Madison INVESTMENTS

BOND CONCEPTS

Credit Analysis

History has taught us that even highly-rated bonds can quickly experience deteriorating credit quality and wreak havoc on a portfolio. Naturally, credit quality becomes a focus in weakening market conditions, but the importance of credit research in all market conditions must be considered.

What is credit risk?

Credit risk is the potential for an issuer to default on its loan obligations. In the event of a default, the investor (or lender) will suffer a loss.

The level of credit risk at the individual security level varies within the bond market. U.S. Treasury bonds tend to have the lowest "credit risk profile" because they are backed by the full faith and credit of the U.S. Government (rely on the promise of the United States to repay the bonds at maturity, whether that maturity is in three months or 30 years).

In the corporate bond market, there are over 15,000 issuers, each with very different risk factors. To understand these risk factors, many professional investment managers will conduct "credit analysis." Similar to analyzing an individual stock, a credit analyst researches the bond issuer's balance sheet, income statement, and periodic financial reports to assess the strength of the issuer's financial position and the likelihood it will be able to meet its interest and principal repayment obligations. The credit analyst also analyzes the bond indenture – a formal document that lays out the issuer's responsibilities to bond buyers and the buyer's remedies if things don't go as planned. Based on such data, the credit analyst forms an opinion on the quality of the bond, which can be used to compare it to other issues in the marketplace.

Notable Credit Collapses

Enron
BBB+
October 2001
Defaulted
December 2001

Lehman Brothers
A
September 2008
Defaulted
September 2008

Bear Stearns
A
December 2007
Defaulted
March 2008

Silicon Valley Bank
A
March 2023
Defaulted
March 2023

Credit ratings: The role of rating agencies

Several Nationally Recognized Security Rating Organizations (NRSROs) conduct research and publish bond ratings for investors to use as a guideline in assessing credit quality. Moody's and Standard and Poor's (S&P) are two of the most widely known NRSROs. These firms publish ratings when a bond is issued and update them periodically when rated issuers file financial statements.

While NRSRO ratings are a valuable, publicly available guideline for assessing the quality of a bond issuer, there are limitations investors should be aware of. NRSRO ratings tend to be backward-looking and lag the market. By the

time a bond receives a new rating, the market has likely already priced in the change in conditions. An active investment manager may use NRSRO ratings as a starting point in evaluating an issuer's risk profile but will likely have their own credit research process.

NRSRO Rating Scheme
(in descending order of credit quality)

	Moody's	S&P
Investment Grade	Aaa	AAA
	Aa	AA
	A	A
	Baa	BBB
"High Yield"	Ba	BB
	B	B
	Caa	CCC
	Ca	CC
	C	C
	D	D

Credit spread: How credit risk affects bonds

The credit risk of a bond is reflected in the bond's credit spread. Credit spread is the difference in yield between two bonds with the same maturity but different credit ratings. Simply put, the riskier the market deems a bond to be, the more compensation (yield) will be required to take on the additional risk. The most common measure of a bond's spread is to compare its yield with that of a treasury with the same maturity.

Credit Spread = Corporate Bond Yield - Treasury Bond Yield

Credit spreads will typically widen during periods of economic stress or if an issuer's risk factors are amplified. Widening spreads result in rising corporate bond yields, negatively affecting a bond's price and portfolio performance. Conversely, spreads will tighten during "risk on" market sentiment, positively affecting a bond's price.

How does credit analysis add value?

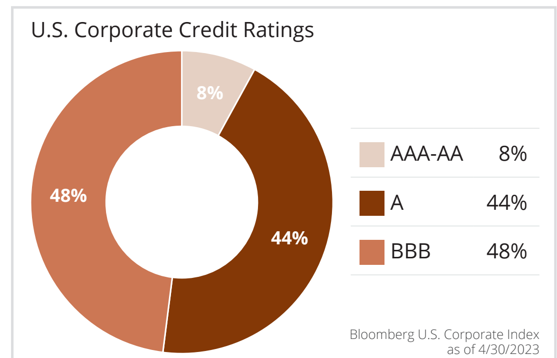
The two primary ways credit analysis adds value are: risk management and total return opportunity. After reviewing an issuer's financial statements, an analyst may deem the issuer to have either more or less risk than the market is pricing in. Suppose an issuer is currently out of favor with the market, but the investor's credit analysis concludes that the market's sentiment is misplaced or short-sighted. In that case, the manager will buy the bonds at an attractive spread, hoping that the spread will narrow, and the bond's price will rise as their thesis on the issuer plays out.

Similarly, suppose the investor feels that the bonds of an issuer currently held in the portfolio are selling at too small of a risk premium compared to their evaluation of the issuer's risk. In that case, the investor will sell the issuer's bonds and "swap" into another issuer's bonds. Repeating this process as opportunities become available in the marketplace provides an additional opportunity to pursue incremental returns for a portfolio already actively managing the other risks of bond investing.

By the numbers: Credit ratings in the market

The size of the BBB market is $3.02 trillion outstanding as of May 31, 2023, growing from $822 billion outstanding since May 31, 2009 and representing about 48% of the total investment grade market, which stands at $6.30 trillion as of May 31, 2023.

Year-to-date, as of May 31, 2023, roughly $12.8 billion has been downgraded from investment grade to "high-yield" across 6 issuers. Conversely, approximately $40 billion has been upgraded from "high-yield" to investment grade across 11 issuers during the same period.



DISCLOSURES

"Madison" and/or "Madison Investments" is the unifying tradename of Madison Investment Holdings, Inc., Madison Asset Management, LLC ("MAM"), and Madison Investment Advisors, LLC ("MIA"). MAM and MIA are registered as investment advisers with the U.S. Securities and Exchange Commission. Madison Funds are distributed by MFD Distributor, LLC. MFD Distributor, LLC is registered with the U.S. Securities and Exchange Commission as a broker-dealer and is a member firm of the Financial Industry Regulatory Authority. The home office for each firm listed above is 550 Science Drive, Madison, WI 53711. Madison's toll-free number is 800-767-0300.

Any performance data shown represents past performance. Past performance is no guarantee of future results.

Indices are unmanaged. An investor cannot invest directly in an index. They are shown for illustrative purposes only, and do not represent the performance of any specific investment. Index returns do not include any expenses, fees or sales charges, which would lower performance.

The Bloomberg U.S. Corporate Bond Index is an unmanaged market-value-weighted index of investment-grade corporate fixed-rate debt issues with maturities of one year or more.

Non-deposit investment products are not federally insured, involve investment risk, may lose value and are not obligations of, or guaranteed by, any financial institution. Investment returns and principal value will fluctuate.

This report is for informational purposes only and is not intended as an offer or solicitation with respect to the purchase or sale of any security.

In addition to the ongoing market risk applicable to portfolio securities, bonds are subject to interest rate risk, credit risk and inflation risk. When interest rates rise, bond prices fall; generally, the longer a bond's maturity, the more sensitive it is to this risk. Credit risk is the possibility that the issuer of a security will be unable to make interest payments and repay the principal on its debt. Bonds may also be subject to call risk, which allows the issuer to retain the right to redeem the debt, fully or partially, before the scheduled maturity date. Proceeds from sales prior to maturity may be more or less than originally invested due to changes in market conditions or changes in the credit quality of the issuer.

Madison INVESTMENTS