STARMINE QUANTITATIVE ANALYTICS

refinitiv.com

Grounded in sound economic intuition and backed by rigorous analysis, our robust models span sectors, regions and markets to help you achieve higher returns.

REFINITIV™

DATA IS JUST
THE BEGINNING

Leveraging predictive analytics to generate Alpha

A legacy of performance

The key to the StarMine approach is to build clear-box, alpha-generating models of observable market anomalies based on intuitive economic hypotheses.

With StarMine, you are adding a deep-well of global expertise to your investment team. It is like adding an entire research department of Ph.Ds to your firm. For over 16 years, our financial researchers and analysts have developed a reputation for creating unique and profitable stock selection, credit and sovereign risk and economic prediction analytics and models.

How successful are the StarMine models? The numbers tell the story

StarMine has a long and proven track record in successful predictive modeling – both short- and long-term, with on-going performance reporting. We leverage factors that others overlook – and the result is simple: better Alpha generation.

Clear-box design is transparent and customizable

While our models perform well as formulated, they're designed so you can see – and understand – the underlying analytics. You can use the final model rankings or the underlying component rankings as part of your quantitative process or use them to test your own hypotheses.

Discover more profitable opportunities

Today, no one can sit back and react to the market. You have to reliably predict what the market will do, where it's headed, where the gaps fall and when the trends start. StarMine gives you a unique, proven way to see and seize these opportunities – often ahead of other market participants.

The Portfolio of StarMine Quantitative Analytics and Models
- Analytics
  - SmartEstimates
  - SmartEconomics
- Classic Quantitative Models
  - Analyst Revisions
  - Price Momentum
  - SmartGrowth and Intrinsic Valuation
  - Relative Valuation
  - Earnings Quality
- Smart Money Models
  - Smart Holdings
  - Short Interest
  - Insider Filings
- Combination Models
  - Value Momentum
  - Combined Alpha Model
- Credit and Sovereign Risk Models
  - Structural Credit Risk
  - SmartRatios Credit Risk
  - Text Mining Credit Risk
  - Combined Credit Risk
  - Sovereign Risk

StarMine Quantitative Models are built using industry-leading content from
- I/B/E/S Estimates
- Reuters Fundamentals
- Equity Ownership
- Reuters News
- StreetEvents Transcripts
- Global Corporate Filings
- Datastream
- Datascope

Analytics

StarMine Analytics are best-of-breed proprietary algorithms. These analytics lead to more accurate estimates and serve as powerfully effective inputs to both our own StarMine models, or to your privately developed models.

SmartEstimates

Earnings surprises and consensus revisions are well-known drivers of stock price movements. StarMine has a proven ability to predict these surprises and revisions by creating a SmartEstimate that is more accurate than the consensus.

SmartEstimates help you better predict future earnings and analyst revisions with estimates that place more weight on recent forecasts by top-rated analysts. SmartEstimates are created in two steps. First, we exclude stale estimates and data errors, then weight the remaining estimates based on each analyst's track record and the date of the estimate. When the SmartEstimate diverges from consensus by 2% or more, our research shows that you can anticipate the direction of earnings surprises with an accuracy rate of over 70%.

SmartEconomics

SmartEconomics takes StarMine's proprietary SmartEstimates methodology and applies it to forecasts of macroeconomic data and FX rates to create a SmartEstimate of economic data that is more accurate than the simple consensus forecast.

SmartEconomics marries the breadth of Datastream economic data with the industry-leading Reuters polling data to rigorously assess the historical accuracy of each contributor at every point in time on every economic indicator for which the contributor had a forecast. The indicator-specific, StarMine historical accuracy score for each forecaster then determines the weight that each forecast receives in the SmartEstimate. Backtests show that the SmartEstimate correctly predicts the direction of macro surprises relative to the consensus forecast about 61% of the time when the SmartEstimate is significantly different from the consensus.

StarMine Quantitative Models

These models provide robust stock selection factors that you can use as is, or in your own models. They output percentile ranks between 1 (lowest ranked stock) and 100 (highest). We rank the factors globally as well as by region, sector and industry.

Analyst revisions (ARM)

StarMine ARM is an analyst revisions stock ranking model that is designed to predict future changes in analyst sentiment. The model incorporates more accurate earnings estimates through StarMine's proprietary SmartEstimate earnings prediction service. It also includes estimates on multiple fiscal periods, uses other financial measures in addition to earnings, and considers changes in analyst recommendations.

Our research has shown that past revisions are highly predictive of future revisions, which in turn are highly correlated to stock price movements. StarMine's proprietary formulation includes overweighting the more accurate analysts and the most recent revisions and intelligently combining multiple dimensions of analyst activity to provide a more holistic portrait of analyst sentiment.

Price Momentum (Price MO)

StarMine Price Mo intelligently acknowledges the tendency of long-term trends in returns to continue, plus the tendency of short-term trends to revert. The model also includes an innovative blend of short-term, mid-term, and long-term components and incorporates information on industry-level price momentum and the degree of consistency or volatility in prior returns.

The Long-Term Component takes advantage of the tendency of upward or downward price trends to persist. The Mid-Term Component provides a measure of more recent price momentum and serves as a check that the more recent price trends are consistent with those found in the Long-Term Component. The Mid-Term Component also serves to make the overall signal more responsive to turn around situations. The Short-Term Component serves as a reversal indicator such that the biggest winners over the last week tend to be losers in the following week.

SmartGrowth and Intrinsic Valuation (IV)

StarMine IV leverages SmartGrowth Earnings Projections into a refined estimate of intrinsic value. Enjoy a more accurate stream of growth forecasts with SmartGrowth Earnings Projections which intelligently adjust for analyst bias.

Research has shown that sell-side analyst estimates include significant systematic errors and biases. StarMine has identified and systematically removed three forms of analyst error and bias to improve the accuracy of longer-term estimates and enhance their ranking and sorting abilities. The resulting StarMine SmartGrowth Earnings Projections for FY1 through FY5 provide more accurate and reliable inputs than analyst consensus estimates.

StarMine IV utilizes SmartGrowth Earnings Projections and improved forward dividend estimates to calculate fair values for over 19,000 stocks worldwide. This determination of a company's intrinsic value entails discounting an infinite stream of future cash flows. You can count on StarMine IV to be more comprehensive and predictive than similar commercial offerings.

Relative Valuation (RV)

StarMine's robust stock-ranking RV model profitably sorts companies by intelligently combining information from six powerful valuation ratios into a single comprehensive measure of relative valuation. It expertly blends the most additive and complementary valuation ratios and includes both reported actuals and our proprietary SmartEstimates for FY1 and FY2.

Forward estimates are overweighted relative to actuals where analyst estimates have historically been most accurate and underweighted for measures where estimate error is typically highest. The inputs are combined using a dynamic algorithm that differentially weights each component according to company-specific characteristics. The result: a profitable, robust, and intellectually satisfying method for sorting stocks based on relative valuation.

Value-Momentum (VAL-MO)

This model takes advantage of the valuable and complementary information in value and momentum signals. It condenses into one powerful signal all the unique and proprietary information contained in StarMine's valuation and momentum models. The culmination of 10 years of research, StarMine Val-Mo combines our innovations in four distinct areas: intrinsic value, relative value, analyst revisions and price momentum.

Value signals differentiate stocks that are cheap and those that are overpriced, whereas momentum signals acknowledge the tendency of past trends to continue into the future. By combining value and momentum, StarMine Val-Mo identifies cheap stocks that are poised for rebound and over priced stocks that are likely to experience reversion. The combination differentiates between "value traps" and stocks that are truly undervalued and gaining favor with analysts and investors.

Earnings Quality (EQ)

StarMine EQ employs a quantitative multi-factor approach to predict the persistence of earnings. Unlike more simplistic models that focus exclusively on accruals, StarMine EQ differentially weights the sources of earnings based on analysis of their relative sustainability.
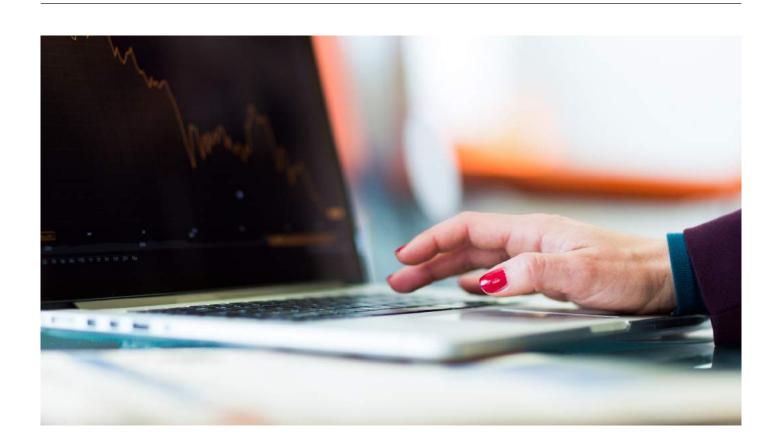
Several key inputs incorporated by StarMine EQ:

- Accruals: eight different sources of accruals are included according to their contribution to the persistence of earnings.
- Cash Flow: when earnings have high cash flow, they are more likely to persist.
- Operating Efficiency: when earnings result from high margins and good asset utilization, they are more likely to persist.
- Exclusions: when pro-forma earnings are similar to GAAP earnings, they're more likely to persist.

The StarMine EQ score allows you to objectively compare a company's earnings quality relative to all other companies. The model highly ranks stocks whose earnings are backed by cash flows and other sustainable sources and penalizes those driven by accruals and other less sustainable sources.

"Quant tools are being used by a growing number of investors. StarMine released its first quantitative analytics in 2001. It was an early leader, and remains at the forefront, of quant model construction."

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DIRECTOR RESEARCH AND INNOVATION,
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Smart Money Models

The StarMine Smart Money suite of models leverages information about the actions of various groups of informed investors whose movements can predict changes in stock prices. We take into account the actions of a mix of firms and individuals, including financial institutions, short sellers and corporate insiders.

Smart Holdings

Smart Holdings goes beyond "backwards-looking" popular methods and accurately predicts forward changes in institutional buying and selling by determining which factors are in play with institutional investors and which stocks are becoming more or less desirable in the current environment.

Smart Holdings combines several content sets including ownership data, corporate financial data, as well as I/B/E/S Estimates. Extensive research has found that merely relying on levels of current holdings as they are reported to regulatory agencies (such as 13-F filings in the US which include a 45-day reporting lag allowed by the SEC requirements) produces little value. Our research revealed that a model must be predictive of which stocks will be bought or sold by fund managers over the upcoming quarter.

At the core of the model is an algorithm that reverse engineers each fund manager's purchasing profile based on the underlying fundamental factors of the companies the fund is buying. Once the profile is determined, the fundamental factors of all global stocks are compared to each fund's purchasing profile to determine the alignment between the stock and the fund, and then aggregated over all funds. The Smart Holdings model also blends in peer information to determine if funds are already concentrated in a company's peer group, as well as a change measure to target securities that are increasingly becoming aligned or misaligned with current fund preferences. The result is a model that accurately sorts stocks on predicted future increases or decreases in institutional ownership.

Short Interest

The Short Interest model ranks US stocks based on the hypothesis that stocks with a high (low) number of shares shorted will under (out) perform. It improves upon a basic short interest model by accounting for well-known arbitrage strategies and incorporating institutional ownership as a supply factor that measures the number of shares available to be lent to short sellers. We view high demand, in the form of a high number of shares shorted, in the presence of tight supply, as a sign of conviction on the part of short sellers. The Short Interest model also removes the effects of shares shorted as hedges in order to focus on the shares shorted by investors making directional bets. We also provide a Short Squeeze Indicator to help you address the risk of being forced to cover your short positions.

Insider Filings

StarMine Insider Filings ranks companies in the US on the basis of the sentiment of company executives and directors about their company stock, as reflected in insider stock transactions and ownership. The model exploits the finding that agreement across insiders as expressed by buying (selling) stock is predictive of company out (under) performance in the coming months. Our intuitive model uses publicly available insider filings to assess two dimensions of insider sentiment: how many insiders are buying or selling company securities, and how much is being bought and sold by insiders. The model employs proprietary methodologies to incorporate various types of security and options transactions, while also paying special attention to the timing of those transactions.

Combined Alpa Model

StarMine's CAM combines all available StarMine alpha models in an optimal, static, linear combination. The weights assigned to each model vary by geographic region. CAM takes advantage of the fact that some regions, such as the US and Japan, are more value focused while in Developed Europe and Asia ex-Japan momentum plays a larger role. The model intelligently handles missing data and makes use of all available models for a given security. The models used in StarMine CAM are Analyst Revisions (ARM), Relative Valuation (RV), Intrinsic Valuation (IV), Price Momentum, Earnings Quality (EQ), Smart Holdings, Insider Filings (US only), and Short Interest (US only). StarMine CAM is our best performing alpha model to date.

Credit and Sovereign Risk Models

Using a multi-pronged approach comprising several models, this suite quantitatively assesses and predicts credit risk and the probability of default. The default probabilities are also mapped to traditional letter grades and ranked to produce 1-100 percentile scores.

Structural Credit Risk Model

The Structural Credit Risk model evaluates the equity market's view of the probability that a company will go bankrupt or default on its debt obligations over the next one-year period. The model is StarMine's proprietary extension of the structural default prediction framework introduced by Robert Merton that models a company's equity as a call option on its assets. The equity volatility, market value of equity, and liability structure are used to infer a market value and volatility of assets. The final default probability is equivalent to the probability that the market value of assets will fall below a default point, which is a function of the company's liabilities, within one year. The Structural Credit Risk model is considerably more accurate at predicting defaults than the Altman Z-score or a basic Merton model, capturing almost 85% of default events within a 12-month horizon in its bottom quintile of scored companies.

SmartRatios Credit Risk Model

The SmartRatios Credit Risk Model is an intuitive and robust default prediction model that provides a view of a firm's credit condition and financial health by analyzing a wide array of accounting ratios that are predictive of credit risk. The model incorporates accounting ratio analysis utilizing both financial statement data and forward-looking analyst estimate data via the StarMine SmartEstimate.

Using the SmartEstimates in its algorithm significantly enhances the model's accuracy and responsiveness over other formulations that rely exclusively on reported financials. The model assesses credit risk along five dimensions:

- profitability
- leverage
- interest and debt coverage
- liquidity
- growth and stability

It also incorporates industry-specific metrics for companies in select sectors and combines the accounting ratios in a weighting scheme that ensures the most important ratios for a given sector receive the most weight.

Text Mining Credit Risk Model

This very unique component of StarMine Credit Risk applies sophisticated text mining algorithms to StreetEvents earnings conference-call transcripts, financial statements and other regulatory filings, Reuters News and select broker research reports to identify language that is predictive of credit risk. StarMine found that the language predictive of credit events is unique and slightly different in each document type. StarMine Text Mining Credit Risk therefore uses custom dictionaries for each type of document to accurately assess the unique diction and style in each one. The model allows analysts to quickly identify the most important documents for a company out of the potentially hundreds they may be responsible for, and it gives quantitative managers a powerful, new quantitative signal by systematically analyzing a large body of previously untapped qualitative data.

Combined Credit Risk Model

The CCR is StarMine's best estimate of credit risk at the company level that incorporates information from the StarMine Structural, SmartRatios and Text Mining Credit Risk Models into one final estimate of corporate credit risk. By incorporating information from multiple independent data sources – from the equity market, from analyst estimates and financials, and from analysis of the language in important textual documents – and placing the most emphasis on the inputs that are most effective for a given company, StarMine CCR creates powerful default predictions and assessments of credit risk that are more accurate than using any one data source alone.

Starmine Sovereign Risk Model

StarMine SR evaluates a wide array of macroeconomic, market-based and political data to estimate the probability that a sovereign government will default on its debt. The model produces estimates of the annualized probability of default for over 100 countries at six time horizons: one, two, three, five, seven and 10 years. The default probabilities are also mapped to traditional letter grades and ranked to produce 1-100 percentile scores.

StarMine SR utilizes a logistic regression framework to estimate default likelihoods. The model was trained to over 30 years of sovereign credit event data. The data included actual defaults (missed payment), distressed restructurings (debt reissued in less favorable terms) and debt rescheduling under the auspices of the Paris Club. The primary input drivers of the model are macroeconomic data from Datastream. Additional market-based and political data inputs are also used to generate a comprehensive picture of sovereign risk.

"Using StarMine models as part of the stock selection process to filter through the list of possibilities, makes new-idea generation a lot more efficient and effective."

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