IFID Certificate Programme

Credit Analysis and Products

Introduction

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1. Overview

In this part of the IFID Certificate programme we turn our attention from market risk to credit risk:

- What is credit risk and how is it assessed?
- What is the role of credit risk in fixed income portfolios?

Although we nowadays tend to analyse and trade credit products as a separate category from the market rate products that we saw in part II of this programme, in reality it is a bit arbitrary where exactly we draw the line between these two areas of the fixed income markets.

Ultimately, there is no such thing as a credit risk-free instrument and the real issue is how far down the **credit ladder** we draw the line when we separate essentially market risk products from credit risk products.

Credit Risk - Where do we Draw the Line?
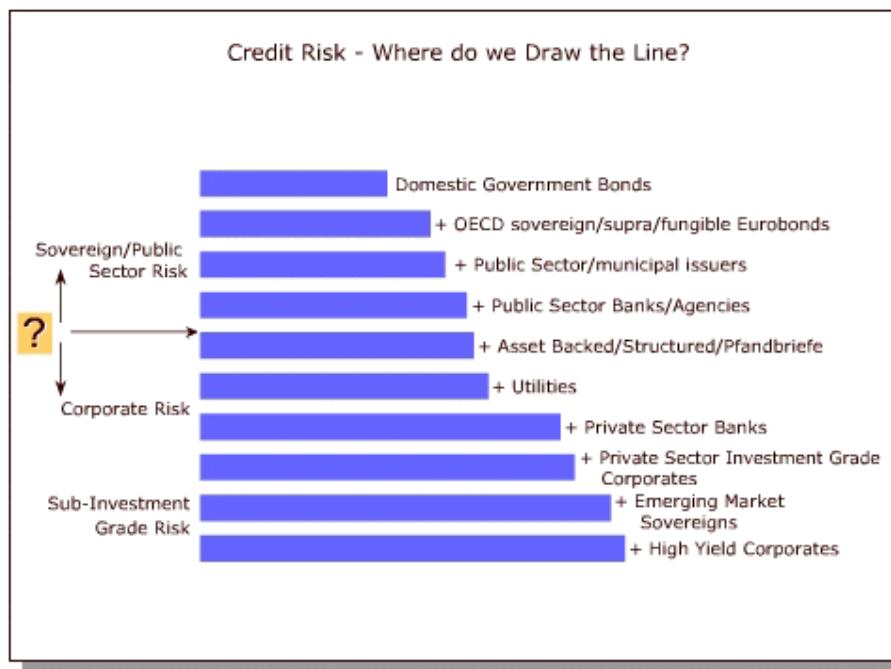
This module gives you a basic road-map for this part of the programme, by defining some key credit risk terminology and the main methodologies used to analyse it.

Learning Objectives

By the end of this module, you will be able to:

1. Distinguish between the primary focus of a credit analyst and that of an equity analyst and identify areas of overlap between the two disciplines

2. Explain the 'credit cliff' that issuers experience when their bonds fall below investment grade

2. Credit Spread Drivers

In the bond markets we talk of yields on non-government bonds as trading at a certain **yield spread** over government securities. This spread is the percentage yield, over-and-above the yield on treasuries (the **risk-free** rate), that the investor earns for taking on the issuer's default risk: the higher the assumed risk of default, the higher will be the spread.

The figure below breaks down the yield spread on a bond into 3 main factors.
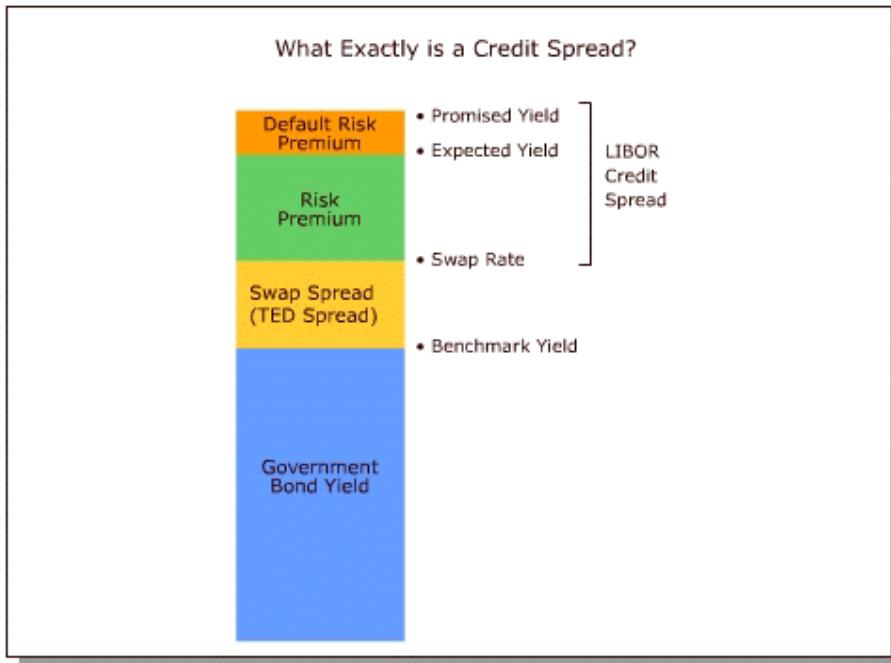
- **Government bond yield**
  This part of a bond's yield represents is its pure time value of money, without any credit risk. In practice, it is either the yield on an on-the-run treasury with similar maturity, or as an interpolated yield between two treasuries with adjacent maturities (using one of the techniques discussed in module Yield Curve Dynamics – Interpolation Methods).

- **The LIBOR or swap spread over treasuries**
  Known in the US as the Treasury – Eurodollar spread (the **TED spread**), this is the rate at which the LIBOR or the swap curve trades over the risk-free rate. Since the interest rate swap is the most widely-used instrument to strip out the market risk on a bond and LIBOR is the funding benchmark for banks engaged in the credit derivative markets, changes in this spread do have an impact on yield spreads on corporate credits. As we explain in module Interest Rate Swap – The Swap Spread, this spread is driven by a complex set of market factors.

- **The bond yield spread over LIBOR**
  This component of the yield spread reflects all the additional credit risk that an investor takes on when acquiring a security that is rated below that of the banks that populate the swap curve (typically in the A – AA band).

  As we saw in module Interest Rate Swaps – Asset Swaps, this is approximately what a bond yields on an asset swap and, as we shall see in module Credit Derivatives – Pricing, it is also the basis on which credit derivatives on the bond are priced.

  In the figure above, this yield component is broken down into two parts:

  o   The promised yield, which is what the bond will earn the investor assuming that all its coupons and its principal are paid as scheduled

o   Its expected yield, which is what statistically the bond is likely to earn the investor, given that some issues will cause credit losses. As we shall see in this module, this element of loss will be a function of the bond's default probability and its likely loss in the event of default

Yield spread over treasuries ≈ Swap spread + Credit spread over LIBOR

As asset swaps and credit derivatives gain increasing influence in the debt capital markets it makes sense to look at the yield spread on a corporate bond over treasuries in terms of the swap spread plus a spread over LIBOR. But you should note that these are not the unique drivers of credit spreads. As we mentioned in module Yield Curve Dynamics – Curve Fitting, in practice there are other factors at play that distort the picture - things like the issue's market liquidity and tax distortions.

3. Analysing Default Risk

A bond's credit rating is meant to reflect its default risk. Credit analysts, including those who work for rating agencies such as Moody's or S&P (see below), assign ratings by analysing two aspects about the issuer:

Non-financial:
- Issuer's industry and market position
- Competitive forces and competitive strength
- Business and geographic diversity
- Seasonality of the business
- Technological change
- The company's strategic direction
- Management strength and track-record
- Operational efficiency and productivity
- Environmental and legal risks
- Sovereign risks

Financial:
- Capital structure
- Amount of debt and balance sheet gearing (or leverage)
- Debt structure
- Debt protection measures
- Liquidity and financial flexibility
- Quality of cashflows
- Capital expenditure plans
- Working capital requirements
- Treasury policies

Some Trade-offs

Credit analysis is much more of an art than a science!

There are a lot of factors to consider and obviously there is some trade-off between the sets of factors. For example, a company operating in a high growth sector with low competitive pressures is better able to support a more geared balance sheet than one that operates in a low growth and more competitive environment.

Financial & Business Risks Trade-off
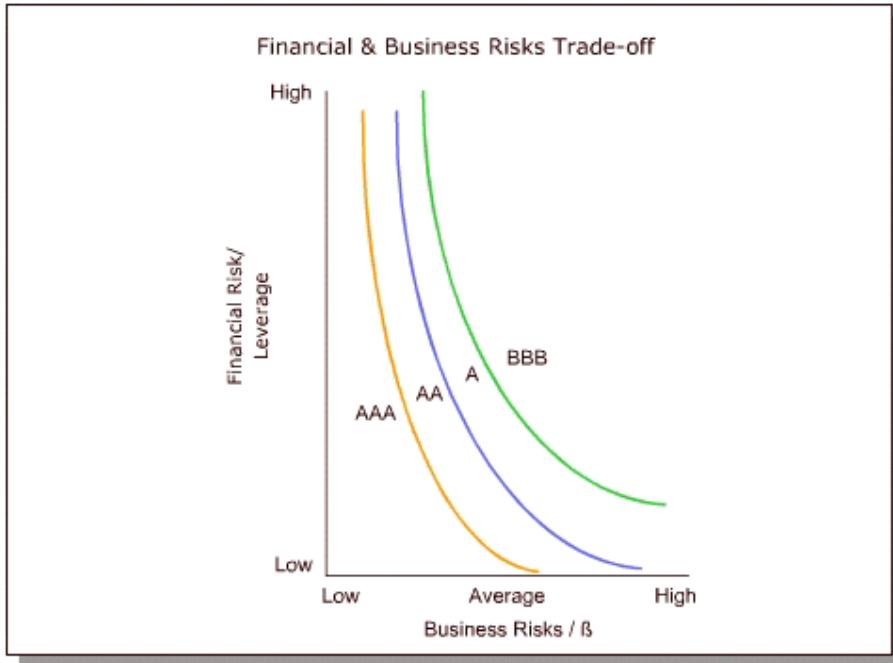
3.1. Credit and Equity Analysis

The yield spread on a bond over the risk-free rate is a reward that the investor takes for taking on the credit risk on the issuer with none of its potential upside:

- If the assets of the company perform well, the debt-holder does not participate in the company's fortunes (unlike the equity holder); they simply receive their principal back

- If the assets perform poorly, debt-holders will receive title to those assets (in the event of liquidation), for whatever recovery value they can get, rather than the full principal owed on the loan

Seen from this perspective:

The yield spread on a corporate bond is a premium to the debt-holder for selling a put option on the assets of the company.

Long corporate bond = Short a put option on the company's assets
Long equity   = Long a call option on the company's assets

Therefore as with any option, the bond's credit spread (the 'premium') is a function of the volatility of the company's asset value (= market capitalisation + book value of debt) and how far the company is away from technical insolvency – i.e. asset value < book value of debt (the 'strike').

This relationship between a company's equity value and that of its debt was first spelt out by Robert Merton in the 1980s and highlights the overlap between equity and debt analysis. Equity and credit analysts therefore have a common interest in the issuer's financial and non-financial situation and prospects. The differences between these two disciplines are more ones of emphasis than of nature; for example credit analysts tend to place more emphasis on the issuer's liquidity position than equity analysts, as we shall see.

4. The Rating Agencies

A number of agencies provide public ratings on debt issues - the best-known being Standard & Poor's Corporation and Moody's Investor Services. A smaller but also well-regarded rating agency is Fitch Investor's Services.

- Investors take ratings seriously because they can have a dramatic effect on a bond's yield and therefore on its price.

- Debt issuers also take ratings seriously because a ratings change can cost or save a company substantial sums in terms of funding costs.

  In particular, the yield differential between a BBB (investment grade) and a BB (non-investment grade) bond (respectively BBB and BB) of the credit spectrum, so companies whose ratings are down-graded through this part of the credit spectrum (the "fallen angels") experience a so-called **credit cliff** as their cost of raising new debt suddenly rises dramatically.

Below are some of the strengths and weaknesses of relying on corporate ratings as the basis for investment decision.

4.1. Strengths

Breadth of coverage

Each agency monitors all the publicly issued debt securities of approximately 2,000 companies, a much wider coverage than the credit analysis team of any single investment bank.

Access to private information

If a company wants a rating on a bond issue, it must apply to the rating agency which will then require access to certain information, including non-public data, to perform the analysis. No investment bank has access to so much private information across such a wide range of debt issuers.

Independence

The agencies are in most cases requested by the issuers themselves to rate their bonds and are paid a one-time up-front fee to do so (after which the agencies review the issues periodically during their life).

But the agencies are themselves independent of their sponsors and very often find themselves at odds with issuers who believe that their securities deserve a better rating than the ones they have been given.

Consistent methodology

The financial parameters that are considered by the agencies to derive a rating are consistent and explicit, allowing:

- Issuers to understand what gives them a good rating; and
- Investors to set ratings-based investment policies

Industry-standard rating scale

While the grading system of each agency differs in detail, broadly speaking they are sufficiently consistent to allow a general distinction between:

- = AAA or Aaa: prime paper
- = AA or Aa: high quality
- = A: upper medium grade
- = BBB or Bbb: medium-grade
- < BBB or Bbb: **non-investment grade**, **high yield** or **junk bonds**

Relative pricing

The consistency of the rating criteria applied makes it easier for market participants to get a sense of the relative pricing levels that should prevail between bonds with different ratings.

Default rate database

The agencies have been compiling their data over many years, providing useful statistical information about **credit migrations** and **default probabilities** over time (see section *Other Methodologies* below and also module Credit Ratings - Corporate Vs Bond Ratings).

4.2. Weaknesses

Lack of timeliness

The agencies have frequently been criticised for not responding quickly enough with ratings changes to reflect actual changes in credit conditions.

Not sufficiently forward-looking

Many analysts argue that the agencies tend to be reactive rather than proactive, responding to changes in credit conditions after they happen, as opposed to before.

Ratings don't capture term structure effects

The agencies consider that their main obligation is to rate the long-term (as opposed to short-term) prospects of companies and their debt: they have a 3-5 year horizon and purposely avoid changing a rating simply because of short-term fluctuations. Such an approach means that the term structure of an issuer's credit spread may not be adequately reflected in its bonds with different maturities.

Credit opinions are often very subjective in nature

Although the agencies have a defined set of criteria for performing credit analysis, in order to make it as objective as possible, there is substantial scope for subjectivity and potential bias.

US bias in historical data

Most of the historical data is sourced from the US markets, making statistical analysis of issuers in other markets rather difficult.

4.3. Credit Watch

Mindful of some of these criticisms, the ratings agencies have responded. In particular, the issue of timeliness has forced them to broadcast **credit watches**: names of issuers whose ratings are being re-assessed before their normal scheduled review date, on account of their rapidly changing financial circumstances. The wording of the credit watch statement is designed to anticipate a credit trend and possible future ratings change.

Example

TOKYO (Standard & Poor's) Dec. 22, 2003 - Standard & Poor's Ratings
Services today placed its 'BB+' rating on SK Corp. on CreditWatch with negative implications following the announcement of a complex scheme to provide financial support in the amount of WON 143 billion (US$120 million) to its affiliate, SK Shipping. This move - together with plans by wholly owned subsidiary SK Power Co. Ltd. to raise WON 400 billion in new financing for the construction of a power plant, and SK Corp.'s ongoing plan to sell treasury shares to selected parties to minimize the influence of minority shareholders - raises further questions over the business direction and financial policies of SK Corp.

The CreditWatch status will be resolved after Standard & Poor's completes its examination of SK Shipping and SK Power, as well as an assessment of SK Corp.'s overall strategic business objectives and financial policies. The rating could be lowered by one or more notches as a result of this review.

In module Credit Ratings we will examine how the rating agencies go about assigning a rating to a specific bond, but first we need to understand how they go about assessing an issuer's **corporate credit rating**.

5. Other Methodologies

The information that is available from the ratings agencies is useful for establishing credit risk comparisons between issuers, but does not by itself tell us what the market should earn for taking different levels of risk – i.e. what should be the credit spreads that the bonds ought to pay in order to compensate investors for the likely losses.

A detailed description of the types of model that have been developed to calculate the price of credit risk is beyond the scope of the IFID syllabus, but you should be at least aware of the most widely used models, which are outlined below.

> **KMV**
> KMV's model (now part of Moody's) is based on Robert Merton's methodology outlined in section *Analysing Default Risk*, above, which treats the credit spread on a bond, over-and-above its risk-free rate, as the premium earned by the bondholder for selling a put option on the company's assets. Therefore, the bond's credit spread is a function of the volatility of the company's equity and how far the company is away from technical insolvency.

- **CreditMetrics**
  This model derives expected bond re-ratings from the **credit transition matrices** published by the rating agencies (see special topic) and the price volatilities of the equity of issuers from different industry sectors. Briefly, the model works as follows:

  o A given percentage fall (or rise) in the issuer's share price is associated with each downgrading (or upgrading) in the credit migration table

  o Assuming a log-normally distributed equity price volatility, it is therefore possible to calculate the expected market loss on account of the re-rating of each bond in a portfolio with a certain degree of confidence

  o Given the observed correlations between the equity prices in different industry sectors, it is also possible to capture the effect of correlation in the credit risks within a portfolio and assess the effectiveness of risk diversification measures

- **CreditPortfolioView**
  In order to calculate a portfolio's credit loss distribution, this model develops a **credit transition matrix** based on three variables:

  o Macroeconomic credit cycles
  o Industry trends
  o Credit migrations and counterparty defaults

- **Credit Risk+**
  This is a model that uses an actuarial approach, rather than the statistical approach of CreditMetrics, to approximate a loss probability distribution.

> **Models are approximations – but which short cuts are**
> **appropriate? Is it possible to have a credit risk portfolio model**
> **based on econometrics? Do they account for complex liability**
> **structures? M. Gordy & E. Hatfield**

At the end of the day, models are a useful check but are no substitute for bottom-up analysis. The next module provides an introduction to the main financial and non-financial techniques applied in credit analysis.

Transition matrices
Credit rating migration tables published by the rating agencies

The credit rating agencies maintain historic ratings data on all the bonds they have rated and from these data they can construct **migration tables** or **transition matrices** showing the percentage of bonds with different ratings that on average migrate up or down by one or more **notches** during the course of a year.

The table below shows Standard & Poor's migration table for 1996.

	AAA	AA	A	BBB	BB	B	CCC	Default
AAA	90.67%	8.33%	0.68%	0.06%	0.12%	0.10%	0.02%	0.02%
AA	0.70%	90.64%	7.79%	0.64%	0.06%	0.14%	0.02%	0.01%
A	0.09%	2.27%	91.05%	5.52%	0.74%	0.26%	0.01%	0.06%
BBB	0.02%	0.33%	5.95%	86.93%	5.30%	1.17%	0.12%	0.18%
BB	0.03%	0.14%	0.67%	7.73%	80.53%	8.84%	1.00%	1.06%
B	0.01%	0.11%	0.24%	0.43%	6.48%	83.45%	4.08%	5.20%
CCC	0.11%	0.22%	0.22%	1.30%	2.38%	11.24%	64.74%	19.79%