S3 ANALYTICS:
CROWDED SCORE & SQUEEZE RISK SCORE

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S3 Analytics: Crowded Score & Squeeze Risk Score

S3 has developed two new analytics: Crowded Score and Squeeze Risk Score. In this whitepaper, we detail the methodology used to calculate each analytic and how investment professionals and risk managers can derive value from them.

Each score is comprised of a multi-factor model that produces a numeric rating from 0 (lowest) to 100 (highest). The score gives the user a normalized way to comparatively consider the Crowdedness or Squeeze Risk in a universe of 50,000+ stocks that differ greatly by market cap, geography, or sector. The intention here is that when a company's stock has a score of 50, the 50 represents the same amount of Crowdedness or Squeeze Risk whether considering a small cap US-based technology company or a large cap EMEA based industrials firm.

Crowded Score

The Crowded score is calculated using a multi-factor model that helps to identify "crowded" shorts. The industry measures "crowding" in a variety of different ways with a variety of different intentions and outcomes; Our model includes elements of many of these traditional measures, as follows:

1. **Total dollar amount of short position in a company's stock**
2. **Liquidity in the stock loan market**
3. **Trading capacity (Average Daily Volume)**
4. **Short interest as a true percentage of a company's tradeable float**

You can read more about these factors in Appendix A

Clients can leverage the Crowded score to identify the relative crowdedness of the short position in any given company, on a scale of 0-100. This data point can be leveraged in risk models that seek to identify/reduce exposure to crowded trades. It offers investment professionals and trading desks the opportunity to quickly filter for situations with crowded shorts to make better informed decisions as it relates to their workflow.

Squeeze Risk Score

The Squeeze Risk Score highlights the risk (on a 0-100 scale) that shorts could be forced to reduce or liquidate a short position. The analytic leverages all factors of the Crowded Score and introduces two additional components – the two major reasons that a short seller could be forced out of a position: **Increased stock lending costs and mark-to-market losses.**

We overlay the associated profit & losses with a short position in a company across multiple durations to accentuate the larger impact of recent profits & losses on investment decisions.

Clients can use the Squeeze Risk Score to screen for stocks that are at risk of a potential short squeeze.

A higher Squeeze Risk Score forecasts increased volatility, identifying binary trading decisions: an alert for short sellers to cover their positions; an alert for long buyers to identify names with momentum.

Conclusion

If the Squeeze Risk score is **LOWER** than the Crowded score, the momentum in the name is **FOR** the short sellers. This screen could highlight situations for an alpha generating short trade.

If the Squeeze Risk score is **HIGHER** than the Crowded score, the momentum in the name is **AGAINST** the short sellers. This screen could provide risk managers an opportunity to exit or hedge positions ahead of a possible squeeze event or highlight situations for an alpha generating long trade.

***The Crowded Score and Squeeze Risk Score are not intended to provide signals that should be used as investment advice. These scores highlight unique attributes about the short positions in a company's stock and should not be relied upon as the sole criteria for a buy or sell decision.**

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Appendix A – Crowded Score – Factor details

Total dollar amount of short position in a company's stock

A total short position of $50mm on its own is difficult to fully assess without considering other data points, such as market cap of the company being shorted and the number of individual short positions that comprise that total dollar amount. A $50mm short position in a highly liquid mega-cap company is materially different than a $50mm short position in a thinly traded small cap name. Other parts of our multi-factor model (liquidity/trading capacity) help to account for this difference in our overall scores. Our model also accounts for how market structure allows institutionally sized positions to function.

Liquidity in the stock loan market

We consider increasing financing rates and hard-to-borrow/hard-to-locate signals that show decreasing liquidity in the stock loan market – a sign that it would be difficult to put on any incremental short positions.

Trading capacity (Average Daily Volume)

In this factor, we consider the Average Daily Volume (ADV) as number of shares shorted vs. number of shares traded daily. To that end, when ADV increases, our Crowded Score decreases – as the increased trading volumes allow for easier entry/exits of positions.

Short interest as a true percentage of a company's tradeable float

S3 has developed a proprietary analytic for short interest as a true percentage of a company's tradeable float, which we call the S3 % of Float. You can read more about this analytic in a whitepaper here: https://www.s3partners.com/S3-Whitepaper-v2.pdf.

Appendix B – How to Interpret the Crowded Score

The Crowded Score is a qualitative measure of the relative "crowdedness" of a short position in a single security. There is no quantitative relativity between the Crowded Score of Security A vs. Security B – each score is a representation of an individual security's "short crowdedness" at a specific moment in time.

More information about the ranges of scores is below. As a reminder, the 4 factors of the Crowded Score include:

1. **Total dollar amount of short position in a company's stock**
2. **Liquidity in the stock loan market**
3. **Trading capacity (Average Daily Volume)**
4. **Short interest as a true percentage of a company's tradeable float**

Crowded Score	**Description / Characteristics of Securities with Crowded Score in this range**
1 – 49	These are securities that are not crowded on the short side. Securities towards the higher end of this range have slightly elevated factor scores.
The following ranges show securities that are starting to get crowded	
50 – 59	At least one factor is above the norm.
60 – 69	At least one element is significantly higher than the norm; or at least 2 factors are above the norm.
70 – 79	At least 2 elements are significantly higher than the norm.
80 – 89	At least 3 elements are significantly higher than the norm; or at least 2 significantly higher than norm.
90 – 100	All 4 elements higher than the norm; or at least 2 significantly higher than norm, with rapid material increases in amount of short selling in the security and stock borrow rates.

Appendix C – How to Interpret the Squeeze Risk Score

The Squeeze Risk Score is also a qualitative measure – it seeks to highlight when the circumstances necessary for a squeeze event are all present in any given security. These necessary circumstances include the 4 factors of the Crowded Score, as well as increasing stock lending costs and increasing mark-to-market losses on short positions in the given security.

An elevated Squeeze Risk Score does not indicate that a squeeze event will definitively take place, nor does it seek to indicate a higher relative likelihood of a squeeze event versus a security with a lower score. It simply indicates to the user that a greater number of conditions necessary for a squeeze event to occur are happening at present, and that should the stock price start to appreciate (i.e. forcing short sellers into greater mark-to-market losses), a squeeze event could materialize quickly.

Squeeze Risk Score	**Description / Characteristics of Securities with Squeeze Risk Score in this range**
1 – 49	These are securities that are not crowded or just starting to get crowded. These are securities that have been profitable shorts or recently have only had minimal losses.
50 – 59	Minimally crowded and have one element significantly higher than the norm; or minimally crowded & incurred recent mark-to-market losses.
60 – 69	More crowded and have at least one element significantly higher than the norm and have incurred recent and appreciable mark-to-market losses (~5% or greater).
70 – 79	More crowded and have 2 elements significantly higher than the norm, and have incurred recent and appreciable mark-to-market losses (~5% or greater).
80 – 89	VERY crowded and have 2 or more elements significantly higher than the norm and have incurred recent and significant mark-to-market losses (~10% or greater).**Shorts with less conviction/liquidity may begin to be squeezed in this range.*
90 – 100	VERY crowded and have 3 or more elements significantly higher than the norm, and have incurred recent and significant mark-to-market losses (~10% or greater).