R44 Fundamentals of Credit Analysis

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Version 1.0

1. Introduction

This reading covers the basic principles of credit analysis, explores the relationship between the credit risk and capital structure of the firm, the role of credit rating in debt markets, and the impact of credit spreads on risk and return.

2. Credit Risk

Credit risk is the risk that the borrower will fail to make principal and/or interest payments on time. Credit risk has two components:

- **Default risk or default probability:** The borrower may fail to pay the full amount or a partial amount. The risk that the issuer fails to meet its obligation of making interest and principal payments on time is called default risk.
- **Loss severity or loss given default:** How severe is the loss incurred by the investor? What portion of the bond's value (including interest) is not paid by the issuer? A default leads to various severity of losses; for instance, the loss may be total, or the bondholders may recover some value.

We combine both the components into a single term called the **expected loss**.

Expected Loss = Default probability x Loss severity given default
Loss severity = 1 - Recovery rate

Loss severity is expressed either as a monetary amount or as a percentage of the principal. Expressing it as a percentage is more useful as it is independent of the invested amount.

The **recovery rate** is the percentage of principal amount recovered in the event of a default.

Important credit-related risks include:

- **Spread risk:** Corporate bonds are usually quoted as a spread (yield premium) over risk-free bonds such as U.S. treasury bonds. The amount of spread is quoted in basis points. Assume the spread was initially 200 basis points, but has now increased to 250 basis points. This widening may be because of two factors: (1) factors specific to the issuer such as downgrade risk and (2) factors associated with the market as a whole such as an increase in market liquidity risk.
- **Downgrade risk**: It is the decline in an issuer's creditworthiness, which makes investors believe that the risk of default is higher. This results in widening of yield spread on the issuer's bonds to widen and its bond prices to fall. It is also known as credit migration risk.
- **Market liquidity risk**: This is the risk that the price at which investors can buy or sell may differ from the market price. A higher liquidity risk implies that it is more difficult for investors to transact (buy/sell) at a fair price. This happens when dealers show little interest in buying/selling bonds. The ability and willingness of dealers to make markets is reflected in the bid-ask spread. If the market liquidity risk is high, the bid-ask spread is wide.

Two issuer-specific factors that affect market liquidity risk are:

1. The size of the issuer (large size means more debt is traded and market liquidity risk is low).
2. The credit quality of an issuer. The lower the quality, the higher the risk.

3. Capital Structure, Seniority Ranking, and Recovery Rates

3.1 Capital Structure

Capital structure refers to the way a firm finances its assets across operating units. In short, it refers to the composition of equity (common share, preferred share) and debt (bank debt, bonds of all seniority rankings) across its operating units.

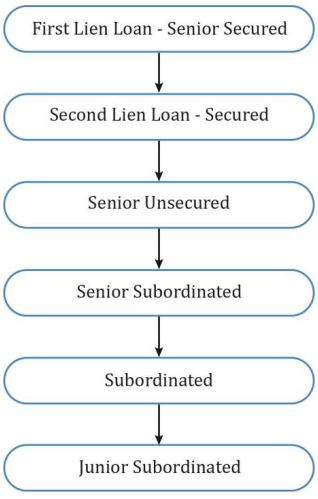
Assume a company has a total capital of $100 million of which bank debt is $5 million, bonds are $35 million, preferred shares are worth $10 million, and common equity accounts for $50 million. This is a simple capital structure. You may also have complicated capital structures with a holding company with multiple subsidiaries underneath it across geographies issuing their own debt with different seniority ranking.

3.2 Seniority Ranking

A single borrower may issue debt with different maturity dates and coupons. These various bond issues may also have different seniority rankings. Seniority ranking determines who gets paid first, or who has the first claim on the cash flows of the issuer, in the event of default/bankruptcy/restructuring. Bondholders are broadly classified into secured and unsecured.

- **Unsecured bonds** are known as debentures. They have a general claim on an issuer's assets and cash flows.
- **Secured bondholders** have the first (direct) claim on cash flows in the event of a default.
- Priority of claims determines who gets paid first.

The exhibit below shows seniority ranking.



Within each category of debt, there are types and sub-rankings. Let us look at each of the items in detail now (in the order of priority for repayment):

Secured debt: Highest ranked debt in which some asset is pledged as collateral.

- First mortgage debt**:** A specific property is pledged.
- First lien debt**:** A pledge of certain assets such as buildings, patents, brands, property, and equipment, etc.
- Second lien or third lien**:** Some more assets could be pledged as a second or third lien to rank below the first mortgage/first lien.

Unsecured debt (in the order of ranking): Loss severity can be as high as 100%. Lowest priority of claims. No asset is pledged as collateral. The types are:

- Senior unsecured
- Subordinated
- Junior subordinated

Companies issue debt with different ranking for the following reasons:

- Cost effective: Secured debt has a lower cost due to reduced credit risk.
- Less expensive than equity: From a borrower's perspective, even though the cost of issuing subordinate debt may not be as low as secured debt, it is less restrictive and is relatively less expensive than equity.
- Investors invest in subordinated debt because the higher yield compensates the high risk assumed.

3.3 Recovery Rates

Recovery rate is the percentage of the principal amount recovered in the event of default. Key points related to recovery rates are given below:

- **Pari passu:** All creditors at the same level of capital structure fall under the same class, and they will have the same recovery rates. For example, assume there are two creditors in the senior secured class; one with a 3-year bond and the other with a 1-year bond. The debt of the 1-year bondholder matures in 3 months while the debt of the 3-year bondholder matures in 2.5 years. If there is a default, both the investors will have the same recovery rates irrespective of the time left to maturity. This type of equal ranking for the same class of bonds is called pari passu (on equal footing)**.**
- **Recovery rates vary by seniority ranking:** If the seniority ranking is high, recovery rate will also be high.
- **Recovery rates vary by industry:** If the industry is on a decline like the newspaper publishing industry, then the recovery rates will be low. There may be companies going bankrupt in industries during a recession (e.g., the steel industry in 2011-12), but in general the recovery rates here are higher than those on a decline.
- **Recovery rates depend on when they occur in a credit cycle:** For instance, if a default happened in 2008 at the peak of the recent credit crisis, then the recovery rates would have been lower relative to, let us say, in 2004-05.

- **Recovery rates vary across industries and across companies within an industry.**
- **Priority of claims is not always absolute:**
  - Secured holders have a claim to cash flows/asset in the event of a default before anyone else. However, if the value of the pledged asset is less than the claim, then the unpaid amount becomes the senior unsecured claim.
  - Unsecured creditors have a right to be paid before common/preferred shareholders.
  - Senior creditors take priority over junior/subordinated creditors.

4. Rating Agencies, Credit Ratings, and Their Role in Debt Markets

Moody's, S&P, and Fitch are the three main rating agencies. At least two of these agencies assign a rating to the majority of the bonds. The credibility/dominance of the rating agencies is because of:

- Their independent assessment of credit risk.
- Ease of comparison across bond issuers and issues.
- Regulatory and statutory reliance and usage.
- Issuer payment for ratings: This is controversial as some believe the rating may be biased as it creates a conflict of interest between the issuer, investor, and the rating agency.
- Growth of debt markets.

4.1 Credit Ratings

Be familiar with what the ratings are (Aaa represents the highest quality among investment grade securities, etc.). The rating system is almost similar across agencies starting from A for investment grade to C/D for junk.

Long-Term Ratings Matrix: Investment Grade vs. Non-Investment Grade

		Moody's	**S&P**	**Fitch**
Investment Grade	**High-Quality Grade**	Aaa	AAA	AAA
		Aa1	AA+	AA+
		Aa2	AA	AA
		Aa3	AA-	AA-
	Upper-Medium Grade	A1	A+	A+
		A2	A	A
		A3	A-	A-
	Low-Medium Grade	Baa1	BBB+	BBB+
		Baa2	BBB	BBB
		Baa3	BBB-	BBB-

		Moody's	**S&P**	**Fitch**
		Ba1	BB+	BB+

Non-Investment Grade "Junk" or "High Yield"	**Low Grade or Speculative Grade**	Ba2	BB	BB
		Ba2	BB-	BB-
		B1	B+	B+
		B2	B	B
		B3	B-	B-
		Caa1	CCC+	CCC+
		Caa2	CCC	CCC
		Caa3	CCC-	CCC-
		Ca	CC	CC
		C	C	C
	Default	C	D	D

Source: CFA Program Curriculum, Fundamentals of Credit Analysis

- Bonds rated AAA/Aaa have the highest quality, lowest credit risk, and lowest probability of default. They have extremely low default rates.
- Bonds rated Baa3/BBB- or higher are investment grade bonds. Investment grade is further divided into high-quality, upper-medium and low-medium.
- Bonds rated lower than Baa3/BBB- are non-investment grade bonds. Non-investment grade includes speculative and default bonds. These have higher default risk.
- **Outlook**: This is an additional indicator on a rating. The outlook can be *positive, stable, or negative*.
- The rating agencies may also indicate the potential direction of the ratings by including comments like "on review for a downgrade" or "on credit watch for an upgrade."

Note: "Investment-grade ratings focus more on timeliness, while non-investment grade ratings give more weight to recovery".

4.2 Issuer vs. Issue Ratings

Rating agencies provide two ratings:

- **Issuer rating**: This is based on the creditworthiness of the issuer. It applies to senior unsecured debt. Also known as corporate family rating (CFR).
- **Issue rating**: This rating is assigned to a specific debt/financial obligation. It takes into consideration the seniority ranking of the debt within the capital structure. Also known as corporate credit rating (CCR).

Cross-default provision: It is believed that the probability of default on one issue is linked to other issues of the same issuer. That is, a default on one issue triggers default on other issues with the same default probability.

Notching: A rating methodology to distinguish rating between different liabilities (bond issues) of an issuer. The objective is that two securities with the same rating should have the

same expected loss rate (probability of default * expected severity loss). Credit rating on issues can be moved up or down by a notch based on the risk of default/severity loss.

Factors the rating agencies consider while assigning ratings (notching up/down):

- Probability of default: it is the primary factor that drives the rating.
- Priority of payment: who gets paid first in the event of a default; secured/senior unsecured/subordinated?
- Structural subordination: this is when the issuer is a holding company rather than an operating company. Assume both the holding company and each of its operating subsidiaries has issued bonds. The debt of the subsidiaries gets serviced by its cash flows and assets first before any of it can be passed on to the holding company. All else equal, debt issued by the holding company will have a lower rating than the debt issued by the subsidiary.

4.3 ESG Ratings

ESG investing involves making investing decisions based on:

- Environmental themes, such as investing in companies that: follow sustainable practices, try to reduce carbon emissions, or try to achieve other environmental agendas.
- Social themes, such as investing in companies committed to a diverse and inclusive workplace, minimizing salary gap, and community involvement programs.
- Governance themes, such as investing in companies committed to diverse board composition and strong oversight.

Rating agencies have started incorporating ESG factors into their ratings of firms. For example, MSCI Inc has launched a set of ratings that aim to measure a company's attitudes, practices, and advances related to ESG. They identify and track leaders and laggards in the space. Companies are assessed according to their exposure to ESG risks and how well they manage those risks as compared to their peers. The leaders receive a higher rating such as AAA or AA, while the laggards receive a lower rating such as B or CCC.

4.4 Risks in Relying on Agency Ratings

There is sufficient evidence that rating agencies, in general, have done a good job of assigning ratings that reflect the risks involved. Investors rely on these ratings to assess the credit risk of their investments. However, these ratings are not foolproof and have their own limitations:

- **Credit ratings can be very dynamic:** Credit rating of a bond issue may change over time. For instance, a bond may have had "AAA" rating when it was issued. But five years later, it may be A. There have been instances where an "AAA" rated bond at issuance has turned into non-investment grade or junk within three years.
- **Rating agencies are not infallible:** The high ratings on subprime-backed mortgage securities are the best example of this. If the rating agencies had rated the issue

appropriate to their risk level, it would have made investors cautious.

- **Idiosyncratic or event risks are difficult to capture in ratings:** Rating agencies do a poor job of foreseeing event risks because it is not possible and these cannot be reflected in a credit rating. A recent example is of the March 2011 tsunami that hit Japan, which in turn affected the credit risk of Tokyo Electric Power Company.
- **Ratings tend to lag market pricing of credit:** Bond prices move on a daily basis based on the perceived credit risk in them, as the market sees it. But, rating agencies do not revise their ratings that often. Investors who time their buy/sell decisions solely on the ratings issued by agencies are at the risk of underperforming the market. But a sudden downgrade has a disastrous effect on bond prices.

5. Traditional Credit Analysis: Corporate Debt Securities

5.1 Credit Analysis vs. Equity Analysis: Similarities and Differences

In many ways, credit analysis may look similar to equity analysis, but there are some important differences:

Credit Analysis vs. Equity Analysis	
Credit Analysis	**Equity Analysis**
Analysis focuses on the downside risk: is the cash flow sustainable? Will the company be able to pay interest and principal?	The focus is on analyzing the growth potential of a company (increase in EPS); how shareholder value will be maximized. How the company fares against its peers in the industry.
Management has a legal obligation to its bondholders.	Maximizing shareholder value is the objective of management.
Analysts focus on balance sheet and cash flow statements. How much of total capital is debt and what is the seniority ranking of debt?	Analysts focus more on income and cash flow statements.
Bondholders do not participate in the growth of a company but have limited downside risk in the event of a default.	Shareholders have unlimited upside, but are more exposed to loss. They stand to lose their investment entirety before bondholders suffer a loss.

5.2 The Four Cs of Credit Analysis: A Useful Framework

The four Cs of credit analysis framework are:

- **Capacity:** The ability of the borrower to make interest and principal payments on time over the term of the debt.
- **Collateral:** Quality and value of the assets pledged as collateral against the debt.
- **Covenants:** Terms and conditions of the agreement that the issuer must comply with.

- **Character:** Refers to the quality of the management. What is the financial history of the issuer; has it defaulted on payments in the past, or has there been a case of bankruptcy?

We will now look at each of the four Cs in detail.

Capacity

Capacity is the ability of a borrower to generate enough cash flows to service its debt. To determine an issuer's capacity in credit analysis, you can draw a parallel to the top-down analysis in equity analysis. The steps involved are:

1. Industry structure
2. Industry fundamentals
3. Company fundamentals
4. Competitive position

Industry Structure

Let us begin by analyzing the industry structure using Porter's five forces framework.

- *Bargaining power of suppliers:* Industries with few suppliers have greater credit risk. Fewer suppliers → limited negotiating power → customers have no control over frequent price raise.
- *Bargaining power of buyers/customers:* Industries with few buyers have greater credit risk. Buyers have negotiating power.
- *Barriers to entry:* High barriers to entry have lower risk as competition is low and pricing power is strong. Examples of high barriers to entry: high capital investment (aerospace), large distribution systems (auto dealerships), high degree of regulation (power plants, utilities).
- *Substitution risk:* Industries that offer products/services with great value and poor substitutes have low credit risk and strong pricing power. Ex: jet airplanes.
- *Level of competition:* Highly competitive industries have less predictable cash flow and higher credit risk. Ex: utilities, telecom companies.

Another factor to look at is the *degree of operating leverage* (DOL) in an industry/companies within the industry. If DOL is high, then fixed costs are high. If fixed costs are high, then as long as revenue is good, cash flows/profitability will be good.

The next step is to assess the industry's fundamentals. What are its growth prospects? Does it get affected by macroeconomic factors? Etc.

Industry Fundamentals

The capacity to pay is influenced by company fundamentals. Some of the key points in this regard are given below:

- *Cyclical or non-cyclical:* Cyclical companies are affected by economic downturns. Their revenues and cash flows are impacted adversely during a recession. If a company is in

a cyclical industry, then the level of debt must be low. Example: demand for steel fell drastically following the recent credit crisis and slowdown in Europe. On the contrary, non-cyclical companies in pharmaceutical and consumer products industries outperformed during this period.

- *Growth prospects:* Should credit analysts analyze growth prospects like equity analysts do? Yes to an extent, as weaker companies may struggle to sustain themselves financially in slow-growth industries unless they merge with another company, or are acquired by a larger company.
- *Published industry statistics:* Statistics published by rating agencies or government agencies are a good source of information for credit analysts to get a sense of how the industry is performing.

Company Fundamentals

Analysts must consider the following factors while evaluating a company's fundamentals:

- *Competitive position:* What is the company's market share – is it increasing/decreasing? Is the company competitive within its industry? How is its cost structure relative to its peers?
- *Track record/operating history:* How has the company performed over time through different economic cycles? How does the balance sheet look like (debt vs. equity)? How is the performance of the current management team?
- *Management's strategy/execution:* What is the management's strategy; to grow and to compete? Is it too aggressive relative to its peers? Is it venturing into unrelated businesses? How does it plan to finance its strategy?
- *Ratios and ratio analysis:* Ratio analysis is used to assess a company's financial health at any point in time, its performance over time, and how competitive it is relative to its peers. Credit analysts calculate a number of ratios. Here, they are categorized into the following three groups:
  - Profitability and cash flow: This is important to see if a company is profitable and generates enough cash flows to make interest/principal payments on time.
  - Leverage.
  - Coverage: Measures an issuer's ability to meet its interest payments.
  - Liquidity is another measure that analysts look at as high liquidity means lower credit risk.

Key ratios used in credit analysis are:

Profitability ratios:

- Refers to operating income and operating profit margin. Operating income is typically defined as earnings before interest and taxes.
- A higher profitability ratio indicates lower credit risk.

Cash flow measures: Cash flow is measured as

- Earnings before interest, taxes, depreciation, and amortization (EBITDA).

- Funds from operations (FFO).
- Free cash flow before dividends.
- Free cash flow after dividends.

A high cash flow indicates lower credit risk.

Leverage ratios: Includes

- Debt-to-capital ratio.
- Debt-to-EBITDA ratio.
- FFO-to-debt ratio.

Lower leverage indicates lower credit risk.

Coverage ratios: Includes

- EBIT-to-interest expense ratio.
- EBITDA-to-interest expense ratio.

Higher coverage ratios indicate lower credit risk.

Collateral

The objective of collateral analysis is to assess the value of the assets relative to the amount of debt issued by a company. Credit analysts consider the collateral value if the probability of default is too high.

Methods used by analysts to determine the quality and value of a company's assets are discussed below:

- One of the ways to calculate the quality of a publicly traded company's assets is equity market capitalization. For instance, if the company's stock is trading below its book value, then the quality of its assets is low.
- If capital expenditure is less than depreciation expense, then the quality of assets may be low as the company is not investing enough in its business.
- How many intangible assets (patents/goodwill) does the company have on its balance sheet? Patents are valuable and may be sold.

Collateral value is insignificant for companies with primarily human and intellectual capital (e.g., software and investment management firms) as they do not have hard assets.

Covenants

Instructor's Note:

This was discussed in detail in the introductory Fixed-Income Securities reading.

Covenants are clauses that state what an issuer can and cannot do. Bond covenants are legally enforceable rules that borrowers and lenders agree on at the time of a new bond issue. They are described in the bond prospectus. There are two types of covenants: affirmative (positive) or negative (restrictive).

Affirmative covenants

- Indicate what the issuer must (is obligated to) do.
- Examples: Make interest and principal payments on time, comply with all laws and regulations.

Negative covenants

- Indicate what the issuer must not do.
- Examples: Restrictions on debt, limits on maximum acceptable leverage ratios and minimum acceptable interest coverage ratios, negative pledges such as no additional debt can be issued that is senior to existing debt.

Character

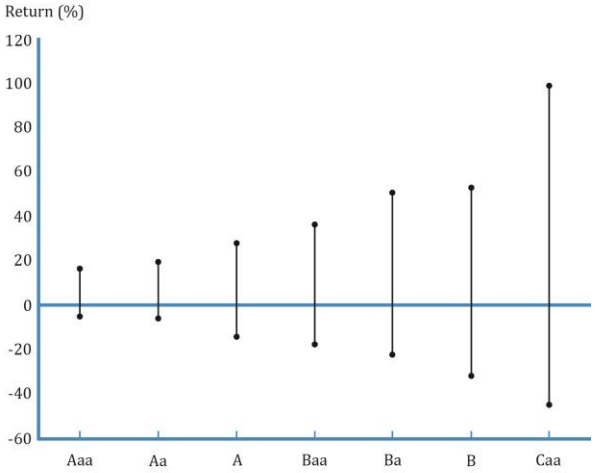
Nowadays, most companies are publicly owned, instead of by individuals. Judging the character of a management is different than it would be for an owner-managed firm.

- How sound is the management's strategy for growth of the company?
- How successful was the management in executing strategies in the past?
- Are the accounting/tax policies too aggressive?
- Is there any history of fraud?

6. Credit Risk vs. Return: Yields and Spreads

We saw in equity that high risk meant a higher potential return. Similarly, issues with lower credit ratings offer higher yields. The higher the credit risk, the higher the return potential, and the higher the volatility of that return. The realized return will be different because interest rates change over time.

As you can see in the exhibit below, junk bonds rated Caa offered the highest return, but also experienced the highest volatility. In contrast, the average return of high-quality investment grade bonds was the lowest at 6.18%. But, they were also the least volatile.



	Aaa	Aa	A	Baa	Ba	B	Caa
Avg. Return	6.18%	6.63%	6.52%	7.33%	8.58%	6.93%	8.10%
Max. Return	16.08%	19.30%	29.39%	36.43%	50.80%	52.10%	97.47%
Min. Return	-4.17%	-5.47%	-14.98%	-15.70%	-22.12%	-31.47%	-44.35%

Source: CFA Program Curriculum, Fundamentals of Credit Analysis

Yield on corporate bond

The yields on extremely liquid bonds with virtually no default risk (e.g., government bonds) will be equal to real interest rate plus a premium for expected inflation.

The yields on corporate bonds will include an additional risk premium that compensates investors for credit and liquidity risk and possibly the tax impact of holding a specific bond. This additional risk premium is called a spread.

Factors that affect the spread on corporate bonds:

- Credit cycle**:** Credit spreads narrow when the credit cycle improves; a spread is narrower at the top of a credit cycle. Credit spreads widen when the credit cycle deteriorates as seen during the recent credit crisis after 2008.
- Broader economic conditions: Credit spreads widen in a weak economy and narrow in a strong economy.
- Funding availability in the financial sector: Unlike stocks that primarily trade on exchanges, bonds usually trade over the counter. Brokers and dealers are market makers in the debt market. Yield spreads are narrow when brokers-dealers provide sufficient capital. However, at times of crisis as seen during the post-2008 period, many broker-dealer firms either closed down or were acquired. The capital available for making markets reduced substantially leading to wider spreads.
- General market supply and demand: If the supply is more and demand is less, credit spreads will widen. Conversely, if the demand is high and supply is low, then spreads tighten.
- Financial performance of the issuer: Earnings releases, news, and other developments associated with the issuer affect credit spreads. Good news will narrow spreads while bad news will widen spreads.

A number of these factors caused spreads to widen dramatically during the 2008-2009 global financial crisis.

6.1 Credit Risk vs. Return: The Price Impact of Spread Changes

How changes in spread affect the price and return of a bond:

Two factors that affect the return on a bond are:

- Modified duration: Price sensitivity to interest rate changes.
- Magnitude of the spread change.

Return impact is calculated using these formulae:

Return impact with and without convexity adjustment

For small changes in yield**:**

$$\text{Return impact (without convexity adjustment)} \approx -\text{ModDur} \times \Delta\text{spread}$$

For large changes in yield:

Return impact (with convexity adjustment) ≈ - (ModDur x Δspread) + $\frac{1}{2}$ x Convexity x $(\Delta spread)^2$

where ModDur is the modified duration

Note: The negative sign indicates that bond prices and yields move in opposite directions.

Relationship between spread changes and duration for credit-risky bonds		
Spread changes	**Bond return/price**	**Modified Duration**
Narrow	Positive (higher)	
Wider	Negative (lower)	
Higher spread sensitivity	Greater price volatility	Higher/longer

7. High-Yield, Sovereign, and Non-Sovereign Credit Analysis

What is important from a credit analyst and an investor's perspective when investing in corporate bonds: to choose high-quality, investment-grade bonds. Can the same credit analysis principles we have seen so far be applied to evaluate other credit-risky bonds as well? Yes, to an extent, but there are differences. We look at three market segments: high-yield corporate bonds, sovereign bonds, and municipal bonds.

7.1 High Yield

These are non-investment grade, junk bonds that are rated below Baa3/BBB by most agencies.

Why do bonds issued by some companies get junk status?

Instructor's Note: Remember the points from the four Cs in credit analysis that an investment-grade bond must have. This list is just the opposite of that.

- Highly leveraged capital structure.
- Limited or negative free cash flow (no capacity).
- Weak or limited operating history.
- Highly cyclical business.
- Poor management (poor character).
- Risky financial policies.
- Declining industry.
- Lack of competitive advantages.
- Large off-balance sheet liabilities.

If the bond is at a risk of default, then the analysis must be more detailed than for an investment-grade bond. The factors a credit analyst must focus on for a high-yield bond are as follows:

- Liquidity and cash flow.
- Detailed financial projections.

- Debt structure.
- Issuer's corporate structure.
- Covenants.
- Equity-like approach to high-yield analysis.

Let us look at each of the points in detail now:

Liquidity

- Investment grade companies have cash on their balance sheets or committed sources of capital to roll over maturing debt.
- High-yield companies may not have access to debt/equity markets or other sources of capital.
- Sources of liquidity (*listed below are sources ordered from strongest to weakest*) for a high-yield company must be analyzed:
    - Cash on the balance sheet – most reliable.
    - Working capital.
    - Operating cash flow.
    - Bank credit facilities.
    - Equity issuance – not reliable if market conditions are bad.
    - Asset sales – least reliable.

Cause of concern/warning sign:

- Debt coming due in the next 6 to 12 months with low sources of liquidity.

Detailed financial projections

- Forecast future earnings and cash flow under different stress scenarios to see if credit profile is improving, stable, or declining.
- Must take into account ongoing capital expenditures.

Debt structure

- High-yield companies issue debt with varying levels of seniority (second lien, senior unsecured, subordinated, preferred stock). It is important to understand the debt structure – how much debt is senior and subordinated? Within senior debt, how much is secured and unsecured?
- Leverage (calculated as Debt/EBITDA ratio) must be calculated at each level of debt to determine the recovery rate if default occurs. Leverage can either be calculated as gross or net leverage. Gross leverage includes cash. In net leverage, cash is subtracted from debt and calculated as (Debt-cash)/EBITDA.
- The lower the ranking → the lower the credit rating →the lower the expected recovery rate.

Corporate structure

- High-yield investors must analyze an issuer's corporate structure and distribution of debt between the parent and its subsidiaries. Is the corporate structure complex?

- How does the cash flow between the parent (holding company) and its subsidiaries – subsidiary to parent, or parent to subsidiary?
- Is the issuer a holding company? Do the holding company's subsidiaries have outstanding debt? How are the leverage ratios for each debt-issuing entity?

Covenant analysis

The covenants for high-yield issuer may include:

- Change of control put: If the issuer gets acquired, then this clause requires the issuer to buy back the debt from investors either at par or small premium to par. The objective is to protect them from a downgrade after acquisition or a weaker acquirer.
- Restricted payments: Defines how much cash can be paid to shareholders over time.
- Limitations on liens and additional indebtedness: Defines how much secured debt an issuer can have. The objective is to protect unsecured bondholders in the event of default by not having too many secured layers above them.
- Restricted versus unrestricted subsidiaries: Subsidiaries are classified as restricted and unrestricted. Certain subsidiaries with significant assets may be classified as restricted to help service parent-level debt.

Equity-like approach to high-yield analysis

- Risk and return profile of high-yield bonds falls somewhere in between high-quality investment grade bonds and stocks.
- So, analyzing high-yield bonds like equities is useful.
- Credit analysts may analyze high-yield bonds by calculating enterprise value = equity market capitalization + total debt – cash.
- Then, they may compare EV/EBITDA and Debt/EBITDA of different issuers as part of their analysis.

7.2 Sovereign Debt

Governments issue sovereign debt to finance public projects such as infrastructure, education, and airports, and to pay wages to government employees.

Types of debt issued by governments:

- Local (internal) debt: Issued in the sovereign's own currency: easier to service as the government can print money or raise taxes.
- External debt: Not denominated in the sovereign's currency but some other currency, like the U.S. dollar.

Characteristics of sovereign debt:

- Historically viewed as risk-free, but that is changing as seen post-2008. Many Eurozone countries such as Greece and Spain were on the verge of default.
- Best able to service debt if a sovereign runs twin surplus (current account surplus and budget surplus).

- Two key issues to consider in sovereign analysis: the government's ability to pay and willingness to pay.
- Credit rating agencies distinguish between local currency debt and foreign currency debt. Rating agencies usually assign a higher rating to local currency debt relative to foreign currency debt.

Given below is a framework (adapted from S&P's methodology) to evaluate sovereign credit and assign sovereign debt ratings:

Framework for sovereign credit analysis	
Institutional and economic profile	**Flexibility and performance profile**
Institutional assessment • Institution's ability to deliver sound public finances and balanced economic growth; • Effectiveness and predictability of policymaking institutions; • Track record of handling past political, economic, financial crises; • Ability and willingness to implement reforms to address fiscal challenges; • Transparent and accountable institutions with low perceived level of corruption; • Independence of statistical offices and media; • Checks and balances between institutions; • Unbiased enforcement of contracts and respect for rule of law and property rights; • Debt repayment culture • Potential external and domestic security risks	External assessment • Low external debt → better able to service foreign currency debt. • Actively traded currency → less impacted by adverse shifts in global investor portfolios (e.g., U.S. Dollar).
Economic assessment • How is the income per capita? Higher income per capita means a deeper tax base. • Trend growth prospects: Creditworthiness is supported by sustainable and durable trend growth across business cycles. • Diversity and stability of growth: Sovereigns with concentrated or narrow economies are more vulnerable to higher volatility in growth and can which in turn	Fiscal assessment • Fiscal performance and flexibility: Decline in government debt/GDP → strong credit. • Long-term fiscal trends: If $\frac{\text{Government interest expense}}{\text{expenditure}} < 5\%$, then it is good; > 15% is poor. • Debt burden and structure: $\frac{\text{Net general government debt}}{\text{GDP}} < 30\%$ is good.

adversely affect a government's balance sheet. • Size of public sector to private sector. The public sector should be smaller compared to the private sector. • Age of population. A young population implies an expanding tax base, and contributes to GDP. Japan has an ageing population that puts pressure on health care and social services.	
	Monetary assessment: • What is the exchange rate policy (listed in order of maximum independence/effectiveness) – free floating currency, fixed rate or a hard peg? Sovereigns with a reserve currency have the most flexibility. • Central bank • Is the bank independent or does the government influence its monetary policy? • Credibility of monetary policy, measured by track record of low and stable inflation. Credible monetary policy is supported by an operationally and legally independent central bank. • Is controlling inflation (low, stable levels) the objective? • How developed is the banking system and capital markets because they help in effective policy transmission

Source: CFAI Curriculum

7.3 Non-Sovereign Government Debt

Non-sovereign government debt is debt issued by state, provincial, and local governments. It generally refers to U.S. municipal bonds and consists of tax-exempt and (a small portion of) taxable bonds.

General obligation bonds

- GO bonds are unsecured and issued with the full faith and credit of issuing government.
- Credit analysis focuses on employment, per capita income, per capita debt, tax base, etc.
- Over-reliance on one or two types of tax revenue (e.g., capital gains or sales tax) can signal credit risk.

Revenue bonds

- Issued for specific project financing like toll road, bridge, etc.
- Credit analysis is similar to corporate bonds.
- Higher risk than GO bonds because of a single source of revenue.
- A key metric to calculate: debt-service-coverage ratio (DSCR), i.e., how much revenue to cover debt service payments.

The higher the DSCR, the stronger the creditworthiness.

Summary

LO.a: Describe credit risk and credit-related risks affecting corporate bonds.

Credit risk is the risk of loss if the borrower fails to make scheduled payments of interest and/or principal.

Credit-related risks include:

- Downgrade risk: Refers to a decline in an issuer's creditworthiness.
- Market liquidity risk: Refers to a widening of the bid–ask spread on an issuer's bonds.

LO.b: Describe default probability and loss severity as components of credit risk.

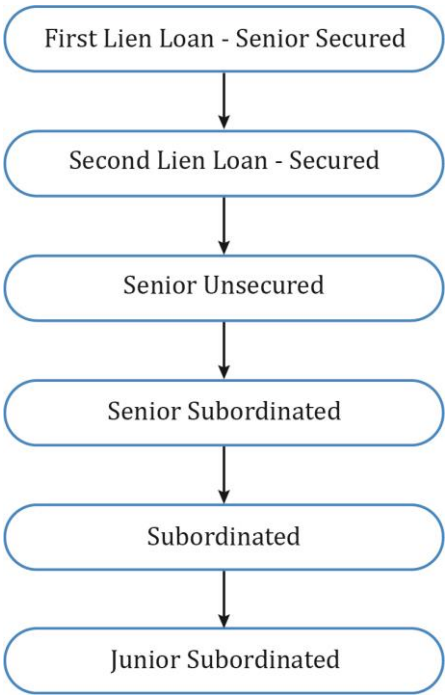
Credit risk has two components:

- Risk of default: The probability that the borrower will default.
- Loss severity: If the borrower does default, how severe is the loss.

Expected Loss = Default probability x Loss severity given default

LO.c: Describe seniority rankings of corporate debt and explain the potential violation of the priority of claims in a bankruptcy proceeding.

Corporate debt is ranked by seniority or priority of claims; the following diagram shows this:



The priority of claims in bankruptcy is not always absolute. In bankruptcy, the court may approve a repayment plan that does not follow the priority of claims order.

LO.d: Compare and contrast corporate issuer credit ratings and issue credit rating and describe the rating agency practice of "notching".

Credit rating agencies, such as Moody's, Standard & Poor's, and Fitch issue credit ratings for bonds which are opinions about a bond issue's creditworthiness. These ratings help investors compare the credit risk of different debt issues.

The rating agencies rate both issuers and issues.

- Issuer ratings reflect an issuer's overall creditworthiness—its risk of default.
- Ratings for issues reflect factors such as their rankings in the capital structure.

Notching

- Notching refers to the practice of adjusting an issue credit rating upward or downward, as compared to the issuer credit rating, to reflect the seniority or other provisions in that specific issue.

LO.e: Explain risks in relying on ratings from credit rating agencies.

The risks of relying on ratings from credit rating agencies are:

- Credit ratings can be very dynamic.
- Rating agencies are not foolproof.
- Idiosyncratic or event risks are difficult to capture in the ratings.
- Ratings tend to lag market pricing of credit.

LO.f: Explain the four Cs (Capacity, Collateral, Covenants, and Character) of traditional credit analysis.

The four Cs of the credit analysis framework are:

- Capacity: The ability of the borrower to make interest and principal payments on time over the term of the debt. The steps involved are: Industry structure → industry fundamentals → company fundamentals → competitive position.
- Collateral: Quality and value of the assets pledged as collateral against the debt.
- Covenants: Terms and conditions of the agreement that the issuer must comply with.
- Character: Refers to the quality of the management. What is the financial history of the issuer has it defaulted on payments in the past, or has there been a case of bankruptcy?

LO.g: Calculate and interpret financial ratios used in credit analysis.

Credit analysts use profitability, cash flow, leverage, and coverage ratios to assess the issuer's capacity. These ratios are explained in the next LO.

LO.h: Evaluate the credit quality of a corporate bond issuer and a bond of that issuer, given key financial ratios of the issuer and the industry.

Key ratios used in credit analysis are:

Profitability ratios:

- Refers to operating income and operating profit margin. Operating income is typically defined as earnings before interest and taxes.

- A higher profitability ratio indicates lower credit risk.

Cash flow measures: Cash flow is measured as:

- Earnings before interest, taxes, depreciation, and amortization (EBITDA).
- Funds from operations (FFO).
- Free cash flow before dividends.
- Free cash flow after dividends.
- A high cash flow indicates lower credit risk.

Leverage ratios: Includes

- Debt-to-capital ratio.
- Debt-to-EBITDA ratio.
- FFO-to-debt ratio.
- Lower leverage indicates lower credit risk.

Coverage ratios: Includes

- EBIT-to-interest expense ratio.
- EBITDA-to-interest expense ratio.
- Higher coverage ratios indicate lower credit risk.

LO.i: Describe macroeconomic, market, and issuer-specific factors that influence the level and volatility of yield spreads.

Factors that affect the spread on corporate bonds:

- Credit cycle: Credit spreads narrow when the credit cycle improves; it is narrower at the top of a credit cycle.
- Broader economic conditions: Credit spreads widen in a weak economy and narrow in a strong economy.
- Funding availability in the financial sector: The amount of capital available from brokers and dealers can influence spreads.
- Supply and demand: If the supply is more and demand is less, credit spreads will widen.
- Financial performance of the issuer: Earnings releases, news, and other developments associated with the issuer affect credit spreads.

LO.j: Explain special considerations when evaluating the credit of high-yield, sovereign, and municipal debt issuers and issues.

High-Yield Bonds

- They are more likely to default than investment grade bonds.
- More emphasis should be placed on an issuer's sources of liquidity, as well as on its debt structure and corporate structure.
- Covenant analysis and using an equity-like approach can be helpful.

Sovereign bonds

- Sovereign credit analysis includes assessing both:
  - an issuer's ability (Ability to pay will be high for debt issued in the country's own currency than for debt issued in foreign currency).
  - willingness to pay its debt obligations.

Non-sovereign government debt

- Non-sovereign debt is usually either general obligation bonds or revenue bonds.
- General obligation (GO) bonds are backed by the taxing authority of the issuing non-sovereign government. Therefore, credit analysis of GO bonds is similar to sovereign analysis.
- Revenue-backed bonds support specific projects, such as toll roads, bridges, airports, and other infrastructure. Therefore, credit analysis of revenue bonds depends on the income generating capacity of the project.

Practice Questions

1. Credit risk is *best* measured by the:
   A. expected loss.
   B. severity of loss.
   C. probability of default.

2. Which of the following would *most likely* have the highest priority of claims in a bankruptcy proceeding?
   A. Senior secured debt
   B. Senior unsecured debt
   C. Senior subordinated debt

3. An organization issued the following categories of option free bonds. The bond with the lowest yield *most likely* is:
   A. first lien loan.
   B. subordinated debt.
   C. junior subordinated debt.

4. 'Notching' is best described as the difference between :
   A. a company credit rating and an industry average credit rating.
   B. an issuer credit rating and an issue credit rating.
   C. S&P credit rating and Moody's credit rating.

5. A bond's price did not fall when it was downgraded by S&P from A to A-. Which of the following is the *most likely* explanation?
   A. Bond prices never react to rating changes
   B. The bond doesn't trade often so the price hasn't adjusted to the rating change yet
   C. The market was expecting the rating change, and so it was already "priced in" to the bond

6. To analyze the collateral of a company, a credit analyst would *most likely* assess the:
   A. cash flows of the company.
   B. growth prospects of the industry.
   C. value of the company's assets in relation to the level of debt.

7. Higher credit risk is indicated by a higher:
   A. FFO/Debt ratio.
   B. Debt/capital ratio.
   C. EBIT/interest expense ratio.

8. Credit yield spreads will tend to widen when:
   A. demand for bonds is high.
   B. equities performed poorly.
   C. economic conditions strengthen.

9. Which of the following factors in credit analysis is more important for municipal bonds than for sovereign bonds?
   A. Per capita income.
   B. Power to levy and collect taxes.
   C. Requirement to balance an operating budget.

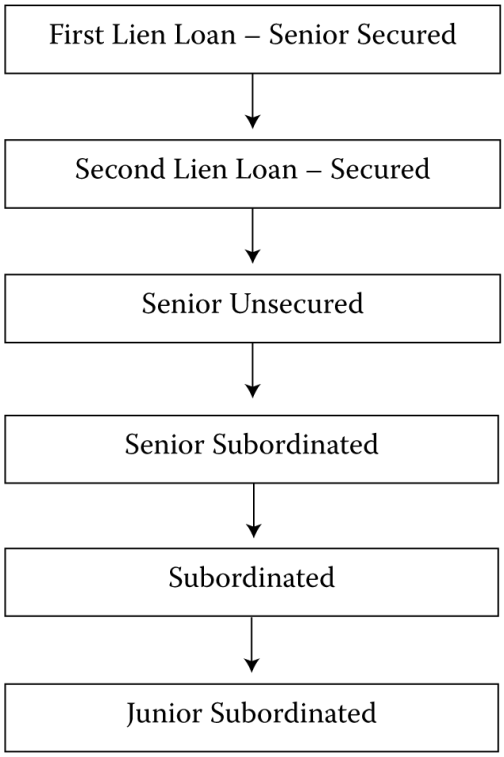
10. What is the *most likely* effect on credit spreads in a country when the credit cycle deteriorates and financial markets perform poorly?
   A. Credit spread is unaffected.
   B. Credit spread widens.
   C. Credit spread narrows.

Solutions

1. A is correct. Credit risk is best measured by expected loss which is the product of probability of default and the severity of loss in the event of default. Neither component alone completely reflects the risk.

2. A is correct. Among the listed senior secured debt comes first followed by senior unsecured debt followed by senior subordinated debt.

3. A is correct. Based on seniority ranking first lien loan has first right among the listed bonds. Hence, they have the lowest credit risk than the other two options. Hence, these would offer lowest yield. The exhibit below shows seniority ranking.



4. B is correct. Notching refers to the credit rating agency practice of differentiating between an issuer credit rating and an issue credit rating to reflect the seniority and other provisions of the debt issue.

5. C is correct. The market was anticipating the rating downgrade and had already priced it in. This is one of the risks of relying on credit ratings; credit ratings lag market pricing. Bond prices often do react to rating changes, particularly multi-notch ones. Even if bonds don't trade, their prices adjust based on dealer quotations given to bond pricing services.

6. C is correct. The value of assets in relation to the level of debt is important to assess the collateral of the company.

7. B is correct. A high Debt/Capital ratio is a sign of higher leverage and therefore higher credit risk. High FFO/Debt ratio and EBIT/interest expense ratio indicate lower credit risk.

8. B is correct. In weak financial markets, including weak markets for equities, credit spreads will widen.

9. C is correct. Unlike sovereigns, municipalities cannot use the monetary policy to service their debt. Therefore, they are usually required to balance their operating budget.

10. B is correct. When the credit cycle deteriorates and financial markets perform poorly, the credit spread generally widens.