
Quantitative Corporate Bond Credit Analysis Models

Introduction to QuantCredi®

QuantCredi is Midwest Asset Management's proprietary quantitative credit analysis and portfolio management process which is designed to systematically outperform corporate bond indices without engaging in interest rate anticipation or buying out-of-index issues. To achieve this goal in a high probability manner, QuantCredi focuses almost exclusively on superior credit analysis and minimizes relative duration, sector, and timing risks.

As described below, QuantCredi combines a backward-looking accounting model with a forward-looking structural model to improve upon the probability of default implied by agency credit ratings and market prices, and to systematically select issues that are more likely to be upgraded than downgraded. Although each model is independently effective, they tend to perform even better when combined as they compensate for each other's primary weakness.

Backward-Looking Accounting-Based Models

Accounting-based credit score models were first developed in the 1960s by William Beaver and Edward Altman, and more advanced forms are currently available from firms such as Zeta Services, Inc. In general, these models use discriminant or logit analysis to identify the optimal combination of financial statement accounting ratios that best differentiate firms which subsequently default from firms that do not. Significant ratios include those related to capitalization, leverage, liquidity, turnover, profitability, and earnings stability, among others. Ratios are weighted in the form of a linear or quadratic equation which is then used to calculate credit scores that quantify financial health and estimate the probability of default.

The strength of accounting-based models is that they utilize objective and reliable data from financial statements, and therefore are not distorted by behavioral biases and subjective forecasts of future performance. However, because of this backward-looking approach, they do not incorporate potentially significant new information that is publicly available but not yet reflected in financial statements. To compensate for this weakness, QuantCredi also utilizes a forward-looking structural model that captures this valuable information.

Forward-Looking Option-Based Structural Models

Option-based structural default risk models were first developed in the 1970s by Robert Merton, and more advanced forms are currently available from firms such as Moody's KMV and RiskMetrics Group. When the market value of a firm's assets falls below the book value of its liabilities, it becomes increasingly difficult for the firm to service its debt and meet its obligations. This is when credit defaults tend to occur. Structural models utilize price and volatility information from the equity market to estimate the likelihood of such a situation taking place in a given time frame.

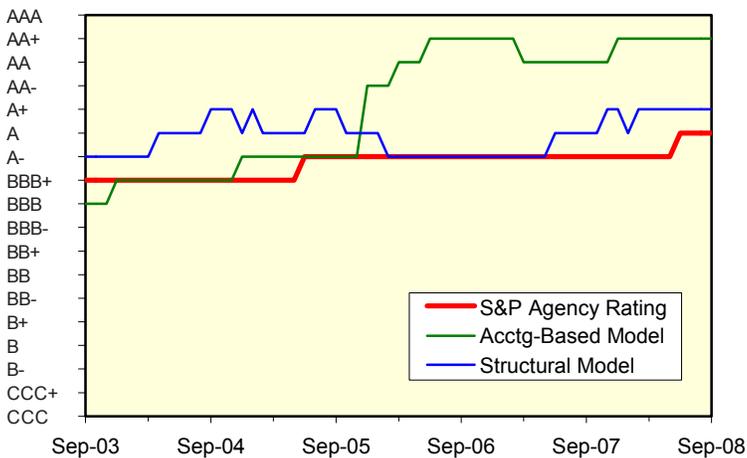
Because equity can be viewed as a call option on the underlying assets of a firm, an option pricing model such as Black-Scholes can be used to translate the observable market value and volatility of a firm's equity into the un-observable implied value and volatility of the firm's assets. With this information, the probability of the asset value falling below the book value of liabilities and triggering a default can be calculated using a cumulative distribution function.

The strength of option-based structural models is that they capture valuable forward-looking expectations from the broad and liquid equity market in a timely manner. This information is often not observable in financial statements until a later date. The weakness of these models, however, is that they are highly dependent on the stock market being efficient. This is not always the case as stocks can become significantly overvalued and undervalued, especially over the short-term, which distorts the probability of default. Thus, QuantCredit's accounting-based model (described in the prior section) is an excellent complement to its structural model, as it is not subject to this effect.

Examples

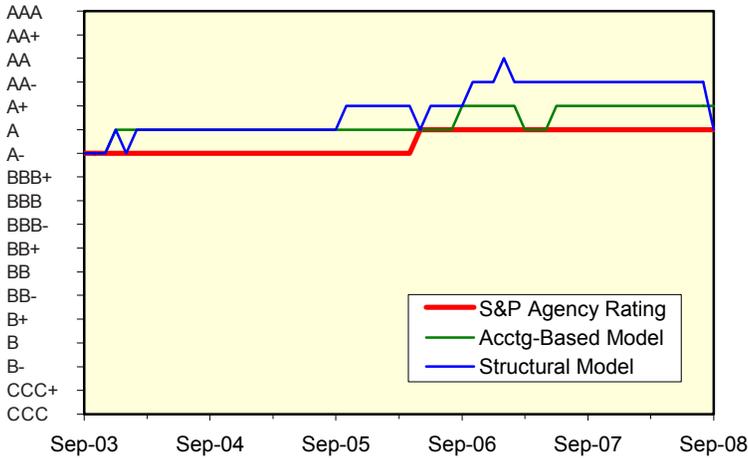
The following examples demonstrate how these models help to identify bonds that are likely to be upgraded, and to avoid those that are likely to be downgraded. They also demonstrate the benefit of combining both the backward-looking accounting and forward-looking structural models when analyzing credit risk.

Occidental Petroleum Corporation



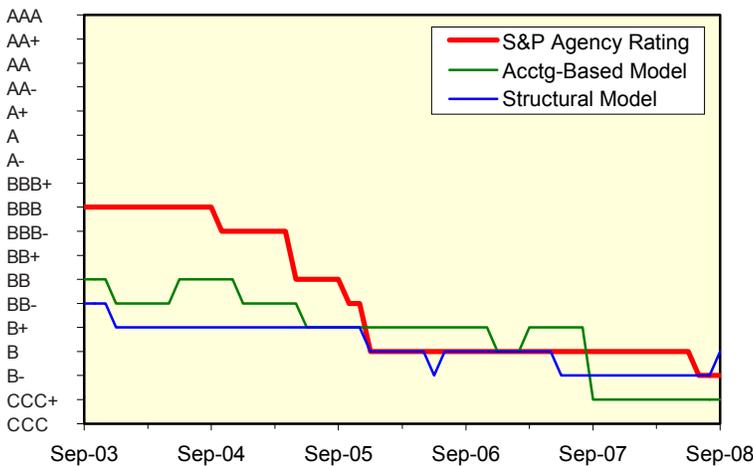
In this example, Occidental Petroleum was rated more highly by both models than by S&P prior to the company being upgraded. This indicated a potential buy opportunity.

Praxair, Inc.



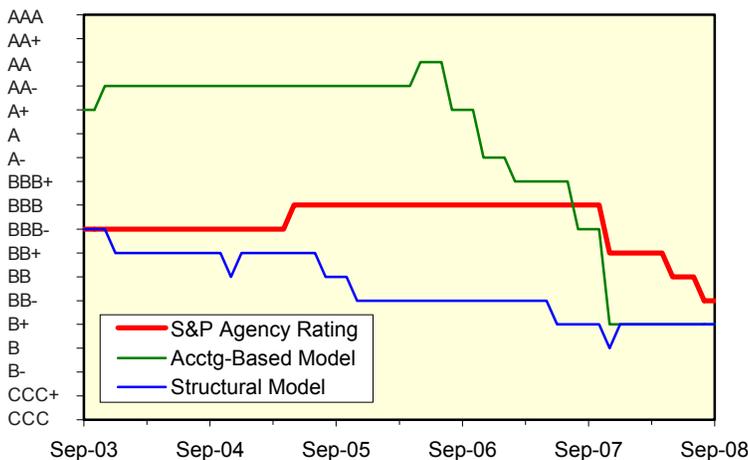
In this example, Praxair was rated more highly by both models than by S&P prior to the company being upgraded. This indicated a potential buy opportunity.

General Motors Corporation



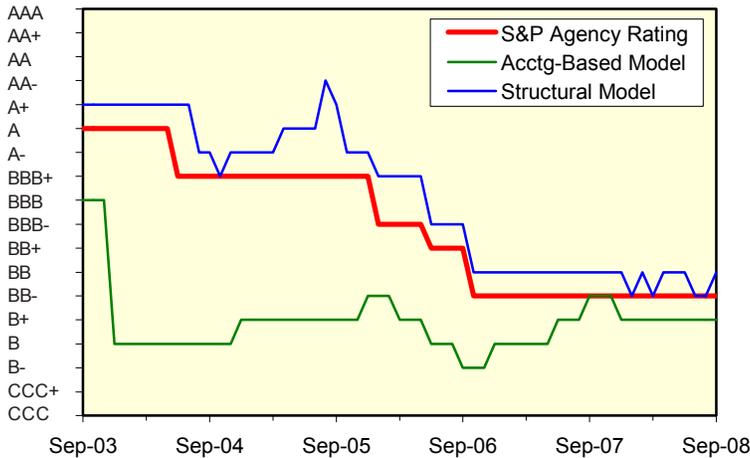
In this example, both models rated General Motors as junk prior to the company being downgraded by S&P. This was a signal to avoid the bonds, or to sell them if already held.

Lennar Corporation



In this example, Lennar is initially rated higher by the accounting-based model than by S&P, indicating a potential buy opportunity if that model was used in isolation. However, by incorporating information from the structural model, which rated it as junk, investors could have avoided this issuer prior to it being downgraded to junk by S&P.

Deluxe Corporation



In this example, Deluxe is initially rated higher by the structural model than by S&P, indicating a potential buy opportunity if that model was used in isolation. However, by incorporating information from the accounting-based model, which rated it as junk, investors could have avoided this issuer prior to it being downgraded to junk by S&P.

Conclusion

Although these models can occasionally generate unreliable signals with respect to any single issue, especially when used in isolation, they tend to be quite effective overall when combined and systematically applied to a large diversified portfolio. We believe that this gives QuantCredit a notable edge over the desired benchmark, and increases the probability of generating consistent excess returns over the long-term.

Successful investing is by no means easy, but it does not have to be complicated. By reducing the investment equation to key, time-tested variables and by eliminating the subjectivity and emotion that can hinder superior and consistent results, QuantCredit places the probability of success greatly in your favor.