, as shown below.

³²We omit *ability, advertising, algorithm, alliance, business model, business process, client, client relations, customer, customer base, customer list, customer relation, data, database, incentives, investment, market, market share, network, project, service, software, system, technology, tool, and website* (including plural forms and inflections).

talk nor is it a significant determinant of the other dependent variables.³³

Third, we check whether it is the takeover-announcement-specific intangibles talk that is reflected in stock price reactions and the other dependent variables. To conduct this exercise, we measure intangibles talk by managers of each company in earnings conference calls presentations and answers. That is, we use our word list to compute the frequency of intangibles talk in each conference call in the sample period. We then take an average, by firm, thus computing the typical “intangibles talk style” of a company. To avoid reducing the sample sizes further, for firms for which we cannot find matching conference call transcripts we replace intangibles talk in conference calls with the industry average and include a dummy variable equal to 1 (and 0 elsewhere) to absorb the effect of this adjustment in our empirical specifications. Panel G shows that the results for intangibles talk in merger announcements remain unchanged. The market generally responds negatively to merger announcements of firms who usually use a lot of intangibles talk (as seen in the negative and significant coefficient of intangibles talk in conference calls), but the communication in the merger announcement is considered separately by market participants. This is for good reason, as this communication predicts operating performance and insider trading.

Fourth, it is conceivable that intangibles talk relates to the competence of managers, or to their backgrounds. [Demerjian et al. \(2012\)](#) estimate managerial ability using data envelopment analysis: Firms that are more efficient in generating revenues than one would expect based on their characteristics are posited to be run by more competent managers. A merit of this method is that can be applied to a wide range of firms. We use their decile rank measure (from 0 to 1, by industry and year), though the results also hold with the cardinal score. Untabulated results show that managerial ability is unrelated to intangibles talk. Panel H shows that controlling for managerial ability does not change our results regarding the role of intangibles talk in explaining stock price reactions, payment method, and insider trading.³⁴ In untabulated results, we find (using data ranging until 2007 provided by [Custódio et al. \(2013\)](#)) that general ability, having an MBA, or having an Ivy league degree also do not correlate with intangibles talk. However, the number of observations drops to around 500 in this analysis.

³³HHI_t is indeed negatively correlated with intangibles talk (-10.7%), but it is not a significant explanatory variable of intangibles talk when included in [Table 4](#). Our results also remain robust when we control for the bidder industry concentration.

³⁴It is somewhat surprising that in our sample managerial ability is unrelated to announcement returns.

Fifth, controlling for industry-year fixed effects, while demanding in this setting given the relatively limited sample size, does not substantially change the results, as seen in Panel I. The effect of intangibles talk on operating performance becomes insignificant, though arguably adding these fixed effects is excessive given that the dependent variable is already industry-adjusted each year.

Sixth, Panel J confirms that the results are not driven by very large or very small deals (that is, deals in the 1st and 99th percentiles of deal size).

The results are also robust if we control for positive and negative word frequencies separately. We have also experimented with controlling for other textual aspects of the takeover announcement. For example, we have controlled for its (textual) complexity by computing the average of words per sentence.³⁵ The results remain robust controlling for this measure of complexity.

7 Conclusion

Intangible assets represent an important component of firm value. Indeed, their importance seems to be growing. For example, [Lev \(2012\)](#) documents a secular decline of the ability of accounting data to explain share price differences across companies. It is, therefore, of interest to know how managers communicate about intangibles. This paper quantifies intangibles talk, defined as the frequency of words associated with intangible assets, in financial text. We construct a novel word list of intangible-related words to capture what a financial release about a merger says about this hard-to-value asset class. Intangibles are conceptually particularly important in the context of mergers and acquisitions. Therefore, we apply the list to corporate takeover announcements in the U.S. from 2002 to 2019. The analysis reveals considerable variation in the use of intangibles talk in the announcements. The amount that managers talk about intangible aspects significantly varies across industries and depends on some deal and target characteristics. Notably, however, at least in public deals, the intangible assets of the target explain little of the usage of intangible words in the takeover announcements.

³⁵To parse for sentences, we follow [Loughran and McDonald \(2014\)](#) and first remove abbreviations and numbers, and then assume that the remaining periods are sentence terminations.

Intangibles talk is not just inconsequential managerial guff. It is negatively related to announcement returns. The strong negative market reaction to intangibles talk (and the lack of improved operating performance following the deal) suggests that managers do not use intangibles words to disclose advantageous private information about the target. The agency explanation of the relation between intangibles talk and negative announcement returns receives no strong support in data. An analysis of the cross-section of stock price responses, of payment mode choices, and of insider trades reveals, by contrast, evidence of managerial overoptimism about deals they describe with intangibles talk. We speculate that this overoptimism partly arises because the importance of intangibles is a relatively new phenomenon. As such, business school teachings and prior managerial experience are not (yet) sufficiently helpful in assessing and communicating about deals along this dimension. Overall, these results suggest that it can pay off for investors to carefully study the phraseology of takeover announcements.

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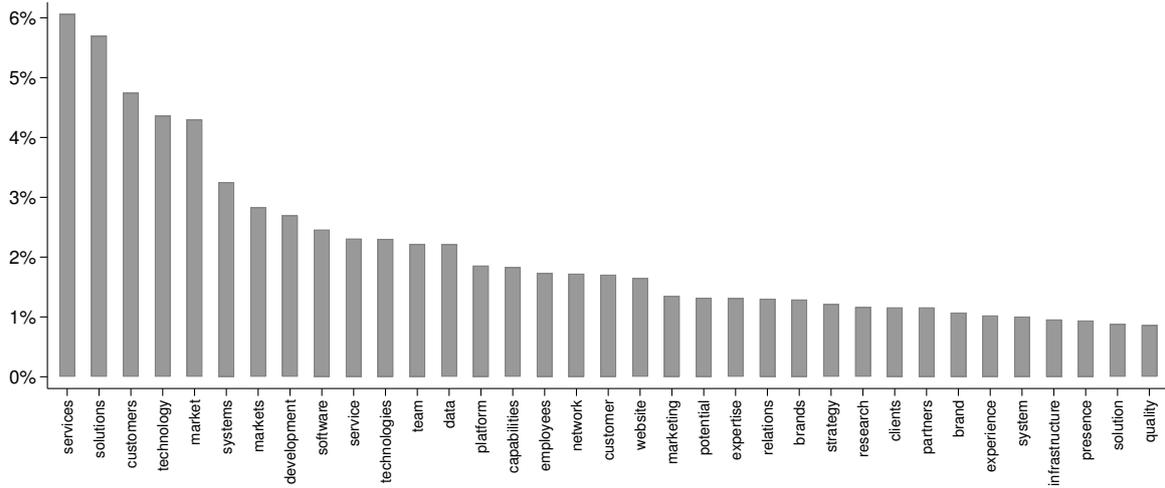


Figure 1: The most frequent intangibles words in takeover announcements

The figure presents the frequency of 35 most common intangibles words in takeover announcements. It is calculated as a ratio of each word count to the total count of all intangibles words (see [Table 1](#)) occurring in the announcements. The sample consists of 3,698 takeover deals announced between January 2002 and December 2019 with a bidder that is a publicly traded company domiciled in the United States.

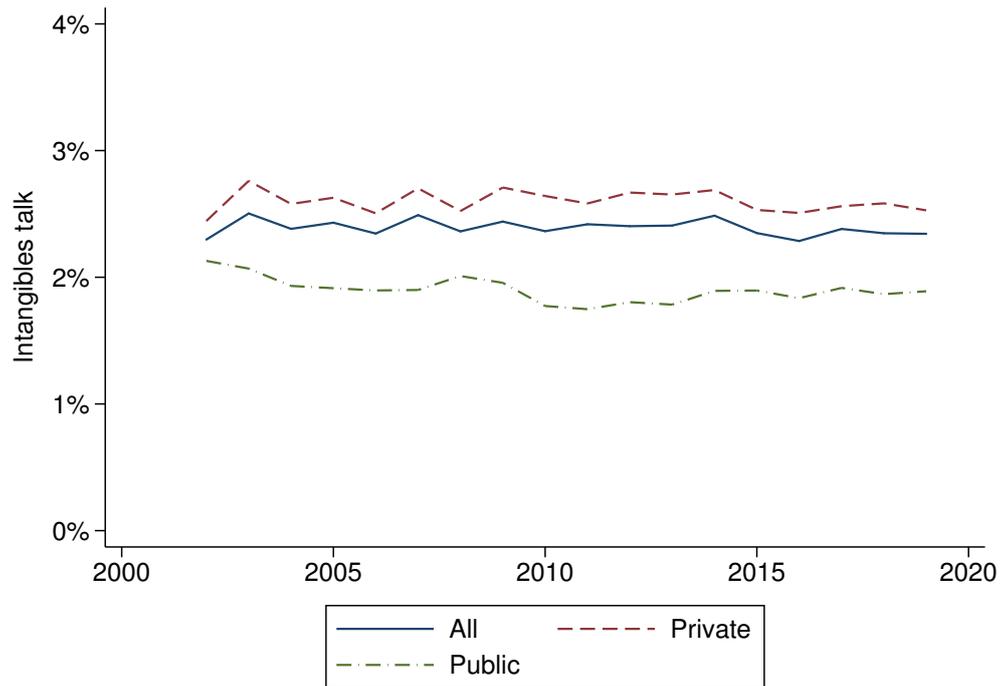
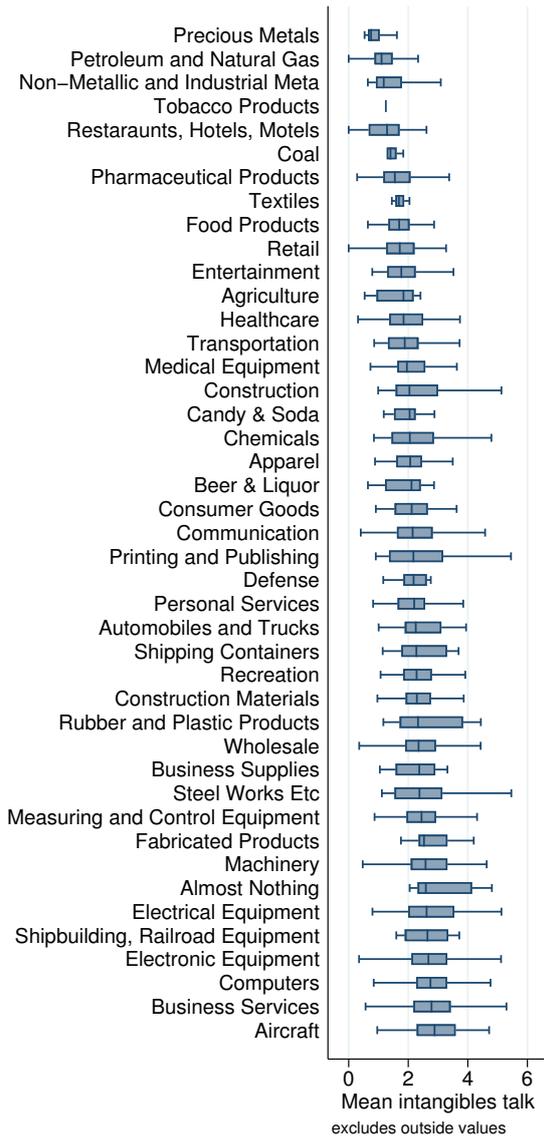
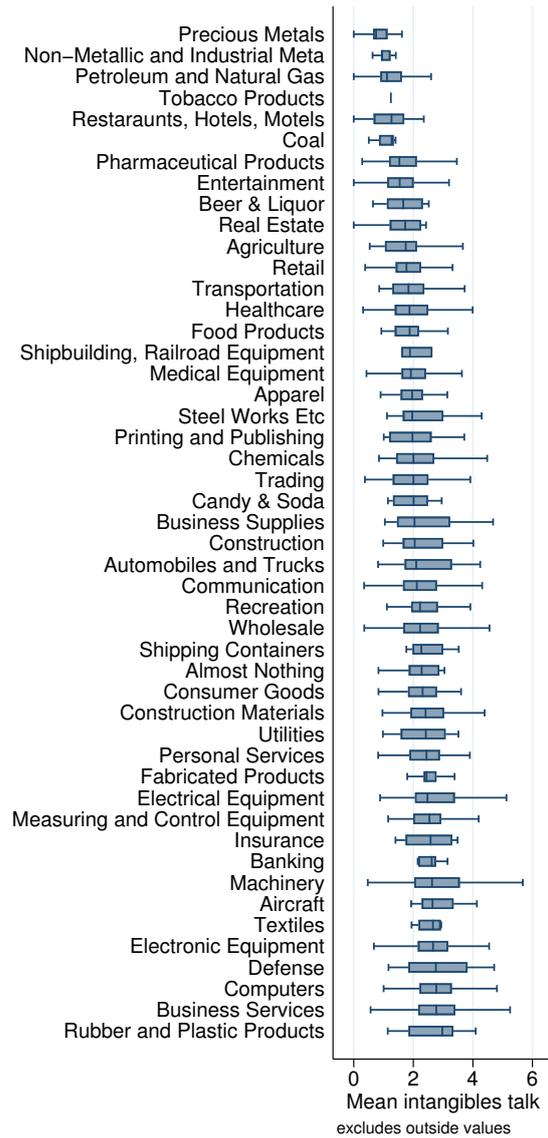


Figure 2: Intangibles talk over time

This figure plots the average frequency of intangibles words relative to the total word count in takeover announcements over time. The frequency is calculated for the whole sample (solid line) and separately for deals with private and public targets. The sample consists of 3,698 takeover deals announced between January 2002 and December 2019 with a bidder that is a publicly traded company domiciled in the United States.



(a) Acquirer industry



(b) Target industry

Figure 3: Intangibles talk by industry

The figure presents distribution of intangibles talk across different acquirer and target industries. Intangibles talk is defined as the frequency of intangibles words in takeover announcements, expressed as a percent. The sample consists of 3,698 takeover deals announced between January 2002 and December 2019 with a bidder that is a publicly traded company domiciled in the United States.

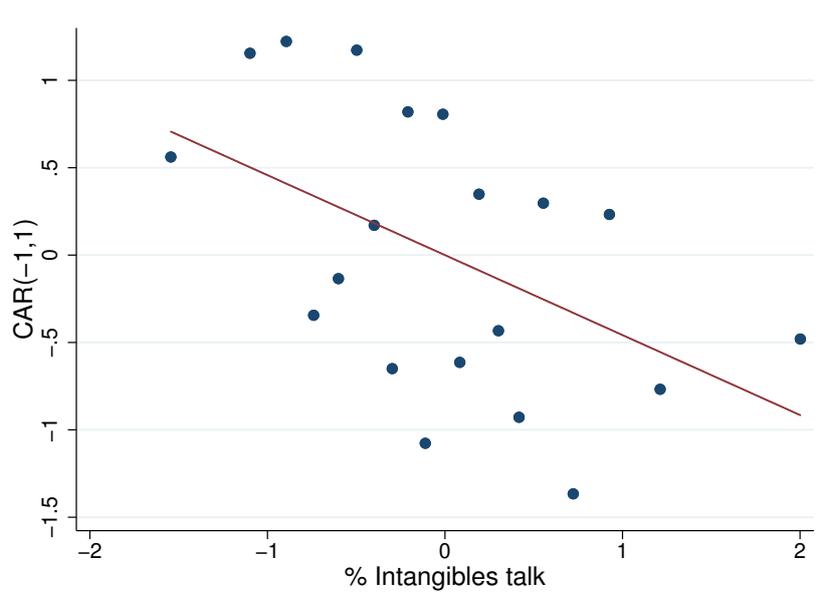


Figure 4: Bidder returns and intangibles talk

The figure shows the relation between the bidder announcement cumulative abnormal return (CAR) adjusted for industry, announcement year and target public status and the frequency of intangibles words in the announcement text. The announcement abnormal return is the cumulative 3-day event period return minus the associated Carhart four-factor model return. Cumulative daily abnormal returns are winsorized at the 1st and 99th percentiles. Plotted returns are residuals of OLS regressions of announcement CAR and intangibles talk on industry and year fixed effects and a dummy indicating whether the target is a public company. The sample consists of 3,698 takeover deals announced between January 2002 and December 2019 with a bidder that is a publicly traded company domiciled in the United States.

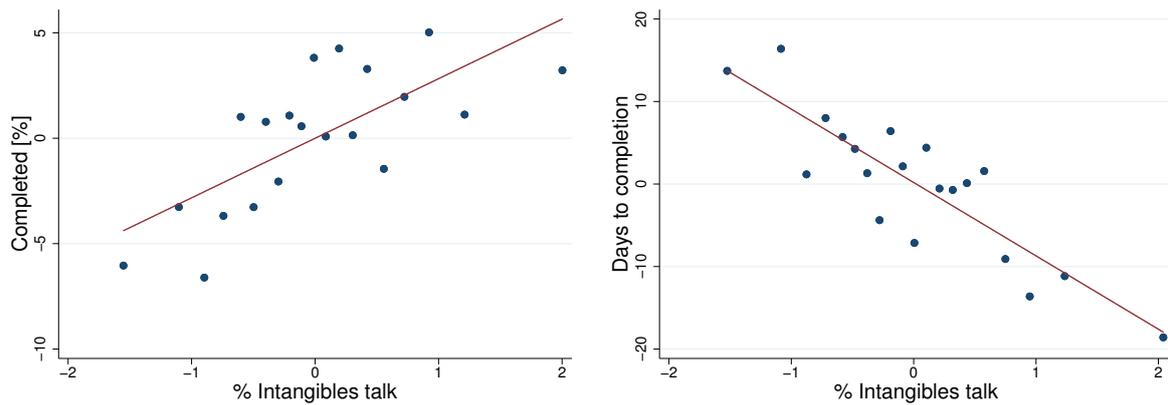


Figure 5: Completion speed and intangibles talk

The relation between the completion rate and the frequency of intangibles words in the announcement text is shown on the left diagram. The relation between time to completion and the frequency of intangibles words in the announcement text is shown on the right diagram. Time to completion is measured by the number of days it takes to complete the deal following the announcement given that the bidder acquires the target. The figures plot residuals of regressions of each variable on industry and year fixed effects and a dummy indicating whether the target is a public company. Thus, the figure shows actual completion (100% or 0%) minus predicted completion probability from a Probit regression in case of the completion rate; actual days to completion minus predicted days to completion from a OLS regression for time to completion; actual intangibles talk minus predicted intangibles talk from a OLS regression. The sample consists of 3,698 takeover deals announced between January 2002 and December 2019 with a bidder that is a publicly traded company domiciled in the United States.

Table 1: Intangibles word list

This table shows our intangibles word list. The list includes words and phrases that identify intangibles based on [Hall \(1992\)](#), [Lev \(2005\)](#) and [Lev \(2012\)](#). Following [Loughran and McDonald \(2011\)](#), we add the plural form of nouns, the simple past tense, the past participle, gerund and the third person present tense for verbs. Additionally, we include appropriate synonyms and words with similar meaning.

Intangibles words				
Abilities	Customer relations	Invented	Program	Trade names
Ability	Customers	Inventing	Programs	Trade secret
Advertising	Data	Invention	Project	Trade secrets
Algorithm	Database	Inventions	Projects	Trademark
Algorithms	Databases	Invents	Protected design	Trademarks
Alliance	Design	Invest	Protected designs	Trade-secret
Alliances	Designs	Invested	Qualities	Trade-secrets
Authorship	Developed	Investing	Quality	Training
Authorships	Development	Investment	R&D	User
Brand	Developments	Investments	Registered design	Users
Branding	Discoveries	Invests	Registered designs	Website
Brands	Discovery	Joint venture	Relation	Websites
Business model	Efficiencies	Joint ventures	Relations	Workforce
Business models	Efficiency	Knowhow	Relationship	
Business process	Employee	Know-how	Relationships	
Business processes	Employees	Knowledge	Reputation	
Capabilities	Employee-training	Label	Research	
Capability	Experience	Labels	Researches	
Capacities	Expert	Licence	Rights	
Capacity	Expertise	Licences	Risk management	
Client	Experts	Logo	Service	
Client relations	Footprint	Loyalty	Service mark	
Clients	Footprints	Market	Service marks	
Collaborate	Formula	Market share	Services	
Collaborated	Formulae	Marketing	Site visits	
Collaborates	Franchise	Markets	Skill	
Collaborating	Franchises	Model	Skills	
Collaboration	Goodwill	Models	Software	
Competence	HR	Network	Solution	
Competences	Human capital	Networks	Solutions	
Competencies	Human resources	Order backlog	Strategies	
Competency	Incentive	Organization capital	Strategy	
Connections	Incentives	Organizational design	Structure	
Connectivity	Infrastructure	Organizational designs	Structures	
Consumer	Infrastructures	Partner	Supply chain	
Consumers	Innovate	Partners	Supply chains	
Contract	Innovated	Patent	System	
Contracts	Innovates	Patented	Systems	
Copyright	Innovating	Patents	Talent	
Copyrights	Innovation	Platform	Talents	
Cost savings	Innovations	Platforms	Team	
Coverage	Innovator	Potential	Teams	
Coverages	Innovators	Potentials	Teamwork	
Culture	Intangible assets	Presence	Technologies	
Customer	Intangibles	Private-label	Technology	
Customer base	Intellectual capital	Private-labels	Tool	
Customer bases	Intellectual property	Process	Tools	
Customer list	Internet activities	Processes	Trade mark	
Customer lists	Internet activity	Product pipeline	Trade marks	
Customer relation	Invent	Productivity	Trade name	

Table 2: Variable definitions and sources

This table defines the main variables used in the analysis. They are obtained directly from or constructed using Compustat, CRSP, EDGAR, ExecuComp, I/B/E/S (Recommendations - Summary Statistics section), RiskMetrics, SDC, Thomson Reuters Institutional (13F) Stock Holdings, Thomson Reuters Insider Filings (IF), and Thomson Reuters Street Events (Refinitiv Company Events Coverage) databases.

Variable	Definition	Source
<i>Textual variables</i>		
% Intangibles talk	Ratio of the number of intangibles words to the total number of words in the takeover announcement, expressed in %.	EDGAR
% Negative	Ratio of the number of negative words to the total number of words in the takeover announcement, expressed in %.	EDGAR
% Positive	Ratio of the number of positive words to the total number of words in the takeover announcement, expressed in %.	EDGAR
% Strong modal	Ratio of the number of strong modal words to the total number of words in the takeover announcement, expressed in %.	EDGAR
% Uncertainty	Ratio of the number of uncertainty words to the total number of words in the takeover announcement, expressed in %.	EDGAR
ln(Text length)	Natural logarithm of the number of words in the takeover announcement.	EDGAR
Negativity	Ratio of the difference between the number of negative and positive words in the takeover announcement to their sum.	EDGAR
<i>Dependent variables</i>		
CAR(-1,1)	Cumulative abnormal returns (in %) for the bidder firm from day -1 to day 1 calculated using the Carhart four-factor model. Model parameters are estimated over days (-280, -31).	CRSP
CAR(-1,30)	Cumulative abnormal returns (in %) for the bidder firm from day -1 to day 30 calculated using the Carhart four-factor model. Model parameters are estimated over days (-280, -31).	CRSP
CAR _t (-1,1)	3-day cumulative abnormal returns (in %) for the target firm calculated using the Carhart four-factor model. Model parameters are estimated over days (-280, -31).	CRSP
V.w. comb. CAR(-1,1)	Value-weighted average of the bidder and target CAR(-1,1) where weights are calculated as day 0 market value of equity. The variable is expressed in %.	CRSP
Completed	1 for completed acquisitions.	SDC
Days to completion	Number of days between the effective and announcement dates.	SDC
ΔROA(0,T)	Acquiring firm T-year post acquisition increase in return on assets benchmarked to the mean performance of a portfolio of 2-digit SIC industry peers that do not differ more than 50% in size from the acquirer, and are not involved in any acquisition during a six-year period surrounding the transaction. The variable is expressed in percentage points.	Compustat
ΔAnalyst recom.	Change in the analyst recommendation calculated as a difference between the earliest available median recommendation that is calculated within the 7-60 days period after the takeover announcement and the most recent median recommendation calculated within the 7-60 days period before the takeover announcement. Thomson Reuters calculates median recommendations by assigning to each contributing analyst's recommendation an integer based on the standardized Thomson Reuters recommendation scale and calculating a real number median. We construct and use the inversed scale as follows: 5. Strong Buy, 4. Buy, 3. Hold, 2. Underperform, 1. Sell.	I/B/E/S

Table 2 – continued from previous page

Variable	Definition	Source
CEO buys	1 if the number of shares a CEO purchases exceeds the number of shares he sells over a trading window that begins 2 days after the announcement and ends 30 days after the announcement or the effective day if it comes first.	TR IF
CEO or Top Execs buy	1 if at least one of the following variables is equal to 1: CEO buys or Top Execs buy	TR IF
Directors buy	1 if the aggregate number of shares board members purchase exceeds the aggregate number of shares they sell over a trading window that begins 2 days after the announcement and ends 30 days after the announcement or the effective day if it comes first. Board members who hold an executive role (CEO, CFO, COO, CIO or CTO) are excluded.	TR IF
GW/AT ₀	Goodwill (GDWLQ) scaled by the book value of the bidder total assets in the most recent quarter before the deal completion date (quarter 0).	Compustat
Insiders buy	1 if at least one of the following variables is equal to 1: CEO buys, Directors buy or Top Execs buy	TR IF
SIA/AT ₀	Separable intangible assets computed as a difference between the total book value of intangible assets and goodwill (INTANQ - GDWLQ) scaled by the book value of the bidder total assets in the most recent quarter before the deal completion date (quarter 0).	Compustat
Top Execs buy	1 if the aggregate number of shares top executives (CFO, COO, CIO and CTO), aside from the CEO, purchase exceeds the aggregate number of shares they sell over a trading window that begins 2 days after the announcement and ends 30 days after the announcement or the effective day if it comes first.	TR IF
<i>Measures of intangible assets</i>		
Intan. assets _{acqt}	Dollar value of target intangible assets (in millions of US \$) measured as deal size minus the book value of tangible assets of the target [Tangible assets = Total assets (AT) - Intangible assets (INTAN)].	Compustat, SDC
Intan. assets _{bvj}	Dollar value of the book value of $j=[b(\text{idder}), t(\text{arget})]$ intangible assets (in millions of US \$).	Compustat
Intan. assets _{PTj}	Dollar value of $j=[b(\text{idder}), t(\text{arget})]$ intangible assets (in millions of US \$) measured as in Peters and Taylor (2017) . The measure, labeled as K_{int} and defined as the estimated replacement cost of the firm's intangible capital, is available through WRDS.	WRDS
(IA _{acq} /AT) _t	Ratio of target intangible assets to the book value of target total assets. Intangible assets are measured as deal size minus the book value of tangible assets [Tangible assets = Total assets (AT) - Intangible assets (INTAN)].	Compustat, SDC
(IA _{bv} /AT) _j	Ratio of the book value of $j=[b(\text{idder}), t(\text{arget})]$ intangible assets to the book value of target total assets.	Compustat
(IA _{PT} /AT) _j	Ratio of $j=[b(\text{idder}), t(\text{arget})]$ intangible assets to the book value of target total assets. Intangible assets are measured as in Peters and Taylor (2017) . The measure, labeled as K_{int} and defined as the estimated replacement cost of the firm's intangible capital, is available through WRDS.	Compustat, WRDS
<i>Control variables</i>		
Acquirer term. fee	1 if the acquirer is liable to pay a termination fee to the target.	SDC
Cash	1 for deals financed with cash only.	SDC
Cross-country	1 when the bidder and the target are not from the same country.	SDC
Cross-industry	1 when the bidder and the target are in a different 2-digit SIC code industry.	SDC

Table 2 – continued from previous page

Variable	Definition	Source
Deal size	Total value of the transaction (millions of US \$).	SDC
Friendly	1 if attitude of the target management is friendly.	SDC
HHI _j	The Herfindahl-Hirschman Index (HHI) that measures concentration of the $j=[\text{bidder}, \text{target}]$ industry. It is calculated by squaring the market share (in %) of each firm competing in the 2-digit SIC industry and then summing the resulting numbers. Market shares are calculated using firms' sales in the most recent year before deal announcement (Compustat item SALE [#12]).	Compustat
High-tech	1 when the target belongs to the following industries: drugs (SIC codes 2833-2836), research and development services (8731-8734), programming (7371-7379), computers (3570-3577), and electronics (3600-3674), as in Baginski et al. (2004) .	SDC
Managerial ability	Managerial ability (in decile ranks by industry and year) as in Demerjian et al. (2012) . The authors split total firm efficiency into firm efficiency and managerial ability by regressing total firm efficiency on six variables: firm size, firm market share, cash availability, life cycle, operational complexity, and foreign operations. The residual from this estimation is their measure of managerial ability.	Peter Demerjian
Market cap	Bidder market capitalization [=Share price (PRCC_F) × Number of shares outstanding (CSHO) (millions of US \$)] at the last fiscal year end before the takeover announcement.	Compustat
Market-to-book	Ratio of the bidder market capitalization to its book value of equity [=Total shareholders' equity (SEQ) + Deferred taxes and investment tax credits (TXDITC) - Preferred stock liquidating value (PSTKL)] at the last fiscal year end before the takeover announcement.	Compustat
Mixed	1 for deals financed with a mix of cash and stock.	SDC
Multiple bidders	1 when there is more than one bidder.	SDC
Private	1 when the target is a private company.	SDC
Public	1 when the target is a publicly listed company.	SDC
Relative size	Ratio of the deal size to the bidder market capitalization at the last fiscal year end before the takeover announcement.	Compustat, SDC
ROA	Bidder firm return on assets [EBITDA / Book value of assets (AT)] at the last fiscal year end before the takeover announcement, expressed in %.	Compustat
Shares	1 for deals financed with stock only.	SDC
Target term. fee	1 if the target is liable to pay a termination fee to the acquirer.	SDC
Tender offer	1 when the deal is structured as a tender offer	SDC
<i>Additional interaction variables</i>		
% Positive _{earn}	Average ratio of the number of positive words to the total number of words in a company's earnings calls, expressed in %.	Refinitiv Company Events Coverage
Anti-takeover defenses	Governance index constructed according to Gompers et al. (2003) . The original index is available only for the period 1990 to 2006. We extend it following Peters and Wagner (2014) . The variables included in this modified governance index (GIM) are blank check preferred, classified board, limit ability to call special meeting, limit ability to act by written consent, golden parachutes, limit ability to amend bylaws, limit ability to amend charter, cumulative voting, supermajority requirement, unequal voting rights, fair price, and poison pill.	RiskMetrics
Disclosure quality	The level of disaggregation of accounting data through a count of nonmissing data items in firms' annual reports as reported by Compustat (as in Chen et al., 2015).	Compustat

Table 2 – continued from previous page

Variable	Definition	Source
Executive incentives	The natural logarithm of executive incentives to increase the share price (equity delta), as in Core and Guay (2002) and Coles et al. (2006) .	Execucomp
High forecaster	1 for bidders whose fraction of voluntarily disclosed earnings forecasts that exceed the ex-post realized earnings or, alternatively, the analyst consensus forecast (following Otto, 2014) is in the top quartile, and zero otherwise. Since the original measure is available only for the period 1996 to 2005, we extended it over the years 2006 to 2019 keeping the same values.	Clemens Otto
Institutional ownership	Total stock ownership by institutional investors relative to the number of shares outstanding.	TR 13F
Longholder	1 for bidders with overoptimistic CEOs. CEOs are classified as overoptimistic if all their options were exercised within one year of the expiration date, and all of them were at least 40% in the money at the end of the year that precedes the exercise date (as in Malmendier and Tate, 2008 ; Otto, 2014).	ExecuComp
ln(Num. of analysts)	The natural logarithm of the number of analysts covering an acquiring company.	I/B/E/S
Operating CF/AT	Operating cash flow divided by the acquirer's book value of assets when the acquirer's M/B ratio is not in the top quartile, and zero otherwise (as in Li et al., 2018a). Operating cash flow is defined as operating income before depreciation minus interest expense, taxes, preferred dividends, and common dividends (as in Lang et al., 1991). $(OIBDP[\#13] - XINT[\#15] - (TXT[\#16] - \text{change in } TXDITC[\#35]) - DVP[\#19] - DVC[\#21]) / AT[\#6]$	Compustat

Table 3: Descriptive statistics

This table reports summary statistics for the main variables used in our analysis. Panel A reports statistics for the announcement text variables. Panel B reports statistics for the dependent variables. Different measures of bidder and target intangible assets are presented in Panels C and D, respectively, followed by the control variables presented in Panel E and additional interaction variables presented in Panel F. The sample consists of 3,698 takeover deals announced between January 2002 and December 2019 with the bidder that is a publicly traded company domiciled in the United States, though the sample is smaller for some regressions because not all variables are available for all deals. We require that deal and bidder data are available in SDC, CRSP and COMPUSTAT, and that the takeover announcement is accessible through EDGAR. We collect transactions with at least \$1 million deal value and 1% relative size (deal value to bidder market capitalization ratio) and that are not labeled as recapitalizations, repurchases, self-tenders, nor exchange offers. We require that the bidder owns at least 80% of the target after the purchase in case of completed deals, and not more than 15% before the announcement. Bidders that operate in regulated utilities (SIC code 4900-4999) or financial industry (SIC code 6000-6999) are excluded from the sample. % *Intangibles talk* is defined as the number of intangibles words divided by the total number of words in the announcement, expressed in percent. The detailed description of the other variables is provided in [Table 2](#).

	Mean	Median	St. Dev.	p25	p75
<i>Panel A: Textual variables</i>					
% Intangibles talk	2.40%	2.31%	0.99%	1.68%	3.03%
% Negative	0.34%	0.28%	0.28%	0.16%	0.46%
% Positive	1.44%	1.39%	0.58%	1.04%	1.81%
% Strong modal	0.19%	0.16%	0.12%	0.11%	0.24%
% Uncertainty	0.42%	0.38%	0.24%	0.26%	0.54%
Negativity	-0.56	-0.61	0.27	-0.75	-0.42
Text length	890.2	788	471.2	556	1111
<i>Panel B: Dependent variables</i>					
CAR(-1,1) [%]	0.63%	0.37%	8.68%	-3.01%	4.09%
CAR(-1,30) [%]	-2.08%	-1.13%	18.9%	-10.7%	7.81%
CAR _t (-1,1) [%]	24.2%	19.9%	23.1%	8.91%	35.1%
V.w. comb. CAR(-1,1)	3.07%	2.29%	7.87%	-0.98%	7.23%
Δ ROA(0,1) [%]	0.88%	0.83%	7.82%	-1.99%	3.86%
Δ ROA(0,3) [%]	0.66%	0.82%	11.4%	-3.63%	5.29%
Δ Analyst recom.	0.015	0	0.36	0	0
(GW/AT ₀) _{quarter[-7,0]}	0.16	0.12	0.15	0.023	0.25
(GW/AT ₀) _{quarter[1,8]}	0.37	0.30	0.31	0.15	0.51
Completed	0.91	1	0.28	1	1
Days to completion	54.7	34	67.7	0	79
CEO buys	0.098	0	0.30	0	0
CEO or Other Execs buy	0.12	0	0.33	0	0
Directors buy	0.13	0	0.33	0	0
Insiders buy	0.18	0	0.39	0	0
Top Execs buy	0.062	0	0.24	0	0
<i>Panel C: Bidder intangible assets</i>					
(Intan. assets _{PT}) _b [USDm]	2183.0	275.6	7412.8	79.7	992.7
(Intan. assets _{bv}) _b [USDm]	1066.0	80.7	3731.5	11.1	434.4
(IA _{PT} /AT) _b	0.76	0.69	0.53	0.46	0.93
(IA _{bv} /AT) _b	0.25	0.21	0.22	0.058	0.40
<i>Panel D: Target intangible assets (public targets only)</i>					
(Intan. assets _{PT}) _t [USDm]	1368.5	221.2	4177.5	81.0	744.1
(Intan. assets _{bv}) _t [USDm]	729.2	33.0	2532.8	1.76	244.6
(Intan. assets _{acq}) _t [USDm]	1728.5	207.1	4504.1	20.1	1178.0
(IA _{PT} /AT) _t	0.92	0.72	0.92	0.41	1.06
(IA _{bv} /AT) _t	0.19	0.12	0.20	0.015	0.32
(IA _{acq} /AT) _t	1.57	0.82	2.37	0.13	1.85
<i>Panel E: Control variables</i>					
Acquirer term. fee	0.097	0	0.30	0	0
Cash	0.58	1	0.49	0	1
Cross-country	0.16	0	0.37	0	0
Cross-industry	0.36	0	0.48	0	1
Deal size [USDm]	832.9	80	2948.4	23.2	328
Friendly	0.98	1	0.15	1	1
HHI _t	0.059	0.037	0.071	0.030	0.067
High-tech	0.42	0	0.49	0	1
Market cap [USDm]	4949.7	725.4	15566.7	202.9	2403.8
Market-to-book	3.67	2.54	3.77	1.63	4.13

Table 3 – continued from previous page

	Mean	Median	St. Dev.	p25	p75
Mixed	0.31	0	0.46	0	1
Multiple bidders	0.028	0	0.17	0	0
Private	0.70	1	0.46	0	1
Public	0.30	0	0.46	0	1
Relative size	0.31	0.12	0.49	0.048	0.32
ROA [%]	7.62%	11.3%	18.1%	4.91%	16.3%
Shares	0.11	0	0.31	0	0
Target term. fee	0.23	0	0.42	0	0
Tender offer	0.059	0	0.24	0	0
<i>Panel F: Additional interaction variables</i>					
% Positive _{eam}	1.65%	1.63%	0.30%	1.44%	1.83%
Anti-takeover	5.20	5	1.51	4	6
Disclosure quality	0.48	0.48	0.27	0.25	0.70
Executive incentives	1163.7	218.1	9683.9	90.2	575.5
High forecaster	0.24	0	0.43	0	0
Institutional ownership	0.64	0.73	0.30	0.45	0.89
Longholder	0.13	0	0.34	0	0
Number of analysts	7.70	6	6.48	3	10
Operating CF/AT	0.039	0.053	0.11	0	0.100

Table 4: What explains intangibles talk?

This table reports OLS regression results. The dependent variable, *% Intangibles talk*, is defined as the number of intangibles words divided by the total number of words in the takeover announcement, expressed in percent. Panel A reports results for the full sample (takeover announcements between January 2002 and December 2019 with the bidder that is a publicly traded company domiciled in the United States), while panel B is limited to public target deals. Financial data are not available for private targets and for targets abroad. $(IA_s/AT)_j$ is the ratio of $j=[b(\text{ bidder}), t(\text{ target})]$ intangible assets to total assets, where $s=[PT(\text{ Peters and Taylor}), bv(\text{ book value}), acq(\text{ deal size minus the book value of tangible assets})]$. IA_{acq} is only available for targets. Additional variable descriptions are provided in Table 2. The continuous variables are winsorized at the 1st and 99th percentiles. Each regression includes industry and year fixed effects as indicated. The standard errors (reported in parentheses) are clustered by the announcement year and are robust to heteroskedasticity. Significance levels: : * - 10%, ** - 5%, *** - 1%.

(a) Panel A: Full sample

	(1)	(2)	(3)	(4)	(5)	(6)
$(IA_{PT}/AT)_b$	0.132*** (0.034)		-0.029 (0.036)		-0.003 (0.032)	
$(IA_{bv}/AT)_b$		0.387*** (0.107)		0.002 (0.096)		0.064 (0.084)
Relative size					-0.314*** (0.020)	-0.313*** (0.020)
Public					-0.511*** (0.025)	-0.513*** (0.026)
Constant	2.205*** (0.024)	2.232*** (0.018)	1.065*** (0.179)	1.057*** (0.178)	1.283*** (0.208)	1.280*** (0.207)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	No	Yes	Yes	Yes	Yes
Adjusted R^2	0.00	0.01	0.22	0.22	0.31	0.31
Observations	3698	3698	3698	3698	3698	3698

(b) Panel B: Public targets: The role of target intangible assets

	PT(2017) IA measures			Book value IA measures			Acquired IA measures		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$(IA_{PT}/AT)_b$	0.227*** (0.065)	0.149* (0.073)	-0.027 (0.077)				0.227*** (0.065)	0.222*** (0.064)	-0.007 (0.067)
$(IA_{bv}/AT)_b$				0.461*** (0.112)	0.345** (0.136)	0.016 (0.160)			
$(IA_{PT}/AT)_t$		0.079* (0.040)	0.025 (0.039)						
$(IA_{bv}/AT)_t$					0.056 (0.119)	-0.190 (0.113)			
$(IA_{acq}/AT)_t$								0.005 (0.012)	-0.007 (0.010)
Relative size			-0.190*** (0.032)			-0.186*** (0.035)			-0.197*** (0.032)
Constant	1.980*** (0.043)	1.933*** (0.040)	1.503*** (0.051)	2.047*** (0.020)	2.034*** (0.017)	1.476*** (0.026)	1.980*** (0.043)	1.938*** (0.039)	1.502*** (0.051)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	No	Yes	No	No	Yes	No	No	Yes
Adjusted R^2	0.02	0.02	0.28	0.01	0.00	0.28	0.02	0.01	0.28
Observations	1099	802	802	1099	802	802	1099	802	802

Table 5: Abnormal bidder returns

This table reports OLS regression results for the bidder's cumulative abnormal returns, CAR(-1,1) and CAR(-1,30), measured using Carhart four-factor model returns. The sample consists of takeover announcements between January 2002 and December 2019 with the bidder that is a publicly traded company domiciled in the United States. % *Intangibles talk* is defined as the number of intangibles words divided by the total number of words in the announcement, expressed as a percent. Additional variable descriptions are provided in Table 2. The dependent variables (CAR(-1,1) and CAR(-1,30)) and continuous control variables are winsorized at the 1st and 99th percentiles. The standard errors (reported in parentheses) are clustered by the announcement year and are robust to heteroskedasticity. Significance levels: : * - 10%, ** - 5%, *** - 1%.

	(1) CAR(-1,1) [%]	(2) CAR(-1,1) [%]	(3) CAR(-1,30) [%]	(4) CAR(-1,30) [%]
% Intangibles talk	-0.409** (0.175)	-0.500*** (0.151)	-0.815** (0.355)	-0.958** (0.351)
Negativity		-1.080 (0.683)		-1.297 (1.241)
% Uncertainty		0.568 (0.581)		0.179 (1.239)
% Strong modal		0.844 (1.305)		4.036 (2.664)
Public	-3.295*** (0.736)	-3.319*** (0.731)	-3.694*** (0.946)	-3.725*** (0.929)
Mixed	-0.601* (0.295)	-0.644** (0.299)	-0.926 (0.697)	-0.986 (0.720)
Shares	-0.757 (0.796)	-0.774 (0.808)	-2.710* (1.301)	-2.764* (1.336)
Relative size	2.061*** (0.535)	2.033*** (0.545)	2.060* (1.063)	2.038* (1.049)
Cross-industry	-0.426 (0.364)	-0.433 (0.367)	-0.816 (0.699)	-0.825 (0.695)
Cross-country	0.084 (0.450)	0.070 (0.459)	-0.251 (0.761)	-0.253 (0.765)
Tender offer	2.371*** (0.672)	2.441*** (0.681)	3.837*** (1.182)	3.943*** (1.153)
Multiple bidders	-1.031 (1.319)	-1.024 (1.319)	-0.509 (2.155)	-0.515 (2.155)
Friendly	-0.699 (0.672)	-0.743 (0.648)	4.420* (2.390)	4.404* (2.323)
ln(Text length)	-0.714* (0.341)	-0.624* (0.307)	-1.408* (0.720)	-1.066 (0.742)
(IA _{PT} /AT) _b	-0.136 (0.427)	-0.134 (0.427)	-1.299 (1.383)	-1.303 (1.388)
ROA [%]	0.001 (0.014)	-0.000 (0.014)	0.067** (0.030)	0.065** (0.031)
ln(Market cap)	-0.294** (0.104)	-0.299** (0.103)	0.125 (0.305)	0.108 (0.302)
Market-to-book	0.061 (0.055)	0.061 (0.054)	-0.220 (0.160)	-0.220 (0.159)
Constant	21.494*** (3.180)	21.088*** (3.561)	35.926*** (9.613)	34.028*** (9.561)
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Adjusted R ²	0.05	0.05	0.02	0.02
Observations	3698	3698	3698	3698

Table 6: Ex-post performance and analyst stock recommendations

The table reports OLS regression results for changes in the bidder performance (Δ ROA) and analyst stock recommendation changes (Δ Analyst recom.) following the acquisition. The sample consists of completed takeover deals announced between January 2002 and December 2019 with the bidder that is a publicly traded company domiciled in the United States. The first specification reports results for changes in ROA from year 0 to year 1, where year 0 is defined as the year of acquisition. The second specification reports results for a 3-year period. We adjust bidder ROA changes by subtracting those of the bidder's industry peers. For each bidder, we construct a portfolio of peers that do not differ more than 50% in size from the bidder, operate in the same 2-digit SIC industry, and are not involved in any acquisition during a six-year period surrounding the transaction. The benchmark is calculated as a mean performance change of each portfolio. The third specification reports results for changes in the analyst recommendations, calculated as the difference between the earliest available median recommendation that is calculated within the 7-60 days period after the takeover announcement and the most recent median recommendation calculated within the 7-60 days period before the takeover announcement. Thomson Reuters calculates median recommendations by assigning to each contributing analyst's recommendation an integer based on the standardized Thomson Reuters recommendation scale and calculating a real number median. We construct and use the inversed scale as follows: 5. Strong Buy, 4. Buy, 3. Hold, 2. Underperform, 1. Sell. *% Intangibles talk* is defined as the number of intangibles words divided by the total number of words in the announcement, expressed as a percent. Additional variable descriptions are provided in Table 2. All regressions include the control variables included in Table 5. The dependent variables and continuous control variables are winsorized at the 1st and 99th percentiles. The standard errors (reported in parentheses) are clustered by the announcement year and are robust to heteroskedasticity. Significance levels: : * - 10%, ** - 5%, *** - 1%.

	Δ ROA(0,1 year)	Δ ROA(0,3 years)	Δ Analyst recom.
	(1)	(2)	(3)
% Intangibles talk	-0.437** (0.177)	-0.088 (0.550)	-0.015** (0.005)
Controls	Yes	Yes	Yes
Textual variables	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Adjusted R^2	0.04	0.01	0.01
Observations	2795	2091	3304

Table 7: Balance sheet consequences

The table reports results of differences-in-differences panel data regressions for the acquirer goodwill (GW) and separable intangible assets (SIA) over the time period of 16 quarters – 8 quarters before and 8 quarters after the deal completion date. All dependent variables are scaled by the book value of the bidder total assets in the most recent quarter before the deal completion date (quarter 0). The sample in the first two specifications consists of 3,378 completed takeover deals announced between January 2002 and December 2019 with the bidder that is a publicly traded company domiciled in the United States. The last two specifications additionally require that the bidder does not announce another acquisition within ± 2 years around the deal announcement day, resulting in 583 deals. *% Intangibles talk* is defined as the number of intangibles words divided by the total number of words in the announcement, expressed as a percent. *Post* dummy is equal to one for quarters after the deal completion date. The regressions control for the same variables as Table 5, and their interactions with *Post*. Additional variable descriptions are provided in Table 2. The dependent variables and continuous control variables are winsorized at the 1st and 99th percentiles. The standard errors (reported in parentheses) are clustered by deal and quarter. Significance levels: * - 10%, ** - 5%, *** - 1%

	All completed deals		No deal w/i ± 2 years	
	(1) GW/AT ₀	(2) SIA/AT ₀	(3) GW/AT ₀	(4) SIA/AT ₀
% Intangibles talk	-0.007 (0.010)	-0.002 (0.002)	-0.013 (0.012)	-0.010 (0.008)
Post	0.036 (0.060)	-0.004 (0.043)	-0.145* (0.088)	-0.010 (0.088)
Post \times % Intangibles talk	0.010** (0.005)	-0.010*** (0.003)	0.021*** (0.007)	-0.006 (0.006)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
R^2 overall	0.359	0.329	0.470	0.426
R^2 within	0.393	0.355	0.497	0.406
R^2 between	0.326	0.295	0.454	0.436
Observations	51896	50894	8814	8744

Table 8: Agency and bidder returns

The table summarizes the effect of intangibles talk on bidder returns conditional on the quality of corporate governance of the bidder. Panel A reports OLS regression results for 3-day bidder cumulative abnormal returns, CAR(-1,1), measured using Carhart four-factor model returns. Panel B reports OLS regression results for CAR(-1,30). The sample consists of the takeovers announced between January 2002 and December 2019 with the bidder that is a publicly traded company domiciled in the United States. *% Intangibles talk* is defined as the number of intangibles words divided by the total number of words in the announcement, expressed as a percent. In each of the columns, we interact intangibles talk with a different corporate governance measure (*Gov*): (1) Institutional investor holdings, (2) Executive incentives, (3) Disclosure quality, (4) ln(Number of analysts), (5) Operating CF/AT, and (6) Anti-takeover defenses. Additional variable descriptions are provided in Table 2. All regressions include the control variables included in Table 5. CAR and continuous control variables are winsorized at the 1st and 99th percentiles. The standard errors (reported in parentheses) are clustered by the announcement year and are robust to heteroskedasticity. Significance levels: * - 10%, ** - 5%, *** - 1%.

(a) Panel A: CAR(-1,1)

	(1)	(2)	(3)	(4)	(5)	(6)
% Intangibles talk	-0.509*** (0.147)	-0.751*** (0.203)	-0.543*** (0.161)	-0.473** (0.180)	-0.510** (0.178)	-0.652*** (0.205)
Gov	-0.582 (0.760)	0.352** (0.133)	-0.242 (0.522)	-0.223 (0.223)	-2.173 (2.078)	0.030 (0.132)
Gov × % Intangibles talk	-0.034 (0.454)	-0.058 (0.112)	0.515 (0.423)	-0.019 (0.131)	-0.954 (2.190)	-0.072 (0.092)
Textual variables	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.05	0.06	0.05	0.04	0.05	0.08
Observations	3673	1883	3544	3328	3314	1682

(b) Panel B: CAR(-1,30)

	(1)	(2)	(3)	(4)	(5)	(6)
% Intangibles talk	-0.948** (0.353)	-1.654*** (0.522)	-0.967** (0.377)	-0.822 (0.562)	-0.807* (0.422)	-1.187* (0.613)
Gov	2.908 (2.032)	0.800*** (0.217)	-0.834 (0.938)	0.828 (0.737)	7.603 (5.049)	0.033 (0.253)
Gov × % Intangibles talk	-0.011 (1.383)	-0.198 (0.228)	1.879 (1.334)	0.186 (0.450)	6.533 (4.197)	0.305 (0.245)
Textual variables	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.03	0.04	0.02	0.03	0.03	0.03
Observations	3673	1883	3544	3328	3314	1682

Table 9: Optimism and bidder returns

The table summarizes the effect of intangibles talk on bidder returns conditional on the optimism of the bidder. Panel A reports OLS regression results for 3-day bidder cumulative abnormal returns, CAR(-1,1), measured using Carhart four-factor model returns. Panel B reports OLS regression results for CAR(-1,30). The sample consists of the takeovers announced between January 2002 and December 2019 with the bidder that is a publicly traded company domiciled in the United States. *% Intangibles talk* is defined as the number of intangibles words divided by the total number of words in the announcement, expressed as a percent. In each of the columns, we interact intangibles talk with a different optimism measure (*Opt*): (1) minus Negativity, (2) % Positive, (3) % Positive in earnings calls, (4) Longholder, and (5) High forecaster. Additional variable descriptions are provided in Table 2. All regressions include the control variables included in Table 5. CAR and continuous control variables are winsorized at the 1st and 99th percentiles. The standard errors (reported in parentheses) are clustered by the announcement year and are robust to heteroskedasticity. Significance levels: * - 10%, ** - 5%, *** - 1%.

(a) Panel A: CAR(-1,1)

	(1) CAR(-1,1) [%]	(2) CAR(-1,1) [%]	(3) CAR(-1,1) [%]	(4) CAR(-1,1) [%]	(5) CAR(-1,1) [%]
% Intangibles talk	-0.496*** (0.151)	-0.496** (0.188)	-0.494*** (0.152)	-0.507* (0.264)	-0.550* (0.311)
Opt	0.802 (0.666)	0.237 (0.345)	-0.008 (0.146)	1.073** (0.473)	0.292 (0.465)
Opt × % Intangibles talk	-0.943* (0.490)	-0.399** (0.143)	-0.150 (0.141)	-0.337 (0.571)	-0.554 (0.479)
Textual variables	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.05	0.05	0.05	0.08	0.10
Observations	3698	3698	3698	1097	613

(b) Panel B: CAR(-1,30)

	(1) CAR(-1,30) [%]	(2) CAR(-1,30) [%]	(3) CAR(-1,30) [%]	(4) CAR(-1,30) [%]	(5) CAR(-1,30) [%]
% Intangibles talk	-0.940** (0.338)	-0.873** (0.380)	-0.950** (0.365)	-0.472 (0.705)	-1.022 (0.629)
Opt	0.286 (1.297)	0.240 (0.657)	0.420 (0.404)	0.785 (1.177)	0.785 (1.376)
Opt × % Intangibles talk	-3.435** (1.242)	-1.055** (0.369)	-0.787** (0.273)	-2.906*** (0.860)	-2.443* (1.242)
Textual variables	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.03	0.03	0.03	0.04	0.07
Observations	3698	3698	3698	1097	613

Table 10: Deal completion

This table reports the analysis of the relation between intangibles talk and deal completion. The first two specifications report results of probit regressions estimating the propensity for the bidder to complete the deal following the takeover announcement. The last two specifications report OLS regression results for the number of days it takes to complete the deal, given that the bidder acquires the target. The sample consists of takeover deals announced between January 2002 and December 2019 with the bidder that is a publicly traded company domiciled in the United States. *% Intangibles talk* is defined as the number of intangibles words divided by the total number of words in the announcement, expressed as a percent. Additional variable descriptions are provided in Table 2. Days to completion and continuous control variables are winsorized at the 1st and 99th percentiles. The first two specifications report average marginal effects instead of estimated coefficients. The standard errors (reported in parentheses) are clustered by the announcement year and are robust to heteroskedasticity. Significance levels: : * - 10%, ** - 5%, *** - 1%.

	Completion		Days to completion	
	(1)	(2)	(3)	(4)
% Intangibles talk	0.023*** (0.005)	0.015*** (0.005)	-3.946*** (1.252)	-3.058** (1.342)
Negativity		-0.044*** (0.014)		5.554* (2.994)
% Uncertainty		-0.035** (0.015)		6.379* (3.579)
% Strong modal		-0.042 (0.045)		0.509 (6.470)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Adjusted R^2			0.48	0.48
Pseudo R^2	0.27	0.28		
Observations	3698	3698	3378	3378

Table 11: Payment method

This table reports the analysis of the relation between intangibles talk and payment method choice. The table reports results of probit regressions. The dependent variable is Cash, a binary indicator which is 1 for deals financed with cash only. Column (1) and (4) use the full sample, Columns (2)-(3) and (5)-(6) only public targets. The sample consists of takeover deals announced between January 2002 and December 2019 with the bidder that is a publicly traded company domiciled in the United States. *% Intangibles talk* is defined as the number of intangibles words divided by the total number of words in the announcement, expressed as a percent. Additional variable descriptions are provided in [Table 2](#). The continuous control variables are winsorized at the 1st and 99th percentiles. The table reports average marginal effects. The standard errors (reported in parentheses) are clustered by the announcement year and are robust to heteroskedasticity. Significance levels: : * - 10%, ** - 5%, *** - 1%.

	All (1)	Public targets (2)	Public targets (3)	All (4)	Public targets (5)	Public targets (6)
% Intangibles talk	0.102*** (0.008)	0.100*** (0.018)	0.076*** (0.018)	0.040*** (0.009)	0.076*** (0.023)	0.078*** (0.023)
(IA _{PT} /AT) _b	-0.179*** (0.015)			-0.044*** (0.015)		
(IA _{PT}) _t /(IA _{PT}) _b		-0.093*** (0.027)			-0.002 (0.006)	
ln(IA _{PT}) _t /ln(IA _{PT}) _b			-0.714*** (0.070)			-0.223** (0.099)
Textual variables	No	No	No	Yes	Yes	Yes
Controls	No	No	No	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R ²	0.11	0.21	0.26	0.26	0.43	0.43
Observations	3698	805	805	3698	805	805

Table 12: Insider trading

The table reports results of probit regressions that estimate the propensity for the acquirer CEO, top executives, and board members to buy stock following the takeover announcement. The sample consists of the takeovers announced between January 2002 and December 2019 with the bidder that is a publicly traded company domiciled in the United States. We calculate the total number of shares traded by the CEO, Top Executives and Board members during the period 2-30 days after the takeover announcement. If the number is positive, we classify the trade as a buy. The dependent variable in regressions (4) through (6) is equal to one if either the CEO or the group of other top executives buy. The dependent variable in regressions (7) through (9) is equal to one if either the CEO or the group of other top executives or board members buy. *% Intangibles talk* is defined as the number of intangibles words divided by the total number of words in the announcement, expressed as a percent. Additional variable descriptions are provided in Table 2. The continuous control variables are winsorized at the 1st and 99th percentiles. The table reports average marginal effects. The standard errors (reported in parentheses) are clustered by the announcement year and are robust to heteroskedasticity. Significance levels: : * - 10%, ** - 5%, *** - 1%.

	CEO	Top Execs	Directors	CEO or Top Execs			Insiders		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
% Intangibles talk	0.020*** (0.005)	0.013*** (0.004)	0.021** (0.008)	0.027*** (0.007)	0.009 (0.007)	0.014** (0.007)	0.039*** (0.007)	0.018** (0.009)	0.025*** (0.008)
CAR(-1,1) [%]	-0.002*** (0.001)	-0.001*** (0.000)	-0.003*** (0.001)	-0.002*** (0.001)	-0.003*** (0.001)	-0.004*** (0.001)	-0.003*** (0.001)	-0.005*** (0.001)	-0.005*** (0.001)
% Int. talk × Rel. size						0.018*** (0.004)			0.026*** (0.008)
Textual variables	No	No	No	No	Yes	Yes	No	Yes	Yes
Controls	No	No	No	No	Yes	Yes	No	Yes	Yes
Year FE	Yes								
Industry FE	Yes								
Pseudo R ²	0.05	0.07	0.05	0.05	0.18	0.18	0.05	0.15	0.15
Observations	3698	3698	3698	3698	3698	3698	3698	3698	3698

Table 13: Summary of hypotheses and results

This table summarizes the relation between intangibles talk and the dependent variables in the major tests conducted in the paper and compares them with the predictions of the three main hypotheses. For the hypotheses, a “+” sign indicates an expected positive relation, a “-” sign indicates an expected negative relation, and an “n.a.” indicates that in that framework the corresponding variable does not feature. For the empirical findings, a “0” indicates that no significant relation is found.

	Signs for the relation between intangibles talk (IT) and ...						
	Bidder returns	Change in ROA	Bidder returns: Interaction of IT with bad governance proxies	Bidder returns: Interaction of IT with optimism proxies	Completion speed and probability	Cash payment	Insider purchases
<i>Hypothesis</i>							
Advantageous Info	+	+	n.a.	n.a.	+	-	+
Agency	-	-	-	n.a.	+	-	-
Overoptimism	-	-	n.a.	-	+	+	+
Empirical findings	-	-	0	-	+	+	+

Table 14: Robustness

The table summarizes robustness checks for all main regressions. Panel A reports results when tech words are excluded from the basic dictionary. Panel B extends the basic dictionary with synergy words. Panel C uses a dictionary that omits words mentioned in Section 6. Panel D omits bidders that operate in the industry that is classified as High-tech, as in Baginski et al. (2004). Panel E controls for disclosure quality as in Chen et al. (2015). Panel F controls for the target industry concentration measured by the Herfindahl-Hirschman Index (HHI). Panel G controls for Intangibles talk in earnings conference calls. Panel H controls for managerial ability (in decile ranks by industry and year) as in Demerjian et al. (2012). Panel I uses industry-year fixed effects. Panel J omits deals with the smallest 1% and largest 1% of deal volumes. The sample consists of the takeovers announced between January 2002 and December 2019 with the bidder that is a publicly traded company domiciled in the United States. Column (1) reports OLS regression results for bidder 3-day event period cumulative abnormal returns, CAR(-1,1), measured using the Carhart four-factor model return. Column (2) reports OLS regression results for CAR(-1,30). Column (3) reports OLS regression results for changes in ROA from year 0 to year 1, where year 0 is defined as the year of acquisition. We adjust bidder ROA changes by subtracting those of the bidder's industry peers. Column (4) presents probit regressions that estimate the propensity for the bidder to complete the deal following the takeover announcement. Column (5) reports OLS regression results for the number of days it takes to complete the deal, given that the bidder acquires the target. Column (6) reports results of probit regressions that estimate the propensity for the acquisition to be financed with cash. Finally, Column (7) reports results of probit regressions that estimate the propensity for the acquirer CEO, the group of other top executives or the board directors in aggregate to buy stock following the takeover announcement. Regressions with industry-year fixed effects use linear probability models. For details, see the prior tables. % Intangibles talk is defined as the number of intangibles words divided by the total number of words in the announcement, expressed as a percent. % Intangibles talk (conf.) is defined as the average, by firm, of the number of intangibles words divided by the total number of words in what management says in earnings conferences calls in the sample period, standardized to the same standard deviation as % Intangibles talk. All regressions include industry and year fixed effects as well as the same firm-specific and deal-specific controls as before, as well as controls for negativity, uncertainty, and strong modal words in the announcement. Additional variable descriptions are provided in Table 2. The continuous dependent variables and continuous control variables are winsorized at the 1st and 99th percentiles. Regressions (4), (6) and (7) report average marginal effects instead of estimated coefficients. The standard errors (reported in parentheses) are clustered by the announcement year and are robust to heteroskedasticity. Significance levels: * - 10%, ** - 5%, *** - 1%.

(a) Panel A: IT dictionary excluding tech words

	(1) CAR(-1,1)	(2) CAR(-1,30)	(3) Δ ROA(0,1)	(4) Completed	(5) Days to completion	(6) Cash pay	(7) Insiders buy
% Intangibles talk _{w/o Tech words}	-0.534*** (0.184)	-1.006* (0.524)	-0.670** (0.282)	0.019** (0.007)	-2.359 (1.709)	0.049*** (0.013)	0.026** (0.011)
Adjusted R^2	0.05	0.02	0.04		0.47		
Pseudo R^2				0.28		0.26	0.14
Observations	3698	3698	2795	3698	3378	3698	3698

(b) Panel B: IT dictionary including synergy words

	(1) CAR(-1,1)	(2) CAR(-1,30)	(3) Δ ROA(0,1)	(4) Completed	(5) Days to completion	(6) Cash pay	(7) Insiders buy
% Intangibles talk _{w/ Syn. words}	-0.403*** (0.128)	-0.907** (0.355)	-0.277* (0.144)	0.016*** (0.005)	-2.353* (1.210)	0.033*** (0.009)	0.018** (0.008)
Adjusted R^2	0.05	0.02	0.04		0.48		
Pseudo R^2				0.28		0.26	0.14
Observations	3698	3698	2795	3698	3378	3698	3698

(c) Panel C: Short IT dictionary

	(1) CAR(-1,1)	(2) CAR(-1,30)	(3) Δ ROA(0,1)	(4) Completed	(5) Days to completion	(6) Cash pay	(7) Insiders buy
% Intangibles talk _{Short}	-0.676*** (0.191)	-1.333** (0.471)	-0.817*** (0.279)	0.015*** (0.006)	-3.751** (1.725)	0.059*** (0.011)	0.017 (0.014)
Adjusted R^2	0.05	0.02	0.04		0.48		
Pseudo R^2				0.28		0.26	0.14
Observations	3698	3698	2795	3698	3378	3698	3698

Table 14: – continued from previous page**(d) Panel D: Excluding high-tech industries**

	(1) CAR(-1,1)	(2) CAR(-1,30)	(3) Δ ROA(0,1)	(4) Completed	(5) Days to completion	(6) Cash pay	(7) Insiders buy
% Intangibles talk	-0.392** (0.160)	-0.774* (0.384)	-0.412* (0.206)	0.021** (0.008)	-2.478 (1.755)	0.033*** (0.011)	0.024* (0.013)
Adjusted R^2	0.06	0.02	0.08		0.49		
Pseudo R^2				0.34		0.28	0.16
Observations	2135	2135	1595	2135	1943	2135	2135

(e) Panel E: Disclosure quality

	(1) CAR(-1,1)	(2) CAR(-1,30)	(3) Δ ROA(0,1)	(4) Completed	(5) Days to completion	(6) Cash pay	(7) Insiders buy
% Intangibles talk	-0.557*** (0.160)	-1.026** (0.382)	-0.429** (0.196)	0.015*** (0.005)	-3.378** (1.306)	0.042*** (0.009)	0.020** (0.010)
Disclosure quality	-0.235 (0.522)	-0.894 (0.942)	0.174 (0.550)	-0.005 (0.017)	4.529 (3.584)	-0.028 (0.025)	-0.003 (0.026)
Adjusted R^2	0.05	0.02	0.04		0.47		
Pseudo R^2				0.27		0.26	0.13
Observations	3550	3550	2703	3550	3245	3550	3550

(f) Panel F: Industry concentration

	(1) CAR(-1,1)	(2) CAR(-1,30)	(3) Δ ROA(0,1)	(4) Completed	(5) Days to completion	(6) Cash pay	(7) Insiders buy
% Intangibles talk	-0.512*** (0.147)	-0.986** (0.353)	-0.435** (0.176)	0.016*** (0.005)	-3.045** (1.346)	0.041*** (0.009)	0.020** (0.009)
HHI _t	-1.494 (1.468)	-1.659 (4.129)	1.767 (1.739)	0.083 (0.069)	3.876 (13.647)	0.250* (0.148)	0.104 (0.084)
Adjusted R^2	0.05	0.02	0.04		0.48		
Pseudo R^2				0.28		0.27	0.14
Observations	3698	3698	2795	3698	3378	3698	3698

(g) Panel G: Intangibles talk on conference calls

	(1) CAR(-1,1)	(2) CAR(-1,30)	(3) Δ ROA(0,1)	(4) Completed	(5) Days to completion	(6) Cash pay	(7) Insiders buy
% Intangibles talk	-0.357** (0.146)	-0.896** (0.357)	-0.452** (0.182)	0.015*** (0.006)	-2.672* (1.403)	0.040*** (0.009)	0.018* (0.010)
% Intang. talk (conf.)	-0.792*** (0.202)	-0.419 (0.472)	0.059 (0.164)	0.002 (0.006)	-2.066* (1.138)	0.002 (0.008)	0.011 (0.009)
Adjusted R^2	0.06	0.03	0.04		0.48		
Pseudo R^2				0.28		0.26	0.14
Observations	3698	3698	2795	3698	3378	3698	3698

(h) Panel H: Managerial ability

	(1) CAR(-1,1)	(2) CAR(-1,30)	(3) Δ ROA(0,1)	(4) Completed	(5) Days to completion	(6) Cash pay	(7) Insiders buy
% Intangibles talk	-0.578*** (0.162)	-1.115*** (0.375)	-0.404** (0.190)	0.017*** (0.006)	-2.719* (1.400)	0.043*** (0.008)	0.020** (0.009)
Managerial ability	-0.223 (0.465)	-1.775* (0.940)	0.847* (0.407)	-0.018 (0.014)	5.167 (3.391)	-0.082** (0.033)	-0.047** (0.021)
Adjusted R^2	0.04	0.03	0.05		0.48		
Pseudo R^2				0.30		0.26	0.14
Observations	3465	3465	2701	3465	3184	3465	3465

Table 14: – continued from previous page**(i) Panel I: Industry-year fixed effects**

	(1) CAR(-1,1)	(2) CAR(-1,30)	(3) Δ ROA(0,1)	(4) Completed	(5) Days to completion	(6) Cash pay	(7) Insiders buy
% Intangibles talk	-0.580*** (0.196)	-0.964* (0.543)	-0.269 (0.318)	0.015** (0.006)	-2.939** (1.291)	0.039*** (0.011)	0.015 (0.013)
Industry-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.05	0.01	0.03	0.24	0.50	0.27	0.10
Observations	3698	3698	2795	3698	3378	3698	3698

(j) Panel J: Omitting very small and very large deals

	(1) CAR(-1,1)	(2) CAR(-1,30)	(3) Δ ROA(0,1)	(4) Completed	(5) Days to completion	(6) Cash pay	(7) Insiders buy
% Intangibles talk	-0.507*** (0.148)	-0.980** (0.352)	-0.441** (0.176)	0.015*** (0.005)	-3.058** (1.342)	0.040*** (0.009)	0.020** (0.009)
Adjusted R^2	0.05	0.02	0.04		0.48		
Pseudo R^2				0.28		0.26	0.14
Observations	3698	3698	2795	3698	3378	3698	3698

Supplementary Appendix

A Sample construction

Table SA.1: Sample construction

This table lists the steps taken to form the sample of M&A deals announced between 2002 and 2019 that are available in the SDC database.

Sample filters	# of deals
Date announced: January 1, 2002 to December 31, 2019	827,450
Bidder is a US company	199,193
Bidder is a public company	74,763
Exclude: recapitalizations, repurchases, self-tenders and exchange offers	62,415
Deal value (\$ mil) ≥ 1	28,228
% of shares held at announcement $\leq 15\%$	27,073
% of shares owned after transaction $\geq 80\%$ (only for completed deals)	25,350
Target is a private or public company	16,697
Payment method: cash, stock or a mix of cash and stock	13,196
Exclude bidders that operate in regulated utilities (SIC code 4900-4999) or in the financial industry (SIC code 6000-6999)	9,547
Return data on CRSP	7,128
Accounting data on Compustat	6,679
Relative size $\geq 1\%$	5,727
Acquirer book value of equity positive	5,564
Acquirer files an 8-K within 4 business days after the announcement	4,444
M&A announcement identified	3,701
Peters and Taylor (2017) measure of intangible assets for bidder	3,698

B Additional results

Table SA.2: Correlation of the measures of target intangible assets

The table reports the correlation coefficients for three different measures of target intangible assets that are used in the analysis. Panel A reports the correlation between the measures of absolute size of target intangible assets while panel B presents the correlation between the ratios of intangible assets to target total assets size. *Intan. assets_{bv}* is the book value of target intangible assets. *Intan. assets_{acq}* is the estimate of acquired target intangible assets calculated as the difference between deal size and the book value of target tangible assets. *Intan. assets_{PT}* is the estimated replacement cost of target's intangible capital introduced in [Peters and Taylor \(2017\)](#). *IA/AT* is the ratio of target intangible assets (IA) to the book value of target total assets (AT).

(a) Panel A: Absolute size

	(Intan. assets _{bv}) _t	(Intan. assets _{acq}) _t	(Intan. assets _{PT}) _t
(Intan. assets _{bv}) _t	1		
(Intan. assets _{acq}) _t	0.579***	1	
(Intan. assets _{PT}) _t	0.882***	0.645***	1

(b) Panel A: Size relative to total assets

	(IA _{bv} /AT) _t	(IA _{acq} /AT) _t	(IA _{PT} /AT) _t
(IA _{bv} /AT) _t	1		
(IA _{acq} /AT) _t	-0.066*	1	
(IA _{PT} /AT) _t	-0.0053	0.15***	1

Table SA.3: Deal characteristics and bidder returns

The table reports the effect of intangibles talk on bidder returns depending on deal characteristics. We report cross-sectional regression results for bidder cumulative abnormal returns (CAR) measured using the Carhart four-factor model. We interact intangibles talk with measures of deal complexity, *Cross-industry* (column (1)), *Cross-country* (column (2)), and *Relative size* (column (3)). *Public* indicates a publicly listed target. *% Intangibles talk* is defined as the number of intangibles words divided by the total number of words in the announcement, expressed as a percent. Additional variable descriptions are provided in Table 2. CAR and continuous control variables are winsorized at the 1st and 99th percentiles. The standard errors (reported in parentheses) are clustered by the announcement year and are robust to heteroskedasticity. Significance levels: : * - 10%, ** - 5%, *** - 1%

(a) Panel A: CAR(-1,1)

	(1)	(2)	(3)	(4)
% Intangibles talk	-0.484** (0.172)	-0.462*** (0.153)	-0.597*** (0.183)	-0.479*** (0.164)
Complex	-0.430 (0.364)	0.090 (0.468)	2.376*** (0.614)	
Public	-3.319*** (0.730)	-3.329*** (0.730)	-3.342*** (0.734)	-3.361*** (0.722)
Complex × % Intangibles talk	-0.041 (0.358)	-0.235 (0.278)	0.554 (0.500)	
Public × % Intangibles talk				-0.141 (0.294)
Textual variables	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.05	0.05	0.05	0.05
Observations	3698	3698	3698	3698

(b) Panel B: CAR(-1,30)

	(1)	(2)	(3)	(4)
% Intangibles talk	-1.050** (0.426)	-0.994** (0.374)	-1.148** (0.463)	-0.959** (0.377)
Complex	-0.839 (0.695)	-0.272 (0.752)	2.713* (1.313)	
Public	-3.726*** (0.930)	-3.717*** (0.925)	-3.770*** (0.926)	-3.724*** (0.943)
Complex × % Intangibles talk	0.236 (0.725)	0.222 (0.850)	1.091 (1.228)	
Public × % Intangibles talk				0.006 (0.938)
Textual variables	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Adjusted R^2	0.02	0.02	0.02	0.02
Observations	3698	3698	3698	3698

Table SA.4: Combined announcement returns for public targets

The table reports regression results for bidder, target and combined cumulative abnormal returns, CAR(-1,1), measured using Carhart four-factor model return. Combined CAR is calculated as a value weighted average of the bidder and target CAR(-1,1) where weights are calculated as day 0 market value of equity. The sample consists of public-target takeover announcements between January 2002 and December 2019 with the bidder that is a publicly traded company domiciled in the United States. The number of observations in columns (3) to (6) is smaller than in columns (1) and (2) because we do not have CAR data for targets abroad. *% Intangibles talk* is defined as the number of intangibles words divided by the total number of words in the announcement, expressed as a percent. The regressions control for the same variables as Table 5. Additional variable descriptions are provided in Table 2. The dependent variables and continuous control variables are winsorized at the 1st and 99th percentiles. The standard errors (reported in parentheses) are clustered by the announcement year and are robust to heteroskedasticity. Significance levels: : * - 10%, ** - 5%, *** - 1%

	Bidder CAR		Target CAR		Combined CAR	
	(1)	(2)	(3)	(4)	(5)	(6)
<i>% Intangibles talk</i>	-1.387*** (0.346)	-1.388*** (0.351)	-0.016 (2.107)	0.046 (2.284)	-1.129* (0.556)	-1.137 (0.721)
Negativity		-0.771 (0.636)		-1.298 (5.411)		-1.385 (2.174)
<i>% Uncertainty</i>		1.982 (1.153)		4.305 (5.068)		2.396** (1.053)
<i>% Strong modal</i>		-0.544 (3.039)		-5.659 (11.848)		1.361 (3.649)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.12	0.12	0.13	0.12	0.16	0.16
Observations	1099	1099	759	759	759	759

Table SA.5: Robustness - optimism and agency measures

The table reports the effect of intangibles talk on bidder returns conditional on both the quality of corporate governance of the bidder and the optimism of the bidder. The sample consists of the takeovers announced between January 2002 and December 2019 with the bidder that is a publicly traded company domiciled in the United States. In Panel A, we summarize OLS regression results for 3-day bidder cumulative abnormal returns, $CAR(-1,1)$, measured using Carhart four-factor model. In Panel B, we report OLS regression results for $CAR(-1,30)$. *% Intangibles talk* is defined as the number of intangibles words divided by the total number of words in the announcement, expressed as a percent. *% Positive* is defined as the number of positive words divided by the total number of words in the announcement, expressed as a percent. We interact intangibles talk with the measure of optimism, *% Positive*. Moreover, in each column with interact intangibles talk with one different corporate governance measure (*Gov*): (1) Institutional investor holdings, (2) Executive incentives, (3) Disclosure quality, (4) Number of analysts, (5) Operating CF/AT, and (6) Anti-takeover defenses. Additional variable descriptions are provided in Table 2. All regressions include the control variables included in Table 5. CAR and continuous control variables are winsorized at the 1st and 99th percentiles. The standard errors (reported in parentheses) are clustered by the announcement year and are robust to heteroskedasticity. Significance levels: : * - 10%, ** - 5%, *** - 1%.

(a) Panel A: CAR(-1,1)

	(1)	(2)	(3)	(4)	(5)	(6)
% Intangibles talk	-0.468** (0.198)	-0.656** (0.236)	-0.483** (0.213)	-0.398* (0.215)	-0.518** (0.225)	-0.562** (0.243)
% Positive	0.404 (0.328)	0.485 (0.299)	0.359 (0.326)	0.520* (0.278)	0.522 (0.316)	0.380 (0.286)
% Positive × % Intangibles talk	-0.445*** (0.153)	-0.397** (0.164)	-0.410** (0.150)	-0.376** (0.137)	-0.561*** (0.168)	-0.206 (0.158)
Gov	-0.591 (0.764)	0.372** (0.133)	-0.189 (0.513)	-0.053** (0.025)	-2.059 (2.105)	0.029 (0.137)
Gov × % Intangibles talk	-0.089 (0.676)	0.009 (0.110)	0.724 (0.614)	0.020 (0.016)	-2.001 (3.007)	-0.082 (0.110)
Gov × % Positive	0.622 (1.110)	-0.284 (0.164)	-0.901 (1.134)	-0.052 (0.040)	3.424 (4.178)	0.035 (0.152)
Textual variables	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.05	0.06	0.05	0.04	0.05	0.08
Observations	3673	1883	3544	3328	3314	1682

(b) Panel B: CAR(-1,30)

	(1)	(2)	(3)	(4)	(5)	(6)
% Intangibles talk	-0.789* (0.375)	-1.389** (0.516)	-0.840* (0.409)	-0.519 (0.571)	-0.701 (0.446)	-0.937 (0.557)
% Positive	0.337 (0.668)	0.337 (0.811)	0.388 (0.678)	-0.007 (0.708)	0.264 (0.615)	-0.156 (0.904)
% Positive × % Intangibles talk	-1.161*** (0.339)	-0.521 (0.608)	-1.065** (0.379)	-0.892** (0.355)	-1.253** (0.455)	-0.582 (0.654)
Gov	2.950 (2.018)	0.801*** (0.217)	-0.702 (0.907)	0.040 (0.099)	7.552 (5.095)	0.027 (0.251)
Gov × % Intangibles talk	0.453 (1.725)	-0.220 (0.271)	1.601 (1.500)	0.081 (0.066)	7.129 (5.787)	0.246 (0.232)
Gov × % Positive	-0.585 (1.830)	0.031 (0.408)	0.630 (2.601)	-0.151 (0.090)	-1.960 (7.842)	0.211 (0.355)
Textual variables	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.03	0.04	0.02	0.03	0.03	0.02
Observations	3673	1883	3544	3328	3314	1682

Table SA.6: Synergies talk and intangibles talk

The table presents results for all main regressions when controlling for synergies words. The sample consists of the takeovers announced between January 2002 and December 2019 with the bidder that is a publicly traded company domiciled in the United States. Column (1) reports OLS regression results for bidder 3-day event period cumulative abnormal returns, CAR(-1,1), measured using the Carhart four-factor model return. Column (2) reports OLS regression results for CAR(-1,30). Column (3) reports OLS regression results for changes in ROA from year 0 to year 1, where year 0 is defined as the year of acquisition. We adjust bidder ROA changes by subtracting those of the bidder's industry peers. Column (4) presents probit regressions that estimate the propensity for the bidder to complete the deal following the takeover announcement. Column (5) reports OLS regression results for the number of days it takes to complete the deal, given that the bidder acquires the target. Column (6) reports results of probit regressions that estimate the propensity for the acquisition to be financed with cash. Finally, Column (7) reports results of probit regressions that estimate the propensity for the acquirer CEO, the group of other top executives or the board directors in aggregate to buy stock following the takeover announcement. For details, see the prior tables. *% Synergy* is defined as the number of synergies words (see the text) divided by the total number of words in the announcement, expressed as a percent. *% Intangibles talk* is defined as the number of intangibles words divided by the total number of words in the announcement, expressed as a percent. All regressions include industry and year fixed effects as well as the same firm-specific and deal-specific controls as before, as well as controls for negativity, uncertainty, and strong modal words in the announcement. Additional variable descriptions are provided in Table 2. The continuous dependent variables and continuous control variables are winsorized at the 1st and 99th percentiles. Regressions (4), (6) and (7) report average marginal effects instead of estimated coefficients. The standard errors (reported in parentheses) are clustered by the announcement year and are robust to heteroskedasticity. Significance levels: * - 10%, ** - 5%, *** - 1%.

	(1) CAR(-1,1)	(2) CAR(-1,30)	(3) Δ ROA(0,1)	(4) Completed	(5) Days to completion	(6) Cash pay	(7) Insiders buy
<i>% Intangibles talk</i>	-0.541*** (0.158)	-0.962** (0.346)	-0.498** (0.186)	0.014*** (0.005)	-3.254** (1.391)	0.043*** (0.008)	0.020** (0.010)
<i>% Synergy</i>	0.901 (0.666)	-0.458 (1.555)	1.423** (0.566)	0.031** (0.014)	4.821 (4.695)	-0.055** (0.027)	-0.015 (0.030)
Adjusted R^2	0.05	0.02	0.04		0.48		
Pseudo R^2				0.28		0.26	0.14
Observations	3698	3698	2795	3698	3378	3698	3698

C Changes in the balance sheet intangible assets of the acquirer

Figure SA.1 traces goodwill (GW) and separably identifiable assets (SIA) over time. It constructs two groups of firms by splitting the sample by median intangibles talk, controlling for target public status, payment method, and relative size. One sees that before the takeover, both GW and SIA are quite stable and moving in parallel for both those acquirers that later use intangibles talk above the median and those below. In the full sample (shown in the top figure), there is a general upward trend in GW and SIA. This reflects the fact that companies occasionally conduct an acquisition also in some of the other quarters. In the bottom figure, which uses the restricted sample of acquirers with only one acquisition in a 16-quarters window, as expected, GW and SIA are effectively unchanged in all quarters except the completion quarter. With either method, the picture confirms the regression evidence in the main text. Specifically, in acquirers employing more intangibles talk GW rises more and SIA increases less than for comparison firms.

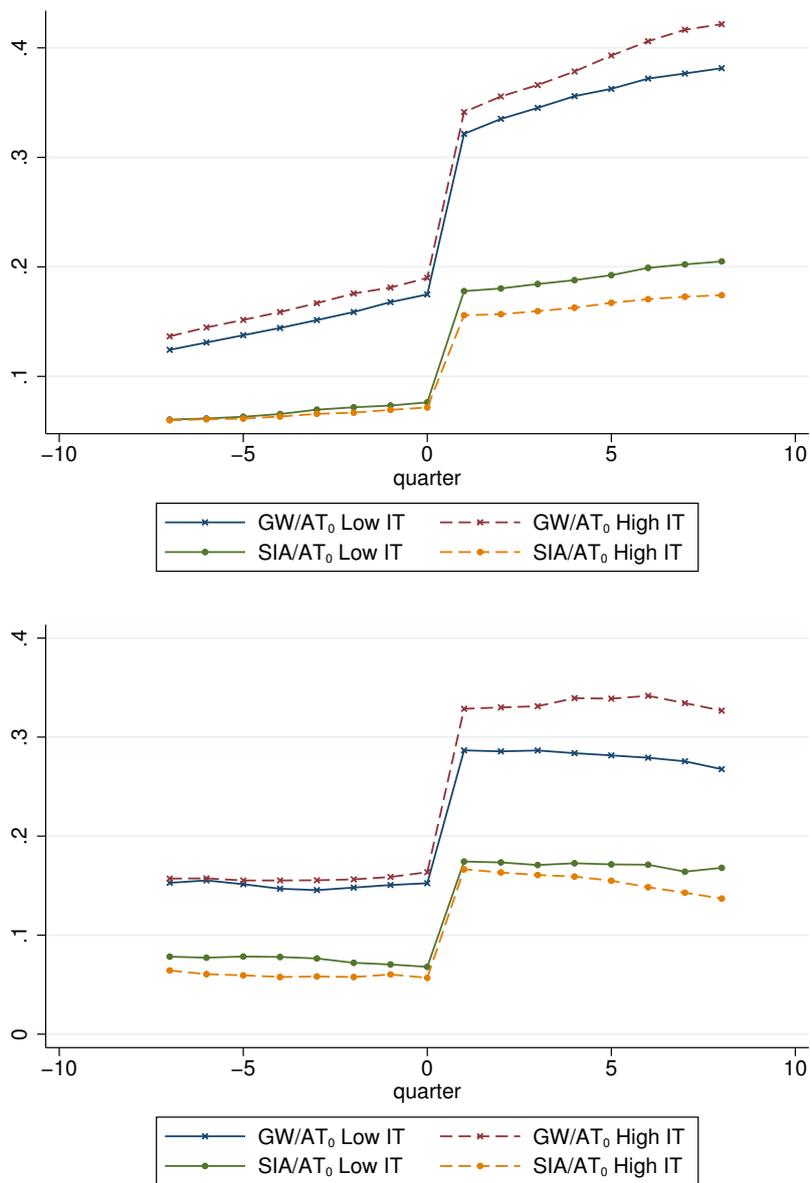


Figure SA.1: Acquirer intangible assets

The figure plots separable intangible assets and goodwill of the acquirer relative to the book value of total assets in quarter 0 over 16 successive quarters – 8 quarters before and 8 quarters after the deal completion date. Quarter 0 is the most recent quarter before the deal completion date. The sample is split by the median intangibles talk (IT) within subsamples that have the same target public status, payment method (cash vs. non-cash) and relative size (high vs. low). Separable intangible assets (SIA) are defined as acquirer balance sheet intangible assets minus goodwill (GW). Intangibles talk is defined as the frequency of intangibles words in takeover announcements. The sample consists of the completed takeovers announced between January 2002 and December 2019 with an acquirer that is a publicly traded company domiciled in the United States. The top figure uses the sample of completed deals. The bottom figures uses the sample consisting of 583 completed deals where the acquirer does not acquire another company within ± 2 years around the announcement day.

D Data appendix

D.1 8-K download and identification

The download procedure starts with quarterly master index files from EDGAR. The indexes can be found at the following location: [https://www.sec.gov/Archives/edgar/full-index/\[year\]/QTR\[1-4\]/master.zip](https://www.sec.gov/Archives/edgar/full-index/[year]/QTR[1-4]/master.zip), and have entries in this form: `CIK|CompanyName|FormType|DateFiled|Filename`.³⁶ The indexes contain the whole universe of filings. We loop through them and look for the CIK codes from our takeover sample that are associated with the 8-K form type, and are filed no later than 4 business days after the announcement date.³⁷ We allow for filings that are made one business day before the announcement date reported by SDC due to inconsistencies across EDGAR and SDC (see [Section D.2](#)). Some companies file multiple 8-Ks within 4-day period after the announcement, which requires additional verification checks.

When companies file with the SEC they rarely submit only one document. EDGAR takes all filing documents, processes them, and then bunches those together into a single text file. A typical 8-K filing has a SEC header and one or more documents that follow. There is no announcement date nor announcement time specified in the header. The acceptance time field is missing in some filings. Acquisition announcements are saved in one of the documents that follow the header. The documents can be either in *text*, *html* or *pdf* format. Each one starts with the `<DOCUMENT>` tag that is followed by a number of document header fields after which comes the actual content bounded by the `<TEXT>` and `</TEXT>` tags. The documents end with the `</DOCUMENT>` tag. The document header contains a type, a sequence number, filename and the document description. Press releases of acquisition announcements are saved in the documents that are labelled as `Exhibit 99`, `Exhibit 99.1`, `Exhibit 99.2`, etc. There is no document type or attachment number that uniquely identifies acquisition filings or acquisition announcement press releases. We parse all filings and identify the documents we need based on their content.

First, we split 8-K files into documents using document tags, `<DOCUMENT>` and `</DOCUMENT>`. The text files extracted from an 8-K filing are already in the format that can be used in the further analysis, while both *html* and *pdf* files need some additional processing before we can get any useful text from them. *Html* files have a lot of overhead in the form of *html* tags that carry no announcement information, but rather give structure to unstructured text. *Pdf* files have no overhead, but are in the binary format. We use Apache Tika to clean documents that are in the *html* or *pdf* format. This procedure works immediately with *html* documents. It fails when applied directly to *pdf* files extracted and saved in the form they are found in 8-K text files. The procedure does not work because *pdf* files are encoded using *uuencoding*, a form of binary-to-text encoding, before they are put into the 8-K text files. Therefore, we first decode *pdf* files, that is translate them from text to the binary format, and then we apply Tika methods on the decoded *pdf* files. This yields clean text that can be used for announcement detection

³⁶For example, the first quarter master index file in 2007 is located here: <https://www.sec.gov/Archives/edgar/full-index/2007/QTR1/master.zip> and one of its entries is:

[1004155|AGLRESOURCESINC|10-K|2007-02-07|edgar/data/1004155/0001004155-07-000038.txt](https://www.sec.gov/Archives/edgar/full-index/2007/QTR1/master.zip)

³⁷We construct a business day calendar by downloading the S&P 500 index from CRSP and keeping only trading dates from the set.

and further textual analysis.

The next task is the most challenging one, the announcement identification itself. We read and analyze dozens of the documents that we have extracted from 8-K files. We then develop a procedure that aims to replicate our own reasoning behind the conclusion we make when facing a problem to identify announcements, and minimize the number of the documents wrongly labeled as potential announcements. We find that a typical announcement press release document has a title section that is followed by an announcement body. The title section can be very short and contain only the title itself, but there are cases when it is rather long with many bullet points and additional information. The announcement body typically starts with *Place + Date + Acquirer + Acquirer Ticker*, “the body start” hereafter. Yet there is some variation. For example, any of these 4 elements might be missing: date is referenced using “today”, a year is missing, the date comes before the place, or the acquirer and its ticker might not be mentioned immediately after the date. [Section D.3](#) provides an example.

We split the announcement identification procedure in 2 steps. The first and more restrictive step relies on the analysis of the beginning of the document only. The second step applies less restrictive requirements on the set of deals that have no announcement document found after the first step. Put differently, the second step checks the deals with no announcement found and picks the related documents that did not meet more restrictive criteria checked in the first step.

The first step starts with requirements that a document:

- is an *Exhibit 99* document,
- is neither defined as a conference call nor financial results release in *the description field*,
- does not contain conference call speech words, e.g. good day, dear etc. (see [Section D.5](#) for the full list), which are typically not used in acquisition announcements, and
- contains words that indicate purchase (acquire, purchase, merge etc., see [Section D.5](#)).

A document is *Exhibit 99* if its type field starts with *ex-99*, *ex99* or *ex 99*, case-insensitive (for example <TYPE>EX-99.1). We identify the body start in any of its possible forms mentioned earlier. We exploit regular expressions for that task. If the body start is not detected within the first 300 words, we disregard the document. If we find the body start, we then inspect text before it, which is in fact the title section. If the title section contains no purchase words nor the target name, but it contains the conference call (which are not the same as conference call speech words), financial results, or public or tender offer words, we disregard the document. Next, we check text that follows the body start. This is the point in text that usually clearly specifies what the document talks about. A topic is usually clearly stated in the first paragraph. We inspect 150 words that follow the body start and require that both purchase words and the target name is detected. If a document passes all these checks, we label it as a potential announcement. We say potential because there can be more than one document that passes all checks. The requirements listed do not necessarily uniquely identify documents that are acquisition announcements. For example, an 8-K filing may, despite not being an acquisition announcement, mention the target and meet the rest of criteria (e.g. quarterly earnings announcement, conference call transcripts, a presentation of the deal, etc.), or when an amend-

ment (8-K/A) is issued following the announcement (8-K).³⁸ Even though we observe multiple documents, only one, in fact, is the announcement itself.

The second step helps identify deal announcements that the first step fails to find. A drawback is that it occasionally labels multiple documents as announcements what requires manual inspection. However, the number of such cases is rather small as the first step already did a good job for the major part of the deals. The second step is simpler than the first one. It does not distinguish between the title section and announcement body, but relies simply on the set of requirements that the full document has to meet in order to qualify as a potential acquisition announcement. In addition to the content-based filters listed below, we require that the minimum word count is more than 30 words and less than 5,000. In terms of content, we require that a document:

- is an *Exhibit 99* document,
- is neither indicated as a conference call nor a financial results release in the description field,
- mentions the target name,
- contains words that indicate purchase (acquire, purchase, merge etc.), as in [Section D.5](#)
- contains announcement words either in the document description field or text (press release, acquisition announcement etc.), and
- contains a “forward-looking statement” disclosure.

SDC does not always record target names in the form they appear in the announcements: short names are used, words such as Inc., Corp., etc. might be omitted, subsidiaries are described if they do not have a name etc. For these reasons we use a fuzzy search procedure ([Section D.4](#)).³⁹ We require that the fuzzy match score is at least 70% in order to confirm that the target name is found in the document. Forward looking statement is something that we observe in all announcements checked, hence we include it in the list of requirements.

D.2 SDC and EDGAR inconsistencies

There are some inconsistencies regarding announcement dates between SDC and EDGAR. In order to include cases like the one shown below, we have to allow for announcements made 1 business day before the announcement date in SDC.

Example:

SDC Deal Number: 2167136040

SDC Announcement date: **2010/03/24**

SEC Filing Date: **2010-03-23**

SEC 8K announcement text:

*“ROGERS, Conn.–(BUSINESS WIRE)–**March 23, 2010**–Rogers Corporation (NYSE: ROG) **announced today** that it has signed an agreement with SK Chemicals Co. Ltd. of*

³⁸We have also found cases of a company filing the same announcement two times within the same day (e.g. CIK: 0000880460; “December 23, 2011 – Perfumania Holdings, Inc. (NASDAQ:PERF) and Parlux Franchises, Inc. (NASDAQ:PARL) announced today that they have signed a definitive merger agreement...”)

³⁹Packages that implement fuzzy search algorithms are readily available in Java. We use FuzzyWuzzy library.

South Korea, to acquire SK Utis Co., Ltd., its high performance polyurethane foam manufacturing unit located in Ansan, South Korea...”

D.3 Typical acquisition Announcement structure

A typical announcement press release document has a title section that is followed by an announcement body. The title section can be very short and contain only the title, but there are cases when it is rather long with many bullet points and additional information. The announcement body typically starts with this structure: *Place + Date + Acquirer + Acquirer Ticker* (Figure SA.2). Yet there is some variation. For example, any of this 4 elements might be missing, the date may be referenced using “today”, the year may be missing, the date may come before the place, or acquirer and its ticker might be mentioned not immediately after the date.

NEWS RELEASE

FOR IMMEDIATE RELEASE

Title section

Telephone and Data
Systems Agrees to Acquire BendBroadband

Supports Cable and
Broadband Growth Strategy

CHICAGO, Ill., (May 1, 2014) - Telephone and Data Systems, Inc. [NYSE: TDS], parent company to TDS Telecom, today announced an agreement to acquire substantially all of the assets of a group of companies operating as BendBroadband, headquartered in Bend, Oregon, for a purchase price of \$261 million

Announcement body

...

Figure SA.2: Typical announcement press release

D.4 Target name detection (fuzzy matching)

Example:

1. SDC deal number: 2012952020
SDC target name: **Pernod Ricard SA-Cruzan Rum**
8K: 0001193125-08-189343
8K announcement text:

*“Under the agreement, Pernod Ricard will pay Fortune Brands \$230 million in pre-tax proceeds, and Fortune Brands will pay \$100 million to **Pernod** to acquire the premium **Cruzan Rum brand...**”*

2. SDC deal number: 1313490020

SDC target name: **Smurfit-Stone-Industrial Pkg**

8K: 0000950144-02-007750

8K announcement text:

*“Caraustar Industries, Inc. (NASDAQ-NMS Symbol: CSAR) today announced that it has entered into a definitive agreement with a **subsidiary** of Smurfit-Stone Container Corporation (NASDAQ:SSCC) to acquire substantially all the assets (excluding accounts receivable) of **Smurfit’s Industrial Packaging Group business** for a purchase price of approximately \$79.8 million...”*

3. SDC target name: **Frank’s Tubular Intl Inc**

8K announcement text:

*“Dallas, TX, May 29, 2003—Lone Star Technologies, Inc. (“Lone Star”) (NYSE:LSS) today announced that it has signed a definitive agreement to acquire the assets of **Frank’s Tubular International** (“FTI”), a Houston-based provider of high-quality threading and inspection services, ...”*

D.5 Word lists used in the 8-K parsing

Purchase	Announcement	Financial Results	Public or Tender Offer	Conference Call	Completion	Acquisition	Months	ConfCall Speech
acquire	press release	quarter	public offer	conference call	close	acquisition	Jan.	good morning
acquires	news release	quarters	tender offer	transcript	closes	merger	Feb.	good day
acquiring	press announcement	full year	stock offer	script	closed	purchase	Mar.	good afternoon
acquired	news announcement	full-year	private placement		closing		Apr.	good evening
acquisition	acquisition announcement	fiscal year	offering		complete		Jun.	hello
acquisitions	merger announcement	results	issue		completes		Jul.	hi
purchase	purchase announcement	earnings	issues		completed		Aug.	dear
purchases	immediate release	net income	issuing		completing		Sep.	ladies and gentlemen
purchasing		revenue	issued		completion		Oct.	
purchased		revenues	issuance				Nov.	
buy		financial guidance					Dec.	
buys							January	
buying							February	
bought							March	
merge							April	
merges							May	
merging							June	
merged							July	
merger							August	
mergers							September	
definite agreement							October	
definite agreements							November	
expand							December	
expands								
expanding								
expanded								
expansion								

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