ICMA Centre

International Capital Market Association

International Fixed Income and Derivatives Certificate

Programme Syllabus

Henley Business School
UNIVERSITY OF READING

Contents

I. Introduction

ICMA's IFID Certificate (formerly known as the General Certificate) is a second level qualification intended primarily for fixed income analysts, asset managers, traders and sales persons within their first two years in the industry, but is open to anyone who would benefit from a more complete knowledge of the fixed income markets and its derivatives.

The Certificate places strong emphasis on developing practical skills based on a thorough understanding of valuation principles and the relationships between the cash and the derivatives markets.

More than product training, the programme aims to develop the candidate's ability to implement practical solutions in specific investment, trading and risk management contexts. Candidates who gain this qualification are therefore recognised to have achieved a level of professional competency which ensures that they can quickly adapt and add value to the business of any major financial institution.

As a second-level qualification, the IFID Certificate syllabus requires that the candidate should already have some familiarity with:

- Fundamental numeric skills
- Basic accounting concepts
- The main (primary and secondary) fixed income market sectors, products and key players

The academic content of the IFID Certificate is overseen by the ICMA Centre, University of Reading, United Kingdom, and reflects the views of a specially appointed Industry Advisory Panel composed of senior practitioners from both the sell and the buy sides of the fixed income markets. This ensures that the IFID syllabus meets the needs of the industry and is the qualification of first choice by fixed income market professionals.

For the benefit of candidates who may be starting from a lower knowledge base, the IFID Study Pack includes some learning materials covering pre-requisite topics, although such topics will not be explicitly examined.

II. Structure of the IFID Certificate Syllabus

The IFID syllabus is organised around five broad subject areas:

I. **Fixed income analysis**
The fundamental pricing and risk measurement techniques for fixed income securities and derivatives

II. **Rates trading and hedging**
Strategies using cash securities and derivatives, with the focus on market risk and the management of interest rate exposures

III. **Structured Securities**
Bonds and OTC investment vehicles with embedded options

IV. **Credit analysis and products**
Analysis of credit risk and the products and techniques that are used for trading and hedging this type of risk

V. **Portfolio and risk management**
Introduction to the main tools of fixed income portfolio construction and risk management,

Sections 2-5 rely extensively on case studies or exercises that highlight the factors that drive trading, hedging and investment decisions in practice and the tensions that are inherent between the buy and the sell sides of the business.

Below are listed the specific learning objectives (LOs) for each of the topics covered in the IFID syllabus. The purpose of the LOs is to:

- Give candidates a clear 'road-map' of the competencies that they may be required to demonstrate in the Certificate exam (every LO is examinable)
- Provide a useful checklist for any tutor who is involved in preparing candidates for the IFID Certificate exam

Candidates who can genuinely perform the task described in each LO listed below can be confident of passing the exam.

1. Fixed Income Analysis

This first part of the syllabus provides an overview of fixed income markets and products and then introduces basic valuation models for spot and forward prices. The section concludes by providing an introduction to bond risk measures.

By the end of this part of the syllabus, the candidate should be able to:

1.1. Bond markets, pricing and yield

1. Describe the key characteristics of debt securities and how they differ to equity.
2. Define and contrast the over-the-counter (OTC) markets common with fixed income securities and contrast that to exchange traded markets more common with other asset classes.
3. Explain the difference between the money market and bond market.
4. Define "simple interest" and how to calculate the price and yield of both a discount money market securities and certificate of deposit (CD).
5. Define the discount margin on an FRN and describe a methodology for calculating it
6. Identify the main factors that cause price sensitivity in an FRN
7. Calculate the dirty price, accrued interest and clean price on straight bonds using different compounding and day-count conventions
8. Using a financial calculator, compute and interpret the following measures of bond yield:
    - Current yield
    - Yield to maturity
9. Explain the significance of reinvestment income in the calculation of yield to maturity
10. Explain the limitation of yield to maturity as a measure of a bond's market value
11. Define the concept of the yield curve
12. Calculate equivalences between yields to maturity based on different compounding periods
13. Interpret the following measures of bond yield: Horizon yield
14. Calculate the net (after-tax) yield on a taxable security and the gross or tax-equivalent yield of a tax-paid security

1.2. Yield Curve Dynamics

1. This short section provides a summary of some key market rates and analytical tools, by way of introduction to the techniques of rates trading and hedging.
2. Interpret the key money market rates in OECD countries, in particular:
    - Official discount rates
    - Fed funds rate
    - European Central Bank refinancing rate
3. Explain the impact of central bank open market operations on market liquidity and rates
4. Outline the possible roles played by market expectations, liquidity preference and market segmentation in explaining the shape of the yield curve
5. Identify the main factors that may cause the Treasuries curve to shift or to pivot
6. Explain what is meant by:
    - A benchmark bond

- An on-the-run bond
- An off-the-run bond

7. Perform a linear interpolation between two adjacent yield points on the yield curve and explain the drawbacks of this approach.

1.3. Spot and forward yields

1. Explain the significance of reinvestment income in the calculation of yield to maturity
2. Explain the limitation of yield to maturity as a measure of a bond's market value
3. Derive, using the method of bootstrapping, a theoretical discount function and its corresponding spot curve from a given coupon curve
4. Define a forward yield and derive a forward curve from the spot curve
5. Explain the relationship between forward yields, par yields and spot yields
6. Explain the effect of a bond's coupon rate on its yield to maturity
7. Explain how the forward curve may be used to identify cheap maturities
8. Explain why spot curves are commonly used to price bonds with irregular cash flows
9. Derive a par rate from a forward curve or a discount function

1.4. Interest Rate Futures

1. Describe the structure and delivery settlement of the most commonly traded interest rate futures contracts
2. Explain how the interest rate futures contract may be used to:
    - Take positions on short term rates
    - Hedge exposures to short term rates
3. Explain the theoretical relationship between interest rate futures prices and the cash LIBOR curve

1.5. Interest rate risk

1. Define the concept of Macaulay duration and describe its application in asset and liability management
2. Explain how the coupon rate, the maturity of the bond and its yield affect its duration
3. Calculate the Macaulay duration on a floating rate note
4. Calculate the Macaulay duration of:
    - A fixed income portfolio
    - A liability structure
    - A combination of the two
5. Distinguish between duration matching and cash flow matching
6. Explain why a duration-immunised portfolio has to be rebalanced over time
7. Define modified (or adjusted) duration and calculate its value from the security's Macaulay duration
8. Estimate the horizon yield on a bond position from its yield to maturity and its modified duration

9. Define a bond's price value of a basis point (PVBP)4 and calculate it from the bond's modified duration
10. Explain the convexity behaviour of a fixed income security and give examples of instruments with:
    - Positive convexity
    - Negative convexity
11. For a straight bond, explain the relationship between convexity and:
    - Coupon rate
    - Maturity
12. Estimate a bond's percentage price change, given its duration, convexity and a specified change in yield
13. Using a financial calculator, compute a bond's PVBP and its effective duration and explain why these differ from the analytical duration/convexity estimate

2. Rates Trading and Hedging

This part of the IFID syllabus focuses on taking positions in interest rates and managing interest rate risk using cash market and derivative products.

By the end of this part of the syllabus, the candidate should be able to:

2.1. Securities Financing

1. Distinguish between the various methods of financing long or short positions in securities:
    - Unsecured borrowing
    - Secured borrowing
    - Margin trading
    - Repurchase agreement (repo)
2. Describe the main advantages of securities financing through repo
3. Identify who is the buyer and who is the seller in a repo transaction
4. Explain the difference between open repo, overnight repo and term repo
5. Illustrate with examples how the repo product is used in:
    - Funding long and short positions in securities
    - Investing surplus cash in the money markets
    - Earning additional income from securities lending
6. List the main differences between classic repo and sell/buy-backs
7. Describe the nature of the collateral in general collateral and in special repo transactions
8. Identify the reasons why some securities to go on special
9. Calculate the interest due on a classic repo transaction
10. Calculate the forward price and the end proceeds on a sell/buy-back operation
11. Explain when a repo transaction gives rise to payments of 'manufactured' coupons or dividends
12. Identify the risks associated with repo transactions
13. Critically assess the claim that a repo transaction provides each of the parties with a double indemnity against credit risk
14. List the key elements of the SIFMA-ICMA Global Master Repo Agreement (GMRA) and explain the advantages of trading under these terms
15. Calculate the initial margin (or haircut) on a repo transaction using the GMRA formula
16. Outline the procedure for margin maintenance in classic repo
17. Distinguish between the following custodial arrangements:
    - Delivery repo
    - Hold-in-custody repo
    - Tri-party repo

2.2. Outright and Spread Trading

1. Explain the strategy of riding the yield curve and analyse the total return on a roll-down, in terms of:
    - Accrued interest

- Capital gain

2. Explain what is meant by outright market risk and yield curve (or pivot) risk
3. Construct the following positions using government bonds:
    - Risk weighted yield curve spread or switch
    - Barbell or butterfly spread
4. Hedge the market risk on a corporate bond portfolio using treasury bonds and identify the residual risks associated with such a hedged position
5. Calculate the net carry, forward breakeven and the net return on a position in fixed income securities
6. Calculate the breakeven spread on a yield curve spread position

2.3. Bond Futures

1. Explain the basic terminology of futures and options exchange trading, in particular:
    - Types of order (market order and limit order)
    - Types of trade (basis, block, bundle, cabinet, EFP and pack)
    - Types of margin (initial, maintenance and variation)
2. Calculate the tick value of a bond futures contract, given the contract size and the tick size
3. Calculate the invoice amount payable against physical delivery settlement
4. Calculate the theoretical (arbitrage-free) forward price of a bond
5. Explain how the conversion factors of the deliverable bonds are calculated and what is their purpose
6. Explain why one or more bonds become cheapest to deliver (CTD)
7. Describe the inflexion analysis technique for determining which bond is likely to become the CTD in different yield curve conditions
8. Define the implied repo rate and explain how this is used in cash-futures arbitrage
9. Define the gross basis
10. Identify the main factors that affect the gross basis
11. Design a risk-weighted basis trade
12. Explain why the gross basis converges towards zero as the futures contract approaches delivery
13. Define the net basis and explain why it exists
14. Explain the relationship between the net basis and the implied repo rate
15. Identify the convexity risk associated with a short basis position
16. Construct a risk-weighted futures position to hedge the market risk on a bond portfolio
17. Identify the residual risks that may be present in a futures hedged bond portfolio

2.4. Swaps

The main focus of this module is on the interest rate swap (IRS) product, where we apply the methodology introduced in module *Spot and Forward Yields*, above, to the pricing and revaluation of vanilla swaps. We also look at some swap variations, including the asset swap, and see how they vary from our standard model. Candidates will use simple spreadsheet models to interpret and apply the standard analytics of these swaps.
By the end of this module candidates should be able to:

1. Identify the common characteristics shared by all swaps and give examples of swap structures in different markets.
2. Define the terms used to describe interest rate swaps.
3. Explain how the cash flows in a fixed-for-floating interest rate swap are calculated and when they are paid.
4. Explain why both the payer and the receiver of fixed in an interest rate swap are exposed to interest rate risk.
5. Explain how swap dealers use STIR futures and government bonds to hedge unmatched positions in the swap trading book.
6. Identify and analyze factors that contribute to swap spreads.
7. Interpret swap quotes.
8. Show how interest rate swaps can be used to express views on future changes in interest rates and to hedge interest rate risk.
9. Interpret and apply swap payment conventions for fixed and floating payments.
10. Calculate the all-in rates payable or receivable on swap-overlaid assets or liabilities, taking into account the payment frequency and day-count conventions for both the swap and the underlying positions.
11. Explain why swap rates can be interpreted as par yields when swaps are priced and revalued using **LIBOR** discounting.
12. Derive swap discount factors and projected forward LIBORs from quoted swap rates when swaps are priced and revalued using LIBOR discounting.
13. Mark to market a swap position using LIBOR discounting.
14. Derive a swap rate from a **strip** of interest rate futures prices and explain why actual swap rates must be adjusted for differences in convexity between the swap and futures.
15. Explain why swaps create counterparty credit risk and describe how this risk can be managed through bilateral collateralization and margining and through central clearing.
16. Explain why collateralized swaps should be revalued using overnight interest rates rather than LIBOR rates.
17. Describe overnight index swaps (OIS) and explain how they are used.
18. Describe tenor basis swaps and explain how they are used.
19. Describe cross-currency basis swaps and explain how they are used.
20. Explain the relevance of LIBOR-OIS spreads, tenor basis spreads and cross-currency basis spreads to swap pricing and revaluation.
21. Derive swap discount factors and projected forward LIBORs from quoted swap rates and OIS rates when swaps are priced and revalued using OIS discounting.
22. Mark to market a swap position using OIS discounting.
23. Calculate the basis point value (BPV) or change in mark-to-market value for a one-basis-point change in underlying interest rates (DV01) of a swap position or swap trading book.
24. Use BPV or DV01 to calculate a bond or futures hedge for a swap.
25. Describe forward starting swaps, constant maturity swaps (CMS) and cross-currency interest rate swaps and explain how they are used.
26. Explain how asset swap margins are calculated and outline their role in measuring relative value in credit markets.

2.5. Options

This module focuses on options generically, but paying particular attention to interest options. We discuss (in non-mathematical terms) the theoretical foundations of options pricing in order to explain phenomena such as volatility smiles and skews. Candidates will be able to explore option sensitivities and risks with the help of a spreadsheet using a simple industry-standard option pricing model. We will also consider common trading strategies using these instruments.
By the end of this module candidates should be able to:

1. Describe the rights and obligations of option buyers and sellers and use these to derive the payoffs to long and short positions in call and put options
2. Explain the basic terminology of options contracts and markets
3. Discuss the implications of the put-call parity relationship between options and forward contracts
4. Explain why we must pay money upfront if we wish to go **long** an option and why we will expect to receive money upfront if we go **short** an option
5. Explain why we must pay money upfront if we wish to go **long** an option and why we will expect to receive money upfront if we go **short** an option
6. Explain why we must pay money upfront if we wish to go **long** an option and why we will expect to receive money upfront if we go **short** an option
7. Distinguish between intrinsic and time value of options and explain how the relationship between time value and the moneyness of the option
8. Define **delta** and explain its role in the hedging of options
9. Explain how option prices are related to expected delta hedging costs
10. Explain the ways in which moneyness, volatility and time to expiry contribute to the value of options
11. Define and interpret key option price sensitivities or risk measures, including delta, gamma, vega, **theta** and rho
12. Explain how these option risk measures are affected by changes in the degree of 'moneyness', the time to expiry and the level of volatility
13. Use an understanding of the option Greeks to explain the sources of profit or loss when trading volatility using options
14. Define implied volatility and explain how it is calculated
15. Explain what is meant by smile or skew in implied volatility and discuss possible explanations for observed patterns in the smile or skew
16. Explain what an implied volatility surface is and how it is used
17. Explain what interest rate caps and floors are, how they are structured, and how they are used
18. Construct an interest rate collar
19. Find the floor strike that will create a zero-cost interest rate collar for a given cap strike and yield curve environment
20. Explain what payer and receiver swaptions are and how they are used
21. Compare and contrast swaptions and interest rate caps and floors
22. Compare and contrast the use of payer and receiver swaptions to construct bear and bull trades on interest rates

23. Use payer and receiver swaptions to construct bull and bear spread trades and explain why and when these trades are used
24. Use payer and receiver swaptions to construct long and short volatility trades such as straddles, strangles and butterflies
25. Use payer and receiver swaptions to construct risk reversals and explain how these trades can be used to trade views on the smile or skew in implied volatility
26. Briefly outline the use of swaptions to construct steepening and flattening trades and trades that express views on the correlation among forward rates

3. Structured Securities

In this module we describe the typical structure and motivations behind the issue of the traditional structured securities such as callable and convertible bonds, as well as some of the new-generation structured products. We highlight the common themes that run through many of these issues – e.g. principal protection and yield enhancement – and we analyse the nature and risk profiles of the options that are embedded in them. With the help of a set of simple spreadsheet-based models, candidates will learn how to interpret and apply the analytic tools used in these markets (e.g. an OAS model).

By the end of this module, the candidate should be able to:

3.1. Callable/putable Bonds

1. Explain the rationale for issuing putable or callable bonds, including stepup Callables
2. Interpret the following measures of bond yield: Yield to call / yield to put
3. Explain the limitations of yield to call and yield to worst as measures of the investment value of a callable bond
4. Define what is meant by the price compression of a callable bond and describe the relationship between:
    - The price of a callable bond
    - The price of an equivalent option-free bond
    - The price of the embedded call option
5. Explain how changes in yield volatility affect the price of callable and putable bonds
6. Describe in outline each of the steps involved in pricing a callable bond using an option-adjusted spread (OAS) model:
    - Modelling the binomial tree for the short rate
    - Calculating the theoretical option-free bond price
    - Calibrating the rates tree
    - Calculating the theoretical option-adjusted bond price
    - Calculating the OAS implied in an actual bond price
7. Estimate the likelihood that a callable or a putable bond will be redeemed before its scheduled maturity and therefore estimate its likely duration
8. Describe the process of stripping the call features out of a callable bond using a Bermudan swaption

3.2. Convertible Bonds

1. Distinguish between:
    - Convertible bonds
    - Exchangeable bonds
    - Mandatory convertibles
    - Bonds with warrants
2. Define the conversion price and the conversion ratio
3. Outline the benefits of convertibles to issuers and to investors

4. Describe the typical soft call and hard call features that are embedded in many convertibles
5. Define and interpret the following measures of a convertible's value: Parity
    - Conversion premium
    - Investment value/bond floor
    - Investment premium
6. Calculate the payback period on a convertible
7. Outline the methodology of the dividend crossover pricing model
8. Describe the nature of the conversion option embedded in a convertible bond
9. Define the delta and the rho of a convertible bond
10. Describe how a convertible-equity switching strategy works and explain its rationale
11. Outline the structure of a convertible asset swap and explain how it may be used in convertible arbitrage
12. Distinguish between a convertible asset discount swap and a convertible asset par swap

3.3. Inflation-linked Bonds

1. Describe the generic structure of an inflation-linked bond and outline the so-called Canadian pricing methodology
2. Calculate the real (inflation-adjusted) yield on a bond, given its nominal yield, compounding period and inflation rate
3. Explain in outline how breakeven inflation rates are derived from nominal yields and the market prices of inflation-linked government bonds

3.4. OTC Structures

This section describes the investor and issuer themes that prevail in this high value added sector by focussing, by way of illustration, on popular structures involving vanilla and exotic options on interest rates, equities and currencies. A key aim of this section is to develop the candidate's skill in identifying the options that are embedded in different OTC structures, by analysing the contractual payoffs.

By the end of this section, the candidate should be able to:

1. Outline the generic structure of a principal protected note (PPN)
2. Explain the rationale for issuing and investing in PPNs
3. Outline the generic structure and investment rationale of a high yielding note
4. Identify the types of option that have been embedded in a structured note by analysing the specification of the note's coupon structure and maturity payoff

4. Credit Analysis and Products

This part of the IFID syllabus covers the special competencies that are required to perform effectively in the credit markets including credit derivatives and structured credit products.

By the end of this module, the candidate should be able to:

4.1. Corporate Bond Analysis

This module introduces the main tools of corporate bond analysis. Its primary focus is the pricing of corporate bonds and the compensation required by investors for bearing the risk of losses in the event of default. We examine in detail:

- The pricing of corporate bonds
- The relationship between yield spreads and expected loss given default
- The factors determining the probability of default and loss severity
- The work of the main ratings agencies

After completing this module, the candidate should be able to:

1. Describe the size and structure of the global corporate bond market, distinguish between financial and non-financial borrowers, and understand the different bond instruments typically issued by corporate borrowers
2. Explain and describe how corporate bonds are quoted on a yield spread basis:
    - Versus benchmark government bonds
    - Relative to interpolated government yields
    - Relative to swap rates and interpolated swap rates
3. Distinguish between interest rate risk and credit risk, and explain how the corporate bond yield spread compensates the investor for bearing default risk
4. Define and interpret the following two key spread measures and their relationship to expected default loss:
    - Asset swap spreads
    - Z-spreads or 'zero volatility' spreads
5. Define the expected loss given default (LGD) in terms of the probability of default, and the loss sustained in the event of default, after allowing for any recovery
6. Describe one way in which a breakeven yield spread for a bond may be derived, given its expected default probability and recovery rate
7. Describe the Merton framework for understanding the payoff to bondholders as an option:
    - Corporate bond investors are selling a put option
    - Combining a risk-free asset with a put
    - Corporate spreads as an option premium
    - Insights of option pricing theory to pricing corporate bonds
8. Identify and distinguish between the following determinants of default risk:
    - Financial factors and the ability to pay

- Internal and external non-financial factors
- The macroeconomic cycle

9. Define and interpret the following financial ratios, which attempt to measure the financial leverage, liquidity, and profitability (or cash flow) of the obligor
    - Current ratio
    - Quick ratio
    - Debt/Book Capital
    - Debt/EBITDA
    - EBITDA/Interest
    - Free Cash Flow
10. Identify structural factors that will reduce risk to the bondholder, or mitigate losses in the event of default, including collateralised (secured) borrowing, the use of bond covenants, and subordination
11. Distinguish between the following categories of debt:
    - Senior secured
    - Senior unsecured
    - Senior subordinated
    - Junior subordinated
12. Describe the role and approach taken by the public ratings agencies and distinguish between a corporate credit rating and a bond rating
13. Distinguish the ratings categories used by the main ratings agencies and identify the dividing line between investment grade and sub-investment grade debt
14. Describe the information contained in the following data published by the ratings agencies:
    - Credit migration tables
    - Default recovery rates
    - Default rates
15. Identify some of the factors that drive activity in the High Yield bond market and explain why performance often differs from other assets in the credit markets
16. Explain the importance of bond covenants such as the ones listed below in high-yield debt issues:
    - Limitations on additional indebtedness and liens
    - Restrictions on dividend payments to the holding company
    - Controls on asset disposals
    - Change-of-control triggers

4.2. Credit Derivatives

This module introduces the key products and terminology of credit derivatives. The focus is on credit default swaps (CDS), which:

- Represent the largest part of the credit derivatives market
- Are closely related to asset swaps (covered in detail in the module *Swaps*)
- Are the underlying instrument in synthetic CDOs (introduced in the module *Structured Credit*)

By the end of this module, the candidate should be able to:

1. Describe the history and development of credit derivative products, demonstrate familiarity with the main derivative structures, and be aware of the uses of such products in trading and hedging strategies
2. Identify the advantages to corporate bond issuers and investors of CDS and explain the reasons for the growth of the market
3. Explain the basic structure of a CDS contract, which will payout when a defined "credit event" occurs, in return for a pre-agreed periodic payment
4. Distinguish the protection buyer and the protection seller in a CDS transaction, and understand the credit exposure taken by the respective counterparty
5. Identify and explain the key features of CDS contracts:
    - Trade date and termination date
    - Premium
    - Reference entity and reference obligation
    - Credit event
    - Physical and cash settlement procedures
    - Deliverable obligation
6. Identify and describe what are usually defined to constitute Credit Events in standard ISDA documentation for CDS contracts:
    - Filing for bankruptcy
    - Failure to pay on 'borrowed money'
    - Restructuring of debt
    - Repudiation/moratorium
7. Describe the protocol to identify a Successor Entity that assumes the obligations of the Reference Entity following a takeover, merger, or other change to corporate identity
8. Describe the procedures used to settle CDS contracts when a Credit Event occurs, and explain the advantages and disadvantages of physical versus cash settlement
9. Explain the pricing relationship between asset swap spreads and CDS, and describe the main determinants of the bond basis
10. Derive the fair value of the CDS spread for given assumptions about the probability of default and recovery rate
11. Define spread duration and understand its use when marking-to-market outstanding CDS positions
12. Explain how to close CDS trading positions through an agreed present value settlement, the use of offsetting transactions, or novation to a third party
13. Describe the principal traded CDS index products in the US and Europe
14. Explain the main features of CDS index contracts:
    - Index constituents and contract rollover
    - Initial premium (coupon) of the contract
    - Accrued premium and market value
    - Procedure in the event of default
    - Arbitrage with index constituents
15. Describe the basic outline of basket default swaps, including first-to-default (FTD) and nth to

default structures

16. Describe the structure and typical applications of:
    - Total return swaps
    - Credit-linked notes
    - Credit spread forward
    - Credit spread option

4.3. Structured Credit

This module considers structured credit products, including asset-backed securities (ABS) and collateralised debt obligations (CDOs). Coverage of the latter also includes synthetic CDOs, which incorporate credit derivatives into the structure. The principal areas of focus are:

- The characteristics and analysis of US Agency MBS
- The origination and typical structure of ABS securities
- The origination and structure of CDOs

By the end of this module, the candidate should be able to:

1. Describe the historical development of structured credit products, the principal products now traded, and the size of the markets
2. Distinguish between asset securitisation and secured lending
3. Identify the main benefits of securitisation to issuers and investors
4. Identify some of the key factors that make certain types of debt suitable for securitisation
5. Describe the history, structure and characteristics of the Agency MBS market in the United States:
    - GNMA/FNMA/FHLMC
    - Creation of pass-through securities
    - Plain vanilla fixed rate level payment Agency MBS
    - Concepts of WAC, WAM and WAL
6. Explain the concept of prepayment risk, and how this gives rise to negative convexity on mortgage bonds
7. Explain how prepayment impacts the yield or return earned by the holders of discount and premium MBS
8. Distinguish the two main approaches to characterising the cash flows arising from prepayment:
    - Constant Prepayment Rate (CPR)
    - Public Securities Association (PSA) standard
9. Explain how the holders of MBS are short of the option to prepay, and describe the application of Option Adjusted Spread (OAS) to the valuation of MBS
10. Identify the main non-mortgage debt products typically used in ABS.
11. Define the role of the following parties in a securitisation:
    - Originator
    - Obligors

- Special purpose vehicle/issuer
- Servicer/asset manager
- Lead manager
- Auditor
- Trustee
- Paying Agent

12. Explain how the following facilities can be used to enhance the credit rating of an asset-backed issue:
    - Over collateralisation
    - Excess spread
    - Reserve account
    - Liquidity facility
    - Subordination
    - Third party guarantees
13. Explain how to calculate the following measures of yield on an asset-backed security:
    - Current yield
    - Cash flow yield and spread to Treasuries
    - Zero volatility spread
14. Distinguish between pass-through securities and collateralised debt obligations (CDOs)
15. Distinguish between the market definitions of 'balance sheet' and 'arbitrage' CDOs, and between 'cash flow' and 'market value' (managed) CDOs
16. Explain the rationale for issuing CDOs in separate tranches
17. Explain why the originator often retains the equity tranche in a CDO
18. Outline different ways in which payments on different CDO tranches may be allocated, including:
    - Sequential interest and amortisations
    - Interest only and principal only tranches
19. Explain how the correlation of default risk in a CDO impacts the returns earned by the holders of different tranches
20. Outline the typical structure of a synthetic collateralised debt obligation (CDO) and the rationale for issuing this product

5. Portfolio and Risk Management

The aim of this section of the syllabus is to examine various macro techniques of fixed income portfolio management and of risk management that are not covered elsewhere in the programme. This includes a brief discussion on the use of forward foreign exchange to manage the currency risk in multi-currency portfolios.

By the end of this part of the syllabus, the candidate should be able to:

5.1. Portfolio Construction

1. Calculate the money-weighted rate of return on a portfolio and explain the difference between this and the internal rate of return
2. Calculate the compounded annual growth rate (CAGR) of a bond portfolio
3. Calculate the return and the risk on an asset portfolio given the risks on its individual components and their return correlations
4. Define the concept of the portfolio frontier and explain how asset correlations affect its shape
5. Explain how the Sharpe ratio is used to compare the performances of different portfolios and to identify optimal portfolios
6. Explain what is meant by the alpha and the beta coefficients in a factor model of bond performance
7. Explain how multi-factor models may be used to 'tilt' credit portfolios in search of market out performance
8. Define tracking error and explain how the performance of bond index tracking funds is assessed
9. Distinguish between a duration-weighted index tracking strategy and a beta-weighted index tracking strategy
10. Construct a synthetic fund which tracks benchmark index with a given duration using:
    - Bond futures
    - Interest swaps

And explain the limitations of such strategies.

5.2. Risk Management

1. Calculate the simple value at risk (VaR) on a bond portfolio, given the return volatilities on the constituent assets and a Z score
2. Calculate the diversified value at risk (VaR) on a bond portfolio, given the return volatilities on the individual assets, their correlations and a Z score
3. Apply the square root of time rule to calculate the VAR on a position over a given period, given its daily VaR
4. Identify some of the limitations of parametric VaR calculations as a methodology for estimating risk, in particular credit risk
5. Describe in outline the following alternative techniques for estimating the VaR on a portfolio:

- Historic simulation
- Monte Carlo simulation
- Stress testing

6. Outline the procedure for calculating market risk using internal models permitted under the *1996 Amendment* to the Basle Accord