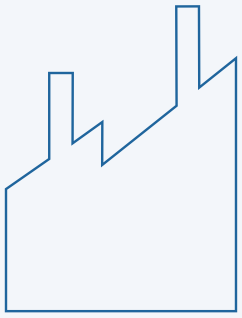

Equities Analytics

The Prattle Primer

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Introduction

The investment research industry is changing. A perfect storm of high costs, regulatory pressure, technological advances, and a growing awareness of cognitive bias are transforming this space, creating an ideal environment for innovation. As Benjamin Quinlan, CEO of Quinlan & Associates, put it: "The global investment research market is on the cusp of major disruption."

This Primer explains the major forces at work in this shift and how Prattle Equities Analytics were developed as a direct response to the needs of the modern institutional investor.

A New Era

Investment research is expensive. It's expensive to produce in house. It's also expensive to purchase from a bank or research firm. In fact, a joint paper by Bloomberg Intelligence, Frost Consulting, and Edison noted that the average cost of analyst coverage was $55,000 per stock. In short, no matter how you go about it, gathering the information necessary to create an informed trading strategy is a costly business. Yet, for all the money spent on research, almost no one actually reads it. In early 2017, Reuters reported that of the "40,000 research reports...produced every week by the world's top 15 global investment banks...less than 1 percent are actually read by investors."

After remaining the status quo for years, these research fees are now under attack. The rising popularity of passive investing alternatives are cutting into the returns of actively managed

funds, forcing fund execs to tighten their belts and take a second look at their expenses. In addition, MiFID II, due to take effect in early 2018, will require investment banks to separate the costs of trading from the costs of investment research. This regulation will expose the magnitude of fees that were once buried in transaction costs. The looming transition, according to the Financial Times, "has sparked frantic rounds of negotiations over the price of research."

Outside of cost pressures, financial research itself is evolving. Quantitative strategies have never been more popular, and, because of this, the demand for quantitative investment research (e.g., data) is likewise growing. Unfortunately for incumbent providers, the vast majority of current investment research, outside of standard financials, is qualitative—precisely opposite of the information best-suited to these systems.

While important, the rising popularity of quantitative approaches is just one part of the tectonic technological shift at play in the industry. Since computers began beating world chess champions, the analytical potential of AI has been clear. But recent advances in natural language processing (NLP), machine learning, and sentiment analysis are blurring the lines between human and machine work even more. Automated systems now have the ability to interpret and evaluate

complex, nuanced language with remarkable accuracy. These advances will have an increasingly profound effect on investment research, as tasks that were once only possible for human analysts, like determining the financial impact of speeches, statements, press releases, etc., can now be done algorithmically.

This rise in technological capability coincides with a growing awareness of the dangers cognitive biases pose to decision making. With trillions of dollars constantly subject to risk in the global markets, few spaces are more invested (literally) in making good decisions than finance. Consequently, asset managers are constantly on the lookout for ways of mitigating the cognitive biases at work in their investment decisions. Cutting-edge investment research providers are responding by leveraging technology to provide the most objective information possible.

In short, the investment research market is trending towards low cost, quantitative, AI-integrated solutions that help investors mitigate their cognitive biases. And Prattle's Equities Analytics platform matches each of those descriptions.

A Novel Solution

Established innovators in textual analysis, the founders of Prattle built an investment research solution tailored to the burgeoning needs of institutional investors and the investment research industry. As experts in textual analysis for financial applications, evaluating corporate communications was a logical progression. The solution they envisioned—and later created—was cost-effective, comprehensive, unbiased, real-time, and quantitative.

In other words, an ideal solution for the modern institutional investor.

Cost-effective

While the industry average cost of research coverage per stock is $55,000, the cost per stock for Prattle coverage is $10. The value of Prattle's data combined with its affordability allows

users to, more or less, have their cake and eat it too: slashing research costs while expanding coverage.

Comprehensive

The evaluation of each communication is built on an algorithmic analysis of the entire historical relationship between each company's language and corresponding stock price movement. In addition, the Prattle dataset currently covers 4,000 publicly traded equities in the U.S. and will soon expand to include every publicly traded company in every developed market. This is significant on at least two fronts: 1. Basically all human interpretation, especially of qualitative information, is based on an incomplete picture of the relevant context. Because Prattle's system evaluates every corporate communication in light of the complete history of relevant information (company language and stock price movement), each evaluation is comprehensive. 2. Given that only 40% of publicly traded companies are covered by traditional research, Prattle offers peerless breadth of coverage.

Unbiased

From foundational historical analysis to the evaluation of individual documents, Prattle's interpretive process is entirely automated—and, because of this, it is not subject to the myriad cognitive biases inherent in human analytical work. Users can

leverage this data as a vital, objective check to their subjective interpretations.

Real-time

It's a time consuming process for any human system to analyze complex, nuanced information, and, the more sophisticated the information is, the more time it takes to evaluate. Prattle's algorithm, on the other hand, has no such hang ups: it can evaluate most language in fractions of a second, regardless of complexity.

Quantitative

These scores are a numerical measure of the impact of the tone of a company's communications (earnings calls, press releases, etc.) on a company's stock price. For quantitative traders, this data is an ideal input for financial trading models. For discretionary traders, this data allows for an unprecedented level of precision. Standard, qualitative evaluations of qualitative information are just difficult to operationalize. Making precise or meaningful comparisons based on "seems like" or "appears" is a clumsy endeavor. In contrast, the quantitative nature of Prattle's evaluations allows for exactly the kind of precise, meaningful comparisons that standard reports do not.[1]

1 For instance, Prattle users can now know exactly what percentile of positive or negative each communication is.

What we've provided here is a brief overview of what Prattle Equities Analytics are and how they are produced. The next two sections of this Primer explore each of these areas in detail.

What Prattle Equities Analytics Are

People speak in patterns. These patterns aren't random—if they were, communication would be unintelligible. Rather, linguistic patterns link specifically to the conscious and subconscious thoughts of the communicator.

Executives and political leaders often explicitly communicate the state of their company or country through linguistic patterns. For example, when former President George W. Bush said "This sucker could go down" in his 2008 speech at the brink of the financial crisis, his thoughts about the state of the U.S. economy were beyond doubt. When an executive speaks similarly about their company, it's time to sell.

But much of the valuable information contained in linguistic patterns is far more subtle. Executives at certain publicly traded casinos, for example, emphasize licensure and regulation when

they are performing well. When performance is poor, however, their emphasis shifts to slots offerings, costs, and casino closings. Historically, only experienced analysts who have a history and rapport with the company's executives could detect these nuanced patterns. Now, technology has made it possible for algorithms to detect what once only above-average human analysis could.

The subtlest of patterns, however, are very difficult (or perhaps impossible) for human analysts to consciously assign meaning to. These patterns manifest in the language of a corporate executive like a poker player's tell. For instance, executives at a small-cap debt collection agency tend to shift focus to future product innovations when the company's performance slumps. Subtle shifts like these are quite challenging for human analysts to consciously notice...let alone concretely analyze and link to stock price.

All of these linguistic patterns, from the obvious to the subtle, impact their audience. When it comes to finance, audience reaction is measured in terms of price movement.

Algorithmically Mapping Language

To understand this relationship between linguistic patterns and stock price, Prattle's system algorithmically maps the language

patterns corporate spokespeople and analysts use when describing a specific company to the historical performance of that company. This process produces a lexicon of scored expressions (words, phrases, sentences, etc.) valued in terms of their impact on stock price.[1] Then, Prattle's system uses this lexicon as a basis of evaluation for subsequent language by those executives and analysts.[2] This fully automated analysis produces a score that is indicative of future company performance.

Prattle's scores capture price-relevant factors that are not captured by a company's fundamentals. By controlling for common fundamental quantitative factors like peer-company performance, Prattle scores represent the price movement that can be directly tied to the sentiment expressed in corporate communications.[3] While the scores will always be influenced by a company's financial trends, they are valuable because they capture and describe the price impact of previously unquantifiable information. This includes blatant price-relevant information; for example, did the company get that drug approved or not, and how will that affect the stock's price? This

1 Prattle's lexicons are databases of words, phrases, sentences, and sometimes whole paragraphs. Each word, phrase, sentence, etc. in these databases has been assigned a value based on its historical impact on stock price. Prattle has created a custom lexicon in this way for every company it covers, and that lexicon continually updates through machine learning.

2 We will talk in more detail about Prattle's methodology later in this paper.

3 If you'd like to learn more about how Prattle isolates for the impact of language on price, you can always schedule an appointment with our quant team. Reach out at info@prattle.co.

also includes subtle price-relevant information; for example, is the CEO speaking in patterns historically consistent with poor performance, and how will that affect the stock's price?

As a result, the scores can contain information that is indicative of a company's future performance and often uncorrelated with other traditional factors used in forecasting performance. And, because Prattle builds each company's lexicon using the history of each company's language in relation to stock price, each score represents a context-specific evaluation of the language in that specific company's communications.[4]

In short, the Prattle process produces a score that indicates a company's likely future performance, captures price-relevant information not included in a company's fundamentals, and is tailored to the specific relationship between a company's language and its stock price.

Applications

A Prattle sentiment score is an indication of expected company performance, given the language of a call. In standard terms, the sentiment score is the change in expected cumulative abnormal return (CAR) caused by the language of a communication as compared to prior communications from

4 Prattle's dataset goes back to 2008; it takes 16 quarters to fully train the algorithm on a company's language.

the past year. Because they are based on abnormal returns, the scores control for market movement and the risk-free rate.[5]

While these scores have a variety of practical applications, we think two particular use-cases warrant particular attention:

1. Prattle scores as hot-takes. Our scores allow users to quickly grasp the sentiment of a communication and what it could mean for a company's stock. This can serve as a filtering mechanism for what stocks warrant further attention or simply a way to maintain a bird's eye view of a wide swath of stocks.

2. Prattle scores as leading indicators. When converted into time series data, the scores can serve as a leading indicator of company performance. This quantitative indicator not only provides a shorthand view of the relationship between the company's language and stock price, but also a measurement that allows users to incorporate this information directly into a quantitative model.

5 Prattle's methodology borrows from the Capital Asset Pricing Model (CAPM).

The Methodology Behind the Data

The foundation of Prattle's algorithmic analysis of corporate communications is the unique lexicons we've built for each company we track. To construct a lexicon for each company, our algorithm is first trained on a series of historical corporate texts known as reference documents. These documents are communications whose content has led to identifiable stock price movement, making them a reliable, historically-rooted foundation for comparison. Using these reference documents, Prattle has mathematically linked specific words, phrases, sentences, and paragraphs—collectively referred to as "expressions"—to each company's stock price movement.

For Prattle, the language of corporate communications is understood in terms of what it indicates about future performance. Language patterns that indicate optimism about product performance, growth prospects, or the broader

company outlook are assigned positive values. Language patterns that are historically indicative of a poor outlook are assigned negative values. These expressions and their corresponding weights make up the initial lexicons for each company.

Prattle uses these lexicons as a basis of evaluation for subsequent communications. But these lexicons are not static databases. Rather, they are constantly updated through machine learning. When our system first encounters a new expression (such as newly-coined words like "WannaCry", "Sandy Bridge", or "Skylake") in a corporate communication, it does not weight that expression because it does not have a basis of evaluation. The second time that expression appears, however, the system is able to weight it based on how it was used previously. In a similar way, the weights of existing expressions in the lexicon are constantly updated based on the evolving way in which they are used in communications.

In short, the weights of expressions within the initial lexicon (the training set) are determined by their association to stock price movement.[1] The weighting of new expressions is then determined by how they are used in relationship to the language in the training set. Thus, the weighting of the

1 At this point, we do not update the reference documents.

expressions in the initial lexicon evolves as the algorithm detects changes in their use over time.[2]

2 For more, please see The Prattle Machine Learning Algorithm: Data.

Conclusion

This Primer has provided the background and an overview of Prattle Equities Analytics, as well as a deep dive into the meaning of and methodology behind the scores. If you have more questions regarding our data or methodology, please feel free to reach out to our team. Contacting us is easy. Just reach out, and one of our team members will reply as soon as possible. Thanks for your time, and we hope to hear from you soon.

The Prattle Team