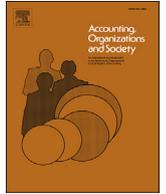




Contents lists available at ScienceDirect

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journal homepage: [www.elsevier.com/locate/aos](http://www.elsevier.com/locate/aos)

# Analysts' qualitative statements and the profitability of favorable investment recommendations

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## ARTICLE INFO

### Article history:

Received 23 July 2014

Received in revised form

21 March 2017

Accepted 22 March 2017

Available online xxx

### Keywords:

Analyst report

Textual analysis

Justifications

Disaggregation

## ABSTRACT

In this study, we examine the relation between sell-side analysts' justifications and favorable rating profitability. Using a novel text analysis methodology, we transform analysts' qualitative statements into a content-based text signal. Our results indicate that information contained in analysts' justifications is indeed associated with favorable recommendation profitability, controlling for information in the quantitative summary measures. We also develop trading strategies using our text signal and find that using the text signal generates economically significant returns. Importantly, to increase our understanding of factors associated with favorable rating quality, we disaggregate the text signal into five discrete information categories. Results show that references to historical financial and nonfinancial performance measures contain significant predictive power. Our findings have important implications for investors and financial analysts.

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## 1. Introduction

Sell-side analysts (hereafter “analysts”) play an important role in gathering, analyzing, and disseminating information about covered companies to the market via research reports. The majority of these research reports include three summary measures—an earnings forecast, an investment recommendation (i.e., buy/hold/sell), and a price target—as well as text that supports or explains the summary measures. An extensive body of research examines whether the summary measures predict future stock returns (e.g., Barber, Lehavy, McNichols, & Trueman, 2001; Jegadeesh, Kim, Krische, & Lee, 2004; Loh & Mian, 2006; Gleason, Johnson, & Li, 2013). However, only a handful of studies have examined textual justifications in conveying information to the market (e.g., Asquith, Mikhail, & Au, 2005; Huang, Zang, & Zheng, 2014; Twedt & Rees, 2012), even though investors rank written reports as more important than quantitative measures, such as earnings estimates (e.g., Institutional Investor, 2011).

In this study, we examine whether the text in analysts' research reports allows us to discriminate between “good” and “bad” buy

ratings. We focus on favorable investment ratings because they represent the majority of research reports issued (e.g., Cox, 2015), suffer from inherent credibility problems (e.g., Morgan & Stocken, 2003), occur more frequently than appears warranted by future returns (e.g., Barniv, Hope, Myring, & Thomas, 2009; Wahlen & Wieland, 2011), and can mislead investors (Mikhail, Walther, & Willis, 2007). We also disaggregate the textual justifications into distinct categories to determine the type of information that drives any observed association with market data, provide additional evidence about analysts' rating process, and provide additional insight into the “black box” of analysts' valuation task (e.g., Bradshaw, 2009).

To test our research question, we adapt a machine learning text methodology that has been used in prior research to predict binary financial events, such as fraud and bankruptcies (cf., Cecchini, Aytug, Koehler, & Pathak, 2010a, 2010b). We generalize this method to predict a continuous variable, i.e., recommendation profitability, using linear regression.<sup>1</sup> This methodology allows us to transform analysts' qualitative statements from a hand-collected sample of favorable analyst research reports into a ‘text signal’ that

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<sup>1</sup> A similar adaptation is being used contemporaneously to examine the predictive value of text within the MD&A of annual reports (Caylor, Cecchini, & Chambers, 2015).

captures systematic differences between the qualitative statements associated with profitable buy ratings (i.e., those that generate a positive market-adjusted return over a twelve-month investment horizon) and those associated with unprofitable buy ratings (i.e., those that generate a non-positive market-adjusted return).<sup>2</sup>

The text signal is constructed automatically via a training sample with little human intervention. Our method is an extension of research in computational linguistics and differs from a naïve Bayes learning approach that is based on probability theory (e.g., Huang et al., 2014). The Bayes learning approach assigns categorical membership to each word and phrase. For instance, each item is categorized as either positive or negative. Our method enhances this process by creating *weighted* ranks of words and phrases to identify items that are more (or less) important to the classification task—e.g., identifying profitable or unprofitable favorable reports. More importantly, unlike Bayes, our methodology does not require manual coding for the domain-specific training sample. Our machine learning method also differs from any tone-based text methods, such as Harvard General Inquirer (freely available on the Harvard website, originated by psychologist Philip J. Stone), applications of those methods that use static word lists (e.g., Loughran & McDonald, 2011; Tetlock, 2007; Twedt & Rees, 2012), and machine learning methods aimed at detecting tone. Our method focuses on the predictive ability of the text, regardless of the tone.

Our dynamic, content-based methodology is particularly advantageous in our setting, as there does not exist a clear *a priori* hypothesis about what text items are useful in evaluating favorable analyst reports. Rather, our approach allows the data to speak for itself and, in doing so, gleans important insights about the informational value of analysts' textual justifications as it pertains to favorable report profitability. Our investigation is therefore atheoretical, as the data itself determines what is predictive; therefore, we attempt to place our results in context by presenting descriptive data, providing information about the uncertainty of estimated coefficients, reporting estimates of economic significance, and conducting exploratory analysis that aid our understanding of the favorable analyst report domain (e.g., Bloomfield, Nelson, & Soltes, 2016).

Our primary empirical tests indicate that analysts' textual statements contain information about the profitability of favorable ratings after controlling for information contained in other variables known to be associated with long-run returns, including revisions in quantitative summary measures (e.g., earnings forecasts). This association between the text signal and the market-adjusted returns over a twelve-month horizon is both statistically and economically significant. On average, a one standard deviation increase in our text signal increases the twelve-month market-adjusted return by 2.99 percent.

To further illustrate the predictive power of the overall text signal, we also implement a trading strategy that forms twelve-month buy-and-hold portfolios by taking long (short) positions in the top (bottom) quintile of the text signal. Implementing this basic trading strategy earns statistically and economically significant market-adjusted returns of 14.04 percent. Moreover, these returns are significantly higher than those achieved when applying trading strategies that rely on earnings forecast revisions or target price revisions (i.e., taking long positions when the revision is positive and short positions when the revision is negative) or by merely following analysts' favorable investment ratings (i.e., buying all companies in our sample).

We also investigate the types of qualitative statements that

provide information regarding favorable rating profitability. To do so, we disaggregate the text signal into five themes. Three themes differentiate profitable buy ratings from unprofitable ones: analysts' textual discussions of historical financial performance measures and non-financial performance measures are significant predictors of rating profitability, while analysts' interpretive statements are marginally predictive. A one standard deviation increase in the combined financial performance and non-financial performance text signals predicts a 4.59% increase in the twelve month market-adjusted return; including the analyst' interpretation text signal predicts a 5.61% increase. (Two other themes, forward-looking information, and management-and-shareholder information, are not statistically or economically significant).

This study advances the literature on sell-side analyst research in a number of ways. First, we complement the existing literature that focuses broadly on the value of sell-side analyst research (e.g., analysts' recommendations and earnings forecasts). We do so by providing evidence that the textual portion of analysts' research reports can be a useful signal when there exists uncertainty about the quality of the ratings (e.g., Morgan & Stocken, 2003). Second, we broaden the findings of research that investigates the information content of analysts' textual statements (e.g., Huang et al., 2014; Twedt & Rees, 2012). Our study expands our knowledge of the value of analyst report text by (1) documenting the association between analysts' qualitative statements and long-term profitability (versus the short-term market reaction in previous studies—e.g., Asquith et al., 2005; Huang et al., 2014), (2) introducing a new, machine-based method of data structuring that can capture the predictive power of analysts' qualitative statements, and (3) providing a deeper understanding of the specific categories of information that drive the observed association between analysts' textual statements and favorable rating profitability. These insights have important implications for investors who consume favorable analyst research and financial analysts who want to improve the diagnosticity of their ratings.

The remainder of the paper is structured as follows. The next section references the literature on favorable investment recommendations and analysts' qualitative statements, and then outlines our research questions. Section 3 describes our data, our machine learning text methodology, and the measurement of our variables. Section 4 presents our empirical results, including the validation of our text methodology. Section 5 concludes.

## 2. Background and research questions

### 2.1. Do analysts' qualitative statements contain information about favorable recommendation profitability?

In this study, we investigate the idea that analysts' textual justifications in their favorable research reports convey their private beliefs about the long-term profitability of the underlying investment. Analysts expend real resources to document justifications within their research reports and, as such, there is reason to believe that their statements convey information incremental to the quantitative measures (e.g., forecasts, target prices, and overall rating). Extant work examining how analysts' statements influence the market reaction to analyst research reports has found mixed results regarding the importance of textual statements (e.g., Huang et al., 2014; Kothari, Li, & Short, 2009), and the studies suggesting that justifications are important indicate that this relation is driven primarily by unfavorable information (Asquith et al., 2005; Huang et al., 2014; Twedt & Rees, 2012). However, prior literature may not yet have detected a significant association between analysts' textual justifications and the reaction to favorable ratings for two reasons: the textual proxies and the reaction window.

<sup>2</sup> Research institutions use different labels for favorable recommendations. We include ratings that are equivalent to buy ratings—e.g., overweight, outperform, etc.

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