Introduction

Social Market Analytics, Inc., (SMA) produces a family of metrics, called S-Factors™, designed to capture financial market sentiment about a particular company. SMA applies these metrics to data captured from social media sources to estimate sentiment for financial instruments. SMA's servers process social media data streams to produce sentiment estimates for equities in the SMA stock universe.

What is the S-Score™?

SMA computes S-Factors™ for stocks. In general, positive S-Scores are associated with favorable changes in market sentiment, while negative levels are associated with unfavorable changes in market sentiment. SMA expects changes in market sentiment, as measured by changes in the S-Score™, and associated metrics, to be reflected in price changes.

For each company in SMA's stock universe, SMA's servers poll the Twitter and StockTwits APIs to capture messages about the stock. The collected messages are filtered for financial market relevance and scored for market sentiment. Then, the scores are aggregated to produce a sentiment measurement for each stock with active content.

Please note that rapid movement in the S-Score may make this information more time sensitive and the volume of posting on a particular stock at any one time may also be limited.

How is the S-Score Calculated?

SMA employs a three stage processing pipeline to mine data from the Twitter and StockTwits message streams. This process is performed 24/7 for all stocks in the SMA stock universe (covering ~ 4200 stocks) at regular intervals throughout the day. The figure below reviews these processing stages with further detail available in SMA's patent ["Systems and Methods of Detecting, Measuring, and Extracting Signatures of Signals Embedded in Social Media Data Streams", U.S. Patent No 9,104,734, August 2015, Washington, DC: U.S.].

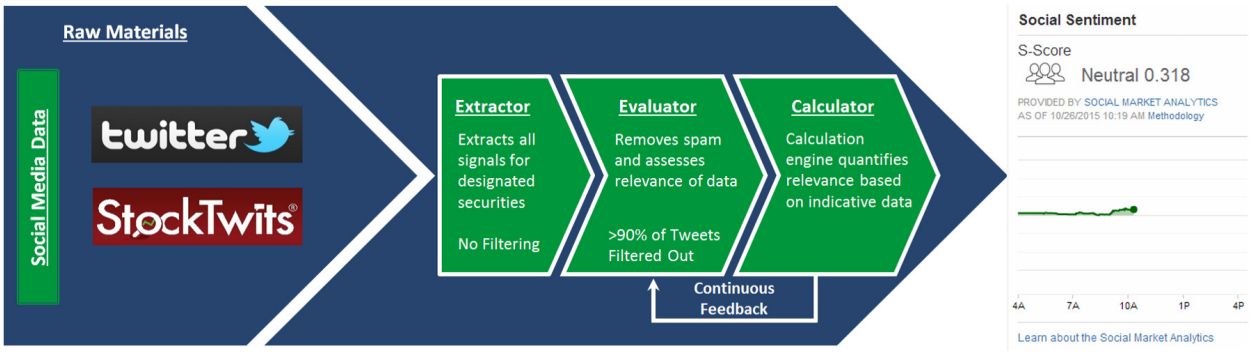

Figure 1: Social Market Analytics Processing Architecture

Extractor - The Extractor accesses the Twitter and StockTwits feeds looking to capture messages containing commentary on any stock in the SMA stock universe, also referred to as "designated securities". The process continuously cycles through the universe list, looking for securities with current content in the message stream.

Evaluator - The Evaluator analyzes each message for financial market relevance to the stocks in the SMA universe. These are called "indicative" messages, as these indicate expressions of market trading sentiment for these stocks. SMA further filters specific Twitter accounts to determine whether the content is from sources SMA believes are relevant. SMA tracks and scores posts from these accounts over time and filters them based on a sophisticated and rigorous rating system. Messages from these accounts SMA deems to be relevant comprise the "indicative" messages used to compute the S-Score.

Calculator - The Calculator determines the sentiment for each stock in SMA's universe whereby the selected indicative messages are then placed into a process to bucket and weigh the sentiment, and grouped into time periods. A normalization and scoring process calculates the S-Score for each stock with active content. S-Scores range from -4.25 to 4.25. Scores between 0 and 1 or 0 and-1 are considered to be neutral.

SMA's processing engine delivers these S-Factors™ metrics to Fidelity:

S-Score™: Is the normalized representation of a sentiment time series over a lookback period. The S-Score™ is a measure of the deviation of a stock's sentiment intensity level from a neutral state. The S-Score™ answers the question, "Is the conversation on Twitter signifcantly more positive or negative than normal for that specific stock?". Higher levels of sentiment indicate a stronger reaction. High positive sentiment suggests that a security is statistically likely to move higher. Conversely, a strongly negative sentiment suggests that a security is statistically likely to go lower.

Interpretation of the S-Score

The most fundamental application of S-Factors™ to market sentiment analytics is to consider the behavior of the level of the S-Score™ metric with respect to market returns. In general, positive S-Scores™ are associated with favorable changes in investor sentiment and may result in increasing stock price, while negative levels are associated with unfavorable changes in investor sentiment and may result in decreases in stock price.

S-Score	Market Sentiment Regime
> 3	**Extreme Positive**
> 2 and < 3	**High Positive**
> 1 and < 2	**Positive**
> -1 and < 1	**Neutral**
< -1 and > -2	**Negative**
< -2 and > -3	**High Negative**
< -3	**Extreme Negative**

Concepts for Application

SMA's documented research and analysis, and other independent work, suggest some points and ideas to consider in your analysis.

1. S-Factors™ exhibit different behavior at different sentiment levels.
2. Market events such as earnings reports, mergers, and acquisition announcements present good case studies, but tend to overshadow social media sentiment. It may be interesting to assess S-Factor™ relevance prior to, and/or, after such market events.
3. S-Factors™ appear to have correlation with other market data, in particular options volatility.
4. S-Factors™ are published 24/7. Although weekends in general exhibit slower activities, it is possible to detect activities over the weekend which may be very informative.
5. S-Factors™ may be useful elements in regression models to analyze volatility, asset returns, and volume on daily and intraday timescales.

More detail on S-Factors

S-Factors™ are designed to quantify sentiment for different stocks. S-Factors™ provide a perspective for understanding changes in sentiment levels and reveal the market sentiment regarding a particular stock over time. A visual representation of the S-Factors is as shown below.

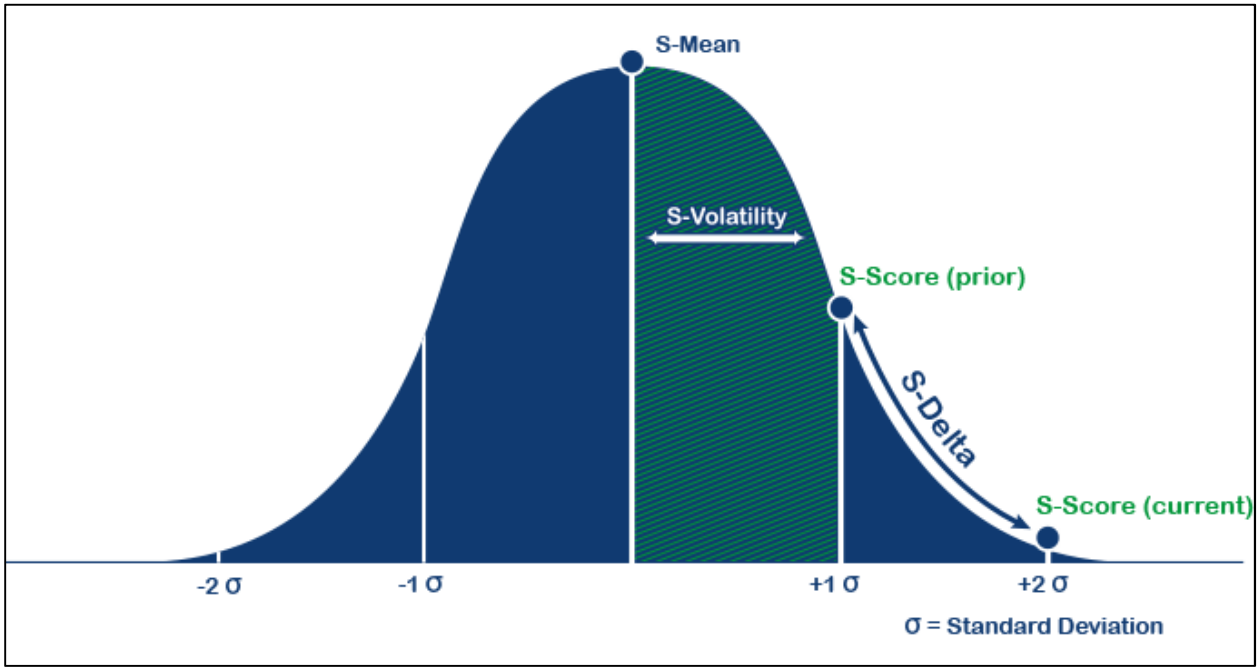

Figure 2: Visual Representation of S-Factors™