IAQF Student Competition Problem
2019

Credit spreads represent the difference in the yield of a risky security versus that of a risk-free security. In general, credit spreads are wider in times of economic uncertainty and narrower when there is less perceived risk. But credit spreads are also affected by supply and demand dynamics for bonds in addition to confidence in economic outlook.

For fixed income investors, the specific risk of a given corporate bond can be diversified away using a broad portfolio of bonds, but the systematic component of risk cannot be eliminated in that manner. If, however, investors had the ability to predict the systematic risk in credit spreads, it would be possible for them to develop trading strategies to take advantage of those predictions. For example, an investor could sell government securities and buy corporate bonds if they could accurately predict that credit spreads will narrow (note that narrow spreads indicate confidence in the economy). When the investor's prediction indicates that credit spreads will widen, the strategy would be to shift investments from corporate bonds to cash or government securities.

When evaluating credit spreads, the key is not the specific number, but its relationship to historical data and trends over time. Say the spread between Treasury bonds and investment grade corporate bonds is 3%. As a stand-alone figure, it doesn't mean much. But if you know this spread is usually less than 1%, and it was 2% only last month, then that 3% figure is a strong indicator that economic conditions are deteriorating—or at least the market perceives that to be the case.

For the purposes of this analysis, you should focus on the credit spread of US investment grade corporate bonds (*e.g.* BofAML US Corporate AAA) over US Treasuries (*e.g.* 10-Year Treasury Constant Maturity Rate). Data can be obtained from the St. Louis Fed data repository https://fred.stlouisfed.org. Using available economic, financial, and other data of your choosing, develop a forecast of the direction and (perhaps) the magnitude of credit spread movements using machine-learning based tools and techniques. Also examine the various potential shortcomings of this approach, including non-transparency/"blackbox", model overfitting, and regime shift issues.