

THOMSON REUTERS STARMINE QUANTITATIVE MODELS

STRUCTURAL CREDIT RISK MODEL

THE STARMINE STRUCTURAL CREDIT RISK MODEL (SCR) IS ONE COMPONENT OF THE STARMINE CREDIT RISK MODEL SUITE. STARMINE SCR EVALUATES THE EQUITY MARKET'S VIEW OF CREDIT RISK VIA 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. IN THIS FRAMEWORK, THE PROBABILITY OF DEFAULT (PD) EQUATES TO THE PROBABILITY THAT THE OPTION EXPIRES WORTHLESS.

StarMine SCR produces daily updated estimates of the probability of default or bankruptcy within one year for 35,000 companies globally, including financials. The default probabilities are also mapped to letter ratings and ranked to create 1-100 percentile scores. Our analysis shows that StarMine SCR is considerably more accurate at predicting defaults than the Altman Z-Score or a basic Merton model, capturing almost 90% of default events within a 12-month horizon in its bottom quintile of scored companies. In addition to obvious uses for risk management and fixed income security selection, StarMine SCR can also be used to enhance equity selection performance.

StarMine has improved three primary components of the Merton model framework based on quantitative analysis of historical data. The three components of StarMine SCR are:

- 1) A leverage component that compares the value of the company's assets to its liabilities. In general, the greater the liabilities relative to assets, the higher the default point and the more likely a default event.
- 2) An asset drift component that represents the non-random component of the change in asset value over time. The greater the asset drift rate, the farther the company moves away from default.
- 3) A volatility component that represents the volatility of the market value of the company's assets. The more volatile the company's assets, the more likely it is that the company's asset value will drop below the default point and the company slip into insolvency.

StarMine SCR provides a single output for each company rather than separate predictions for specific debt issues. The model was structured to predict bankruptcies and standard defaults, not including technical defaults.

MORE POWERFUL DEFAULT PREDICTIONS

StarMine SCR provides more accurate assessments of default risk than common alternatives, capturing 87% of defaulting firms in its bottom quintile of rated companies. Figure 1 compares the power of StarMine SCR in identifying corporate failures with other frameworks. An example of the model's timely response can be seen in the behavior of its evaluation of Lehman Brothers in Figure 2.

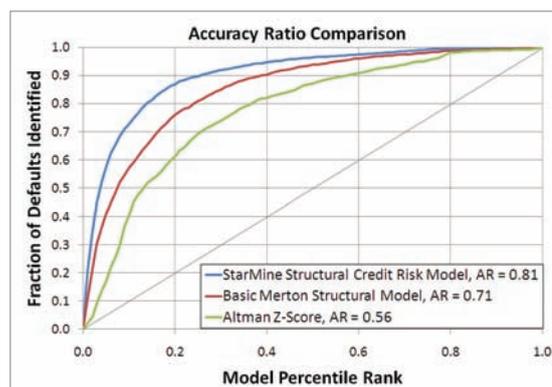


Figure 1. Default prediction comparison. StarMine SCR provides superior default prediction power.

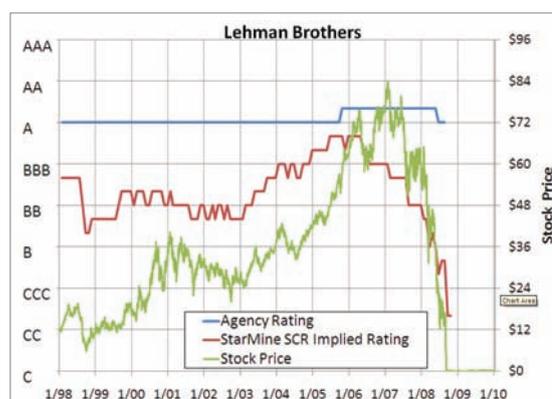


Figure 2. Performance on Lehman Brothers.



StarMine's research identified the drivers of the structural model framework, which allowed them to enhance the traditional framework by:

- Leveraging StarMine's equity alpha model expertise by incorporating StarMine Val-Mo in the drift rate formulation
- Systematically optimizing the formulations for default point and volatility, for example, by employing different treatments of balance sheet liabilities for banks and insurance companies
- Creating a closed-form solution for the model equations, thereby eliminating erroneous outputs inherent in numerically solving the simultaneous non-linear equations used in most structural model frameworks

The result is a model that significantly outperforms competing formulations and ratings for use in:

- Credit risk management
- Cross-asset arbitrage strategies
- Equity and fixed-income investments

MAPPING STARMINE SCR TO LETTER RATINGS

Although the traditional credit ratings agencies have been the subject of much controversy and criticism in recent years, many investors are accustomed to the letter rating scales commonly employed by the rating agencies. Using published statistics on default rates by letter rating, we mapped the StarMine SCR default probabilities to letter ratings for users who prefer to use this form of measurement rather than default probabilities or percentile ranks.

IMPROVE EQUITY SELECTION PERFORMANCE

StarMine SCR can also add value in equity selection frameworks. By eliminating the riskiest 20% of companies identified by the StarMine SCR PD, one can significantly improve upon the risk-adjusted performance of even the most powerful quantitative multi-factor equity selection models. Figure 3 shows backtest results from applying a simple screen that requires the StarMine SCR PD to be less than 0.163% (eliminating approximately the bottom 20% of companies by StarMine SCR score) to a long-short (L-S) strategy based on StarMine's Value-Momentum (Val-Mo) model. The basic Val-Mo strategy goes long global non-micro cap stocks with top decile Val-Mo scores and shorts those with bottom decile scores. Adding the StarMine SCR screen to the portfolio improves the overall Sharpe ratio by 25%, from 2.0 to 2.5. The improvement is also quite consistent across years, not limited to severe bear markets or periods when one would expect risk-aversion measures to work well.

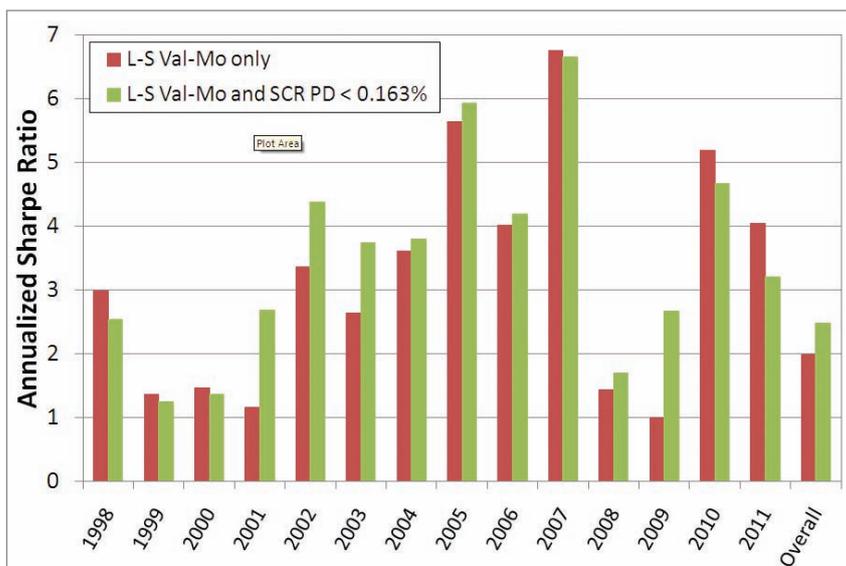


Figure 3. Sharpe ratio in an equity long-short strategy. StarMine SCR can add value in equity selection.

CONCLUSIONS

StarMine SCR leverages the structure of the Merton model and improves on the basic structure by:

- Optimizing the formulations for asset value, default point, asset drift and volatility
- Eliminating erroneous outputs inherent when numerically solving simultaneous non-linear equations; StarMine SCR uses only closed-form calculations and does not depend on numerical solving
- Robustly handling corner conditions, missing values and special situations

StarMine SCR generates default probability estimates, letter ratings, 1-100 percentile rankings and intermediate variables on over 35,000 global companies every day. Contact your Thomson Reuters representative to determine the delivery option that works best for you.

QUESTIONS?

For more information, including delivery options, a detailed White Paper, or historical files for backtesting please contact your Thomson Reuters representative or StarMine Quantitative Consulting: starmine.quantconsulting@thomsonreuters.com

