# Fixed Income

# Credit Risk

## Exam Focus

- Credit risk and its components
- Use of credit ratings
- Credit spread risk



## Credit Risk

As an investor in fixed income, you are expecting a combination of interest and principal payments. Credit risk is the risk the borrower fails to pay these promised payments.

Why might the borrower **default**?

It depends on both issues related specifically to the borrower and to general economic conditions.

## Bottom Up (Borrower Specific)

- Capacity
- Capital
- Collateral
- Covenants
- Character



## Top Down (General Economic Conditions)

- Conditions
- Country
- Currency

## Credit Risk Calculations

**Expected loss** = probability of default × loss given default

**Expected recovery rate** = proportion of a claim an investor will recover, given default

**Loss severity** = 1 – expected recovery rate



## Credit Risk Calculations

**Expected exposure** = amount investor is owed – value of collateral available

**Loss given default %** = expected exposure × (1 – recovery rate)

**Credit spread** ≈ probability of default × loss given default %

## Credit Risk: Example 1

BRWA issued an unsecured 5-year bond with a 3.2% fixed coupon. The credit spread over a comparable U.S. Treasury bond is 90 bps (G-spread).

Given a probability of default of 1% and a loss given default of 80%, are BRWA's investors adequately compensated?

Credit spread ≈ probability of default × LGD% =

The spread offered (0.9%) is greater than the estimate, so BRWA's investors are adequately compensated.

-2

Source: CFA Institute. Used with permission.



## Credit Risk: Example 2

VIVU has issued a 5-year, 6.5% non-callable bond at par, with probability of default of 6% and loss given default of 50%.

The bond's benchmark is a 2.3% U.S. Treasury bond.

Calculate **expected loss** and comment on whether investors are adequately compensated.

Source: CFA Institute. Used with permission.

## Credit Risk: Example 2

Expected loss =

Credit spread ≈

Credit spread is , so investors are adequately compensated.





## Credit Risk Calculations

**Probability of default:** strong profitability ratios will reduce the probability of default (e.g., high interest coverage; low debt/EBITDA)

**Loss given default:** higher loss for unsecured, low-seniority bonds

## Credit Risk: Example 3

Which of the following factors are associated with a lower probability of default and higher credit quality for a corporate issuer?

A. Higher profitability, higher coverage, and higher leverage.

B. Higher profitability, lower coverage, and lower leverage.

C. Higher profitability, higher coverage, and lower leverage.

-1

Source: CFA Institute. Used with permission.



## Other Terminology

- Illiquid versus insolvent
- Cross-default clauses
- Pari passu clauses

# Uses of Credit Ratings

- Comparisons across industries and bond types
- Comparison across time
- Assess credit migration risk

| | S&P | Moody's |
|---|---|---|
| Investment grade | AAA | Aaa |
| | AA+/AA/AA–<br>A+/A/A– | Aa1, Aa2, Aa3<br>A1, A2, A3 |
| | BBB+/BBB/BBB– | Baa1, Baa2, Baa3 |
| High yield | BB+/BB/BB– | Ba1, Ba2, Ba3 |
| | B+/B/B– | B1, B2, B3 |
| | CCC+/CCC/CCC– | Caa1, Caa2, Caa3 |
| | CC+/CC/CC– | Ca |
| | C+/C/C– | |
| | D | C |



# Uses of Credit Ratings: Risks

- Ratings lag market pricing
- Some risks are difficult to assess
- Ratings are not guarantees

## Credit Ratings: Example 1

Which of the following statements *most accurately* characterizes best practices for the use of credit ratings among analysts?

A. Analysts can generally rely on credit ratings and ratings outlooks to predict the market price of credit risk.

B. Analysts must incorporate credit ratings into their analysis to meet regulatory requirements.

C. Analysts should conduct their own credit analysis, as sole reliance on credit ratings to make investment decisions has several pitfalls.

-1

Source: CFA Institute. Used with permission.



## Credit Ratings: Example 2

Which of the following statements *best* describes the relationship between credit ratings and market pricing of credit risk?

A. Credit ratings primarily seek to assess expected loss, while market pricing of credit risk for investment-grade bonds is primarily focused on default timing and expected recovery rates.

B. Credit rating outlooks tend to be more closely aligned with market conditions than credit ratings.

C. Credit ratings usually capture the market pricing of credit risk associated with debt-financed acquisitions.

-1

Source: CFA Institute. Used with permission.

## Credit Spread Risk

This is the risk that yield spreads widen due to deteriorating conditions, causing credit-risky bond prices to decrease.

**Why?**

- Macroeconomic factors
- Issuer-specific factors
- Market (trading-related) factors



## Credit Spread Risk: Macroeconomic

- Credit risk largely moves in line with economic cycles.
- Generally, yield spreads increase with maturity.

- Dispersion of yield spreads for high-yield issuers is higher than investment-grade issuers.
- High-yield spreads tend to fluctuate more.

# Credit Spread Risk: Issuer and Market

**Issuer-specific factors**

- Financial performance of issuer has large impact
- Comparison of issuer's yield spread to average yield spread for similar credit ratings

**Market factors**

- Transaction costs of trading a bond; a wider bid-offer spread implies higher costs of trading, higher market liquidity risk



# Changes in Credit Spread

**% change price of bond =**

$-\text{annual modified duration} \times \Delta\text{spread} + \frac{1}{2} \times \text{annual convexity} \times (\Delta\text{spread})^2$

## Change in Credit Spread: Example

For a bond with a modified duration of 4 and a convexity of 0.25, which of the following changes in credit spread would result in a price decrease *closest* to 7.5%?

A. 1% decrease.

B. 1% increase.

C. 2% increase.

-1

Source: CFA Institute. Used with permission.



## Solutions

## Credit Risk: Example 1

BRWA issued an unsecured 5-year bond with a 3.2% fixed coupon. The credit spread over a comparable U.S. Treasury bond is 90 bps (G-spread).

Given a probability of default of 1% and a loss given default of 80%, are BRWA's investors adequately compensated?

Credit spread ≈ probability of default × LGD% = 1% × 80% = 0.8%

The spread offered (0.9%) is greater than the estimate, so BRWA's investors are adequately compensated.

-2

Source: CFA Institute. Used with permission.



## Credit Risk: Example 2

Expected loss = 6% × 50% = 3%

Credit spread ≈ 3%

Credit spread is 6.5% – 2.3% = 4.2%, so investors are adequately compensated.

-3

## Credit Risk: Example 3

Which of the following factors are associated with a lower probability of default and higher credit quality for a corporate issuer?

A. Higher profitability, higher coverage, and higher leverage.

B. Higher profitability, lower coverage, and lower leverage.

C. Higher profitability, higher coverage, and lower leverage.

Higher profitability, higher coverage, and lower leverage are associated with a lower probability of default and higher credit quality for a corporate issuer.

-1

Source: CFA Institute. Used with permission.



## Credit Ratings: Example 1

Which of the following statements *most accurately* characterizes best practices for the use of credit ratings among analysts?

A. Analysts can generally rely on credit ratings and ratings outlooks to predict the market price of credit risk.

B. Analysts must incorporate credit ratings into their analysis to meet regulatory requirements.

C. Analysts should conduct their own credit analysis, as sole reliance on credit ratings to make investment decisions has several pitfalls.

A is incorrect because credit ratings tend to lag rather than predict the market price of credit risk.

-1

Source: CFA Institute. Used with permission.

## Credit Ratings: Example 2

Which of the following statements *best* describes the relationship between credit ratings and market pricing of credit risk?

A. Credit ratings primarily seek to assess expected loss, while market pricing of credit risk for investment-grade bonds is primarily focused on default timing and expected recovery rates.

B. Credit rating outlooks tend to be more closely aligned with market conditions than credit ratings.

C. Credit ratings usually capture the market pricing of credit risk associated with debt-financed acquisitions.

A is incorrect, as while credit ratings primarily seek to assess expected loss, the market pricing of credit risk for distressed bonds is primarily focused on default timing and expected recovery rates.

-1

Source: CFA Institute. Used with permission.



## Change in Credit Spread: Example

For a bond with a modified duration of 4 and a convexity of 0.25, which of the following changes in credit spread would result in a price decrease *closest* to 7.5%?

A. 1% decrease.

B. 1% increase.

C. 2% increase.

% change price of bond = –annual modified duration (Δspread) + ½ annual convexity (Δspread)$^2$

$-(4 \times 0.02) + \frac{1}{2}(25) \times (0.02)^2 = -0.075$ or –7.5%

The spread change is inversely related to the price effect, with a spread increase leading to a fall in bond price. Note that because duration was 4, we had to rescale the convexity from 0.25 to 25.

-1

Source: CFA Institute. Used with permission.