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Synopsis: Predictive Power? Textual Analysis in Mergers and Acquisitions

Cover Page Footnote
This is a synopsis of the full article in this issue.
According to data from Thomson Reuters, mergers & acquisitions (M&A) represent a vital mechanism for consolidation and restructuring within industries and carry significant influence over rapid changes in market prices. As such, any insight into the unique ability of investors to more successfully utilize publicly available information to identify firms in M&A that are likely to have large price movements is valuable. This paper seeks to answer the question, “How does a textual analysis of mergers & acquisitions SEC filings, segmented by industry, size, and time, predict long-term, cumulative abnormal post-merger-filings returns for an acquirer?” My hypothesis is built on the premise that the soft, qualitative text scribed by corporate boards into M&A proxy letters for shareholders can provide insight into the future success of acquirers' stock that other quantitative data does not. I hypothesize that by using regression analyses with textual measures from the Diction software program, I can gain insights to answer this question.
This paper is not only important within academia but is also viable as a strategy from which investors may achieve superior returns. Huge amounts of capital are involved with merger arbitrage investment firms and in M&A activity generally. For example, U.S. companies alone engage, on average, in more than $1.5 trillion (WSJ Dealogic) of M&A activity each year since 2014. But many of these deals result in lost value for shareholders. As such, studies show the failure rate of M&A (i.e., negative post-transaction stock returns) is somewhere between 70% and 90% (Christensen et al. (2011)). Many researchers have tried to explain this astonishing number by analyzing aspects of transactions that worked and those that did not work. However, even after a myriad of quantitative factors tested, researchers have had limited success in identifying the potential causes of these successes and failures. Despite the losses associated with many mergers, some other deals have generated significant economic gains, and hence investors frequently make speculative investments in M&A transactions.

A majority of publicly traded companies, once targeted for M&A activity, involve company shareholders to vote by proxy in the approval process for the transaction. As part of this process companies are required to make specific SEC filings. These filings include, but are not limited to, the DEFM14A, DEFM14C, and 8K. By examining a variety of possible explanatory variables related to these filings, I hope to find that as firms publish longer filings, or filings that have more certain or optimistic sentiments, they are more likely to experience heightened post-filing acquirer stock returns. This idea builds on work previously conducted by Steven Fortney and Karl Diether at Brigham Young University, using a similar methodology but with improved measures of textual sentiment analysis.

The main underlying idea for my thesis is that firms with more specific and concrete strategic rationales for M&A activity are more likely to generate economic wealth via the transaction leading to better future returns. This more robust rationale is likely to be reflected in differently written or more extensive SEC filings related to the deal. In contrast, deals where the firms might be merging for less robust reasons (e.g., quick fixes or dramatic attempts to shore future performance and compensate management) are likely to be associated with SEC filings whose language reflects these shorter-term rationales. Thus, this work seeks to use textual analysis to identify the soft perspective and intentions of corporate boards and attorneys toward M&A activity through the text in the SEC filings and hopefully be able to identify which firms are most likely to experience superior subsequent returns.

My approach to this textual analysis utilizes the pre-determined sentiment libraries in Diction software packages to measure the sentiment reflected in the M&A public filings. I then regress announcement, and subsequent returns, on measures of text length and sentiment to find out how much of the post-transaction acquirer performance might be explained by the soft information in the filing text. In order for my analysis to find significant results that would be useful to investors, it must be the case that (1) the SEC filings tend to differ in systematic ways between deals that are made for strong versus questionable strategic reasons, (2) these differences must be detectable using the type of textual analysis provided by the Diction software, and (3) the soft information being assessed by the textual analysis measures must not already be reflected in the price. If the market already understands the information, then these measures will not be able to predict successful M&A returns.

The idea that important soft information is available to investors via textual analysis is not new to this paper. For example, Cohen, Malloy, and Nguyen (2016) examined quarterly and annual SEC filings and found that changes to the language within filings have strong implications for future returns. Li (2010) also examines risk sentiment within filings’ text and finds that these reports can predict certain future returns. Closest to this paper is perhaps research done by Yan (2015), who focuses on textual sentiment in merger-related corporate filings and finds that overly optimistic acquirers experience worse long-term post-transaction returns. Given these papers, I was hopeful that textual analysis of merger filings would provide useful information to investors seeking to invest around these transactions.

As described above, the literature has shown evidence that textual analysis can provide guidance in which filings are most likely to be followed by statistically significant returns. However, none of this literature specifically tests whether the various measures of the M&A filing’s sentiment can explain future stock performance. I hypothesize that the post-filing returns of acquiring companies can be explained by the M&A filings in forms DEFM14A and DEFM14C. The acceptance or rejection of this hypothesis will provide a unique perspective into the potential predictive success that textual analysis of SEC proxy letters and other M&A-related SEC filings can have in explaining M&A success as measured by post-merger returns.

As a result of this paper, I identify a generalized lack of statistically significant correlation between textual sentiment and future returns, confirming general market efficiency. However, results in this paper indicate specific instances of significant positive correlation between the sentiment optimism and future returns. Still, this strong positive correlation may be a function of latent variables. Nonetheless, specific market inefficiencies exist in the pricing of acquiring firms’ stock following the public release of corporate M&A filings. As such, investors who utilize this strategy of textual analysis followed by investing in acquirers expressing strong levels of optimism and shorting acquirers expressing weak levels of optimism may experience superior returns – and thus, text may be used in specific instances to predict successful returns to investors in M&A transactions.
DATASET AND METHODOLOGY

The dataset analyzed in this thesis consists of information on ~5,000 public U.S. &A transactions requiring shareholder votes between 1994 and 2017. To collect and analyze the data, I worked with Rob Schonlau, Thaddeus Crockett, Oliver Morgan, Tanner Thompson, and David Lowe. We indexed, cleaned (stripped HTML), and matched documents in the SEC EDGAR database to the Compustat database, and then matched each document to the SDC M&A database. After matching these databases, we had definitive M&A announcement transaction dates. We then linked the data to the CRSP database for stock prices in order to be able to measure post-transaction abnormal returns. Finally, we processed each transaction using the textual-analysis program Diction to produce word count and various measures of sentiment analysis.

TEXTUAL ANALYSIS

I used the Diction software program to perform textual analysis on all the filings. As described on the Diction program webpage, Diction is a computer-aided text analysis program for determining the tone of a verbal message (Harp (2010)) and has been used throughout many peer-reviewed articles and books. Processing text through built-in libraries, the software searches for words that correspond to certain tones within subject-specific libraries, while also generating general word count, unique words used, and average word length for analysis. These tones, or the character or attitude toward an M&A transaction, together form a sentiment, or a more generalized view toward the event. I utilized the “Business: Corporate Public Relation” built-in library package to evaluate the filings. The Diction software then provided numeric measures of the filings’ optimism, certainty, and 38 other sentiment variables. I then regressed the BHARs described above on these measures to test whether future returns are related to the soft information in the M&A filings.

By utilizing Diction, I was able to move beyond the more simplified dichotomies (good/bad, happy/sad) that are focused and prevalent throughout the field of textual analysis, and view text through the lens of 40 different tones and sentiments, identifying patterns within phrases to determine how certain corporate filings might conform to norms. Given the large number of potential independent variables, I identified and analyzed each one, but narrowed down the results around the five “master variables” of:

1. Activity (movement, change, and implementation of ideas)
2. Optimism (satisfaction, praise, endorsements, highlight positives)
3. Certainty (resoluteness, completeness, tenacity, avoid ambivalence)
4. Realism (tangible, familiar, and recognizable to people)
5. Commonality (agreed-upon values, cooperation, rejecting exclusion)

These five master variables are identified by Diction and “provide the most general understanding of a given text and any study” (Diction (2013)). From this set, I particularly focused my analysis around the independent variables of optimism and certainty, but first sought to understand any correlation between these independent variables.

Table 6: Total Sentiment Analysis (Univariate Regression)

Table 6 displays regression coefficients, p-values for the five “master variables” for all transactions available between ’94 - ’17. There are no industry, time, or size controls. Columns (1-5) indicate the acquirer returns around (1) and following the filing date (2-5).

<table>
<thead>
<tr>
<th>Univariate</th>
<th>(1) 30-Day BHAR</th>
<th>(2) Adjusted R-Square</th>
<th>(3) 90-Day BHAR</th>
<th>(4) Adjusted R-Square</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certainty</td>
<td>0.000 (0.324)</td>
<td>0.000</td>
<td>0.001** (0.008)</td>
<td>0.006</td>
</tr>
<tr>
<td>Optimism</td>
<td>0.011*** (0.001)</td>
<td>0.010</td>
<td>0.027** (0.000)</td>
<td>0.016</td>
</tr>
<tr>
<td>Activity</td>
<td>-0.001 (0.792)</td>
<td>-0.001</td>
<td>-0.007* (0.087)</td>
<td>-0.002</td>
</tr>
<tr>
<td>Realism</td>
<td>0.002* (0.054)</td>
<td>0.002</td>
<td>0.007*** (0.002)</td>
<td>0.008</td>
</tr>
<tr>
<td>Commonality</td>
<td>0.003* (0.093)</td>
<td>0.002</td>
<td>0.010*** (0.000)</td>
<td>0.006</td>
</tr>
<tr>
<td>Observations</td>
<td>1,086</td>
<td></td>
<td>1,081</td>
<td></td>
</tr>
</tbody>
</table>

The results in Table 6 indicate primarily positive statistically significant individual long-term correlation between the master sentiment variables and returns across two different horizons. However, these results do not take into consideration the influences and relationships between variables as Table 7 does. Given the results in Table 6, specifically regarding the strongest Adjusted R-Square for the sentiment optimism, I determined to narrow in on this variable as a potential predictor.

Table 7: Total Sentiment Analysis (Multivariate Regression)

Table 7 displays regression coefficients and p-values for the five “master variables” for all transactions available between ’94 – ’17. There are no industry, time, or size controls. Columns (1-5) indicate the acquirer returns around (1) and following the filing date (2-5).

The results in Table 6 indicate primarily positive statistically significant individual long-term correlation between the master sentiment variables and returns across two different horizons. However, these results do not take into consideration the influences and relationships between variables as Table 7 does. Given the results in Table 6, specifically regarding the strongest Adjusted R-Square for the sentiment optimism, I determined to narrow in on this variable as a potential predictor.

Significance at the 10%, 5%, and 1% level is shown with *, **, ***, respectively. P-values are shown below the regression coefficients.

Looking at the regression coefficients in Tables 6 and 7, indications of negative statistically significant correlation at the 10% level between Optimism and 30-day returns exist, confirming prior literature (Yan (2015)) which concluded that increased optimism has negative correlation with post-filing returns. These results therefore do not conflict with prior literature in regard to short-term returns; however, these results indicate that positive significant correlation at the 1% level exists in the longer-term periods. Thus, as managers express higher optimism in transaction filings (as measured by Diction software’s built-in library), the potential returns for an investor in an acquirers’ stock increases.

Only optimism registers as a significant predictor of returns throughout the near and mid-term horizons. Thus, I narrow in on optimism as the variable of choice moving
forward. None of the others are close to significance. I recognize that the R-Square is very low; however, this is understandable as these returns are abnormal, and anything indicates returns above what is expected as accounted for above.

### Table 12: Size Effect Application in Transactions

Table 12 answers the question that the relevant size of a target to its acquirer might influence optimism as a predictor of returns (BHARS across different horizons). Table 12 displays regression coefficients and p-values for the sentiment optimism across time. Optimism and relative size are initially tested individually. Then, the two variables are considered interacting with one another. Significance at the 10%, 5%, and 1% level is shown with *, **, ***, respectively.

In the test results in Table 12, relative size of target to the acquirer is very close to significant negative correlation at the 10% level. This indicates along with prior literature that as the relative size goes up (the target company is larger in comparison to the acquirer), the future returns are negatively impacted. However, when considered in conjunction with optimism, the coefficient becomes significant, being influenced strongly by the optimism sentiment. These results show how the larger the transaction is relative to the acquirer, the more difficult abnormal returns become. However, if optimism is truly a significant predictor of long-term returns, I expect the returns to be amplified on the larger relative transactions, as indicated by these results.

### Conclusion

Textual analysis in M&A related SEC filings has been performed historically in finance literature. This paper asks if particular “soft” qualitative data within the text of DEF14A and DEF14C documents can predict post-filing abnormal returns. The main underlying idea for my thesis is that firms with more specific and concrete strategic rationales for M&A activity are more likely to generate economic wealth via the transaction leading to better future returns.

To answer this question, I created a comprehensive dataset of these M&A filings and collected information about each transaction along with the estimated returns for acquiring firms’ returns. I then utilized the pre-determined sentiment libraries of the Diction software to identify key significant predictors of future returns. These statistically significant results pointed toward, and then focused around positive correlation between optimism and long-term returns. As management expressed more optimistic language in these SEC filings, returns improved across the 60-day and 90-day returns. These firms which express optimism toward transactions – most specifically in the technology and telecommunication industry groups – are most likely to experience superior subsequent returns to the M&A filings.

A general lack of statistically significant correlation in textual analysis indicates market efficiency on a broad scale, as a significant portion of the market’s reaction to M&A transactions is processed in the returns immediately following the announcement. However, the specific results indicated in this paper display market inefficiencies that exist in the pricing of acquiring firms’ stock following the public release of corporate M&A filings. I also presume this lack of significance may be due to the sheer number and diversity of factors considered in M&A transactions. M&A strategy may be delineated in proxy letters to shareholders, while other managers choose to refrain from long-winded explanations of transaction rationale, instead inferring that the shareholders already see crossover and logic behind the merger or acquisition immediately following the transaction announcement. Many institutional shareholders may have already discussed merger particulars with company management, factoring this strategic information and the management sentiment into the stock prices.
Importantly, I note that this study speculates a relationship between sentiment variables and returns across a number of investment horizons. This study has not determined causality, nor professes that it does. Rather, this study explores the relationships between these sentiment variables and post-filing returns to determine correlation. The true abnormal returns associated with M&A transactions are more likely driven by the skill, ability, or experience with M&A strategy that management at the acquiring and target firms have. These transactions may experience more accurate forecasted synergies, or be rooted in economically sound, strategic reasons. At face value there is clearly a statistically significant relationship between optimism and returns, but I observe this is likely driven by latent variables.

Previous applications of textual analysis in M&A filings have been applied sporadically to various texts, including documents outside of the DEFM filings. Methodologies used have varied from the method I used, and thus, these results are varied. The results described in this paper indicate general weak and infrequent correlation with M&A documents; however, in particular settings and over different horizons, statistically significant correlation exists between optimism and post-filing returns. As such, an investor who utilizes this strategy of textual analysis followed by investing in acquirers who express the strongest optimism may experience superior returns – and thus, text may be used to predict successful returns to investors in M&A transactions. Applications of textual analysis in M&A filings will continue to improve as software programs improve. There is still much more to be studied to gain a complete picture of all the causes of positive post-filing returns, yet strategy and intention revealed through sentiment will continue to remain a viable method in investing.

Edited by Evan D Poff