ACI Dealing Certificate

a study guide

Acknowledgements

ACI Singapore – The Financial Markets Association would like to acknowledge the following for their significant and valuable contributions to the preparation of this Study Guide:

1. Mr Phoon Chiong Tuck, principal author of the Study Guide, who put together this Guide.
2. The ACI Board of Education for their guidance and valuable inputs to the preparation of the Guide.
3. The ACI Committee for Professionalism for their valuable inputs, particularly with respect to the section on the ACI Model Code.
4. The ACI Singapore Education Committee, comprising Mr Ng Kwan Meng, Mr Linus Chua, Ms Kwan Li Ling and Mr Jacob Chee for their guidance and support throughout the entire project, and in particular during the review phase.

ACI Dealing Certificate – A Study Guide
First published in 2010 by ACI Singapore – The Financial Markets Association
www.acisin.com

ISBN: 978-981-08-5788-2

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1. Introduction

The development of global banking and finance since the 1950s, when growth resumed in the post-war reconstruction period, has been one of increasing breadth and depth. The 1950s saw the establishment of the Eurodollar market, which was a market that was largely outside of national boundaries.

The year 1971 saw the collapse of fixed exchange rates. Floating exchange rates set by the market replaced this system, obviating the need for government capital controls. Consequently, the removal of capital restrictions on capital flows between countries led to the global financial system that we have today. This system, based on markets determining prices and the flow of capital around the world, has drawn more participants – both users and providers into the marketplace.

The ideological swing towards deregulation in many countries in the 1980s and 1990s also aided the globalisation of markets. There were radical changes in Europe with massive deregulation in the UK and other European countries. More importantly, the introduction of the euro promised a unified single financial market. The integration of financial markets continued into the 2000s. Boundaries across asset classes and countries were becoming increasingly blurred, and innovation was speeding the pace of change.

In the aftermath of the Global Financial Crisis of 2008, there are calls for increased regulation. While changes are to be expected and the more egregious forms of innovation will be curtailed, the financial markets will continue to grow as domestic financial markets of emerging countries develop and integrate into the global system.

2. The ACI

The ACI – Past and Present

The ACI has been in existence since the early beginnings of the modern financial markets. Established in Paris in 1955 as the 'Forex Club – ACI', it now boasts of 13,000 members in 68 countries, 63 of which are national associations affiliated with the ACI. In 1995, the 'Forex Club – ACI' was renamed 'ACI – the Financial Markets Association' to better reflect the broadening focus of its membership.

The ACI provides a standard to the International Financial markets in terms of:

- Maintaining a professional level of competence and ethical standards;
- Market liquidity provided by their traders;
- Giving advice and offering arbitration services in professional disagreements or disputes;
- Offering a third party certification (ACI Dealing Certificate, ACI Operations Certificate, ACI Diploma); and
- Personal and institutional networking.

The ACI Board of Education

ACI's Education mission is to promote the global standards of professionalism, competence and ethics in treasury activities and products in financial markets through ongoing educational programmes and examinations.

3. The ACI Suite of Certifications

The ACI Suite of Exams and Certifications

The ACI provides a suite of specialised examinations for front, middle and back-office staff, targeting areas such as, Foreign Exchange and Money Markets, Derivatives, Repos and Risk Management, among others. The suite comprises:

- The ACI Dealing Certificate
- The ACI Operations Certificate
- The ACI Diploma

This study guide will look specifically at the ACI Dealing Certificate.

4. The Dealing Certificate

The ACI Dealing Certificate

The ACI Dealing Certificate is a foundation programme that allows candidates to acquire a working knowledge of the structure and operation of the major foreign exchange and money markets, including the ability to apply the fundamental mathematics used in these markets. The course covers the core products (cash, forwards and derivatives), and the basic skills required for competent participation, including the ability to apply the fundamental mathematics used in those markets. Candidates will also learn to apply the ACI Model Code to market situations.

Dealing Certificate Topics

The ACI Dealing Certificate is divided into 7 topics:

1) Basic Interest Rate Calculations
Starting from the basic concepts of present value and future value, the topic covers calculation of interest rates and yields, and explains how these can be used to derive payments as well as evaluate alternative investment and funding opportunities. Interest rate calculations are also extended to derive forward-forward rates. Also introduced in this topic are: market practices, including the use of market conventions to determine maturity dates, yield curves and what they indicate.

2) Cash Money Markets
This topic details the various types of money market instruments. The various instruments have specific conventions that cover their quotations, value dates and maturities, and the calculation of transaction proceeds, are all covered in Topic 2.

3) Foreign Exchange
The foreign exchange (FX) market is the largest of the financial markets covered in the course. In Topic 3, candidates will learn about the structure of the FX market and the various participants in this market. The topic also covers the terminology and the mechanics of dealing in the spot, forward FX and FX swaps products. The application of these FX transactions to position, hedge or arbitrage is also discussed. The operation of the metals market is also covered in this topic.

4) Money Market Derivatives
Two widely used instruments to manage interest rate risk are forward rate agreements (FRAs) and short-term interest rate (STIR) futures, The pricing and use of these money market derivatives is covered in Topic 4.

5) Options
This topic describes the basic types of options, the terminology and the determinants of the value of options, and how it is they are linked to the price of the underlying asset. There is also a discussion of hedging techniques and option strategies used to position for market movements.

6) Principles of Risk
Topic 6 identifies and describes the principal forms of risks that a financial institution encounters in its business. It also explains the policies and procedures that can be used to mitigate these risks.

7) The Model Code
The ACI Model Code is a distillation of the recommended best practices in the foreign exchange and money markets. The Model Code guides outlines the conduct that market participants should adopt when operating in the financial market place.

Candidates are expected to be familiar with the Model Code as it is an important aspect of participating in the market, and significant emphasis is placed on this topic in the Dealing Certificate exam.

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5. The Dealing Certificate Examination

Examination Procedure

The examination consists of a single paper (Duration: 2 hours) divided into:

Basic Interest Rate Calculations	5 questions	5 marks
Cash Money Market	5 questions	5 marks
Cash Money Market Calculations	5 questions	5 marks
Foreign Exchange	10 questions	10 marks
Foreign Exchange Calculations	5 questions	5 marks
Money Market Derivatives	10 questions	10 marks
Options	5 questions	5 marks
Principles of Risk	5 questions	5 marks
The ACI Model Code	30 questions	30 marks
	Total	**80 marks**

Pass Criteria

There are two criteria to meet in order to obtain a pass grade in the exam:

- Minimum score of 50% for the Model Code and 40% for each of the other topic baskets; and
- Minimum overall score of 60% (48 marks) assuming the minimum score criteria of the individual topic baskets are met.

6. The Study Guide

The Use of the Study Guide

The study guide is organised into seven topics, following the structure of the Dealing Certificate syllabus. The 'markets' topics (i.e. Topics 1 to 5) should be studied in sequence.

Topic 6 (Principles of Risk) and Topic 7 (The Model Code) can be studied as stand-alone units should the candidate be already familiar with the markets. Sample questions similar to what the candidate may encounter in the Dealing Certificate exam are included with the topics to familiarise candidates with the examination format.

TOPIC 1

Basic Interest Rate Calculations

1.1 Time Value of Money

1.2 Simple Interest and Compound Interest

1.3 Day Count Conventions and Conversions

1.4 Interest Rate and Discount Instruments

1.5 Country Day Count Conventions

1.6 Day and Date Conventions

1.7 Benchmarks – LIBOR, EURIBOR and EONIA

1.8 The Yield Curve

1.9 Interpolated Interest Rates for Broken Dates

1.10 Cash and Forward Rates

1.1 Time Value of Money

One of the functions of the financial system is to allow the transfer of economic resources across time. In the modern financial system, money represents a claim on economic resources. The financial system also serves to move resources that are not consumed (i.e. saved) from savers to investors, who then invest in productive activities that allow for consumption in the future.

A basic assumption in economics is that consumption today is preferred over consumption that is deferred. Therefore, savers will demand a return for the use of their savings. This price is the **interest rate**.

That money has a time value is a fundamental economic principle. The calculations using interest rate to relate **present value** to the **future value** of money underlie the pricing of interest rate instruments.

Present Value and Future Value

Assume that you have $100, which you deposit at 10% per annum for a year. In one year's time, you will receive:

$$\$100 \times (1 + 0.10) = \$110$$

In other words, the **future value** (FV) of $100 in one year's time is $110. Conversely, we could also say that the **present value** (PV) of $110 received in one year's time is $100.

We could extend this to further periods. The future value will grow to:

After year 2: $\$110 \times (1 + 0.10) = \$121$

After year 3: $\$121 \times (1 + 0.10) = \$133.10$

After year n: $\$100 \times (1 + 0.10)^n$

In general, the FV of an amount C in n years' time, given an interest rate of i, can be expressed as:

$$FV = C \times (1 + i)^n \qquad \text{Equation 1}$$

By re-arranging the above equation, the PV of any future cash flow (FV) can be written as:

$$PV = FV \times \frac{1}{(1 + i)^n} \qquad \text{Equation 2}$$

Again, rearranging the above equation will allow us to solve for the interest rate that is applied when we are given both present value and future value:

$$y = \left(\frac{FV}{PV}\right)^{\frac{1}{n}} - 1 \qquad \text{Equation 3}$$

The interest rate y in Equation 3 is often called the yield. In the next section, we will see that when a compound approach is taken in calculating future value as in Equation 3, it is also known as **effective yield**.

Given that money market instruments are generally less than a year in maturity, the term **n** is often a fraction and not an integer. It is more straightforward then to express **n** in terms of days in the interest period:

$$n = \frac{dtm}{dpy}$$

where **dtm** is the days to maturity, and **dpy** is the days in a year.

The equation for **effective yield (y)** can then be expressed as:

Equation 4

$$y = \left(\frac{FV}{PV}\right)^{\frac{dpy}{dtm}} - 1$$

As we will see later on, different markets adopt different conventions when calculating interest. Effective yield allows a common formulation for comparing yields across these markets.

Question 1

If you received USD10,000,000 at the end of 5 years, after having invested a sum of money at 3% per annum, what was your original investment?

A. USD8,500,000
B. USD8,626,087.84
C. USD9,327,873.23
D. None of the above

ANSWER: B

The answer is obtained by calculating the present value of USD10,000,000. This is given by the numbers:

$$PV = FV \times \frac{1}{(1+i)^n} = \frac{10{,}000{,}000}{(1+0.03)^5} = USD8{,}626{,}087.84$$

Question 2

What is the future value of USD10,000,000 invested at 2.7% per annum at the end of 10 years?

A. USD13,052,822.61
B. USD12,389,022.37
C. USD10,555,898
D. None of the above

ANSWER: A

The future value is given by the formula:

$$FV = PV \times (1+i)^n = USD10{,}000{,}000 \times (1+0.027)^{10}$$
$$= USD13{,}052{,}822.61$$

Question 3

After investing USD10,000,000 for half a year, you receive USD10,250,000. What is the effective yield of your investment? (Ignore day count conventions)

A. 2.50%
B. 5.00%
C. 5.06%
D. 6.00%

ANSWER: C

Using the formula for effective yield, we obtain:

$$y = \left(\frac{FV}{PV}\right)^{\frac{dpy}{dtm}} - 1$$

$$= \left(\frac{10{,}250{,}000}{10{,}000{,}000}\right)^{2} - 1 = 5.06\%$$

Note: Take into account day count conventions in your calculation if you are given the information.

The concepts of time value, present value and future value are the building blocks of all money market and bond markets calculations. However, you will find that historic practice in financial market has given rise to conventions that we need to take into account of when applying the equations to actual market situations.

One of these is the use of the simple interest approach in calculating time value, which we will explore in Section 1.2. The other conventions to take note of are:

- Day count conventions; and
- Situations where the interest rate quoted is a discount rate, and not a yield.

1.2 Simple Interest and Compound Interest

Simple Interest

Looking at how we arrived at Equation 1 (Section 1.1), the future value was calculated by multiplying or **compounding** present value over multiple periods. Often, money market instruments are less than a year in maturity. Rather than compounding, a much simpler way of calculating future value was adopted in the early days of finance. This practice continues to be used in the present day. This form of calculation is known as **simple interest**.

In the simple interest approach, future value is simply taken as:

$$\text{Future Value} = \text{Present Value} + \text{Interest Amount} \qquad \textbf{Equation 5}$$

And interest is calculated as:

$$\text{Interest Amount} = \text{Present Value} \times i \times \frac{\text{dtm}}{\text{dpy}} \qquad \textbf{Equation 6}$$

By combining Equations 4 and 5 and rearranging, we arrive at:

$$\text{True Yield} = \left(\frac{\text{Future Value}}{\text{Present Value}} - 1\right) \times \frac{\text{dpy}}{\text{dtm}} \qquad \textbf{Equation 7}$$

Equation 7 is the simple interest rate version of Equation 4. To distinguish this from the effective yield from Equation 4, we call this **true yield**.
For the same values of FV and PV,

Effective Yield > True Yield (for periods below 1 year)
Effective Yield = True Yield (when period is exactly 1 year)
Effective Yield < True Yield (for periods above one year)

From Equation 7, we can obtain an expression for present value, which can be applied to the pricing of money market instruments:

$$\text{Present Value} = \text{Future Value} \times \frac{1}{\left(1 + \text{yield} \times \frac{\text{dtm}}{\text{dpy}}\right)} \qquad \textbf{Equation 8}$$

1.3 Day Count Conventions and Conversions

Day Count Conventions

As a general rule, in most money markets, the calculation of interest takes into account of the exact number of days to maturity. As such:

$$\textbf{Interest} = \textbf{i} \times \frac{\textbf{days}}{\textbf{days in a year}}$$

However, arising from conventions adopted from traditional practice, there are variations in the number of days assumed to be in a year. For example, in USD and Euro instruments, it is assumed that there are 360 days in a year. This convention is known as **ACT/360**.

In GBP instruments, a year is assumed to have 365 days (even in a leap year) and the convention is indicated as **ACT/365**. Other markets that follow this convention include the domestic markets of:

JPY, HKD, SGD, MYR, TWD, THB, ZAR

This leads to some differences when comparing interest rates around the world. A one-year USD deposit at 10% will then pay slightly more than 10% interest:

$$10\% \times \frac{365}{360} = 10.139\% \quad \text{(ACT/360 convention)}$$

A similar deposit in GBP will pay:

$$10\% \times \frac{365}{365} = 10\%$$

Or in a leap year:

$$10\% \times \frac{366}{365} = 10.027\% \quad \text{(ACT/365 convention)}$$

Day Count Conventions (Eurobonds)

Another day count convention commonly used in the markets is the 30E/360 (i.e. 360/360) convention. In this convention, each month is seen to have 30 days in calculating the interest that is accrued. Take as an example, a bond with $1 mm face value that pays 6% each year on 31 December. The accrued interest on 18 April is:

$$\text{Days accrued} = 3 \times 30 \text{ (for Jan, Feb, Mar)} + 18 = 108 \text{ days}$$

$$\text{Interest Amount} = \$1 \text{ mm} \times 6\% \times \frac{108}{360} = \$18{,}000$$

Question 4

After investing USD10,000,000 for half a year, you receive USD10,250,000. What is the *true yield* of your investment? (Assume that there were 182 days in the half year based on the ACT/365 convention)

A. 2.50%
B. 5.00%
C. 5.01%
D. 5.06%

ANSWER: C

This is given by the true yield formula:

$$\text{True Yield} = \left(\frac{\text{Future Value}}{\text{Present Value}} - 1\right) \times \frac{\text{dpy}}{\text{dtm}}$$

$$= \left(\frac{10{,}250{,}000}{10{,}000{,}000} - 1\right) \times \frac{365}{182}$$

$$= 5.01\%$$

Note: The context is identical to the previous question on effective yield. The answer turns out slightly different, illustrating the difference between effective and true yield calculations.

Question 5

In the Euromarkets, which of the following yields represent the best return?

A. Annual bond yield of 2.5%
B. Annual money yield of 2.5%
C. Semi-annual money market yield of 2.5%
D. Semi-annual bond yield of 2.5%

ANSWER: C

The more frequently interest is paid, the better the rate of return, other things being equal. Therefore, the semi-annual yield is better than the annual yield. Money market yield (which is based on a ACT/360) gives an additional 5 days' interest a year compared to bonds (which is based on 30E/360). So between the two, money market yield gives a better return.

Day Count Conversions

To convert an interest rate from an ACT/365 to ACT/360 basis or vice versa, use the following formulae:

$$I_{ACT/365} = I_{ACT/360} \times \frac{365}{360} \quad \text{and}$$

$$I_{ACT/360} = I_{ACT/365} \times \frac{360}{365}$$

Example: If $I_{ACT/360} = 6\%$, what is the equivalent $I_{ACT/365}$ rate?
Given that the interest amounts are same, then:

$$\left(1 + I_{ACT/365} \times \frac{\text{actual}}{365}\right) = \left(1 + I_{ACT/365} \times \frac{\text{actual}}{360}\right)$$

Simplifying, we have:

$$I_{ACT/365} = I_{ACT/360} \times \frac{365}{360}$$

Therefore, we have:

$$6\% \times \frac{365}{360} = 6.00833\%$$

In the case of 30E/360, conversion can be obtained by first noting the 'days' that would have accrued using the 30E/360 convention, and using that in place of the actual days. So that we obtain the equations:

$$\left(1 + I_{ACT/365} \times \frac{\text{actual}}{365}\right) = \left(1 + I_{30E/360} \times \frac{\text{'days'}}{360}\right) \quad \text{or}$$

$$\left(1 + I_{ACT/360} \times \frac{\text{actual}}{360}\right) = \left(1 + I_{30E/360} \times \frac{\text{'days'}}{360}\right)$$

Use the equations to solve for the required version of the I term.

Interest Frequency

We will see that the interest on many money market instruments are paid at maturity, or once a year if maturity goes beyond one year. The practice in bond markets is to pay interest at regular intervals, usually semi-annually.

As interest received earlier can be compounded to earn interest on interest, the impact of a greater frequency in interest payments is to make the annual equivalent yield higher. To calculate the annual equivalent yield on an instrument paying interest m times, we use the formula below:

$$\textbf{Annual Equivalent Yield} = \left(1 + \frac{y_m}{m}\right)^m - 1$$

where **m** is the frequency at which interest is paid a year, and
y_m the interest rate with interest frequency **m**.

Example: A bond pays interest of 4% semi-annually. What is the equivalent annual yield?

$$\text{Annual Equivalent Yield} = \left(1 + \frac{0.04}{2}\right)^2 - 1 = 4.04\%$$

Question 6

A semi-annual USD yield is 1.5%. What is the effective annual yield?

A. 1.4533%
B. 1.4944%
C. 1.50%
D. 1.5056%

ANSWER: D

The annual effective yield can be derived from the formula. A quicker way is to note that the effective yield will be higher than the semi-annual yield leading directly to the correct answer.

Question 7

An annual USD yield is 1.5%. What is the semi-annual yield?

A. 1.4533%
B. 1.4944%
C. 1.50%
D. 1.5056%

ANSWER: B

Use the formula that converts an annual yield to a semi-annual yield. The semi-annual yield should be lower than the annual yield.

1.4 Interest Rate and Discount Instruments

Yield vs. Discount Rate

Money market instruments can be classified as either interest bearing ('interest') or 'discount' instruments. These terms come from the way the interest element is paid on the instruments. In the case of **'interest' instruments**, interest is calculated on the face value of the instrument. At maturity, the face value and the interest element is added together and paid. The future value of the instrument at maturity is therefore:

Future Value of Interest Instrument = Face Value + Interest

Examples of 'interest' instruments are fixed deposits and commercial paper instruments.

In the case of a **'discount' instrument**, only the face value is paid at maturity. Therefore:

Future Value of Discount Instrument = Face Value

The interest element of such instruments is taken as a discount to the face value of the instrument at the time the instrument is purchased i.e.

Price of Discount Instrument = Face Value – Discount Amount

Calculating the Discount Amount

In calculating the discount amount, it is important to note whether the quotation convention in the market is a **yield** or a **discount rate**. For example, US and UK quote commercial paper using a discount rate, while the euromarket uses a yield basis. This is important because the method of calculating the discount amount is different.

Calculating the Discount Amount for Yield Quotation

When the quotation is in the form of a yield, the discount amount is:

$$\text{Discount Amount} = \text{Face Value} \times \left[1 - \frac{1}{\left(1 + y \times \frac{dtm}{dpy}\right)}\right]$$

Eurozone uses yield quotation. We have to take into account the specific day count conventions when applying the formula. Eurozone adopts a ACT/360 convention whereas some countries in Asia, such as Singapore and HK adopt a ACT/365 convention.

Calculating the Discount Amount for Discount Rate Quotation

The US and UK markets quotations are in the form of a discount rate. The discount amount is calculated as:

$$\text{Discount Amount} = \text{Face Value} \times d \times \frac{dtm}{dpy} \quad \text{(used in US and UK)}$$

Where **d** is the discount rate, **dtm** is the days to maturity, and **dpy** is the days in a year.

1.5 Country Day Count Conventions

Summary of Country Money Market Conventions

The table below gives a summary of the conventions used in various money markets. Note that the conventions used for bond markets may be different from money market conventions, even within the same country.

Country	Instrument	Day/Year Basis	Yield or Discount Rate
US	Deposit/CD	ACT/360	Y
	BA/$CP/T-Bill	ACT/360	D
Euroland	Money Market	ACT/360	Y
UK	Deposit/CD/£CP	ACT/365	Y
	BA/T-Bill	ACT/365	D
Japan	Money Market	ACT/365	Y
Switzerland	Money Market	ACT/360	Y
Euromarket (non-domestic)	Money Market	ACT/360	Y
	Exceptions: GBP, SGD, HKD, MYD, TWD, THB, ZAR	ACT/365	Y

Question 8

What is the day count convention used in the USD deposit market?

A. ACT/360
B. ACT/365
C. 30E/360
D. ACT/ACT

ANSWER: A

ACT/360

Question 9

What is the day count convention used in the GBP money market?

A. ACT/360
B. ACT/365
C. 30E/360
D. ACT/ACT

ANSWER: B

ACT/365

1.6 Day and Date Conventions

Spot Date

In the money and FX markets, deals are commonly dealt for **spot date** settlement. Spot deals settle two business days from the dealing date. Deals can also be dealt to settle earlier as **same-day** or **'tom'** (next business day) settlement.

Standard Period Maturity Dates

Deals can also be made to settle further in the future, such as 1 month, 2 months, 6 months, etc. The standard maturity dates for these longer periods are referenced to the spot date. For example, the 3-month maturity date for a deal done on Monday, 4 May (with the spot date as Wednesday, 6 May) is Thursday, 6 August. The maturity date for a 6-month deal is Friday, 6 November.

Where the standard maturity date falls on a holiday, the maturity is adjusted by moving it to the next business date. There are two **exceptions** to this rule:

1. Calendar Month Standard Periods:
No standard period maturity date is quoted beyond its standard maturity month. An example is a one-month maturity date dealt on spot date 30 April ending in May. If 31 May is a Sunday, then rather than adjusting the maturity date forward to 1 June, the adjustment is made back to the last business day in May (Friday, 29 May) to keep the maturity date in May.

2. Month End/End Rule:
If the last business day of the current month is not the last calendar date (due to a weekend or holiday), for standard period maturity date calculation purposes, this date is taken as though it were the month end, and all standard period maturity dates in the months ahead will be the last business day of those months. Assuming that Friday, 29 May was the spot date, then standard forward period dates for this spot date will be: Tuesday, 30 June (one month), Friday, 31 July (two months), Monday, 31 August (3 months), Monday, 30 November (6 months), and so on.

Question 10

It is Thursday, 28 December 20XX. You execute a one-month USD deposit placement. When will the deposit mature?

A. 29 January
B. 31 January
C. 1 February
D. 2 February

ANSWER: D

The spot date for the deal is Tuesday, 2 January, since 1 January is a holiday. One month from this spot date is 2 February, which is the maturity date.

Question 11

It is Wednesday, 27 December 20XX. You place a one-month deposit. When is the maturity date?

A. Monday, 29 January
B. Tuesday, 30 January
C. Wednesday, 31 January
D. Thursday, 1 February

ANSWER: C

The spot date is Friday, 29 December, which is also the last business day of the month since 31 December is a Sunday. Applying the month end/end rule, the maturity date will be the last business day of the following month, which is 31 January.

1.7 Benchmarks – LIBOR, EURIBOR and EONIA

Benchmarks

There are certain interest rate benchmarks that underpin a broad swathe of financial transactions across the financial markets and the wider economy. From wholesale transactions (such as swaps) to retail contracts (such as a house mortgage), reference is often made to these benchmarks. These benchmarks are determined or **fixed** daily and published through market data services, such Reuters or Bloomberg. The more widely used benchmarks in money markets a are: LIBOR, EURIBOR and EONIA

LIBOR

London Interbank Offered Rate (LIBOR) is the money market benchmark interest rate. On each London business day, LIBOR is fixed for 10 currencies (AUD, CAD, CHF, DKK, EUR, GBP, JPY,NZD, SEK, USD). While rates are traded through the business day, at 11a.m. (London time) each day, the British Bankers Association (BBA) takes a poll of a panel of references banks as to where LIBOR is trading for various maturities (1 week up to 12 months). The number of reference banks (contributors) in the panels as well as the rules by which the average rate is calculated (trimming methodology) is currency dependent.

Number of contributors	Trimming Methodology	Number of contributors on which LIBOR is based on
18	top 4 highest rates tail 4 lowest rates	10
17	top 4 highest rates tail 4 lowest rates	9
16	top 4 highest rates tail 4 lowest rates	8
15	top 4 highest rates tail 4 lowest rates	7
14	top 3 highest rates tail 3 lowest rates	8
13	top 3 highest rates tail 3 lowest rates	7
12	top 3 highest rates tail 3 lowest rates	6
11	top 3 highest rates tail 3 lowest rates	5
10	top 2 highest rates tail 2 lowest rates	6
9	top 2 highest rates tail 2 lowest rates	5
8	top 2 highest rates tail 2 lowest rates	4
7	top highest rate tail lowest rate	5

The average is commercially rounded and published as a 5 decimal fixing rate as the BBA LIBOR. While BBA LIBOR is published for 10 currencies, it assumes special importance for USD and GBP because of its widespread use as reference in setting rates in USD and GBP transactions.

EURIBOR

The European Banking Federation (EBF) fixes a similar daily benchmark for the EUR using a broad panel of banks. This benchmark is known as the **European Interbank Offered Rate** (EURIBOR). In recent years EURIBOR has supplanted the BBA Euro fixing as the benchmark reference rate for EUR contracts.

EONIA

The other benchmark interest rate for EUR transactions is the **Euro Overnight Index Average** (EONIA). This is a weighted average of all overnight unsecured lending transactions in the EUR interbank market done by the same panel of EURIBOR contributing banks. Relevant overnight transactions are reported to the **Real Time Gross Settlement** (RTGS) before 6 p.m. CET. The European Central Bank (ECB) uses the RTGS data to compute the EONIA rate.

Other Benchmarks

Dealing centres in other parts of the world have also established their own benchmarks. These take into account differences in local practices in the dealing of local currencies e.g., Tokyo-based TIBOR for JPY, or Singapore SIBOR for SGD transactions.

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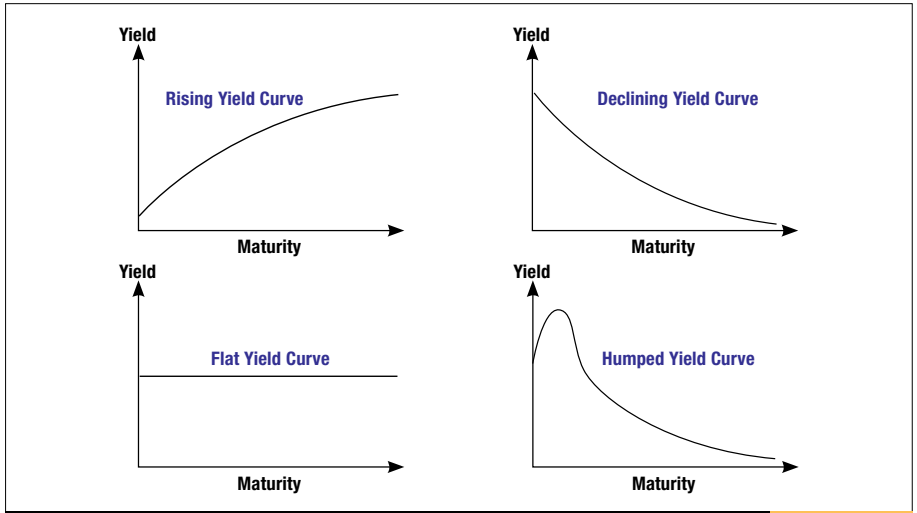
1.8 The Yield Curve

The Yield Curve

The level of interest rates or yields varies with the maturity term. This relationship between interest rate levels and maturity term is **the term structure of interest rates**.

This can be plotted in a graph showing yield against maturity. The resulting graph is called the **yield curve**.

The most commonly observed shape of the yield curve is a positively sloping line, with yields rising with increasing maturity. This is known as a positive or rising yield curve. The shape of the yield curve may be different at different times resulting from different conditions in the market at that point of time. Other yield curve shapes observed include declining, flat and even humped yield curve shapes. (See Figure 1.8.1)



Types of Yield Curves **Fig. 1.8.1**

Some Explanations of Yield Curve Shapes

Expectations

The level of interest rates are determined by expectations of what they will be in the future. If interest rates are expected to be higher in the future, then longer term interest rates will be higher than shorter dated ones. For example, if the level of 3 months' rates is expected to rise over the next 3 months, then this will be reflected in a higher 6-months' rate today since a 6-month deposit will become a 3-month deposit in three months time. Conversely, if rates are expected top fall, the yield curve will exhibit a declining shape.

Liquidity

Market participants demand a higher rate for less liquid investments, i.e. a **liquidity premium**. Therefore, rates for longer maturities will be higher than shorter maturities. This will explain the more frequent observation of a rising yield curve.

Market Segmentation

According to this explanation, the level of interest rate at any point on the yield curve reflects the balance of demand and supply of funds. There are certain providers of funds or borrowers of funds, who for various reasons prefer to lend or borrow at particular parts of the yield curve. For example, insurance companies tend to be providers of funds at long maturities to create assets to match their long term liabilities. Money market funds will only be providers of funds at the short end of the curve. Similarly, different types of borrowers will have different maturity preferences.

The market segmentation explanation says that the different types of lenders and borrowers can be segmented according to their preferences for different maturities along the yield curve. The relative balance of supply and demand stemming from these market segments accounts for the variation in interest rate levels across maturities.

While market segmentation may explain variations over a longer (e.g., 10-plus year) maturity range, it is less likely to explain variation in such a short range of maturity as in the money market (instrument maturities within 2 years).

The idea of relative balance of supply and demand of funds can be applied to situations where there is a particularly strong demand for funds at a point in time (say at year end). Rates at that part of the yield curve coinciding with that point in time will tend to be higher. This may explain the hump sometimes seen in yield curves.

Question 12

What do you call a yield curve where short-term rates are higher than longer-term rates?

A. Positive yield curve
B. Inverted yield curve
C. Flat yield curve
D. Humped yield curve

ANSWER: B

Inverted yield curve

Question 13

There is the expectation that US Federal Reserve will raise interest rates in the immediate future. What shape of yield curve would you expect to see?

A. Positive yield curve
B. Inverted yield curve
C. Flat yield curve
D. Humped yield curve

ANSWER: A

Based on the expectations explanation of yield curve shapes, we would expect to see a positive yield curve.

1.9 Interpolated Interest Rates for Broken Dates

Interpolated Interest Rates for Broken Dates

The interest rates that are commonly traded and quoted in the market are for standard periods i.e. 1 month, 2 months, 3 months, 6 months, etc. When a quotation for a term that is irregular or "broken" (e.g., for a 4-month term), then a dealer has to make an estimate of the appropriate level of interest rate for the "broken" date.

Straight Line Interpolation Method

One method of estimating the level of interest rates for broken dates is **straight line interpolation**. In this method, it is assumed that the yield curve between two regular dates is a smooth, straight line, and that the appropriate rate for the broken date can be interpolated:

$$y_{interpolated} = \frac{dpy}{dpi} \times y_2 + \left(1 - \frac{dpy}{dpi}\right) \times y_1$$

where: $y_{interpolated}$ is the interpolated rate
y_1 is the yield at the later regular date
y_2 is the yield at the earlier regular date
dpi is the number of days in the time interval between the two regular dates
dpy is number of days from the earlier regular date to the interpolated date

Example: If the 3-month rate is 2.5% and the 6-month rate is 3%, what is the interpolated 4-month rate on a 30E/360 basis?

$$\textbf{4-month rate} = \frac{30}{90} \text{ days} \times 2.5\% + \frac{60}{90} \text{ days} \times 3\% = 2.833\%$$

Question 14

If a 90-day US interest rate is 0.25% and a 180-day US interest rate is 1.30%, what is the 130-day US interest rate using straight line interpolation?

A. 0.25%
B. 0.4667%
C. 0.7167%
D. 1.2667%

ANSWER: C

The difference between the two interest rates is 1.05% for an interval of 90 days (180 – 90 days). This equates to 0.011666 a day. The additional 40 days (130 – 90 days) will account for an addition to the 90-day interest rate of 0.4667%, leading to an interpolated rate of 0.7167%.

1.10 Cash and Forward Rates

Cash Rates and Forward Rates

A common interest rate calculation encountered in **forward rate agreements** (FRAs) is the implied **forward-forward** (FF) rates, which is derived from term deposit rates. FF rates are interest rates on deposits that will start some point in the future. An example is a 6-month deposit that will begin only 3 months later (indicated as 3 × 9 FRA).

Suppose that we know the 3-month deposit and 9-month deposit rates prevailing today, then the implied 3 × 9 FF rate is given by:

$$FF_{3\times9} = \left(\frac{1 + \frac{r_2 \times t_2}{dpy}}{1 + \frac{r_1 \times t_1}{dpy}} - 1 \right) \times \left(\frac{dpy}{t_2 - t_1} \right)$$

where: r_2 is the interest rate on a deposit maturing in t_2 days (far date)

r_1 is the interest rate on a deposit maturing in t_1 days (near day)

Forward-forward rates and FRAs will be further explored in Topic 4, Money Market Derivatives.

Question 15

Calculate the 3-month forward-forward rate given the following:

3-month USD LIBOR 0.75% (91 days)
6-month USD LIBOR 0.75% (182 days)

A. 0.60%
B. 0.7333%
C. 0.7486%
D. 0.7833%

ANSWER: C

Using the formula for forward-forward rate, we have:

$$FF_{3\times9} = \left(\frac{1 + \frac{0.0075 \times 182}{360}}{1 + \frac{0.0075 \times 91}{360}} - 1 \right) \times \left(\frac{360}{182 - 91} \right)$$

$$= 0.7486\%$$

TOPIC 2

Cash Money Markets

Cash Money Markets

The money market refers to the markets where all short-term financial instruments that relate to interest rates are traded. The instruments are essentially those used by one party to borrow, and another party to lend. The main instruments include:

Instruments	Main Issuers/Borrowers
Treasury bills	Government treasury
Interbank deposits	Banks
Certificates of Deposits (CDs)	Banks
Commercial Papers (CPs)	Corporations
Bills of exchange	Corporations for trade purposes

These instruments represent an obligation by the borrower to repay principal and interest in a timely manner at maturity.

Repurchase agreements are a form of borrowing based on the use of another financial instrument (such as bonds) as collateral.

The word 'cash' is used in conjunction with the name of the instruments in order to denote them as base instruments used for the financing of the borrower's activities. Therefore, these instruments usually involve the full movement of cash as payment for them. This is in contrast to derivative instruments such as futures and FRAs, which are more often used to hedge interest rate movements than for financing. Money market derivatives is covered in Topic 4.

The importance of the money market is not to be underestimated. If money in the wake of heavy redemptions by investors is the lifeblood of the modern economy, then the money market represents the arteries through which money flows. The smooth functioning of the money markets is vital to the proper functioning of a country's economy. For example, the CP market is used by many large companies for the financing of their working capital. A breakdown of the US CP market occurred when money market funds had to liquidate their CP holdings following the Lehman collapse in September 2008. The seriousness of the situation and the implications for the rest of the economy necessitated the intervention of the US government.

2.2 Treasury Bills

Treasury Bills

Treasury bills are short-term bills issued by the government with maturity of up to one year. They usually represent the most marketable (i.e. the form most easily liquidated into cash) of all the instruments available in the money market. As the government is the borrower and the instrument is short-term in maturity, treasury bills are considered almost risk-free and hence returns are generally lower than other investments.

Issuance and Form

Most governments have a regular primary issuance programme through which treasury bills of varying maturities are issued. In the US, bills in varying maturities such as 28-day (4 weeks), 91-day, 182-day or 364-day treasury bills are auctioned off in an open tender. The majority of treasury bills are scripless and ownership is recorded and transferred via a registered book system.

Quotation

Treasury bills are discount instruments. That is, they are non-interest bearing, issued at a discount from their face value, and redeemed at face value. The investor earns a return equal to the difference between the face value and the discounted price.

Quotation for treasury bills are in the form of an interest rate to 2 decimal places. One important point to note is whether the rate quoted is a **discount rate** (as in the US) or a **market yield** (as in Euroland). A summary of money market conventions is given in Section 1.5.

Treasury Bills Pricing – Yield Quotation

Recall from Equation 8 in Topic 1 that the price of a money market instrument can be generally written as:

$$\text{Price} = \text{Future Value} \times \frac{1}{\left(1 + \text{market yield} \times \frac{\text{dtm}}{\text{dpy}}\right)}$$

In treasury bills, the future value is also the face value of the bill. Again, we have to take into account the specific day count conventions when applying the formula.

Euroland adopts a ACT/360 convention, whereas some countries in Asia, such as Singapore and HK adopt a ACT/365 convention.

Example: A French T-bill with a face value of EUR10 mm matures in 67 days. It is quoted at 2.74%. What is the price?

$$\text{EUR10 mm} \times \frac{1}{\left(1 + 0.0274 \times \frac{67}{360}\right)} = \text{EUR9,949,264.28}$$

Treasury Bills Pricing – Discount Rate Quotation

In the US and UK markets, quotations for bills are in the form of a discount rate. Here, the discount rate is used to calculate the discount amount. This is then applied to the face value to obtain the price i.e.:

$$\text{Price} = \text{Face Value} - \text{Discount Amount}$$

$$= F - \left(F \times d \times \frac{dtm}{dpy}\right)$$

$$= F \times \left(1 - d \times \frac{dtm}{dpy}\right) \quad \text{(US and UK conventions)}$$

where: **F** is the face value, **d** is the discount rate
dtm is the days to maturity, and
dpy is the days in a year (in the day count convention)

Example: A US T-bill with a face value of USD10 mm matures in 67 days It is quoted at 2.74%. What is the price given that the US adopts a ACT/360 convention?

$$\text{USD10 mm} \times \left(1 - 0.0274 \times \frac{67}{360}\right) = \text{USD9,949,005.55}$$

By equating the two pricing formulae, the relationship between these yields and discount rates is given by:

$$y = \left(\frac{d}{1 - d \times \frac{dtm}{dpy}}\right)$$

Question 1

You are looking to buy USD1 mm of US T-bills. A dealer gives the quote for 90-day T-bills as 0.50 – 0.55%. What would pay for USD1 mm face value of the T-bill?

A. USD898,997.32
B. USD998,767.12
C. USD1,000,000.00
D. USD1,001,232.88

ANSWER: B

First, determine the rate you deal at. By buying T-bills, you are a lender of money. Here, you are a price-taker and you buy the T-bill at the lower rate quoted by the dealer i.e. 0.50%. The day count convention in the US T-bill market is ACT/360 and the rate quoted is a discount rate. Therefore, the discount amount is:

$$\textit{Discount Amount} = \text{USD1 mm} \times 0.0050 \times \frac{90}{365}$$

$$= \text{USD1,232.88}$$

$$\textit{Purchase Proceeds} = \text{USD1,000,000} - \text{USD1,232.88}$$

$$= \text{USD998,767.12}$$

2.3 Interbank Deposits

Interbank Deposits

Interbank deposits are the lending and borrowing of funds between banks and financial institutions. The interbank deposit market serves as a means for banks to manage their cash surpluses or deficits. Banks with excess funds can lend to banks with a fund deficit.

From a capital adequacy perspective, interbank bank loans are more advantageous than unsecured lending to a non-financial institution. This is because the Basel 2 Capital Adequacy Directive assigns a 20% risk weighting to banks compared to a 100% risk weighting when calculating the size of risk weighted assets. This is discussed in greater detail in Topic 6, Principles of Risk.

Issuance and Form

Interbank deposits are unsecured, and terminate at maturity. They are non-transferable and if a bank wants to unwind the interest exposure from an interbank loan or borrowing, it is done via an offsetting borrowing or loan.

A distinction is made between the domestic interbank deposit market and the eurocurrency market. A 'Eurocurrency' is currency deposit held in an account outside its country of origin. For example, a USD held by a Singapore-based organisation is a Eurodollar. A JPY held by a Frankfurt-based bank is Euroyen.

The Eurocurrency market evolved from the cash flows of USD held by Russian institutions during the Cold War in the 1950s. The Russian institutions wanted their USD holdings out of US jurisdiction. These funds found ready demand from Europe-based companies. Over time, the Euromarkets have developed their own rules and conventions while remaining outside domestic jurisdiction.

Quotation

Quotation for interbank deposits are in the form of an interest rate in decimals (or sometimes in the form of fractions in some countries). There are two sides, bid and offer, to a price quotation.

While market conventions differ as to whether it is quoted bid/offer, or offer/bid, the higher rate is the offer of funds (rate at which a lender is willing to lend), and the lower rate is the bid for funds (rate at which a borrower is willing to borrow).

Domestic deposits can commence from the same day or next day depending on local practice; Eurodeposits will commence from the spot date, unless specified otherwise.

Call money is money left on deposit for an unspecified length of time, and can be withdrawn anytime upon giving notice to the borrower. **Term money** are deposits placed for specified maturities. Maturities for term money usually extend up to one year, although most of the business is done for shorter periods. Periods up to 4 weeks are known as 'short dates'; periods from one month to one year are 'fixed dates'; periods beyond a year are 'medium term'. Overnight deposits are funds placed out for a one day term.

For standard period maturity term deposits, the day and date conventions (See description in Topic 1, Section 1.3) such as calendar month rule and the month end/end rule should be noted and applied.

Interbank deposits are loans from one institution to another. They are subject to the willingness of the lending institution to take on the credit risk of the borrowing institution. Banks dealing in the interbank deposit market will have a list of the institutions they are willing to extend credit to, as well as corresponding credit limits.

When bids and offers are placed through brokers, dealing parties only know the identity of the other party after a bid or offer is hit. This can gives rise to situations where the lending party does not have credit limits for the party that wants to borrow. The ACI Model Code provides recommendations on how to avoid and resolve potential dealing disputes (See Topic 7, Chapters 6 and 7 of the ACI Model Code).

Pricing

The calculation of the interest amount in interbank deposits is straightforward:

$$\textbf{Interest Amount} = \textbf{Principal Amount} \times \textbf{Interest Rate} \times \frac{\textbf{dtm}}{\textbf{dpy}}$$

Upon maturity, the principal + interest is paid to the lender.

Example: A deposit of USD10 mm is made for 3 months (91 days) at a rate of 2.75% in the euromarket. What is the amount that will be repaid at maturity?

$$\text{Repayment Amount} = \text{USD 10mm} \times \left(1 + 0.0275 \times \frac{91}{360}\right)$$
$$= \text{USD10,069,513.89}$$

Question 2

You are shown the following:

1) **A USD deposit held by a bank based in the US**
2) **A USD deposit held by a bank based in Singapore**
3) **A EUR deposit held by a bank based in the UK**
4) **A GBP deposit held by a bank based in UK**

Which of the above is a Eurocurrency deposit?

A. (1), (2) and (3)
B. (2), (3) and (4)
C. (2) and (3)
D. All of the above

ANSWER: C

A Eurocurrency deposit is a deposit in a currency that is held outside the country domicile of that currency.

2.4 Certificates of Deposit

Certificates of Deposit

Certificates of Deposit (CDs) evolved from fixed deposits that banks accept from their customers. Here, the customer acts as a lender of funds to the bank.

From the perspective of the lender, the disadvantage of fixed deposits is that once a lender has made the deposit, he is unable to have access to those funds unless that deposit is prematurely terminated. This usually entails penalties like foregone interest.

From the perspective of the borrower, any feature that makes the lender less willing to lend is a disadvantage. Further, a premature termination of funds by the lender means a bank would have to borrow to replace those funds.

CDs are issued by a bank as evidence of a lender's deposit with the bank. The key feature is that these instruments are negotiable i.e. can be transferred to another party. Therefore, this allows them to be traded in the secondary market. An owner of a CD can sell the CD in the market if he needs the funds before maturity. Interest earned up to the point of sale will still accrue to the seller of the CD, rather than become forfeited as is the case with a fixed deposit.

Issuance and Form

CDs are yield instruments. They repay both the face value and interest at maturity. They can be scripless or in scrip form. In scrip form, they can be bearer or registered. Generally, the certificates that are issued are held with an authorised depository institution for security and safe-custody purposes.

Maturity terms are usually up to a year, although longer dated CDs of up to 5 years may also be issued. Interest is paid upon maturity. However, for CDs with terms that are over a year, interest is paid at regular intervals (e.g., 6 months or a year).

The interest rate paid on the CD is usually **fixed**. However, it can also be a **floating rate** i.e. determined at regular intervals by referencing a benchmark such as LIBOR.

Floating rate CDs are popular medium-term bank papers. They usually have maturities of between 3 to 5 years and the interest rate is re-priced either on a 3-month or 6-month basis.

Quotation

CDs are quoted as a market yield for the remaining term of the CD. Note that a secondary market sale of the CD is akin to transferring a loan to the new buyer. The new buyer of the CD assumes the credit risk of the issuing bank, not the seller of the CD.

Certificates of Deposit – Pricing

The proceeds from a sale of a CD before maturity is calculated by applying the present value formula (Refer to Equation 8, Topic 1) to the future value (principal + interest) obtained at the maturity of the CD.

Example: A 6-month CD was issued 3 months ago with a face value of USD10 mm at an interest rate of 2.75%. Market yields have fallen and 3-month CDs are now trading at 2.3%. Calculate the proceeds if the CDs are sold today.

$$\textbf{Future Value (FV)} = \textbf{Principal + Interest}$$

$$= \text{USD10 mm} \times \left(1 + 0.0275 \times \frac{182}{360}\right)$$

$$= \text{USD10,139,027.78}$$

$$\textbf{Sales Proceeds} = \left(\frac{\textbf{FV}}{\textbf{1 + y} \times \frac{\textbf{dtm}}{\textbf{dpy}}}\right)$$

$$= \frac{10139027.78}{\left(1 + 0.023 \times \frac{91}{360}\right)}$$

$$= \text{USD10,080,421.33}$$

Question 3

Sixty days ago, you bought a 90-day USD10 mm CD at 2.5% at issue. You sell this CD at 2.25% for the remaining 30 days. What true yield would you have achieved for the holding period?

A. 2.25%

B. 2.50%

C. 2.641%

D. 2.753%

ANSWER: C

The quotation of a USD CD is in discount terms and the proceeds is given by the formula:

Face Value – Discount Amount.

At the time of issue, the purchase proceeds was:

$$\text{USD10 mm} - \left(\text{USD10 mm} \times 0.025 \times \frac{90}{360}\right) = \text{USD9,937,500}$$

The sale proceeds 60 days later is:

$$\text{USD10 mm} - \left(\text{USD10 mm} \times 0.0225 \times \frac{30}{360}\right) = \text{USD9,981,250}$$

The interest amount over the 60 days is difference between the two amounts i.e. USD43,750.

$$\textbf{The true yield return} = \frac{\text{Interest Amount}}{\text{Initial Investment}} \times \frac{360}{60}$$

$$= 2.641\%$$

2.5 Bankers Acceptances/Bills of Exchange

Bankers Acceptance (BA) arose out of the financing of trade. They are also known as bills of exchange, bank bills, trade bills or commercial bills.

It was common practice for an importer of goods to promise to pay an exporter for goods delivered by the exporter. As payment could be months away, the exporter often went to banks to raise funds for his continuing operations on the basis of receipts from these promissory notes. These promissory notes were usually already endorsed by the importers bank (e.g., letter of credit). The exporters bank would present evidence of shipment along with a promissory note to a bank nominated by the importers bank, which would then "accept" the note. The note could then be sold into the secondary market at a discount of the face value by the exporter to raise funds.

The credit risk of a BA was regarded to be low since it was backed by the guarantee of the accepting bank, with recourse to the importers bank and possibly the exporters bank as well. The yields on BAs tend to be lower than on CDs given the multiple bank guarantees on them.

Quotation and Pricing

BAs are discount instruments. Like treasury bills in the US and UK, the rate quoted is a discount rate. The pricing calculations for BAs is the same as for US and UK treasury bills where:

$$\textbf{Price} = \textbf{Face Value} - \textbf{Discount Amount}$$

and

$$\textbf{Discount Amount} = \textbf{Face Value} \times \textbf{d} \times \frac{\textbf{dtm}}{\textbf{dpy}}$$

where **d** is the discount rate.

2.6 Commercial Paper

Commercial Paper

Commercial Paper (CP) is an unsecured short-term promissionary note issued by a non-bank corporation, for financing its short term assets, such as working capital needs, accounts receivable and inventories. Maturities are usually no longer than 9 months with maturities of between 1 to 2 months being the average. As CPs mature and are repaid, companies can rollover their funding by issuing new CPs, according to their funding needs. CPs are a cheaper source of short term funding than bank loans. Companies may choose to back up their CP issuance with stand-by credit lines from banks, in case of rollover difficulties.

Issuance and Form

CPs are usually discount instruments i.e. sold at a discount of their face value.

Investors in CPs are those looking for short-term and relatively risk-free investments. **Money market funds** (MMFs) are big investors in CPs. Given the relatively short maturities of most CPs, investors usually take a buy-and-hold approach. There is less secondary market trading of CPs. Investors typically demand a credit rating for their CP investments. Therefore, a company issuing CPs needs to have a credit rating for its CP to be acceptable accepted. This limits the issuance of CPs to only large corporations.

The issuance process is similar to CDs. Companies can either issue CDs directly to investors (such as MMFs) or through an intermediary e.g., a broker or investment bank. Like CDs, CPs can take the form of a scrip or an electronic register form.

Commercial Paper Pricing – Yield and Discount Rate

Pricing

The pricing of CPs is the same as that of treasury bills. The eurocommercial paper (ECP) market adopts a 'yield' approach to pricing. However, in the US, the quotation is in the form of a 'discount rate'.

In the **'discount' approach**, the formula is:

$$\text{Price} = \text{Face Value} - \text{Discount Amount}$$

$$= F - \left(F \times d \times \frac{dtm}{dpy}\right)$$

$$= F \times \left(1 - d \times \frac{dtm}{dpy}\right) \quad \text{(US and UK conventions)}$$

where: **F** is the face value, **d** is the discount rate
dtm is the days to maturity, and
dpy is the days in a year (in the day count convention)

The relationship between these yield and discount rates is given by:

$$y = \left(\frac{d}{1 - d \times \frac{dtm}{dpy}} \right)$$

Question 4

Sixty days ago, you bought a 90-day USD10 mm CP at 2.5% at issue. What will you receive when you sell this CP at 2.25% today?

A. USD9,937,500
B. USD9,981,250
C. USD10,000,000
D. USD10,250,000

ANSWER: B

The quotation of a USD CD is in discount terms and the proceeds are given by the formula: Face Value – Discount Amount. The sale proceeds when the CP is sold today is:

$$\text{USD10 mm} - \left(\text{USD10 mm} \times 0.0225 \times \frac{30}{360} \right)$$

$$= \text{USD9,981,250}$$

Question 5

Sixty days ago, you bought a 90-day EUR10 mm CP at 2.5% at issue. What will you receive when you sell this CP at 2.25% today?

A. EUR9,937,500
B. EUR9,981,285.09
C. EUR10,000,000
D. EUR10,225,815.19

ANSWER: B

While the question seems similar to the previous question, the difference lies in noting that the conventions of the Eurozone and GBP markets and the euromarkets are significantly different from those in the US market. CPs are quoted on a yield basis in these markets and therefore, the formula applied is:

$$\textbf{Proceeds} = \textbf{Future Value} \times \frac{1}{\left(1 + \textbf{market yield} \times \frac{dtm}{dpy} \right)}$$

$$= \text{EUR10mm} \times \frac{1}{\left(1 + 0.0225 \times \frac{30}{360} \right)}$$

$$= \text{EUR9,981,285.09}$$

Repurchase Agreements

A **repurchase agreement** (repo) is a transaction whereby one party pledges securities, usually government securities, to back its borrowing of funds. A repo is therefore a secured loan. Having roots in the US Treasuries market where it acted as a means for funding holdings of bonds, repos have moved across to the euromarkets and other domestic bond markets as well. In the domestic markets, repos help central banks to manage liquidity in the banking system. As repos are secured loans, the yield on repos tend to be lower than those on unsecured deposits.

The term repo comes from the structure of the transaction, where buyer and seller agree to the simultaneous sale and future repurchase of an asset (e.g., government bonds) against cash, at an agreed price and agreed period.

Maturity of repo transactions range from overnight to a year. However, most of the transactions are for less than three months, with the bulk being overnight transactions.

There are several ways of structuring the repo agreement. The main forms are the **all in (classic) repo**, and the **sell/buy back repo**. The differences are summarised in Table 2.7.1.

At the initiation of the repo agreement, the lender may or may not agree to lend to the full value of the collateral given. If the loan amount is less than the full value, the discount to the full value (‘**haircut’** or initial margin) serves as a cushion against a fluctuation in the value of the collateral. In the classic repo, the lender may call for a top up of collateral value (variation margin) if there is a fall in value.

Comparison of Classic and Sell/Buy-Back Repos **Table 2.7.1**

Classic Repo	Sell/Buy-back
Sale and repurchase	Outright sale; forward buy-back
Bid at repo rate: bid for securities, lend the cash	Repo rate implicit in forward buy-back price
Sale and repurchase price identical	Forward buy-back price different
Return to cash lender is the repo interest	Return to cash lender is difference between sale price and forward buy-back price
Bond coupon received during trade is returned to seller	Coupon need not be returned to bond seller until termination (with compensation)
Standard legal agreement (TBMA/ICMA GMRA)	No standard legal agreement (may trade under GMRA)
Initial margin (‘haircut’) may be taken	Initial margin (‘haircut’) may be taken
Variation may be called. Collateral may be substituted.	No variation margin unless traded under legal agreement . No provision for collateral substitution.

Example of Classic Repo

The **classic repo** is ONE deal with two legs. The first leg being a sale of the bond, and the second being a repurchase at the same price.

A bank holds USD100 mm of Eurobonds at a clean price of 102.50. The bond pays a coupon of 4.60% and has 90 days of accrued interest. The value of the bond is the principal + accrued interest, otherwise known as the **dirty price**. In our example:

Dirty Price = Clean Price + Accrued Interest

$$= 102.50 + \left(100 \times 0.046 \times \frac{90}{360}\right)$$

$$= 102.50 + 1.15$$

$$= 103.65$$

If no initial margin is taken, the bank will receive the full value of the collateral i.e. USD100 mm × 103.65% = USD103,650,000. The amount received at the start of the repo is called the **initial consideration**. The repo market is quoting 2.00 – 2.25% for 7-day funds. Since the bank is borrowing funds, the applicable rate is 2.25%.

At maturity, the bank repays the initial consideration plus the interest on the repo, and is returned the collateral (i.e. the bonds)

$$\text{Interest on repo} = \text{USD103,650,000} \times 0.0225 \times \frac{7}{360}$$

$$= \text{USD45,346.88}$$

Repayment Amount = Initial Consideration + Interest on Repo

= USD103,695,346.88

Example of Sell/Buy Back Repo

The **sell/buy back repo** comprises TWO deals. The first deal is a sale of the bond. The second deal is a buy back of the same at a pre-determined price at the maturity of the repo = 103.65.

Sale Deal: Using the situation in the previous example of classic repo, the bank holds USD100 mm of Eurobonds at a clean price of 102.50. The bond pays a coupon of 4.60% and has 90 days of accrued interest. As in the previous example:

Dirty Price = Clean Price + Accrued Interest

= 102.50 + 1.15

= 103.65

Again, assuming that no initial margin is taken, the bank will receive the full value of the collateral i.e. an initial consideration of:
$100 mm × 1.0365 = USD103,650,000.

Buy Back Deal: The repo market is quoting 2.00 – 2.25% for 7-day funds, and the bank borrows at 2.25%. Since this is a separate deal, the question is the appropriate **clean price at which to buy back the bond at maturity** of the repo. This is fixed at the initiation of the repo.

This can be arrived by noting that at maturity, the amount due to the lender is:

Repayment Amount = Initial Consideration + Interest on Repo

= USD103,695,346.88

This translates to a dirty price at maturity of:

$$\frac{\text{USD103,695,346.88}}{\text{USD100,000,000}} = 1.04$$

At the maturity of the repo, there will be another 7 days of accrued interest. In price terms, this is:

$$\text{Accrued Interest at Maturity} = \left(100 \times 0.046 \times \frac{97}{360}\right)$$
$$= 1.2394$$

Putting the dirty price and the accrued interest at maturity together, the clean price that is fixed at initiation of the repo is:

$$\text{Clean Price at Repo Maturity} = \text{Dirty Price} - \text{Accrued Interest}$$
$$= 103.695346 - 1.2394$$
$$= 102.455946$$

Benefits of Using Repo

Market makers are able to finance their long bond positions at a lower interest cost if they repo out the assets. They can also use repos to temporarily make delivery on short positions.

Repos lead to greater liquidity in specific bond issues, especially government bonds. This, in turn lowers the cost of raising funds for capital market borrowers.

Repos reduce counterparty risk in money market borrowing and lending because of the security offered as collateral given for the loan.

Repos offer investors an added investment option when placing funds.

Question 6

Coupons paid during the life of a classic repo are:

A. Paid directly to the original owner of the bond.
B. Paid to the new owner who passes it to the original owner.
C. Paid to the new owner who then pays it to the original owner on maturity.
D. Not paid.

ANSWER: B

Paid to the new owner who then passes it to the original owner.

Question 7

In the sell/buy back repo, if the collateral falls in value, the lender of cash can:

A. Call for additional collateral.
B. Substitute the collateral.
C. Cancel the transaction.
D. None of the above.

ANSWER: D

In the sell/buy back repo, the initial transaction is taken as an outright sale accompanied by an agreement to buy back at a pre-determined price. Unless specified, there is no provision for the borrower to put up additional collateral during the life of the repo transaction. The lender may protect himself by taking a 'haircut' at the start of the repo.

2.8 Summary of Money Market Instruments

Securities	Form of Instrument	Returns	Maturity	Borrowers' Motivation	Lenders' Motivation
Interbank Deposits	Interest Bearing	Yield on deposit	Typically overnight to12 months	Cover short-term funding needs	Deploy short-term surplus funds
CDs	Interest Bearing	Yield/Interest on CD	≥ 7days Typically 1 to 12 months	Higher yield vs. T-bill, liquid, safe	Source of funding for banks
T-Bills	Discount	Face value less price	≤ 1 year	Safe, liquid	Low cost/Large scale
BAs	Discount	Face value less price	Up to 6 months	Higher yield vs. T-bill, relatively safe	Lower interest & fees charged
CPs	Discount	Maturity value less purchase price	1mth to ≤ 270days	Higher yield vs. T-bills	Lower funding cost than bank borrowing
Repos	Interest Bearing or Discount	Yield on loan or purchase less repurchase prices	Overnight to 12 months	Higher yield, secured lending, liquid	To cover short positions at lower cost

TOPIC 3 Foreign Exchange

ACI THE FINANCIAL MARKETS ASSOCIATION

3.1 The Foreign Exchange Market

Market Structure

The **foreign exchange** (FX) market is by far the largest financial market in the world. In its Triennial Survey (2007), the Bank of International Settlements (BIS) estimated the daily traded volume of the FX markets to be USD3.2 trillion.

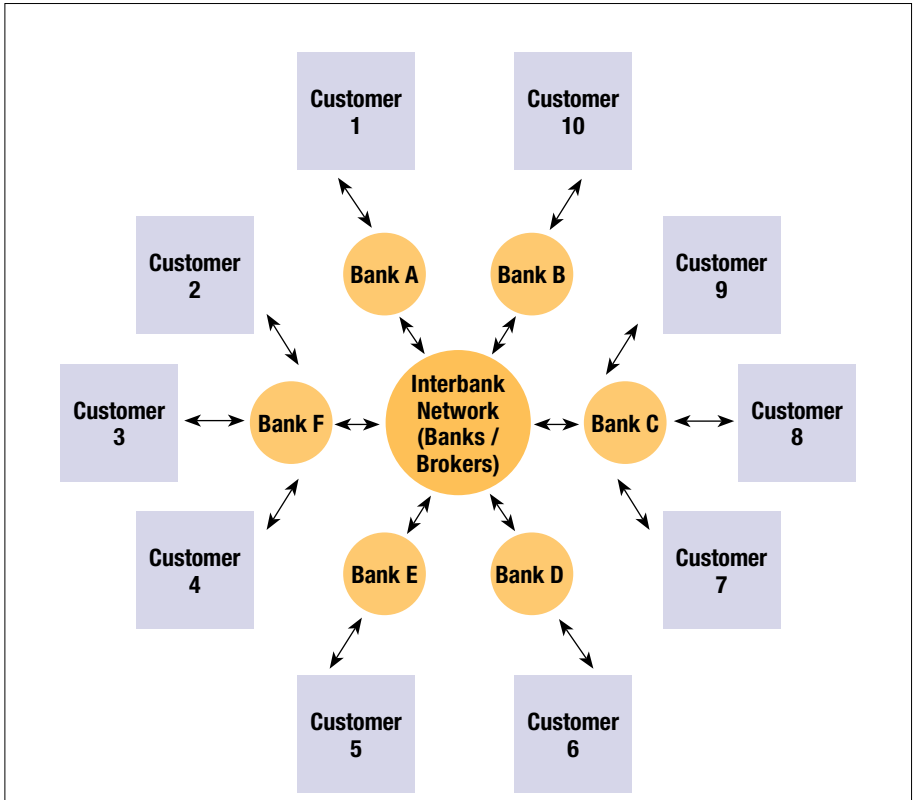
The number of market participants is huge – millions, if you include direct (e.g., an interbank dealer) and indirect participants (e.g., a tourist converting currency).

The basic market structure can be represented by 3 concentric layers as shown in Figure 3.1.1.

At its core is the interbank network of banks, brokers, and electronic platforms - all interconnected to form a core market. In the next layer are individual banks, who are typically part of the interbank network, but who also deal directly with non-bank customers. Non-bank customers form the third outer most layer of participants.

The Banks

At the market's core are the **dealing desks in the banks**. The key role of these dealing desks is to create a marketplace for foreign exchange by **making a price** i.e. simultaneously making a bid and offer. For making prices, these dealing desks earn income through the bid-offer spread by quoting a lower price for buying than for selling. While the bid-offer spread is small on a single transaction, it accumulates over many transactions, making the market making of FX prices attractive to banks.



Structure of the Foreign Exchange Market — **Fig. 3.1.1**

The banks also have **customer desks** (represented by the second layer) whose function is to interface with non-bank customers. Through customer desks, a customer can place orders to buy or sell FX. These orders are conveyed to, and dealt through the dealing desks.

The Brokers

While banks deal directly with each other, they also deal through **brokers**. Brokers play the role of an intermediary - bringing together buyers and sellers with the objective of quoting the finest bid-offer spread available in the market. Brokers are able to do this because they take the prices from multiple banks simultaneously in order to show closer bid-offer prices and better match buyers and sellers among the banks.

Note that brokers are **not** counterparty to a trade, but only serve as intermediaries. Banks pay brokers a commission on deals which are closed through the brokers.

Brokers can take the form of **voice brokers** where orders from dealers are given verbally and transmitted via a network of voice boxes. Given the fast pace of markets and the high degree of manual human involvement in the voice broker process, there is potential for errors and disputes. Chapter 6 of the ACI Model Code outlines the best practices to minimise and resolve such disputes.

Brokers can take the form of an **electronic deal matching system** such as EBS or Reuters 2000 (See Figure 3.1.2). Here, dealers input orders electronically and rules programmed into the system ensure greater dealing efficiency.

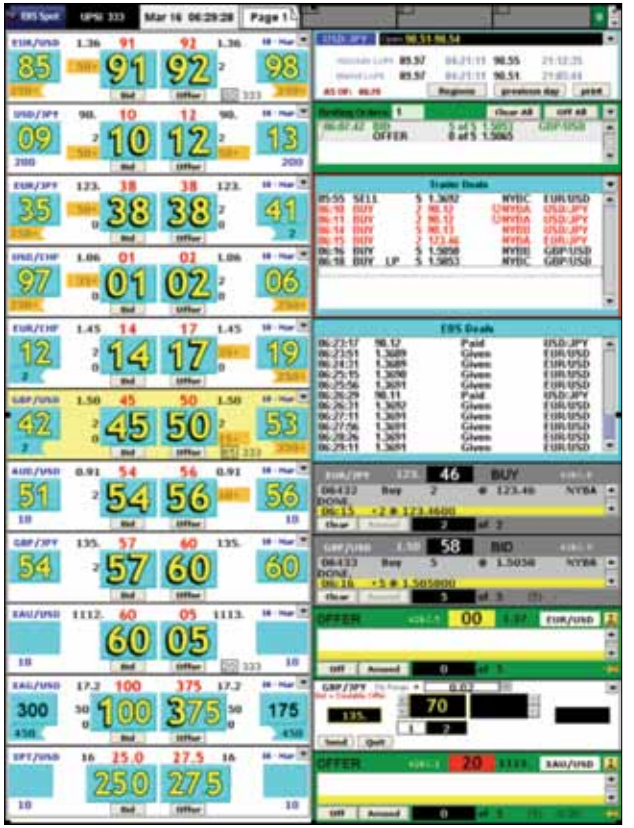
The Customers

Customers are parties who are not expected to make prices, but take them. As price takers dealing at the bid-offer spreads of market making banks, customers provide banks with the income for their market making activities.

Customers are made up of a diverse list of organisations. They include: central banks, smaller banks, insurance companies, hedge funds, investment managers, and industrial or commercial companies e.g., oil and commodity companies.

The reasons why customers transact FX are as varied. The need to transact FX usually derives from some activity that is the customer's main business e.g., an importer needs USD to pay for goods it is importing, or an investment manager JPY needs to pay for an overseas investment it has made in Japan.

The customer is willing to pay a fee to the dealing banks (i.e. the bid-offer spread) to get the FX transaction done.



Courtesy of ICAP Electronic Broking

A Screen Shot of EBS Electronic Deal Matching System **Fig. 3.1.2**

3.2 Foreign Exchange Quotations

FX Transaction

A **foreign exchange** (FX) transaction involves the exchange of one currency for another. There are four key details in an FX transaction:

- Which currency is being sold;
- Which currency is being bought;
- When the transaction is to be settled (the value date); and
- What the exchange rate is.

Through the course of many transactions, the markets have evolved conventions to denote these details.

Quotation Convention – Base and Variable Currency

As explained, an FX transaction involves one currency being sold for another. It is convenient to see an FX transaction as being similar to any other type of transaction, where an item of goods or a commodity is sold or bought. The currency that is sold or bought is called the **base or commodity currency**. The currency that the commodity is quoted in is the **variable currency**.

For a given currency pair, the convention is to indicate the base currency on the left hand side of the quoted currency pair and the variable currency on the right hand side.

Take for an example, the exchange rate USD/JPY = 90. It means that the price of one unit of USD (the commodity) is 90 JPY i.e. 1 USD = 90 JPY. Similarly, if we write, GBP/USD = 1.25, it means that 1 GBP can be exchanged for 1.25 USD.

If the USD is the base currency in a currency pair that involves the USD, it is called an **indirect quotation** e.g., USD/SGD or USD/CHF. If the USD is the variable currency, it is called a **direct quotation** e.g., in GBP/USD or EUR/USD.

FX Quotation – Bid and Offer

As mentioned earlier, an FX transaction can be seen as the sale or purchase of the base currency, quoted in terms of the variable currency. As with dealing in a good or commodity, there are two sides to a price: the bid and the offer.

The **bid** is the rate at which a quoting dealer is willing to buy the base currency. The **offer** is the rate at which a quoting dealer is willing to sell the base currency. Take for example USD/JPY. The typical quote in the market will be given as:

Bid	Offer
90. 25	90. 30

For a party looking to sell USD and buy JPY, the above quote means that if he is looking to deal at the current market price, there is a counterparty who will take his USD and provide him JPY at a rate of 90.25 JPY per USD.

Conversely, if he is looking to buy USD in exchange for JPY, then the exchange rate will be 90.30 JPY per USD.

‘Big Figure’ and ‘Points’

An FX price is said be to made up of two parts, the **‘big figure’** and the **‘points’**. For example, if the rate for USD/JPY is 90.25, then 90 is the ‘big figure’ and .25 is the ‘points’.

In the typical market situation between experienced dealers and brokers, it is usually assumed that the counterparty knows the big figure that the market is trading at. Therefore, only the points is mentioned in a market quotation. In the above example, a price for USD/JPY will be given as: 25 30.

Market Making

The difference between the bid price and offer price is called the **spread**. In the example where USD/JPY is quoted as: 25 30, there is said to be a 5-point spread.

As explained, the function of the dealing desks in banks that make up the Interbank network is to make prices, i.e. simultaneously make a bid and an offer. Through making a price, the dealer serves two purposes:

1) Creates a market for FX; and
2) Creates the potential to make a profit for the dealer.

The idea is for the dealer to buy the currency at the bid and to sell it at the offer. By buying at a lower price and selling at a higher price, the dealer benefits from the price spread and makes a profit.

However, it is unlikely that a dealer will deal on both bid and offer simultaneously. Dealing on only one side would result in the dealer assuming a position, i.e. he will be long or short.

To be profitable, a dealer should ensure that, more likely than not, when he is long, he would be able to sell off his position at a higher price; and when he is short, he would be able to cover his position at a lower price. To do this, a dealer needs to take a view of how the market will move and quote his price accordingly.

One way a dealer can do this is to **shade** or bias his price quotation so that his price tends to be higher when he prefers to be long; and lower when he prefers to be short. That way, he increases the chances for his price to be dealt on the side he prefers.

In making both a bid and an offer, a dealer runs the risk of being dealt on the side that is counter to his view. In such a situation, the dealer would be keen to quickly neutralise or **square** his position. For example, a dealer who is dealt on his bid and thinks the market will head lower, would be keen to be rid of his long position.

He can do this by:

1) Selling his position to the prevailing bid in the market i.e. **hit the bid**; or
2) Lowering his offer price in the expectation that the more attractive offer will be taken by a buyer.

For a dealer quoting a price, the price spread represents the profit potential in making a price as well as the cushion from loss when trying to square a position.

In the market place, with many dealers quoting, the price spread will be narrower given that it reflects the best bid and best offer. Generally, the more liquid the market, the narrower the price spread.

Question 1

Four banks give the following quotes in USD/JPY. Which is the best quote for you if you are a seller of JPY?

- **A.** 90.87/92
- **B.** 90.85/90
- **C.** 90.88/91
- **D.** 90.89/93

ANSWER: B

Here, you are selling the variable currency and buying the base currency. In the USD/JPY quote, USD is the base currency, so you are looking for the lowest offer, which is 90.90.

Question 2

You are a broker consolidating the best quotes and offers in the market. You are given the same quotes as in Question 1.

- **A.** What is the market price?
- **B.** What is the price spread in the market?

ANSWER

a) *The best offer is 90.90. The best bid is 90.89. Therefore, the market price is: 90.89/90.*

b) *The price spread is 1 point.*

Question 3

Spot EUR/USD is quoted by the broker 1.47 00/10. You have an interest to buy EUR at 1.4707 and leave the order with the broker. What does this make the new quote in the market?

- **A.** 1.47 07/10
- **B.** 1.47 00/07
- **C.** 1.47 00/10
- **D.** 1.47 07 either way

ANSWER: A

The broker will reflect the best bid and offer available in the market. Since your bid of 1.4707 is the best available in the market while the market offer remains unchanged, the broker will reflect the new quote on the market as 1.47 07/10.

Question 4

What is the value of a 1-point movement on USD1 mm in the USD/SGD spot rate?

- **A.** USD100
- **B.** USD1,000
- **C.** SGD100
- **D.** SGD1,000

ANSWER: C

The USD/SGD is quoted to the 4th decimal in SGD terms, so 1 tick on USD1 mm is worth 0.0001 × 1,000,000 = SGD100.

Calculating Profit and Loss

Buying low and selling at a higher price will lead to a profit, while the converse will lead to a loss. To calculate the profit or loss from a series of transactions, square off positions in one currency and then calculate the difference in cashflows in the other currency.

Example: Assume that a dealer starts off the day square and through the day undertakes the following transactions:

1. Buy USD10 mm for JPY at 90.25
2. Buy USD10 mm for JPY at 90.30
3. Buy USD10 mm for JPY at 90.38
4. Sell USD10 mm for JPY at 90.40
5. Buy USD10 mm for JPY at 90.45
6. Sell USD30 mm for JPY at 90.50

His P/L would be:

USD	JPY
+10 mm	–902,500,000
+10 mm	–903,000,000
+10 mm	–903,800,000
–10 mm	+904,000,000
+10 mm	–904,500,000
–30 mm	+2,715,000,000
Net Position: square	**P/L: + 52,000,000**

Marking-to-Market

If positions are not closed off by the end of the day, then the positions remain open and are carried over to the next day as overnight positions.

In the event that positions are not closed off by the end of the day, then the profit/loss made during the day can be calculated by imputing a price for the open positions as though they had been closed off, and calculating the profit/loss as shown on this page.

This imputed price is usually the market price at the end of the trading day. It is called the day's **closing price**.

The process of imputing a price to calculate the unrealised profit/loss on a position is called **marking-to-market** a position.

Example: A dealer starts off the day square and through the day undertakes the following transactions:

1) Buy USD10 mm for JPY at 90.25
2) Buy USD10 mm for JPY at 90.30
3) Buy USD10 mm for JPY at 90.38
4) Sell USD10 mm for JPY at 90.40
5) Buy USD10 mm for JPY at 90.45
6) Sell USD10 mm for JPY at 90.50

The closing price for USD/JPY is 90.55. Calculate his P/L for the day. His P/L would be:

USD	JPY
+10 mm	–902,500,000
+10 mm	–903,000,000
+10 mm	–903,800,000
–10 mm	+904,000,000
+10 mm	–904,500,000
–10 mm	+905,000,000
Open Position: –20 mm	+1,811,000,000 (valued at day's closing of 90.55)
Total	**P/L: 6,200,000**

The day's closing price is used to mark-to-market the open position.

Reciprocals and Cross Rates

Reciprocals

Although currency pairs are conventionally quoted in a certain way e.g., USD/JPY, EUR/USD or EUR/GBP, it is possible to quote currency pairs with the base and variable currencies transposed i.e. as JPY/USD, USD/EUR or GBP/EUR.

These transposed pairs are **reciprocals** of the usual price quotation. Reciprocals are useful for customers whose accounting may not be in the conventional base currency.

As the term suggests, the reciprocal is derived by dividing 1 by the conventional rate.

Example:

Given AUD/USD = 0.9210

i.e. 1 AUD = 0.9210 USD

then, 1 USD = 1/0.9210 = 1.0858 AUD

So, USD/AUD = 1.0858

Cross Rates

When a currency pair does not involve the USD, the currency quotation is a **cross rate**. Cross rates are important to someone who has a currency need that does not involve the USD. For example, to a Singapore investor looking to invest in Brazilian stocks, the SGD/BRL rate is important.

Where there is a liquid market for the cross rate, such as in EUR/JPY, the price for a cross rate is taken directly from the market.

However, where the market for a cross rate is not liquid, then the rate has to be derived from the conventional quotations against the USD.

Deriving Cross Rates

Deriving Cross Rates – USD as Common Base Currency

Take the case of SGD/BRL. Both currencies are usually quoted with the USD as the base currency:

USD/SGD = 1.39 65/70

USD/BRL = 1.73 40/45

The convention is to use the stronger currency as the base currency in constructing the cross rate. In this example, it is the SGD.

Deriving the Bid

The quoting bank will buy SGD and sell BRL at the bid. This can be split into two transactions:

1) Buy SGD, sell USD at the offer price of 1.39 70
2) Sell BRL, buy USD at the bid price of 1.73 40

The bank receives 1.3970 SGD per USD, and pays out 1.7340 BRL per USD. Therefore, it receives 1.7340/1.3970 = 1.2412 BRL per 1 SGD.

Deriving the Offer

The quoting bank will sell SGD and buy BRL at the offer. Again, this can be split into two transactions:

1) Sell SGD, buy USD at the bid price of 1.39 65
2) Buy BRL, sell USD at the offer price of 1.7345

The bank pays 1.3965 SGD per USD, and receives 1.7345 BRL per USD. Therefore, it pays out 1.7345/1.3965 = 1.2420 BRL per 1 SGD.

The cross rate quotation derived from SGD/BRL is therefore:
SGD/BRL: 1.24 12/20

Deriving Cross Rates – USD as Base Currency and Variable Currency

Take the quote GBP/SGD. The USD is the base currency in USD/SGD but the variable currency is the GBP/USD quote:

USD/SGD = 1.39 65/70
GBP/USD = 1.65 45/50

Again, we use the stronger currency as the base currency in the cross rate.

Deriving the Bid

The quoting bank will buy GBP and sell SGD at the bid. This can be split into two transactions:

1) Buy GBP, sell USD at the bid price of 1.65 45
2) Sell SGD, buy USD at the bid price of 1.3965

The bank pays 1.6545 USD per GBP, and pays out 1.3965 SGD per USD. Therefore, for each GBP, it pays out
1.6545 × 1.3965 = 2.3105 SGD per 1 GBP.

Deriving the Offer

The quoting bank will sell GBP and buy SGD at the offer. Again, this can be split into two transactions:

1) Sell GBP, buy USD at the offer price of 1.65 50
2) Buy SGD, sell USD at the offer price of 1.39 70

The bank receives 1.6550 USD per GBP, and receives 1.3970 SGD per USD, Therefore, it receives 1.6550 × 1.3970 = 2.3120 SGD per 1 GBP.

The cross rate quotation derived is therefore:

GBP/SGD: 2.31 05/20

Deriving Cross Rates – General Rules

From the above examples, we can see how to derive cross rates in general:

KEY LEARNING POINTS

Given two quotes where the USD is either both the base currency, or both the variable currency, i.e. quotes are both indirect or both direct quotes:

Divide the opposite side of the two-way prices of equivalent USD rates to derive a cross rate, making the stronger currency the base currency.
Examples: SGD/BRL, GBP/AUD

Given two quotes where the USD is the base currency in one and variable in the other, i.e. where one quote is direct and the other indirect:

Multiply the same two sides of the two-way prices of the equivalent USD rates to derive a cross rate, making the stronger currency the base currency.
Examples: GBP/SGD, AUD/JPY

Question 5

The AUD/USD is 0.91 30/35 and the USD/JPY is 0.89 55/60. What is the price you should quote a customer who is looking to sell JPY and buy AUD?

A. 0.8176
B. 0.8180
C. 0.8185
D. 0.8190

ANSWER: C

Here, one currency pair is an indirect quote (i.e. USD is the base currency) while the other is a direct quote. The rule is to multiply the same two sides of the two-way prices of the equivalent USD rates to derive a cross rate. From the quoting bank's perspective, we will be selling AUD at 0.9135 and buying JPY at 0.8960. Therefore, the offer for AUD/JPY is 0.8185.

Question 6

You quote a corporate customer GBP/USD 1.6580/85. He deals at the reciprocal rate of 0.6030. What have you done?

A. You buy GBP at 1.6585.
B. You sell GBP at 0.6030.
C. You sell GBP at 1.6580.
D. You buy GBP at 0.6030.

ANSWER: B

At the reciprocal rate of 0.6360, you sell GBP (1 divided by 1.6585).

Foreign Exchange Quotations – ISO Codes

Currency Codes

The ISO 4217 is the international standard set by ISO (International Organisation of Standardisation) to define the names of currencies using a 3-letter code.

The first two letters of the code describe the country and the third letter, the associated currency. If a country's currency is revalued, the third letter is changed to distinguish it from the old currency, such as in MXN (where N comes from the initial for New Peso) or RUB (where B comes from the third letter of Ruble).

The ISO 4217 also contains codes for the precious metals, which begins with X followed by their chemical symbols e.g, XAU for gold.

The ISO 4217 is used by many organisations such as ACI and SWIFT. The more frequently encountered ISO codes are:

EUR – Euro
USD – United States Dollar
JPY – Japanese Yen
GBP – UK Pounds Sterling
CHF – Switzerland Franc

A more comprehensive list can be found in Appendix 6 of the Model Code.

3.3 Spot Foreign Exchange

Spot Value Date

The most basic FX transaction is the **spot FX transaction**. A spot FX transaction is an outright sale or purchase of one currency for another, for delivery two working days after the dealing date. In the past, this two-day lag allowed for arrangements of cash transfers to be made. Even today, when deals can be processed much quicker, this convention has been retained.

While the two-day spot period is the most common settlement period, there are exceptions. For example, the USD/CAD, where the local convention is for transactions to settle on the next business day (called tom funds).

The transfer of funds takes place on the **value date**. The value date in a spot transaction should be a day when both financial centres where the currencies are settled are open. In the case of USD/JPY, the financial centres are New York and Tokyo. In theory, it does not matter where the counterparty banks are located. However, in practice, traders will arrange trades that do not settle on their own bank holidays. This is to avoid having to monitor payments on a day that their own banks are on holiday.

Delivery dates of both currencies in an FX transaction will usually settle on a common day. There are exceptions for currencies of some Islamic countries, where the markets are closed on a Friday. For example, in the case of the Saudi Arabia Rial (SAR), if a spot USD/SAR transaction takes place on a Wednesday, the USD leg will settle on Friday but the SAR leg will settle on a Saturday.

Question 7

Today is Wednesday, 30 December, 20XX. What is today's spot value date for dealing in USD/SGD?

A. Friday, 1 January 20YY
B. Monday, 4 January 20YY
C. Tuesday, 5 January 20YY
D. None of the above

ANSWER: B

The rule for calculating spot date is today + 2 business days forward. However, Friday, 1 January 20YY will be a public holiday in both the US and Singapore. Since Saturday and Sunday are not working days, this makes Monday, 4 January 20YY the spot date.

3.4 Forward Outrights Exchange Rates

Forward Outright

A **forward outright** is an outright purchase or sale of one currency in exchange for another currency for settlement on a fixed date in the future, on a date other than the spot date.

Quotations of forward outrights are similar to those in the spot market, with the bid indicating the rate at which the quoting bank is willing to buy the base currency, and the offer rate at which it is willing to sell, for delivery of the currencies on the specified value date in the future.

In certain currencies, countries may restrict trading on a forward basis to curb currency speculation. In such cases, forward trading is done offshore outside domestic regulation using **non-deliverable forwards** (NDFs). Currencies are not exchanged on the value date, but the difference between the contracted rate and prevailing reference fixing rate is usually paid out in USD. This effectively allows for the hedging of currency exposures.

Standard Period Maturity Dates

The standard maturity dates for these forward periods are referenced to the spot date. For example, the 3-month maturity date for a deal done on Monday, 4 May (with the spot date as Wednesday, 6 May) is Thursday, 6 August. The maturity date for a 6-month deal is Friday, 6 November.

Where the standard maturity date falls on a holiday, the maturity is adjusted by moving it to the next business date. There are **two exceptions** to this rule:

1) Calendar month standard periods

No standard period maturity date is quoted beyond its standard maturity month. For example, take a one-month maturity date dealt on spot date 30 April and ending in May. If 30 May is a Sunday, then, rather than adjusting the maturity date forward to 1 June, the adjustment is made backwards to the last business day in May (Friday, 28 May) to keep the maturity date in May.

2) Month end/end rule

If the last business day of the current month is not the last calendar day (due to a weekend or holiday), for standard period maturity date calculation purposes, the last business date is taken as the month end. In addition, all standard period maturity dates in the months ahead will be the last business day of those months. Therefore, assuming that Friday, 29 May was the spot date, then standard forward period dates for this spot date would be: Tuesday, 30 June (one-month), Friday, 31 July (two-month), Monday, 31 August (3-month), Monday, November 30 (six-month), and so on.

Determining the Forward Rate

The **forward rate** may be seen as the market's assessment of where the spot rate will be in the future. Through the process of **covered interest arbitrage**, the forward rate is also a reflection of current spot rate and interest rates in the two currencies in the currency pair.

Starting with USD100, consider the following parallel track of transactions.

The convention is to use the stronger currency as the base currency in constructing the cross rate. In this example, it is the USD.

Track A	Track B
Start with USD100	Start with USD100
Sell USD for SGD at spot (S)	Invest USD for 3 months at b% p.a.
Invest SGD for 3 months at v% p.a.	
Sell principal + interest back into USD at the present forward outright rate (F)	

There is no FX exposure as USD proceed have been locked in. Proceeds at the end of the transactions are as shown below. An arbitrage opportunity exists if the two tracks are not of equal value. Market activity will push both towards convergence. Therefore,

$$\frac{100 \times S \times \left(1 + v \times \frac{\text{days}}{\text{year}}\right)}{F} = 100 \times \left(1 + b \times \frac{\text{days}}{\text{year}}\right)$$

Solving for the forward outright rate, F gives:

$$\text{Forward Outright Rate} = \text{Spot} \left[\frac{\left(1 + v \times \frac{\text{days}}{\text{year}}\right)}{\left(1 + b \times \frac{\text{days}}{\text{year}}\right)}\right]$$

In the above equation, the forward rate can be seen as a derivative of the spot rate and the interest rates of the two currencies.

Example: Given the following data, calculate the 3-month forward outright rate.

USD/SGD	1.3950
USD 3-month	1.25% (ACT/360)
SGD 3-month	0.75% (ACT/365)

Substitute data in the formula:

$$\text{Forward Outright Rate} = \text{Spot} \left[\frac{\left(1 + v \times \frac{\text{days}}{\text{year}}\right)}{\left(1 + b \times \frac{\text{days}}{\text{year}}\right)}\right]$$

$$= 1.3950 \left[\frac{\left(1 + 0.0075 \times \frac{91}{365}\right)}{\left(1 + 0.0125 \times \frac{91}{360}\right)}\right]$$

$$= 1.3932$$

3.5 Forward Swap Exchange Rates

Forward Swaps

While deals with the customer are in the form of forward outrights, banks do not deal in forward outrights among themselves in the interbank market. Rather, forward swaps is the instrument traded. The forward outright can therefore be seen as a combination of the spot rate and the forward swap:

Forward Outright = Spot Rate + Forward Swap Rate

From the previous section, we saw that:

$$\text{Forward Outright Rate} = \text{Spot}\left[\frac{\left(1 + v \times \frac{\text{days}}{\text{year}}\right)}{\left(1 + b \times \frac{\text{days}}{\text{year}}\right)}\right]$$

Therefore,

$$\text{Forward Swap Rate} = \text{Spot}\left[\frac{\left(1 + v \times \frac{\text{days}}{\text{year}}\right)}{\left(1 + b \times \frac{\text{days}}{\text{year}}\right)}\right] - \text{Spot}$$

$$= \text{Spot}\left[\frac{\left(1 + v \times \frac{\text{days}}{\text{year}}\right)}{\left(1 + b \times \frac{\text{days}}{\text{year}}\right)} - 1\right]$$

Determining Forward Swap Rates

Example: Given the following data, calculate the 3-month forward swap rate.

USD/SGD	1.3950	
USD 3-month	1.25%	(ACT/360)
SGD 3-month	0.75%	(ACT/365)

Substitute data in the formula:

$$\text{Forward Swap Rate} = \text{Spot}\left[\frac{\left(1 + v \times \frac{\text{days}}{\text{year}}\right)}{\left(1 + b \times \frac{\text{days}}{\text{year}}\right)} - 1\right]$$

$$= 1.3950\left[\frac{\left(1 + 0.0075 \times \frac{91}{365}\right)}{\left(1 + 0.0125 \times \frac{91}{360}\right)} - 1\right]$$

$$= -0.0018$$

From the previous example, the forward outright was calculated as 1.3932. The forward swap rate could also be obtained as:

$$\text{Forward Swap Rate} = \text{Forward Outright} - \text{Spot Rate}$$
$$= 1.3932 - 1.3950$$
$$= -0.0018$$

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Forward Swap Rate

Forward swap prices are quoted in terms of points, coinciding with the last decimal place of the spot price. In the above example, the forward swap is –18 points.

It can be seen in the forward swap formula that when the base currency interest rate is higher than that of the variable currency, the forward swap points will be negative. Consequently, the forward outright rate will be lower than the spot rate.

This can be seen as compensating for the higher interest rate of the base currency. If I deposit the starting amount of money in the base currency, I will get a bigger amount upon maturity, compared to converting into the variable currency and making a deposit in the variable currency. A lower forward outright used in hedging the variable currency exposure back to the base currency offsets this advantage, otherwise, there is an arbitrage opportunity.

The converse is also true. If the base currency interest rate is lower than that of the variable currency, the forward outright rate will be higher, and the forward swap will be positive.

Premium and Discount

When swap points are positive, they are at a base currency premium or simply a **premium**. When they are negative, they are at a **discount**.

As explained earlier, a currency that has a higher interest rate will be at a discount and vice versa. In a currency pair, one currency could be said to be at a forward premium and the other a forward discount. In our example, the USD is at a forward discount, and the SGD is at a premium.

Quoting Forward Swaps – Premium and Discount

Forward swap quotations are typically in the form of bid/offer (see table below).

Where the **bid is lower than the offer**, then the swap points are positive and at a premium.

Where the **bid is higher than the offer**, then the swap points are negative and at a discount. It is the convention not to show the negative sign. In cases where the swap points straddle zero as in –3/1, it written as '3/1 A/P', where A/P is the short form for 'Around Par'. A voice quote will describe it as '3/1 around par', meaning that the left hand side is a discount, and the right hand side is a premium. Below are two examples of a discount and a premium:

USD/SGD Spot Rate: 1.3950			USD/IDR Spot Rate: 9600		
	Period	**Bid / Offer**		**Period**	**Bid / Offer**
o/n	0.30	0.20			
t/n	0.40	0.30			
s/n	0.50	0.30	s/n	–3.14	–0.29
1 wk	1.50	1.15	1 wk	–22.00	–2.00
1 mth	5.00	3.00	1 mth	30.00	80.00
3 mth	12.00	10.00	3 mth	127.00	207.00
6 mth	21.00	18.00	6 mth	245.00	345.00
9 mth	23.00	19.00	9 mth	425.00	525.00
1 yr	26.00	22.00	1 yr	605.00	705.00

The forward outright bid or offer is obtained by adding the relevant swap points to the spot rate.

Example: The 6-month SGD swap is quoted as: 21/18. Obtain the forward outright quote.

Note that the points are a discount, therefore:

Spot rate	1.39 50/55
6-month swap	21/18
6-month outright	**1.39 29/37**

The 6-month IDR swap is quoted as: 245/345. Obtain the forward outright quote.

Spot rate	96 50/55
6-month swap	245/345
6-month outright	**9895/10000**

Broken Dates Forward Swap

As with any over-the-counter (OTC) instrument, while there are standard periods, it is possible to trade forwards for any period. A dealer may calculate an estimate for an odd date or cock date forward swap using straight line interpolation.

Straight line interpolation assumes that the yield curve is a straight line between two standard dates so that swap points can be prorated. Refer to the USD/SGD rates given in the table on page 56. Suppose a quote is asked for a 4-month swap rate. Then noting that:

3-month points	12	10
6-month points	21	18

The points difference between the two dates is –9 points on the bid, and –8 on the offer.

The 6-month period has 182 days and the 3-month period has 91 days, so there is a 91-day gap between the two periods. The number of days between the 3-month to the 4-month date is 31 days.

Prorating the points difference, the additional 31 days will add the following points to the 3-month quote:

Bid = –9 × 31/91 days = –3.1 points
Offer = –8 × 31/91 days = –2.7 points

Therefore, the 4-month forward swap quote will be:

Bid = –12 + –3.1 = –15.1 points
Offer = –10 + –2.7 = –12.7 points

Question 8

USD interest rates are quoted at 1.5% for 6 months and SGD interest rates for the same period are 1%. How would you expect the swap rates to be quoted?

- **A.** At a SGD forward premium
- **B.** At a SGD forward discount
- **C.** Around par
- **D.** None of the above

ANSWER: A

The currency with the lower interest rate will trade at a forward premium. Here, the SGD has a lower interest rate, so the swap rates will be a SGD premium.

Question 9

Spot EUR/USD is quoted at 1.48 50/55, and 6-month forward swaps are 33 – 30. At what rate can you buy EUR 6 months outright?

- **A.** 1.4825
- **B.** 1.4817
- **C.** 1.4883
- **D.** 1.4885

ANSWER: A

The points are at a discount, so the forward EUR/USD offer is 1.4855 less 30 points =1.4825.

Question 10

Spot AUD/USD is quoted 0.9000 (mid point). If 6-month AUD interest rates are quoted at 5%, and the same period USD interest rates is 2%, what is the approximate quotation of AUD/USD forward points?

- **A.** 13/11
- **B.** 12/14
- **C.** 135/130
- **D.** 130/135

ANSWER: C

The 3% differential between USD and AUD interest rates is worth approximately 1.5% of 0.9000 over 6 months, which is 135 points. As the AUD is the base currency and has a higher interest rate relative to USD, the points should be a discount. This leads to answer C. Alternatively, the spot rate and the interest rates can be inputted into the forward swaps formula and calculated.

Question 11

If a 3-month EUR/CHF swap is quoted 27/30 and a 6-month swap is quoted 42/45, what would be the 5-month interpolated forward swap points be quoted?

A. 30/33
B. 33/36
C. 37/40
D. 40/43

ANSWER: C

Both 3-month and 6-month swaps are quoted at a EUR premium. The difference between the two is 15 points on both the bid as well as on the offer. Therefore, the additional premium per month is 5 points. The 5-month swap (two additional months) is worth 10 points more than the 3-month swap, hence, the answer.

Forward Swap Positions

Customers wishing to hedge their currency exposure will do so using forward outrights. By separating the forward outright into spot and a forward swap, the forward swap instrument is a convenient way for dealing banks to unwind positions, that they assume from customers, through liquid markets.

The forward swap equation can be seen as comprising two parts. One being the spot rate and the other being a term involving v and b, as seen in the formula below.

$$\text{Forward Swap Rate} = \text{Spot}\left[\frac{\left(1 + v \times \frac{\text{days}}{\text{year}}\right)}{\left(1 + b \times \frac{\text{days}}{\text{year}}\right)} - 1\right]$$

$$= \text{Spot} \times f(v, b)$$

An examination will show that the forward swap rate is quite insensitive to fluctuations in the spot rate (since f(v, b) is close to zero). However, it is relatively sensitive to changes in f(v, b), which is affected significantly by the interest rate differential between v and b.

Therefore, another way of looking at forward swaps is as an instrument that allows banks to separate the risk that they assume from customers into:

1) A currency risk, which the banks can then unwind through the spot FX market; and
2) A largely interest (differential) risk element that can be unwound through the forward swap, or other interest rate markets.

The forward swap deal itself is an exchange of one currency for another on one date, that is to be reversed on a future date. Thus, when a bank sells USD outright to another party, it can seen as doing the following:

Bank spot dealer sells USD	Spot deal
Bank forward dealer buys USD spot Bank forward dealer sells USD forward	Forward swap deal
Bank sells USD forward outright	Net effect

Therefore, a quote on the forward swap (where USD is the base currency) is effectively doing the following:

Bid	20	/	Offer 18
Sells USD spot			Buys USD spot
Buys USD forward			Sells USD forward

The forward swap can be seen as a temporary purchase or sale of one currency against another. While there is one deal, the transaction has two settlements, one on the value date and the reverse cashflows on the forward value date.

The same effect can also be achieved by borrowing a currency in one period, and lending the other currency for the same period. This is clear when one follows the cashflows stemming from a forward swap deal. On the bid side of the swap, when a first dealer sells and then buys USD forward, he has essentially lent USD and borrowed the other currency. Upon maturity, the currencies are repaid, generating the reverse cashflows.

Conversely, on the offer side of the swap, the dealer has essentially borrowed to USD and lent the other currency.

A dealer dealing on the bid side of a forward swap will benefit when US interest rates fall relative to interest rates of the variable currency. A dealer dealing on the offer side will benefit when US interest rates rise relative to the interest rates of the variable currency. Thus, forward swaps are a way for banks to take positions based on their views on the relative movement of interest rates.

KEY LEARNING POINTS

On the bid side of a swap quotation, a dealer first sells base currency and then buys base currency upon maturity. This is equivalent to lending base currency and borrowing the other currency for the period of the swap.

On the offer side of a swap quotation, a dealer first buys base currency and then sells base currency upon maturity. This is equivalent to borrowing base currency and lending the other currency for the period of the swap.

Applying Forward Swaps

Aside from allowing banks to take a position based on their relative view of interest rates, the link between interest rates and forward swaps allows banks to take advantage of opportunities in different markets. This can be done in several ways:

1) Funding an Overseas Investment

First, say a bank can borrow relatively cheaply in one currency (e.g., its home currency) but at the same time, it needs to fund itself in another currency. The bank can borrow in the cheaper currency, then use a forward swap to convert the cheaper currency to the second currency. The resulting cost of borrowing would be lower.

2) Covered Interest Arbitrage

Second, even if it does not need to borrow in the second currency, it can borrow money in the cheaper currency and then place it out on deposit in the second currency, if the yield in the second currency is relatively high. In the process, it can lock in a yield advantage. This process of borrowing in the cheaper currency, swapping the proceeds, and placing it out in the higher yielding currency is called **covered interest arbitrage**.

3) Hedging of Forward Outright Positions

To review, a Forward Outright = Spot + Forward Swap. Customers wishing to hedge their currency exposures frequently deal in forward outrights. A bank dealing with these customers will have a counter position, which it can unwind in the interbank market through a combination of a forward swap and a spot transaction.

'Ante-Spot' Rates

Short Dates Swap

Bank dealers have to square off their cash balances in the various currencies each day. There will be days when there is a surplus of funds, and deficits on others. Besides using the deposit market, banks can use the short date swap market to square off these cash balances.

The most frequently short date swaps are those for overnight (today against tomorrow), and tom/next (tomorrow against the spot date).

Outright 'Ante-Spot' FX Rate

'Ante' is the Latin word for 'before'. Therefore, 'ante-spot' dates are the dates for delivery before the spot date. These can be for same day (today) or next day (tomorrow) delivery.

Pricing Tom Outright FX

Example: To illustrate ante-spot rates, suppose we have the following quotes:

Spot USD/SGD	1.39 00	10	
Tom/Next swap	0.4	0.3	(swap points are discount)
Overnight swap	0.3	0.2	(swap points are discount)

Suppose a customer asks for a bid in USD/SGD value tom, what rate should the dealer quote?

The solution is to look at the deals that the dealer will have to execute to get back to a square position. The dealer will sell USD/SGD spot to neutralise his FX exposure. However, there is a mismatch in the timing of cashflows even though his FX exposure is square, therefore he would need to execute a tom/next swap. Putting together these 3 transactions, we can see that the dealer is finally square.

	Value Tom	Value Spot
Tom FX buy (from customer)	Buy USD/Sell SGD	
Spot FX sale		Sell USD/Buy SGD
Tom/Next swap	Sell USD/Buy SGD	Buy USD/Sell SGD

As the dealer has to deal at the market price to square his position, he has to hit the spot FX bid as well as the tom/next offer to execute a sell/buy USD swap.

Before we arrive at our answer, we also need to change the sign on quote on the tom/next swap. This is because the tom/next swap quote is for a transaction going forward in time, whereas we are counting back from the spot FX rate in arriving at a value tom outright FX quote.

Putting this altogether, we have the tom FX bid as:

Spot FX bid	1.39 00
Tom/Next swap offer	0.3 (sign reversed)
Tom FX bid	**1.39 003**

Using the same logic, we can also obtain the tom FX offer:

Spot FX offer	1.39 10
Tom/Next swap bid	0.4 (sign reversed)
Tom FX offer	**1.39 104**

Pricing Same-day Outright FX

To obtain same-day outright FX (i.e. settling same day as transaction date), note that we need to execute both overnight and tom/next swaps to cover the mismatch in cashflows.

Following the same reasoning as above, we obtain:

Spot FX bid	1.39 00
Tom/Next swap offer	0.3 (sign reversed)
Overnight swap offer	0.2 (sign reversed)
Same-day FX bid	**1.39 005**

Spot FX offer	1.39 10
Tom/Next swap bid	0.4 (sign reversed)
Overnight swap bid	0.3 (sign reversed)
Same-day FX offer	**1.39 107**

Question 12

Looking at the following rates, what would be the quote for GBP/USD outright value tomorrow?
Spot GBP/USD: 1.48 55/60; tom/next GBP/USD: 1.5/2

A. 1.48 53/585
B. 1.48 565/62
C. 1.48 535/58
D. 1.48 57/615

ANSWER: A

To hedge his position, the market maker has to take spot market quote and use the tom/next to adjust the cashflows to value tomorrow. The outright tomorrow is obtained by reversing the sides of the tom/next quote, then adding the tom/next offer to the spot bid, and adding the tom/next bid to the spot offer. Therefore:

Bid: 1.48 55 + (–2) = 1.4853
Offer: 1.48 60 + (–1.5) = 1.48585

Forward Cross Currency Outrights

In Section 3.2 on Reciprocals and Cross Rates, general rules were given on how cross rates can be derived:

Given two quotes where the USD is neither the base currency, nor the variable currency i.e. quotes are both indirect or both direct quotes:
Divide the opposite side of the two-way prices of equivalent USD rates to derive a cross rate, making the stronger currency the base currency.
Examples: SGD/BRL, GBP/AUD

Given two quotes where the USD is the base currency in one and the variable in the other, i.e. where one quote is direct and the other indirect:
Multiply the same two sides of the two-way prices of the equivalent USD rates to derive a cross rate, making the stronger currency the base currency.
Examples: GBP/SGD, AUD/JPY

These rules can be applied equally to derive spot rates as well as to forward outrights. The additional step is to arrive at the forward outrights of the two currencies and then to apply the rules outlined above.

Example: We have learnt to derive the USD/SGD and USD/IDR forward outrights. To derive the forward cross currency forward SGD/IDR:

6-month Forward Outright USD/SGD = 1.39 29/37
6-month Forward Outright USD/IDR = 9895/10000

The convention is to use the stronger currency as the base currency in constructing the cross rate; in this case it is the SGD.

Deriving the Bid
The quoting bank will buy SGD and sell IDR at the bid. This activity can be split into two transactions:

1) Buy SGD, sell USD at the offer price of 1.39 37
2) Sell IDR, buy USD at the bid price of 9895

The bank receives 1.3937 SGD per USD, and pays out 9895 IDR per USD. Therefore, it receives 9895/1.3937 = 7100 IDR per 1 SGD.

Deriving the Offer
The quoting bank will sell SGD and buy IDR at the offer. Again it can be split into two transactions:

1) Sell SGD, buy USD at the bid price of 1.39 29
2) Buy IDR, sell USD at the offer price of 10000

The bank pays 1.3929 SGD per USD, and receives 10000 IDR per USD. Therefore, it pays out 10000/1.3929 = 7179 IDR per 1 USD.

The Cross Rate Quotation derived fro SGD/ IDR is therefore:

SGD/IDR: 7100/7179

Question 13

You are quoted the following rates.
Spot USD/SGD1.40 30/35; 6-month USD/SGD: 21/18
Spot EUR/USD1.48 55/60; 6-month EUR/USD: 33/30
Where can you buy EUR against SGD 6-month outright?

A. 2.0776
B. 2.0783
C. 2.0787
D. 2.0764

ANSWER: C

First, calculate the 6-month forward outrights. Both forward swaps are discounts, so we have: USD/SGD1.40 09/17; EUR/USD1.48 22/30. Since one currency pair is a indirect quote and the other is a direct quote, we can obtain the cross rate by a straight multiplication of the bids, and multiplication of the offers. The EUR/SGD 6-month forward outright price is: 2.07 64/87. We are looking to buy EUR at the offer, so we will deal at 2.0787.

3.7 Market Terminology

Chapter 11 of the ACI Model Code lists the common terminology used in dealing. Parts 1 and 2 of that chapter summarises the terms used in the FX and Money Markets. Please refer to the relevant sections in the ACI Model Code.

3.8 The Metals Market

Precious Metals

A precious metal is a rare, naturally occurring metallic element that has high economic value. Gold and silver are the best known of the precious metals; their physical properties have enabled them to be used as money throughout history. Even in the present age of fiat (government decreed) money, they still attract the interest of investors and traders. Gold and silver are also commonly referred to as the **bullion metals**.

Besides gold and silver, platinum and palladium are metals that are widely traded. Like currencies, these four metals are denoted by ISO codes. The ISO codes begin with X followed by their chemical short names: gold (XAU), silver (XAG), platinum (XPT), palladium (XPD).

Trading of Metals

The trading of metals is analogous to the trading of FX, with equivalents of spot, forward and forward swaps markets. The price of these metals are quoted in USD per troy ounce. A troy ounce is 31.1035 grams.

Similar to FX, the trading of these metals occurs OTC. The basis for settlement of the Loco London bullion quotation is the delivery of a standard London Good Delivery bar at the London vault, whereas the basis of settlement for platinum or palladium for settlement is delivery of a standard Good Delivery plate or ingot at the London or Zurich vault.

While currency settlement or payment for a transaction will generally be in US dollars over a dollar account in New York, the delivery of metal against transactions in gold, silver, platinum and palladium are, in practice, made a number of ways. These include physical delivery at the vault of the dealer or other specified location, by credit to an 'allocated account', through the London Bullion Clearing, or the London/Zurich Clearing to the 'unallocated account' of any third party.

'Allocated accounts' are accounts held by dealers in clients' names, on which are maintained balances of uniquely identifiable bars, plates or ingots of metal 'allocated' to a specific customer and segregated from other metal held in the vault. The client has full title to this metal with the dealer holding it on the client's behalf as custodian. To avoid any doubt, metal in an allocated account does not form part of a precious metal dealer's assets. An allocated account cannot, by definition, be overdrawn.

'Unallocated accounts' represent the most straightforward and hence most popular way of trading, settling and holding gold, silver, platinum and palladium. The simplicity of this arrangement is reflected in the fact that transactions may be settled by credits or debits to the account, while the balance represents the indebtedness between the two parties. Credit balances on the account do not entitle the creditor to specific bars of gold or silver, or plates or ingots of platinum or palladium. Instead, they are backed by the general stock of the precious metal dealer, with whom the account is held. The client in this scenario is an unsecured creditor.

A negative balance in an unallocated account will represent the precious metal indebtedness of the client to the dealer in the case where the client has a precious metal overdraft facility.

In international market practice, OTC Loco London trading are on an 'unallocated account' basis, unless it is agreed between two parties in advance.

Should an unallocated account holder wish to receive actual metal, this can be done by 'allocating' specific bars, plates or ingots of equivalent precious metal product - the metal content of which is then debited from the unallocated account.

To take the analogy of simple currency bank accounts - precious metal bars, of any form, may be drawn down, or allocated, from an unallocated account in the same way that bank notes with specific unique numbers may be drawn out of a bank checking account. London Good Delivery gold bar must have a minimum fineness of .995 and a gold content of between 350 and 430 fine ounces with the bar weight expressed in multiples of 0.025 of an ounce. Bars are generally close to 400 ounces or 12.5 kilograms.

While the market is OTC, there are important trade associations and exchanges that have significant influence and serve as a reference indicating where prices of the metals are trading. For gold and silver, this is the London Bullion Markets Association (LBMA) and the New York Commodity Exchange (COMEX). For platinum and palladium, it is the London Platinum and Palladium Market (LPPM) and the Chicago Board of Trade (CBOT).

The London Bullion Market Association (LBMA)

The LBMA is a trade association that acts as the coordinator for activities conducted on behalf of its members and other participants in the London bullion market. Here are its main roles:

- It acts as the market's principal point of contact with regulators and other official bodies.
- It ensures the continued evolution and health of a marketplace for gold and silver in which all participants can operate with confidence.
- Further, it promotes good trading practices and develops standard documentation as appropriate.

The broad-based membership of the LBMA includes commercial banks, fabricators, refiners, transport companies and brokers. These companies provide facilities for the trading, refining, melting, assaying, transporting and vaulting of gold and silver bullion. Full membership is open to companies and other organisations actively engage in these activities in the London market.

There are two categories of full membership: members and market making members. Non-market-making members are usually referred to as ordinary members. Market making members are required to quote prices to each other upon request throughout the London business day in any combination of the three main product categories – spot, forwards and options – in both gold and silver. As an alternative to full membership, companies, which are though not actively involved in the London bullion market, undertake activities relevant to it, may be affiliated to the LBMA as Associates.

The LBMA Gold Fixing

In addition to the two-way bid and offer quotations available in the OTC market, gold can be traded in the London Gold Fixings. The guiding principle behind the Fixings is that all business, whether for large or small amounts, is conducted solely on the basis of a single published fixing price. Clients around the world may buy or sell gold at the fixing price, upon which a small commission is generally charged. These fully transparent benchmarks are globally accepted as the basis for pricing a variety of transactions, including industrial contracts and averaging business. They may also be used as a basis for cash-settled swap and option transactions.

There are five members of the Gold Fixing – all of whom are market making members of the LBMA. The chairmanship of the Fixing rotates annually among the fixing member firms.

The Fixing is conducted by telephone twice (at 10.30 a.m. and 3.00 p.m.) on each London business day. Clients may place orders, directly or through banks, with the dealing rooms of the Fixing members, who net all orders before communicating the net interest to their representative at the Fixing. The gold price is then adjusted up and down until sell and buy orders are matched, at which point the price is declared 'fixed' and all orders are executed on the basis of that price.

Transparency at the Fixing is served by the fact that customers are kept advised of price changes, together with the level of interest, while the Fixing is in progress. Customers may cancel, increase or decrease their interest dependent upon this information.

Gold Lease Rate and the Gold Forward Swap

The gold lease rate is the cost of borrowing gold - similar to interest rate differentials in the FX market. This allows gold holders, such as central banks, to loan out their holdings of gold and earn a return.

There is also a gold forward swap market, through which professional dealers and banks may swap gold for USD (or any currencies), or vice versa, for a specified period, similar to the forward swap market in FX. Forward swap against a forward date (forward-forward) instead of spot is also available in the interbank market.

Like the majority of currencies, it is market convention to use the actual/360-day basis in calculating loan and deposit interest as well as forward premiums.

The 'GOFO' rate is the Gold Forward Offered Rate, which is provided on Reuters page 'GOFO' for the periods of 1, 2, 3, 6 and 12 months. The numbers represent the rates at which the market making members will lend gold on swap against US dollars.

The 'GOFO mean' provides an international benchmark for gold swap rates. It is the gold equivalent of LIBOR and is calculated each business day at 11.00 a.m. and published immediately thereafter. In order for the mean to be valid, rates from at least six market makers must be available on the GOFO page at 11.00 a.m. The mean is then determined by discarding the highest and lowest quotations and calculating the average of the remaining rates. The GOFO mean provides the benchmark for long-term finance and loan agreements as well as for the settlement of gold interest rate swaps and forward rate agreements.

Question 14

What are the ISO Codes for gold and silver?

A. GLDS and SILV
B. XAU and XAG
C. Gold and Silver
D. None of the above

ANSWER: B

The ISO codes are 'X' followed by their chemical notations.

Question 15

Which of the choices below qualifies for delivery in the Loco London market?

A. A bar of 100 ounces of .995 gold
B. A bar of 100 ounces of .999 gold
C. A bar of 400 ounces of .999 gold
D. A bar of 500 ounces of .995 gold

ANSWER: C

The specification of a London Good Delivery gold bar is a minimum fineness of 0.995 and a gold content of between 350 and 430 fine troy ounces. Therefore, C qualifies for delivery. (Note: Although C qualifies for delivery, in practice, banks will not deliver gold of .999 fineness against Loco London trades because the refining cost for higher purity gold bars are usually higher as well.)

TOPIC 4

Money Market Derivatives

4.1 Forward-Forward Interest Rates

4.2 Forward Rate Agreements

4.3 Interest Rate Futures

4.4 Interest Rate Swaps

4.1 Forward-Forward Interest Rates

Forward-Forward Interest Rates

Forward-forward interest rates (or forward-forwards) refer to the level of interest rates on deposits that start at some date in the future, but which are contracted today. The concept of forward-forwards was briefly mentioned in Topic 1 under interest rate calculations.

Derivation of Forward-Forward Rates

Forward-forward interest rates are linked to the interest rates on term deposits. To derive forward-forward interest rates, suppose that the 3-month USD rate was 2.5% and the 6-month USD rate was 2.8%. If we borrowed USD1 mm for 6 months and simultaneously deposited it for 3 months, we would have effectively created a borrowing that starts in 3 months' time and ends in 6 months' time. By undertaking these two transactions, we have created a forward-forward borrowing i.e. a borrowing that starts on a forward date and ends on another forward date. Therefore (assuming 3 months = 91 days, and 6 months = 183 days):

1) Borrow for 6 months at 2.8%, then at the end of 183 days, we repay:

$$1 + 0.028 \times \frac{183}{360} = \text{USD}1.01423 \text{ mm}$$

2) Lend for 3 months at 2.5%, then at the end of 91 days we receive:

$$1 + 0.025 \times \frac{91}{360} = \text{USD}1.00632 \text{ mm}$$

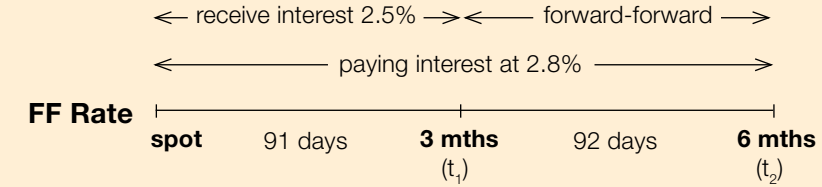
3) Applying the true yield formula (Equation 7 in Topic 1), the cost of a 3-month forward-forward (FF) borrowing, starting 3 months from now is:

$$\textbf{3-month FF} = \left(\frac{\textbf{6-month borrowing}}{\textbf{3-month lending}} - 1\right) \times \frac{\textbf{year}}{\textbf{days}}$$

$$= \left(\frac{1.01423}{1.00632} - 1\right) \times \frac{360}{92}$$

$$= 3.076\%$$

The exercise above can be represented in the diagram below:



In general, an FF rate can be obtained by:

$$\textbf{Forward-Forward} = \left[\frac{1 + \left(i_2 \times \frac{t_2}{\text{year}}\right)}{1 + \left(i_1 \times \frac{t_1}{\text{year}}\right)} - 1\right] \times \frac{\text{year}}{t_2 - t_1}$$

where: i_1 and t_1 is the interest rate applicable to, and the days in the shorter period

and i_2 and t_2 is the interest rate applicable to, and the days in the longer period

Applications

Covering Maturity Gaps

Customers expect banks to customise transactions to suit their specific needs. For example, rates are often fixed in advance for credit facilities. A cumulation of such deals leaves a bank with a 'maturity gap'. This is when the maturity of a bank's liabilities and its assets do not match, leaving it exposed to interest rate risk.

If the maturity gap is large or is in a direction that is counter to the bank's view of interest rates, then the bank would be keen to cover that maturity gap. It can do so through the forward-forward market.

Interest Rate Positioning

The use of forward-forwards can also be extended to open maturity gaps that reflect the bank's views on how it sees interest rates moving. If a dealer is expecting interest rates to fall in the future, it can open a 'short' forward-forward position e.g., lend 6 months' money, 3 months' forward. When interest rates fall, then the dealer can cover the open position in 3 months' time by borrowing 6 months' money at a lower rate, thus locking in a profit.

However, as the forward-forward contract results in lending or borrowing at the start date, it would inflate the balance sheet and take up credit lines, making it a relatively inefficient speculative instrument. For this reason, banks would prefer to use off-balance instruments like forward rate agreements or interest rate futures for interest rate positioning.

Example: A USD deposit dealer has borrowed USD100 mm for 6 months and lent USD100 mm for 12 months. If the market was trading at the following rates:

6 months USD	2.5625 / 2.625
12 months USD	2.825 / 3.00

What is the rate for a 6-month loan starting in 6 months' time?
What view does the dealer have?

Answer: The relevant rates are 2.625% for a 6-month borrowing, and 2.825% for a 12-month loan. Assuming 182 days for the 6-month period and 365 days for a year, the rate for a 6 × 12 forward-forward is given by:

$$\text{Forward-Forward} = \left[\frac{1 + \left(i_2 \times \frac{t_2}{\text{year}}\right)}{1 + \left(i_1 \times \frac{t_1}{\text{year}}\right)} - 1\right] \times \frac{\text{year}}{t_2 - t_1}$$

$$= \left[\frac{1 + \left(0.02825 \times \frac{365}{360}\right)}{1 + \left(0.02625 \times \frac{182}{360}\right)} - 1\right] \times \frac{360}{365 - 182}$$

$$= 2.984\%$$

The dealer has a view that interest rates will fall in the future.

Question 1

You are given the following rates:

EUR 3 months (90 days) – 1.75%
EUR 6 months (180 days) – 2.00%

What is the interest rate on a 3-month deposit that starts in 3 months' time?

A. 1.75%
B. 1.98%
C. 2.17%
D. 2.24%

ANSWER: D

The day count convention is ACT/360. Using the formula for forward-forward rates, we derive the answer as:

$$FF = \left[\frac{1 + \left(i_2 \times \frac{t_2}{year}\right)}{1 + \left(i_1 \times \frac{t_1}{year}\right)} - 1\right] \times \frac{year}{t_2 - t_1}$$

$$= \left[\frac{1 + \left(0.02 \times \frac{180}{360}\right)}{1 + \left(0.0175 \times \frac{182}{360}\right)} - 1\right] \times \frac{360}{180 - 90}$$

$$= 2.24\%$$

4.2 Forward Rate Agreements

Forward Rate Agreements

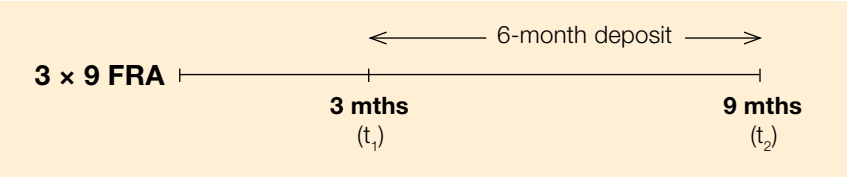
A **forward rate agreement** (FRA) is an off-balance sheet instrument to fix future borrowing or lending rates. It does this through a cash settlement in the future. This leads to an outcome with the same economic effect as a forward-forward.

An FRA is an agreement to pay or receive, on an agreed future date, the difference between an agreed interest rate and the interest rate prevailing on that future date, based on an agreed notional principal amount.

The parties to an FRA take the role of a lender or borrower. A buyer of an FRA is looking to protect his cost of borrowing in the future against a rise in interest rates. A seller is expecting interest rates to fall and is looking to lock in the rate at which he will lend in the future.

Terminology

FRAs are quoted as a $t_1 \times t_2$ FRA, where t_1 is the time in the future that the deposit starts and t_2 is the time that it ends. An agreement to lock in the rate of a 6-month deposit that starts in 3 months is denoted as a 3 × 9 FRA, given that a 6-month deposit starting in 3 months' time will terminate in 9 months from the time of the agreement.



The quotation for an FRA is similar to deposits, e.g.,

	Bid		Offer
3 × 9 FRA	2.55	/	2.60

The party bidding at 2.55 will buy an FRA. By buying an FRA, the bidder is locking in a 6-month borrowing starting in 3 months' time at 2.55%. He is expecting interest rates to rise. The party offering at 2.60 wants to sell an FRA. If the seller is taken at his offer, he will lock in a 6-month lending rate starting in 3 months' time. He is expecting rates to fall.

Settlement of FRA

Refer to the above quotation. Suppose two parties agree to deal at 2.57% for $10 mm notional. Then in 3 months' time, on the dealing date of a deposit whose spot date corresponds with the start date of the FRA, the reference (deposit) rate for the FRA is noted. Often, it is the LIBOR fixing; in our example, it is the 6-month LIBOR rate. If the 6-month LIBOR at the time is higher than 2.57%, a payment is made to the buyer of the FRA. The effect of the payment is to lower the borrowing cost of the buyer. If the LIBOR rate is lower than 2.57%, a payment is made to the seller of the FRA. This effectively increases the lending rate of the seller.

The settlement amount is the difference in the interest amount stemming from the difference between the contracted rate on the FRA, and the benchmark reference rate at the start date of the FRA. However, since interest is usually paid at the end date of a deposit, while in the FRA, the payment is made at the start date, the difference in the interest amount has to be discounted to the start date.

The settlement amount (S) at the start date of the FRA is given by:

$$\text{Settlement Amount (S)} = \text{Notional} \times \frac{\left[(F - L) \times \frac{(t_2 - t_1)}{\text{year}}\right]}{\left[1 + L \times \frac{(t_2 - t_1)}{\text{year}}\right]}$$

where: **F** is the contracted FRA rate
L is the reference LIBOR rate at the start date
$\mathbf{t_1}$ is the start date and $\mathbf{t_2}$ is the end date of the FRA

when: F < L, FRA seller pays the buyer
F > L, buyer pays the seller

Note: The denominator in the formula acts to discount the amount stemming from the interest rate difference between F and L, to the start date.

Example: A 3 × 9 FRA was contracted at 2.57% for $10 mm notional. At the start date, 6-month LIBOR was fixed at 2.8%. Calculate the settlement amount. To whom should payment be made?

$$S = \$10 \text{ mm} \times \frac{\left[(2.57 - 2.80) \times \frac{(273 - 91)}{360}\right]}{\left[1 + 2.80 \times \frac{(273 - 91)}{360}\right]}$$

$$= -\$11{,}465.48$$

Since F < L, the amount of $11,465.48 is paid by the seller to the buyer of the FRA.

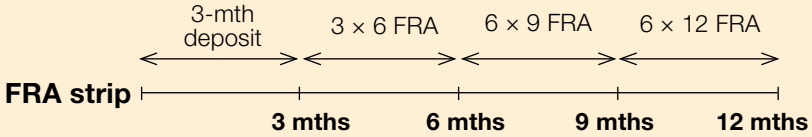
Applications

As with forward-forwards, FRAs may be used for hedging and speculation. However, FRAs are settled as cash payments for the difference between contracted and benchmark rates. As a result, they do not inflate the bank's balance sheet and are a much more efficient instrument for expressing interest rate views and taking positions.

The application of FRAs for covering hedging and positioning is similar to that for forward-forwards.

Constructing a Strip Using FRAs

Earlier, we saw that combining a 3-month deposit with a 3 × 3 FRA or forward-forward would be equivalent to creating a 6-month deposit. Extending this, we could combine a 6-month deposit with a 6 × 9 FRA to create a 9-month deposit. In general, using a series or 'strip' of FRAs, we can create the interest exposure of a deposit of maturity matching the end date of the last FRA. The diagram below shows the use of a series of 3-month FRAs to generate interest rate exposure of a 12-month deposit.



Example: Suppose that it is the beginning of January and the prevailing rates are given below. Using the prevailing rates, lock in the cost for a fixed rate borrowing for 9 months and calculate the cost of the 9-month borrowing. Assume ACT/360.

3-month LIBOR	2.50%	(90 days)
3 × 6 FRA	2.60%	(92 days)
6 × 9 FRA	2.80%	(91 days)

Answer: We can construct the strip as follows:

1) Borrow $1 mm for 3 months at 2.5% today.
2) Re-finance maturing amount in April at 2.60% by buying a 3 × 6 FRA today.
3) Re-finance again the maturing amount in July at 2.80% by buying a 6 × 9 FRA today. The effect is to have locked in a 9-month borrowing maturing in October.

The amount owed at the end of 9 months would be:

$$\$1 \text{ mm} \times \left(1 + 0.025 \times \frac{90}{360}\right) \times \left(1 + 0.026 \times \frac{92}{360}\right) \times \left(1 + 0.028 \times \frac{91}{360}\right)$$

$$= \$1{,}020{,}105.31$$

The cost of borrowing is therefore:

$$\left[\left(\frac{\textbf{Amount Repaid}}{\textbf{Amount Borrowed}} - \mathbf{1}\right) \times \left(\frac{\textbf{year}}{\textbf{days}}\right)\right]$$

$$\left[\left(\frac{1020105.31}{1000000} - 1\right) \times \frac{360}{(90 + 92 + 91)}\right]$$

$$= 2.65\%$$

(Although market practice is for the FRA settlements to be made at the start date of the FRA, we assume that the settlement amount can be invested or borrowed at the prevailing LIBOR when the borrowing is rolled over. The economic effect would be as if the settlement were paid at the end of the series of FRAs.)

Question 2

A dealer borrows for 3 months, while at the same time, lends out money for 8 months. What equivalent FRA position has he created?

A. Long 3 × 8 FRA
B. Short 3 × 8 FRA
C. Long 3 × 5 FRA
D. Short 3 × 5 FRA

ANSWER: B

By borrowing for 3 months, while lending out for 8 months, the dealer has covered his exposure for the front 3 months and left open an exposure equivalent to being short at 3 × 8 FRA.

Question 3

Presently, 3-month LIBOR is 3.2%. A dealer buys a 6 x 9 FRA at 2.7%. What is his view on interest rates?

A. 3-month LIBOR will fall to 2.7% in over 6 months' time
B. 3-month LIBOR will be above 2.7% in 6 months' time
C. 3-month LIBOR will rise from current levels
D. 3-month LIBOR will fall and then rise after 6 months

ANSWER: B

As long as 3-month LIBOR is above the contracted FRA rate (2.7%) in 6 months' time, the dealer will be paid the settlement amount. Therefore, the dealer is expecting 3-month LIBOR to be above 2.7%. The unusual level of the FRA is a reflection of the negative yield curve reflecting the market's view of a fall in interest rates.

Question 4

A 3 × 9 FRA was contracted at 2.57% for $10 mm notional. At the start date, 6-month LIBOR was fixed at 2.8%. At settlement, which of the following will be made? (Assume that the 3-month period is 91 days and the 9-month period is 273 days).

A. $11,465.48 is paid by the buyer to the seller of the FRA at the 3-month point

B. $11,465.48 is paid by the seller to the buyer of the FRA at the 3-month point

C. $11,627.78 is paid by the buyer to the seller of the FRA at the 9-month point

D. $11,627.78 is paid by the seller to the buyer of the FRA at the 9-month point

ANSWER: B

The settlement amount is calculated using the formula:

$$S = \$10\text{ mm} \times \frac{\left[(2.57 - 2.80) \times \frac{(273 - 91)}{360}\right]}{\left[1 + 2.80 \times \frac{(273 - 91)}{360}\right]}$$

$$= -\$11{,}465.48$$

As the LIBOR fixed is greater than the FRA rate, the amount is paid by the seller to the buyer of the FRA. The amount compensates the buyer (borrower of funds) and lowers the cost of borrowing from the prevailing LIBOR to the contracted rate. The settlement amount in an FRA has been discounted to the point where LIBOR is fixed.

4.3 Interest Rate Futures

Short-term Interest Rate Futures

In general, a futures contract is a contract where the commodity being bought and sold is delivered at some future date. Hence the term 'futures contract'. There are two significant differences between a forward contract and a futures:

1) Futures are traded on an exchange while forwards are traded over-the-counter (OTC).
2) Futures have standardised terms and specifications laid down by the exchange while forwards do not. The terms of forwards may be subject to negotiation and agreement if non-standard terms are required.

In the case of **short-term interest rate futures** (STIRS), the commodity traded is the interest rate on a 3-month deposit starting on specified delivery dates. In terms of application, interest rate futures are similar to forward-forwards and FRAs. Pricing an interest rate futures contract is similar to that of a forward-forward.

Quotation of Interest Rate Futures

Typically, STIRs are quoted as:

STIRs = 100% – 3-month interest rate

Therefore, an interest rate of 2.76% will be quoted as 97.24 i.e. 100 – 2.76.

As interest rates rise, the price of STIRs will fall. Conversely, as interest rates fall, the price of STIRs will rise. This parallels the price movement of interest rate instruments such as CDs and bonds.

Exchanges

Futures are traded on exchanges. Two major exchanges for the trading of interest rate futures are LIFFE Euronext, and CME through its International Monetary Market (IMM) subsidiary.

Open Outcry vs. Electronic Trading

When the trading of financial futures started, the method of trading followed the **open outcry** practice of trading commodity futures. This consisted of traders standing in one location (called the Pit) and physically shouting or flashing hand signals to express their intention to buy or sell at the prevailing price. These traders would be executing customer orders, or in the case of "locals", speculative orders for their own account.

In the 1990s, **electronic trading platforms** replaced the practice of open outcry. Increasingly, volume on electronic trading platforms like LIFFE Connect and CME Globex have overtaken volume using open outcry.

Clearing House

After trades are done, they are cleared through a clearing house, which verifies and registers the executed trades. Following the confirmation of the trade, the clearing house places itself as the counterparty to a trade, i.e. it becomes the buyer to every seller, and the seller to every buyer. In doing so, it eliminates the need to check the creditworthiness of multiple counterparties. Instead, it limits the counterparty risk of a futures trade to a single party – the clearing house.

Margin Requirements

The clearing house protects itself from the credit risks of being the counterparty to every trade by demanding that collateral be put up to back every open position. This collateral is called the **margin**. It ensures that every counterparty can make good on losses incurred in the event of adverse price fluctuations on the futures position.

Margin takes the form of an **initial margin**, which is put up when the position is first opened. Subsequently, the exchange will then debit or credit accounts with a **variation margin**, which reflects the day's loss or profit on contracts that are open. If the margin falls below a certain amount, i.e. **maintenance margin**, additional collateral must be posted to top up the account, otherwise the position is closed. Conversely, excess margin above initial margin requirements may be withdrawn from the account. In effect, the calculation of the variation margin is a daily 'marking to market' of positions. The initial margin is intended to cover the exchange for the short period until a position can be revalued and a variation margin called if necessary.

Delivery Dates

A futures contract will have a date as to when it will terminate i.e. when it will stop trading and settlement of the contract is made.

Typically, financial futures contracts coincide with the end of the four quarters i.e. December, March, June and September. The nearest dates over the coming year are known as the front months. Contracts may be available for as far as 10 years from the present date, although liquidity in these further contracts will be limited.

Delivery

The commodity that is traded in STIRs is a reference interest rate specified by the terms of the futures contract e.g., 3-month LIBOR fixing on the delivery date of the contract. That rate, translated to a futures price is the **settlement price**.

In the case of physical commodities, settlement of the futures contract is done through the delivery of the commodity of a specified quality at a specified location at the settlement price. In the case of interest rate futures, there is no physical delivery of a deposit. Instead the trader has to reverse his futures contract before the delivery date. Otherwise, the contract will be closed out by the exchange at the settlement price. The resulting profit or loss is credited or debited from the members account. This form of settlement is called **cash settlement**.

Futures and FRAs Compared

An FRA is an over-the-counter equivalent of a futures contract. The pricing mechanics is similar to forward-forwards. An FRA trader will often refer to the futures market to make an FRA price, as he can use the futures market to hedge his FRA positions.

While both FRAs and futures settle up front at the beginning of the notional borrowing period, FRAs discount the settlement amount, while futures do not. A 90-day FRA will not exactly offset a futures contract even if the amounts and dates are the same.

FRAs and futures trade in opposite directions i.e. a buyer of an FRA benefits when interest rates start to rise. On the other hand, a buyer of a futures benefits when interest rates fall.

Contract Specifications

The terms of a futures contract is specified by the exchange on which it is traded, and traders should note these specifications before dealing in the contracts. The specifications for commonly traded contracts can be found on www.euronext.com and www.cmegroup.com. Take note of the following features of a futures contract:

Contract Size
Eurodollar, Euroswiss, and Euribor are based on a 1 mm, 3-month deposit of the appropriate currency. The Eurosterling contract is based on GBP500,000 while the Euroyen is based on a Y100 mm, 3-month deposit.

Price Quotation
Futures are priced as an index of 100 – the interest rate. For example, if the implied interest rate is 2.76%. Then, the price will be 97.24 (100 – 2.76).

Tick Size
A **tick** is the minimum value by which a contract can change in value. In the past, the tick size was 1 basis point (0.01%) corresponding to the 2nd decimal place on the price quote. However, as markets became more liquid and price quotes narrowed, the tick size became reduced as well. Trading can now occur in 0.0025% increments for the expiring front contract, and 0.005% increments for subsequent months.

The value of a 0.01% on a contract is given as:

$$\textbf{1 Basis Point} = 0.01\% \times \textbf{Contract Size} \times \frac{90}{360}$$

In the Eurodollar contract, this would be equivalent to $25, so if the tick is ¼ basis point, the value of the tick would be $6.25.

Expiry
A futures contract expires i.e. ceases trading at a specified time. In the case of the CME Eurodollar contract, it expires at 11 a.m. London time – two business days before the third Wednesday of the expiry month.

Settlement Price on Expiry
The settlement of outstanding contracts when a contract expires follows procedures outlined in the contract specification. For interest rate futures, the settlement price is referenced against interest rate benchmarks like LIBOR or EURIBOR fixings on the expiry date.

Applications

As with forward-forwards and FRAs, interest rate futures may be used for hedging or speculation.

We noted earlier that there are some differences between futures and FRAs. Stemming from the fixed specifications of futures contracts, they lack the flexibility of customisation that FRAs have. Therefore, unless the exposure to be hedged falls neatly on the expiry date of futures, the hedge using futures will not be precise. This slippage due to a mismatch in dates is called the **basis risk**.

Question 5

Which of the following pairs of financial instruments provide arbitrage opportunities?

A. Spot FX and FRAs
B. Interest rate futures and FRAs
C. Currency swaps and interest rate options
D. Currency swaps and currency options

ANSWER: B

Both interest rate futures and FRAs track forward-forward rates, and from time to time will deviate sufficiently to allow for arbitrage between the two instruments.

Question 6

If you are expecting the yield curve that is presently positively sloped to steepen further, which of the following trades would you execute?

A. Sell the near contract, sell the far contract
B. Buy the near contract, buy the far contract
C. Sell the near contract, buy the far contract
D. Buy the near contract, sell the far contract

ANSWER: D

When a yield curve steepens, the far end interest rate rises relative to the near end. Furthermore, this can be a result of the absolute levels of interest rates falling or rising. You should therefore sell the far contract and buy the near contract.

Question 7

It is presently February 20XX and the front June contract is trading at 99.50. Interest rates rise 25 bps across the yield curve after the release of economic data. Where would you expect the June contract to be trading after the data release?

A. 99.50
B. 99.75
C. 99.25
D. 97.00

ANSWER: C

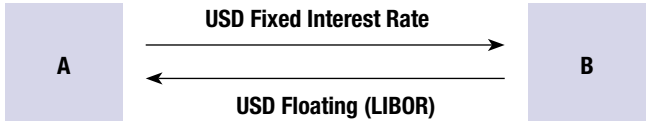
The second decimal point of an interest rate futures contract is 1 basis point. Since the price of an interest rate future is (100 – interest rate), a rise in interest rates will result in a fall of the futures price.

4.4 Interest Rate Swaps

Interest Rate Swaps

An **interest rate swap** (IRS) is an instrument that allows a counterparty to exchange one set of cashflows for another set of cashflows e.g., from fixed to floating. In allowing this exchange of cashflows, IRS also allows for the exchange of one interest rate exposure for another. Unlike the other short-term instruments considered earlier, swaps usually go beyond one year in maturity.

Terminology



The swap market usually talks in terms of fixed interest rates. **A** is the payer of fixed rate dollars, while **B** is the receiver. Swaps have a start date, fixing dates, settlement dates, and a maturity date. On each fixing date, the fixed rate will be compared to the prevailing floating rate benchmark. The difference, calculated on the notional principal, will be settled between the two parties on the settlement date.

Quoting Swap Prices

Swaps may be quoted as absolute rates or as a spread over a fixed rate benchmark. In an **absolute quote**, a dealer may say '3.50 – 3.45 in 10 year dollars'. This means that he is willing to receive 3.50% in fixed rate cashflows in return for paying USD LIBOR; at the same time, he is willing to pay 3.45% in fixed rate cashflows in return for receiving LIBOR cash flows. The term of the swap is 10 years.

Swaps are often quoted in terms of a **spread** over another benchmark rate. The benchmark is usually the government bond rate of a similar maturity as the swap.

When referenced to a fixed benchmark, the dealer may quote '30 – 26 in 10-year dollars'. This means that the dealer is willing to pay an interest rate of 26 basis points over the prevailing mid US Treasury rate, in exchange for the counter LIBOR cashflows. Conversely, he is willing to pay LIBOR to receive fixed rate cashflows of 30 bps above the mid Treasury rate.

Uses of a Plain Vanilla Swap

The IRS described above exchanges fixed for floating cashflows, or vice-versa. This is the most straightforward swap structure, and is often referred to as a **plain vanilla swap**.

A dealer uses swaps to:

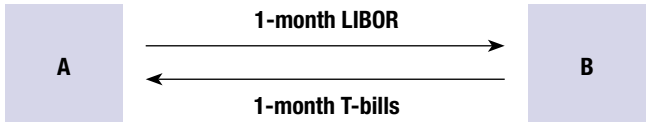
1) Make a profit by benefiting from the bid/offer spread from market making.
2) Position his interest rate book to benefit from movements in interest rates. By paying fixed for floating cash flows, a dealer is expecting interest rates to rise.

Customers use swaps to:

1) Hedge their fixed interest rate exposure.
   A customer who has borrowed at fixed rates and who now believes that rates will fall, can enter into a swap to receive fixed flows to offset his fixed payments.
2) Restructure their liability profile so that there is a better balance between fixed and floating liabilities.
3) Access cheaper funds e.g., when borrowing at a fixed rate and then swapping it for floating will yield a lower cost than borrowing floating directly.

4) An investor who has invested in a fixed rate bond and is receiving a stream of fixed cashflows may believe that interest rates may rise. He could re-position his portfolio by paying these fixed cashflows for floating cashflows.

Index or Basis Swap



A **basis swap** is an exchange of cashflows where the movement in the reference indices that determine the cashflows are different, creating basis risk. One example is the exchange of 1-month LIBOR for 1-month T-bill rate. This could be taken when the spread between T-bills and LIBOR is expected to change.

Overnight Index Swaps

One form of the basis swap is the **overnight index swap** (OIS). In an OIS, one leg of the cashflows is based on a daily overnight reference rate, and the other leg is the interest rate of the maturity of the swap.

For example, a 6-month OIS will pay interest calculated on the daily compounded overnight rate against the 6-month rate. Cashflows are exchanged at the maturity of the swap in 6 months.

The overnight rate is referenced to overnight rate indices for various currencies:

USD: Weighted average of the overnight Fed Funds rate

EUR: EONIA (Euro Overnight Index Average) calculated by the ECB

GBP: SONIA (Sterling Overnight Index Average) calculated by the Money Brokers Association

The OIS is used by banks to hedge their term lending to customers. Proceeds from their customers is set against an index closely approximating their daily funding cost.

Question 8

Which of the following best describes a plain vanilla swap?

A. An exchange of cashflows of one currency for another currency

B. An exchange of fixed cashflows for floating cashflows at periodic intervals

C. An interest rate swap that does not require documentation

D. An interest rate swap that is based on standard ISDA documentation

ANSWER: B

A plain vanilla swap is the basic form of an interest rate swap. This is where counterparties agree to exchange one set of cashflows based on an interest rate for another set based on a floating rate such as LIBOR.

Question 9

A dealer expects interest rate to rise. Which of the following action reflects that view?

A. He would be a payer of interest rate swaps.

B. He would be a receiver of interest rate swaps.

C. He would be a buyer of bonds.

D. He would be a seller of FRAs.

ANSWER: A

A dealer would want to pay away fixed cashflows to receive floating cashflows (which are expected to increase with higher interest rates). The other transactions benefit when interest rates fall.

TOPIC 5

Options

5.1 Options

5.2 Option Pricing

5.3 The ‘Greeks’ – Managing Option Risks

5.4 Option Payoff Profiles

5.5 Trading Strategies

5.6 Foreign Exchange Options

5.7 Interest Rate Guarantees, Caps and Floors

5.1 Options

Options

An **option** is a contract that confers on the buyer of the option the right to complete a transaction in the future (i.e. buy or sell a specified amount at a previously agreed price before or on a given date) if he so chooses, but he is not obliged to do so.

In comparison, his counterparty has no choice in this, but has the obligation to follow through with the decision of the option buyer.

In a sense, an option can be seen as a forward deal except that the buyer of the option has the flexibility of whether to complete the deal. For this flexibility, the buyer pays a fee, called the **option premium**.

Options are available for a wide range of underlying instruments, including currencies and interest rates.

Option Terminology

The buyer of the option is also called the **option holder**. The party that sells the option is the **option writer**.

To use an option is to **exercise** it.The date that the option matures (if it is not used) is the **option expiry** date.

A European option allows for exercise only on the expiry date. An American option allows for exercise at any time before the expiry of the option. A Bermudan option allows for exercise only on certain dates before expiry.

There are more complex styles. In Asian options, the price of the underlying is averaged over a number of days in determining the payout (difference between strike and underlying), rather than on one price when the option is exercised.

An option allows the holder, if the option is exercised, to sell or buy a specific quantity of the underlying instrument (called the **underlying**) at a pre-specified price. This price is called the **strike price**.

An option that gives the option holder the right to buy at the strike price is a **call option**. Conversely, an option that gives the holder the right to sell at the strike price is a **put option**.

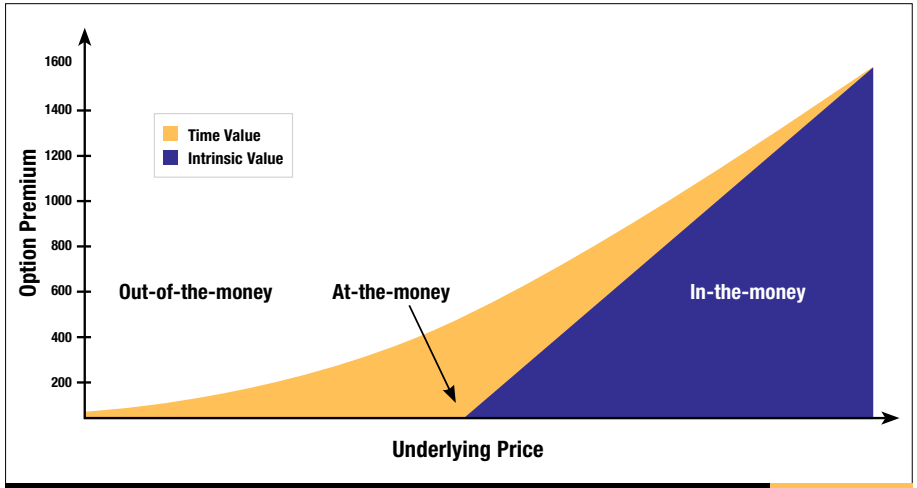
When the price of the underlying is at a level where it is advantageous for the option holder to exercise the option, the option is **in-the-money**. When it is not advantageous, the option is **out-of-the-money**. When the price of the underlying is equal to strike price, the option is **at-the-money**.

	Call Option	Put Option
In-the-money	Spot Price > Strike Price	Spot Price < Strike Price
At-the-money	Spot Price = Strike Price	Spot Price = Strike Price
Out-of-the-money	Spot Price < Strike Price	Spot Price > Strike Price

When an option is in-the-money, exercising the option will yield a profit, represented by the difference between the spot price and the exercise price. This profit is the minimum value of the option, and gives the option an **intrinsic value**. When an option is out-of-the-money, the option will not be exercised as the intrinsic value is zero.

Aside from the intrinsic value, an option has value because it gives the holder of the option the flexibility to buy or sell at the strike price until the time of the option's expiry or exercise. This value, which is in addition to the intrinsic value, is the **time value** or **extrinsic value** of the option. The value of an option is the sum of its intrinsic and extrinsic value.

To illustrate the terminology and concepts of option pricing, Figure 5.1.1 below shows the price of a call option plotted against the price of the underlying instrument. Time value of an option is greatest when the option is at-the-money.



Value of an Option Vs. Price of the Underlying **Fig. 5.1.1**

Question 1

Which of the following best describes a European option?

A. An option that can be exercised at anytime during the life of the option.

B. An option that can only be exercised at the maturity of the option.

C. An option listed on a European exchange.

D. An option written on a futures contract of Euronext.

ANSWER: B

A European option is one that can only be exercised at the maturity of the option. This is usually contrasted with an American-style option that allows exercise at anytime during the life of the option.

Question 2

A European option that is out-of-the-money has:

A. Zero value.

B. Zero intrinsic value.

C. Positive intrinsic value.

D. None of the above.

ANSWER: B

An option that is out-of-the-money has zero intrinsic value. However, it will still have time value so long as it has not expired.

5.2 Option Pricing

Option Pricing

From an option buyer's perspective, the premium paid represents the buyer's expected payout (i.e. the difference between underlying and strike price) from the option. Given that a buyer will only exercise the option when the payout is positive, the payout ranges from zero upwards. On the other side of the option, the seller will need to assess the various payouts and their probabilities.

Option pricing is therefore dependent on assessing various probabilities of the payouts. The expected value of these payouts is equal to a fair price for the premium.

Early approaches to pricing options looked at the pricing of various payout scenarios and probabilities. However, instead of mirroring the smooth movement of prices, the scenarios were discrete. Furthermore, the number of scenarios to be taken into account when considering scenarios over multiple periods proved to be intractable as computing power was limited then.

In 1973, Fischer Black and Myron Scholes arrived at a formula that solved for a fair value of a call option. This formula was expanded by others such as Robert Merton. The ability to arrive at a formula for calculating fair value led to the rapid growth of options trading. The **Black-Scholes** formula with various enhancements is still widely-used in pricing options.

Improvements in computing power also made practical the early **Binomial Approach** of looking at probablistic scenarios over multiple periods to price options.

Option Pricing Determinants

Determinants of Option Pricing

The ACI Dealing Certificate syllabus does not require a full exposition of the pricing of options. However, it is important to understand the factors that drive the price of an option.

The factors that determine the payout and probabilities are:

Strike Price
The more advantageous the strike price is to the buyer when the option is priced, the more likely the option will be exercised at a profit to the option buyer and at a loss to the writer, hence, the greater the premium.

Volatility
Volatility is the measure of how much the price of the underlying fluctuates. The more volatile the price, the more likely it is that the price will move into a scenario that is favourable to the buyer of the option. Therefore, the greater the volatility, the higher the premium.

The measure of volatility frequently encountered in option pricing formulae is the **standard deviation** of the price of the underlying.

Maturity of the Option
The longer the maturity, the greater the likelihood that the price will move into a scenario that is favourable to the buyer of the option because the price will have a longer time to fluctuate. Therefore, the longer the maturity of an option, the greater the premium. This factor also gives rise to the **time decay** in an option. That is, as the option approaches expiry, the value of the option that is attributable to its extrinsic value will erode, leaving only the option's intrinsic value at expiry.

Interest Rates

As payment of a small option premium gives the buyer the right to call upon delivery of the underlying at some future date, a call option can be seen as a leveraged position on the forward delivery of the underlying. As it is implicitly a forward position, the mechanics of forward pricing have a role in option pricing.

For many types of options, an increase in money market rates relative to the yield of the underlying (i.e. dividends on a stock or yield on an underlying bond) will result in the forward price being more in-the-money for a call option, and less in-the-money for puts. Therefore, an increase in interest rates will generally lead to an increase in call premiums and a decrease in put premiums.

Question 3

What are the key determinants of the value of an option?

A. The time value of an option.

B. The intrinsic value of the option.

C. The strike price, volatility of the underlying, time to maturity and interest rates.

D. The volatility of the option.

ANSWER: C

The four factors when used in an option pricing formula determine the fair value of an option.

Question 4

Generally, the higher the volatility of the underlying, then:

A. The higher the value of the put option.

B. The lower the value of the call option.

C. The further out-of-the-money is the option.

D. None of the above

ANSWER: A

An increase in volatility results in a higher value of an option (including put options).

5.3 The 'Greeks' — Managing Option Risks

Measuring Impact of Changes in the Determinants

In order to manage a portfolio of options, a dealer needs to know how the value of the options will vary with changes in the determinants of option price. There are a number of measures, denoted by letters in the Greek alphabet, that do this.

Delta

An option's **delta** measures how its value (i.e. its fair price) will vary with small changes in the price of the underlying:

$$\textbf{Delta} = \frac{\textbf{Change in Option Value}}{\textbf{Change in the Underlying Price}}$$

For example, if we have a call on the gold price that is valued at $1 when the price of gold is $1000, and the value increases to $2 when the price of gold increases to $1005, then the delta of the call option will be 1/5 = 0.2 or 20%.

For a call option that is deep out-of-the-money, changes in the underlying price will have little impact on the price of the option, so that delta is close to zero.

For an option that is deep in-the-money, any change in the underlying price will flow almost completely into the intrinsic value of an option, so that delta is close to 1.

For an option that is at-the-money, the delta is 0.5. Puts will have a delta that is a negative value, indicating that the price of the option moves in an opposite direction to changes in the underlying.

Delta Hedging

When an option dealer wants to hedge an option that he has written, he can do it in several ways:

1) Buy an exact matching option.
2) Buy or sell the underlying.
   In this case, the dealer will sell or buy an amount of the underlying so that if the price of the underlying changes, he will make a profit or loss that will offset the changes in the value of the option that he has written. Take the previous example of a gold option whose delta is 0.2. A change of $5 in the price of gold will result in the price of the option changing from $1 to $2. If a dealer has written a call option for 100 oz of gold, the change in value of the option will be 100 oz × $1 = $100. To offset the change in value of the call option, the dealer will have to buy 0.2 × 100 oz = 20oz of gold. In general, the amount of underlying used to hedge an option is given by:

$$\textbf{Amount of Underlying to Buy/Sell} = \textbf{Delta} \times \textbf{Notional Amount}$$

The calculation of the hedge amount using the delta of an option is known as **delta hedging** and illustrates the importance of knowing the delta.

3) Buy or sell another instrument where the delta is known, so that changes in the value of this hedging instrument offsets the changes in the value of the option portfolio. A example of an alternative hedging instrument may be another call option with a different strike or maturity.

In general, when using an alternative instrument to hedge an original exposure, the amount of the alternative instrument to buy or sell is given by:

$$\text{Notional Amount of Alternative to Buy/Sell} = \frac{\text{Delta of Original Instrument}}{\text{Delta of Hedging Instrument}} \times \text{Notional Amount of Original Instrument}$$

The case of using the underlying to hedge is a special case when the delta of the hedging instrument is 1.

Gamma

We have noted that the delta of an option changes depending on the distance of the underlying price from the strike price of the option. As the price of the underlying changes, the delta will change leaving the exposure overhedged or underhedged.

Gamma measures how delta changes with changes in the price of the underlying.

$$\text{Gamma} = \frac{\text{Change in Delta}}{\text{Change in Price of Underlying}}$$

It gives an indication of how frequently delta hedges need to be adjusted. Ideally, a dealer would like to be 'gamma neutral' i.e. gamma = 0, so that the rebalancing of hedges is not necessary as the underlying price changes.

Gamma is positive for long call and long put positions; it is negative for short call and put positions. Delta does not change much when the option is deep in-the-money or out-the-money. Therefore, gamma for deep in-the-money or out-the-money options is small. Gamma is significant for at-the-money options.

Vega

Vega (also variously known as epsilon, lambda or kappa) measures the sensitivity of the option price to changes in the volatility of the underlying.

$$\text{Vega} = \frac{\text{Change in Option Value}}{\text{Change in Volatility}}$$

In options pricing, the volatility is estimated and entered as an input into pricing formulae. When the strike price and maturity are specified, and the interest rate is known, the only variable is the volatility input. Therefore, in interbank dealings, quotes are often in terms of the volatility input instead of the option price.

Vega is at its highest at-the-money, and falls as the underlying price moves away from the strike price. Vega is higher when the time to expiry is longer. To be 'long vega' is to benefit when volatility rises. This is achieved by being long calls or puts.

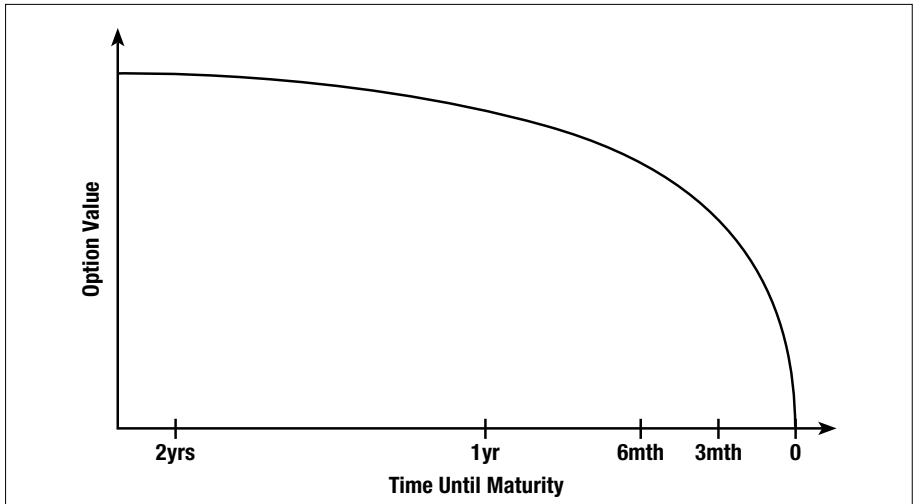
Theta

Theta measures how much an option's value changes with the passage of time.

$$\text{Theta} = \frac{\text{Change in Option Value}}{\text{Change in Time}}$$

For example, if an option portfolio has a value of 10 and theta is –1, then the value of the option portfolio will be 9 the next day. Given that the value of an option falls with the passage of time, theta is negative for long call or puts, and positive for short calls or puts (meaning that value accrues to the writer of the option with the passage of time).

Theta is small when the time to expiry is a long; it increases as the option nears expiry. This is illustrated in the diagram below.



Value of an At-The-Money Option Over Time — Fig. 5.3.1

Rho

Rho measures how much the option value changes with interest rates changes. Rho tends to be higher when the maturity of the option is longer.

Question 5

When an option is deep out-of-the-money the delta tends towards:

A. 0
B. 1
C. 0.5
D. 2

ANSWER: A

The delta of an out-of-the money is small.

Question 6

If the price of a call option rises by $5 when the gold price changes by $10, the delta of the call option is:

A. –0.5
B. +0.5
C. –2
D. +2

ANSWER: B

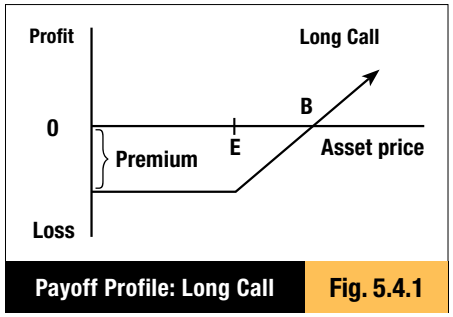
The delta is: change in the price of the option/change in the price of the underlying. Therefore, the delta is $5/$10 = 0.5. The delta of a call is positive, so the answer is +0.5.

5.4 Option Payoff Profiles

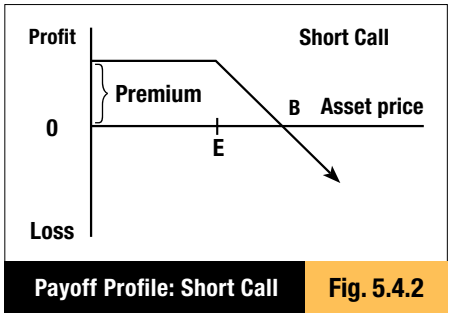
Payoff Profiles

A useful way of analysing option positions is through the use of **payoff profile diagrams**. These diagrams chart the profit/loss from an option position against the movement of the underlying. Note that when charting profit/loss, the payoff profile ignores the time value of an option, and shows only the intrinsic value. This would be an accurate reflection of the option payoff, at the time of expiry of the option, when time value is zero.

Figures 5.4.1 and 5.4.2 show the payoff profile from being long a call and short a call respectively. They are mirror images reflecting opposite sides of a trade. The premium is reflected as an initial profit or loss for either party. As the underlying price moves higher above the strike price E, the call has increasing intrinsic value, adding to the profit for the long call position.

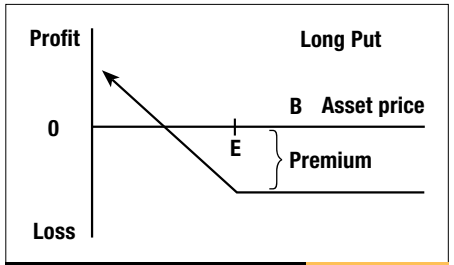


Payoff Profile: Long Call Fig. 5.4.1

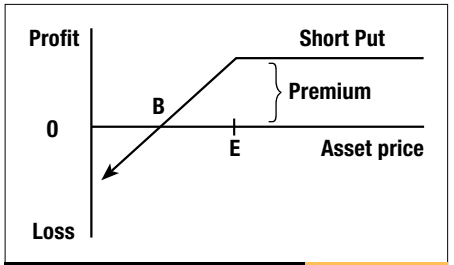


Payoff Profile: Short Call Fig. 5.4.2

Figures 5.4.3 and 5.4.4 show the payoff profile from being long a put and short a put respectively. The value of the long put increases as the price of the underlying falls below the strike price E.



Payoff Profile: Long Put Fig. 5.4.3



Payoff Profile: Short Put Fig. 5.4.4

Put-Call Parity – Synthesising the Underlying

Synthesising a Forward

The payoff profile diagram is very useful in showing the effects of combining options. Figure 5.4.5 shows the effect of putting together a long call with a short put, both with a strike price E.

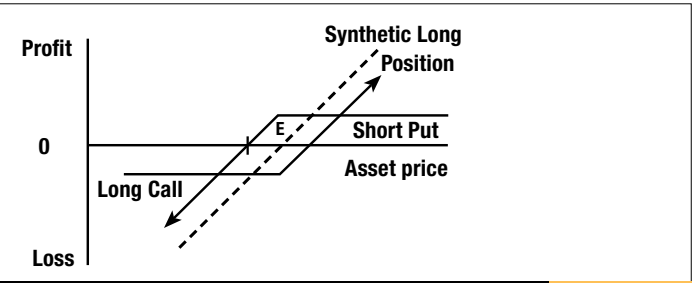
The combined effect on profit/loss is obtained by vertically summing the profiles of the two options, and it is shown by the 45 degree line. This is identical to the payoff profile of a long position of the underlying instrument, entered at a price E. More precisely, since the diagrams reflect the payoff at expiry of the options, it is the payoff of a long forward position on the underlying instrument.

This relationship is called the **Put-Call Parity**:

Long Call + Short Put = Long Forward
+ Call – Put = + Forward

The put-call parity equation shows that from two of the three positions, the payoff profile of the third can be created or synthesised. For example, a combination of a long call and short forward will result in the profile of a long put position, as in:

+ Call – Forward = + Put



Put-Call Parity **Fig. 5.4.5**

Question 7

The put-call parity equation describes how a long forward position can be synthesised by combining options in the following manner:

A. Long call and long put.
B. Long call plus short put.
C. Short call and long put.
D. Short call and short put.

ANSWER: B

Other than remembering the put–call parity equation, the correct answer can be worked out using the payoff profiles of the options.

Use of Options in Positioning

The ability to go long or short of an underlying instrument through a forward allows a simple positive or a negative view on the underlying to be expressed. The payoff profiles of calls and puts expand the possibilities of how views may be more precisely expressed.

For example, the following positions all benefit from a rise in the price of the underlying. However, they also express a more nuanced view of the market.

Position	Underlying View	Profit/Loss	Volatility View
Long Forward	Up	Unlimited/ Unlimited	none
Long Call	Up	Unlimited/ Limited	increase
Short Put	Up	Limited/ Unlimited	decrease

The table above also shows that aside from the directional view of the underlying price, the use of options adds a new dimension to trading. That is a view on changes in volatility. By running a position that is either positive or negative vega, traders can express a view on how market volatility will change.

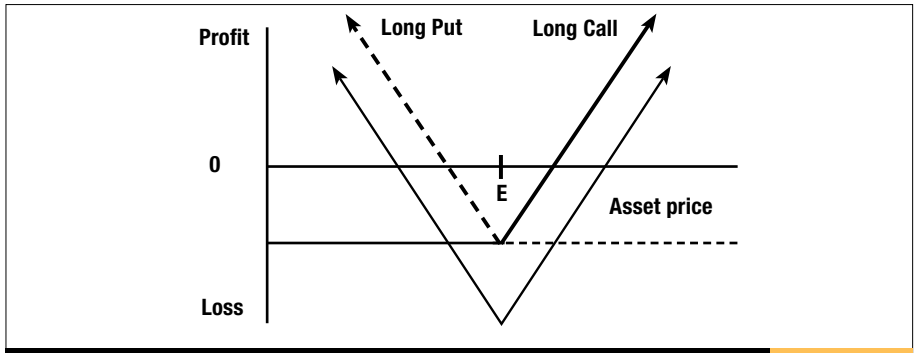
Through various combinations of puts and calls, the payoff profile can be altered to reflect a trader's views and risk/return preferences. This is illustrated by the following diagrams on **straddles** and **strangles**.

Long Straddle

Implementation:
Long call and long put with the same strike price matching the current price of the underlying.

View Expressed:
The trader believes the market is about to move away from current market levels, but the trader is unsure of the direction. He is also expecting volatility to increase.

Payoff Profile:
Profit is unlimited if market moves in either direction. Loss is limited to the premium paid. However, as premium is paid on both the long call and long put (both of which are at-the-money), it is an expensive strategy, especially if time decay is significant.



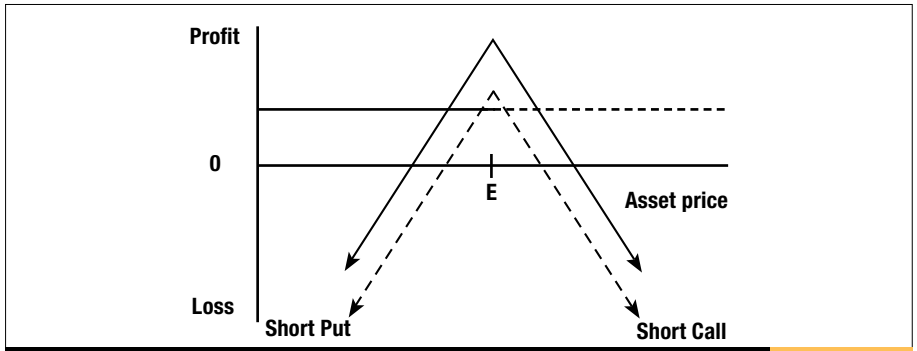
Long Straddle — Fig. 5.4.6

Short Straddle

Implementation:
Short call and short put with the same strike price matching the current price of the underlying.

View Expressed:
The trader believes the market will trade around current market levels, and is unlikely to make a significant move. He is also expecting volatility to fall.

Payoff Profile:
Profit is limited to the premium received from the sale of the call and put. Losses are unlimited and can be significant if market moves sharply in either direction.



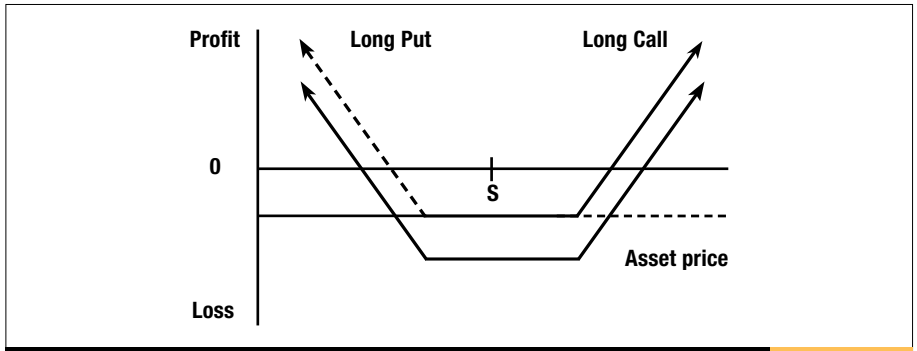
Short Straddle — Fig. 5.4.7

Long Strangle

Implementation:
Long call and long put with out-the-money strikes.

View Expressed:
The trader believes that the market is about to move significantly from current market levels, but the trader is unsure of the direction. He is also expecting volatility to increase.

Payoff Profile:
Profit is unlimited if market moves in either direction. Loss is limited to the premium paid. Given that the options are both out-of-the-money, the premiums paid will be lower than that for a straddle.



Long Strangle — Fig. 5.4.8

Short Strangle

Implementation:

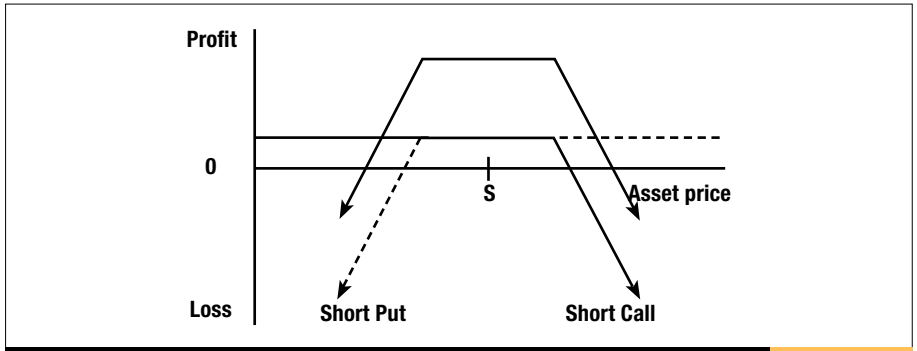
Short call and short put with out-of-the-money strikes.

View Expressed:

The trader believes that the market, which is currently volatile, will calm down. Therefore, it will trade within a broad range, and volatility will fall.

Payoff Profile:

Profit is limited to the premium collected. Loss is unlimited if the market moves significantly outside the range defined by the strike prices of the call and put. The position is vega negative, meaning that it can be covered at a profit if volatility falls.



Short Strangle — Fig. 5.4.9

5.6 Foreign Exchange Options

Over-the-Counter FX Options

Over-the-counter (OTC) options are traded directly between banks, or between banks and their customers. As a result, buyers of OTC options bear the counterparty risk of the writer of the option. Counterparty risk arises because the writer may default on his promise to make good on the performance of the option after receiving the option premium.

Customers use currency options to hedge their currency exposures. The varying needs of customers means that currency options are of non-standard specifications.

Exercise of OTC options usually leads to the actual delivery of the currency at the strike price.

Quotation of OTC FX Options

A call on one currency is a put on the other currency in the currency pair. Since all currencies are quoted against the USD, the convention in quoting currency options is to take the non-USD currency as the reference currency. For example, for USD/SGD options, the quote is in terms of call or put on SGD. Where the currency pair is a cross rate, then both currencies are mentioned, as in: EUR call/JPY put. This is to avoid ambiguity.

Despite these conventions, OTC currency option prices can be expressed in a variety of ways:

(a) As a percentage of the base currency amount

(b) As a percentage of the variable currency

(c) In the base currency per unit of base currency

(d) In the variable currency per unit of base currency

(e) In the base currency per unit of the variable currency

(f) In the variable currency per unit of the variable currency

Example: A call option on SGD has a strike of 1.50, with current spot at 1.40. The premium is on USD1 mm notional is USD10,000. This can be expressed as:

(a) 1.00% (= USD10,000/USD1 mm)

(b) 0.93% (= USD10,000 × 1.40/USD1,000,000 x 1.50)

(c) 1 US cent per USD

(d) 0.93 SG cents per SGD

(e) 0.67 US cents per SGD (= 0.93/1.40)

(f) 1.4 SG cents per USD (= 1 US cent × 1.40)

(a) and (f) are mostly frequently used.

Exchange Traded Options

Currency futures and options are also traded on exchanges like the CME. Unlike the OTC market, exchange traded contracts have standard specifications, and thus do not offer the degree of flexibility to meet customer needs. However, standard specifications obviate the need to match preferred settlement dates of buyer and seller. This makes exchange traded options easier to trade, and to be used for hedging or taking of FX risk exposures.

Furthermore, the counterparty to positions on the exchange is the clearing house, again obviating counterparty credit checks. The exchange requires the posting of collateral or a performance bond to ensure performance on contracts.

Quotations follow those of the futures contracts, which are in terms of US cents per unit of the non-USD currency.

The CME currency options are options for delivery of currency futures contracts. Currency futures are deliverable into actual currency flows. Refer to Table 5.6.1 for examples of CME currency options.

Examples of CME Currency Options **Table 5.6.1**

Currency	Underlying	Strike Prices	Premium Quotation
GBP	1 GBP future (GBP62,500)	USD 0.25 steps	USD per GBP
EUR	1 EUR future (EUR125,000)	USD 0.01 steps	US cents per EUR

5.7 Interest Rate Guarantees, Caps and Floors

Interest Rate Options

To illustrate the use of interest rate options, consider a case where a company has issued a 5-year floating rate bond. The interest rate is fixed every 6 months. Suppose that the company thinks interest rates are headed down but it does not want to pay more than 3.50% at the next fixing. If the present FRA rate corresponding to the fixing date is 3.40%, the company could do one of two things:

1) Lock in a rate of 3.4% using a FRA; or
2) Buy call on the FRA with a strike of 3.5%.

In (1), through the operation of the FRA that pays the difference of the contracted FRA rate and the LIBOR fixing at the start of the FRA, the company would lock in the rate at 3.4%, thus achieving one of its aims. However, if rates fall as expected, the company would not benefit further.

In (2), if rates rise above 3.5%, the company could exercise the call and lock in a rate of 3.5%, again achieving its aim of borrowing no higher than 3.5%. The additional benefit is that if rates fall as expected, then the company can allow the option to expire unexercised, and borrow at a lower rate.

On the lending side, if an investor were trying to lend at a minimum rate, he could buy a put on an FRA to protect the risk of rates falling below his minimum rate.

The use of long calls or long puts on FRAs can therefore guarantee a minimal interest rate outcome. These options are also known as **interest rate guarantees**.

Caps and Floors

A **cap** is a series of interest rate guarantees that protects a borrower's cost of funds from rising beyond a specified level. In our previous example, the borrower could purchase a series of calls on FRAs corresponding to all the LIBOR fixing dates on the 5-year bond. This will keep the borrowing rate below 3.5%.

A **floor** is a series of long puts on FRAs that ensure a minimum interest rate for investors.

Question 8

When a borrower wants to fix the rate that he borrows at, he should:

A. Buy an interest rate cap.
B. Buy an interest rate floor.
C. Buy a forward rate agreement.
D. Sell a forward rate agreement.

ANSWER: C

By buying a forward rate agreement, a borrower **fixes** *a rate that he would pay against LIBOR ahead of time. Interest rate options protect but do not fix a rate.*

Question 9

What is an interest rate cap?

A. A series of calls on FRAs that protect a borrower's cost of funds.

B. A series of puts on FRAs that protect a lender's rate of return.

C. A series of FRAs that fix a borrower's cost of funds.

D. None of the above.

ANSWER: A

An interest rate cap can be seen as a series of calls on FRAs that limit the rate that a borrower pays over the life of his borrowing to a specified maximum.

TOPIC 6

Principles of Risk

6.1 Risk Management

6.2 Market Risk

6.3 Credit Risk

6.4 Settlement Risk

6.5 Liquidity Risk

6.6 Operational Risk

6.7 Legal Risk

6.8 Risk Capital

6.1 Risk Management

Importance of Risk Management

An obvious phenomenon in the financial services industry over the last three decades is the growth in the size of the industry, as well as the growing complexity and size of transactions. Resulting from this trend are increasing downside risks i.e. exposure to potential negative developments.

Risk is inherent in the transactions that a financial institution undertakes. Given the competitive forces in the financial marketplace, financial institutions cannot avoid taking risks if they are to generate profits. The key question is how well these risks are managed.

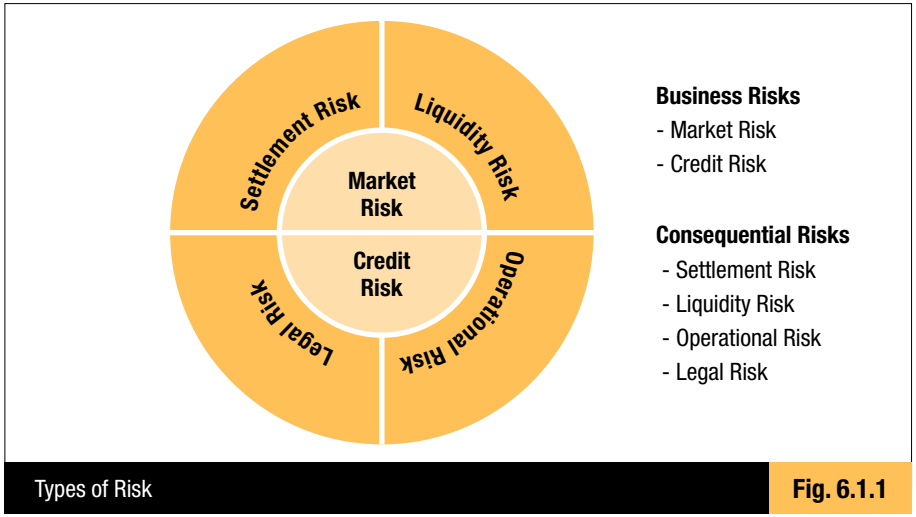
The importance of managing these risks was highlighted during the Credit Crisis of 2007–2008. The adverse financial climate had brought many firms down and forced governments to step in and support firms to prevent a breakdown of the global financial system. Firms that managed their risks well weathered the financial storm and emerged stronger.

Outside of the extraordinary circumstances of the Credit Crisis, proper risk management is essential for the sustainable, day-to-day functioning of a financial institution. Failure to manage risk properly would result in losses (both financial and reputational), or even in the failure of the institution itself, as seen in the case of the 1995 failure of Barings Bank.

Risk management involves the identification, monitoring (and measurement, if possible), and mitigation or control of those risks.

Types of Risk

A useful classification of risks is one developed by the Basel Committee in 1994. It classified the risks that a financial institution faces into 6 categories (see Figure 6.1.1)



Types of Risk **Fig. 6.1.1**

Market risk and credit risk can be regarded as business risks that a firm chooses to assume in order to generate profits. On the other hand, the other risks are not taken with a view of making money, but are consequential i.e. they result from being in the financial services industry. Managed well, losses from consequential risks can be prevented; managed badly, consequential risks can result in significant losses for the firm.

Market Risk

Market risk is the institution's exposure to the changes in the value of a financial instrument or portfolio due to changes in market prices.

Among the various areas of risk, perhaps the greatest attention has been given to the management of market risk. Firms understand that taking market risks is necessary to generate profits. While risk management may not prevent losses, it can ensure that a firm is aware of the type of risks and is comfortable with the level of market risks taken.

Firms usually have a risk committee that decides on the risk profile and policies that the firm should take in the face of changing market environments.

Managing market risk begins with the identification of market risk, followed by the measurement of that risk, and next, laying down policies and procedures to control market risk.

Identification of Market Risk

Managing market risk requires information of the market risk assumed across the institution. This requires an understanding of the types and sources of the risk.

Market risk can be broken down into various types. Traditionally, the principal forms of market risk are: spot FX risk, interest rate levels, and equity price risk. Other forms of market risk also include yield curve risk, basis or spread risk, or implied volatility. As new instruments such as Residential Mortgage Backed Securities (RMBS) or commodity swaps are introduced as traded instruments, market risk could also include real estate and commodity price risk.

The risk from spot instruments will principally be from one of the key risk types e.g., spot FX or the level of interest rates. Aside from the key principal risks, forward instruments have some form of interest rate risks such as interest rate, yield curve or interest rate spread risk. Options will include some form of implied volatility risk. Identification of sources of risk in an instrument will help in the proper capture and assessment of market risk.

FX Risk

An example of risk identification is **FX risk**. For banks as well as companies, the impact of FX changes are threefold:

1) **Transaction Risk**, which arises from transactions undertaken by the firm. For banks, these are open FX exposures from positions. For companies, it may be FX exposures-related expected proceeds from an overseas sale of goods or services.

2) **Translation Risk**, which is the impact of FX changes on the assets and liabilities of the firm. One example is the increased cost of repaying a USD loan if the home currency depreciates against the USD. Another example is the value of overseas subsidiaries that may need to be revised downwards in the home currency if the home currency appreciates substantially.

3) **Economic Risk**, which is the impact of FX changes on a firm's ability to compete with overseas competitors on the global market when the home currency appreciates because its domestic costs are increasing, relative to overseas revenues.

Arbitrage versus Hedging

Another example of risk identification is the distinction between arbitrage and hedging. **Arbitrage** is the process of putting on a series of related transactions, which because of the property that the transactions will converge by the time the they mature, will result in a profit for the arbitrageur. For example, suppose the spot price of gold is $1000, and a firm can lend cash or borrow gold at 2% interest p.a.. At the same time, the one-year forward price of gold is $1010. The arbitrageur can sell gold spot and obtain $1000 cash, borrow the gold to deliver and lend cash, and then buy gold one-year forward at $1010. At the end of one year, it will obtain $1020 from its lending and use that $1010 cash to pay for its forward gold purchase, paying back the gold it borrowed and at the same time, netting a $10 profit.

Hedging occurs when a firm tries to reduce the risk of a position in one instrument by taking a counter position in another closely-related but not identical instrument. By relying on the historically close correlation of the two instruments, it hopes to reduce the firm's market risk exposure. However, it may introduce other forms of market risk. In the above example, if the dealer had a long gold position that he wished to sell but was unable to deliver immediately, he could hedge the long position by selling the position forward at $1020. However, if the cost of funds suddenly jumped to 3% it would cost him $30 to fund his position for a year. At the end of the period, he would obtain $1020 – $30 = $990 when he delivers on his forward gold sale. This is less than the $1000 he could get if he could sell spot. Therefore, while he has hedged his principal spot gold risk, he has not completely avoided other forms of risks.

Aggregation of Market Risks and Stress Testing

One way of managing market risk in the past was the use of stress testing. This looked at the impact on the firm from a given set of market price changes, stemming from the risk positions across the firm.

By applying shock scenarios, stress testing was a straightforward and effective way of giving senior management as well as regulators a sense of whether the firm could weather 'worst case scenarios' and if the firm's risk capital was adequate, given the risks it was taking.

Measurement of Market Risks and Value-at-Risk

Demand for a higher quality of risk reporting, at a time that computing power made it possible, led to a different way of looking at market risk. **Value-at-Risk** (VaR) takes a statistical approach by looking at probable market price changes over a given time period.

By multiplying the size of market exposure with the probable size of market price change (at a given probability for a given time horizon), we could arrive at statistical measure of the loss. That is:

VaR = Market Exposure × Market Price Change
(At Given Probability/Time Period)

Example: A bank's overall VaR is $100 mm with a time horizon of 10 days with 99% confidence level. This means that within a 10-day period, there is a 99% chance that the loss sustained by a bank on its positions will be within $100 mm. However, there is a 1% chance that it might exceed $100 mm.

There are three approaches to estimate or model the probability of market price changes:

1) Covariance Matrix method
This calculates the volatilities and correlations of various risk factors based on historical data. Exposures are assumed to be a linear function of these risk factors. This is the approach taken by Riskmetrics. One shortcoming is that non-linear effects associated with options is not captured. If a normal probability distribution is assumed for the risk factors, then the frequency of extreme swings in market prices (so called fat-tailed events) are underestimated.

2) Monte Carlo method
Instead of assuming a normal distribution, the Monte Carlo uses some other probability assumptions and runs computer simulations to approximate the market price outcomes. This is a more flexible approach but requires great computing power.

3) Historical Simulation method
This takes historical data over a recent period (say 3 years) and applies it to the firm's exposure to simulate a distribution of returns of the firm's overall positions.

The performance of the various approaches can be tested by comparing whether the distribution of a portfolio returns matches those predicted by the risk model. This **back testing** of a model is part of the process of ensuring that the modelling of risk approximates reality.

Market Risk Controls

Risk measurement techniques like VaR give management an indication of the losses that might be sustained from the various positions held across the firm. The next step in managing market risk is laying down policies that ensure that risk taken across the firm stay within acceptable limits.

This usually takes the form of limits on market risk that the firm can take, from the institutional to the individual (e.g., dealer) level. Limits can be placed on VaR, notional position size, or actual (realised or unrealised) losses. Procedures to ensure that these limits are followed should also be put in place.

Limits on VaR and on Notional Positions

Limits on VaR or notional position size operate in a similar way by restricting risk or the size of a dealing position so that the potential loss is controlled. Consequently, the bank will not suffer a loss it cannot absorb. Limits should be set in a manner that allow dealers to operate without being overly restrictive, while at the same time facilitating the control of risk.

Notional position limits can be expressed as limits on longs and limits on shorts. While long and short positions share the common characteristic of exposure to market price movements, short positions have the additional risk of the firm not being able to cover the short and make good on the delivery on settlement date. This can lead to regulatory as well as financial penalties.

Limits may be set in the form of:

- Maximum overall open position in a single instrument or currency;
- Maximum position held by a particular desk in the dealing room;
- Maximum position that may be held intra-day, called a **daylight limit**; or
- Maximum position that may held for more than one day, called **overnight limit**.

Loss Limits

VaR and position limits restrict position sizes without placing restrictions on losses that are actually incurred. **Loss limits** puts a check on the losses that are incurred and are a good way to ensure that losses incurred (whether actualised or mark-to-market) do not exceed a given level, especially when markets become volatile. They are a useful complement to VaR and position limits.

Like position limits, loss limits may be set in various forms for different levels.

Managing Market Risk Controls

These controls would not be effective if they were not enforceable. This requires an effective information system, and also good operational enforcement. Some of these issues, like separation of roles, are discussed in Section 6.6, Operational Risk.

Credit Risk

Credit risk is the risk that a counterparty will not perform on an obligation owed to the institution.

In the past, when bank loans were held to maturity, the focus was on the actual default, and credit losses were taken only when counterparties defaulted on their obligations. Now, the focus is on recognition of potential default. The development of traded instruments that are based on credit e.g., Credit Default Swaps (CDS) has also driven this trend towards recognising default potential. Under this approach, it is the increase in the likelihood of default, not just default, that bears monitoring.

For a financial institution, credit risk does not just arise from active taking of exposure, as in making loans and trading credit instruments. It also arises as a consequence of doing business.

Credit Risk in FX Transactions

Take the example of a forward FX deal that settles in 3 months' time. The risk that a bank assumes when the transaction is done is FX risk, which the bank can cover through transactions in the FX market. If the position moves in the bank's favour, the counterparty will "owe" the bank money, which will be settled upon maturity of the forward. Until then, the difference between the contracted rate and market rate represents a credit risk of the counterparty to the bank.

If the counterparty defaults before the maturity of the forward, the bank will lose this mark-to-market profit. At the same time, default of the counterparty will result in an FX exposure on the bank's books that the bank will need to cover in the market. The cost of covering the position is the **replacement cost**, and is a measure of the credit risk from the forward position.

At maturity, the counterparty is delivered the currency that he bought in return for the currency it sold. There is a risk that in the simultaneous exchange of currencies, the bank would have sent payment without the counterparty giving reciprocal instructions to pay the bank, leaving the bank out of pocket of the full amount of the transaction. This **settlement risk** is a credit risk, albeit a temporary one, until the counterparty settles. Given the huge amounts involved in the daily settlement of transactions, measures aimed at mitigating settlement risk have been adopted and are discussed in Section 6.4, Settlement Risk.

Credit Risk in Interest Rate Transactions

The credit risk in making a loan, such as to a customer or in the interbank deposit market, is obvious. That is the risk that interest or principal may not be paid when it is due.

In the case of traded instruments in the interest rate markets, there are also issues of replacement costs and settlement risks. Often, instruments such as bonds or CDs are held by dealers to be re-sold to customers or traded to benefit from a change in interest rates. However, as bonds and CDs also represent loans, the credit risk inherent in these instruments should be recognised. This is particularly so in sell/buy back repos where collateral held to back the lending of cash to a counterparty may fall substantially in price due to a deterioration in the credit quality of the issuer, negating the purpose of the collateral held.

Managing Credit Risk

A key element to managing credit exposure is to understand the likelihood of default of the party that credit is extended to. This is the purpose of **credit analysis**.

Another key element is setting appropriate limits on credit extended to a counterparty. **Credit limits** should take into account the credit quality of the counterparty, the type of transaction involved, and the institution's own ability to absorb resulting losses should the counterparty default.

Needless to say, timely capture of the credit exposure to counterparties, and **monitoring the exposure** against the limits set is needed for the whole process to be effective.

6.4 Settlement Risk

Settlement Risk

Settlement risk is the risk that an institution will not receive funds or instruments from its counterparties by the expected time.

Although settlement risk is present in all financial transactions where there is an exchange of a cashflow for securities or for another cashflow, it is particularly acute for FX transactions because the exchange of cashflows are cross border across different time zones. Payment instructions are usually given one day before settlement, and incoming receipts are reconciled the day after the settlement date.

The potential risk actualised on 26 June 1974. On that day, the Herstatt Bank, which had been active in the FX market had its banking license withdrawn and ordered into liquidation. Several banks had already given irrevocable instructions to pay Herstatt Bank in European currencies, and were caught out when USD payments from Herstatt Bank were suspended. For that reason, settlement risk is also known as **Herstatt risk**.

Managing Settlement Risk

Steps have been taken at the industry level to reduce settlement risk. **Netting** is a way to reduce settlement risk by reducing the size of cashflow exchanges. This is done by netting off payments and receipts in various currencies between two institutions occurring on the same day, Only the resulting net cashflows are exchanged. This arrangement between two institutions is called **bilateral netting**.

Netting can also occur among multiple institutions. **Multilateral netting** works in a similar way as bilateral netting in that payments and receipts among institutions in any given currency are netted as far as possible, and cashflow movements are for the net amount, rather than the original gross amount.

An example of multilateral netting is the **continuous linked settlement** (CLS) system. The system was set up by some of the largest FX banks in an initiative supported by the key central banks. Banks and corporates who have signed up for CLS enter their trades into the system, and these are matched. Cashflows arising from matched trades are netted, and the netted cashflows are settled daily through accounts that the institutions have with the CLS Bank. The CLS claims a netting efficiency of 95% i.e. $100 billion of gross cashflows require only actual cashflows of $5 billion after netting. Settlement of transactions is on a **payment versus payment** (PvP) basis. In PvP, payments made by a bank in one currency is simultaneous with a receipt of funds in another currency in its accounts with the CLS Bank.

6.5 Liquidity Risk

Liquidity Risk

An institution faces two kinds of liquidity risk. **Market liquidity risk** is related to the ease at which products and instruments can be sold or the risk unwound in the markets. **Funding liquidity risk** is related to the ability of the institution to obtain funds to finance its activities.

For financial institutions, the two types of risks are related as problems with market liquidity will often result in problems with funding liquidity. One example is the performance of US money market funds during the Credit Crisis in 2008. The drying up of market liquidity in instruments that the money market funds held (e.g., CPs) meant that holdings could only be sold at substantial mark-downs from indicative market prices. Investors started to withdraw monies based on fears that the funds would lose value. Without the intervention of the US government to provide repo facilities to the money market funds, it is likely that many of these funds would not have been able raise the cash to meet withdrawals.

Managing Liquidity Risk

An institution should be aware of the market liquidity in instruments that it is trading in, and match exposure limits in these instruments with the degree of market liquidity. Risk estimates like VaR factor in a holding period in calculating risk exposures. The holding period is based on the assumption that market conditions may prevent the immediate sale of positions, and that market exposure can be reduced only over a holding period.

In the management of funding liquidity risk, a sensible strategy is to match the funding horizon with the liquidity of the position. Thus, holdings of relatively illiquid instruments like high yield bonds should be matched by longer term funding. This is to allow time for buyers, who are willing to buy these at market prices, to be found.

Institutions should diversify their funding sources, particularly sourcing for stable sources of funds. An example is money market funds securing bank-up lines of credit from banks, even while relying on the sales of its holdings to meet redemptions.

6.6 Operational Risk

Operational Risk

Operational risk refers to the risk that deficiencies in internal systems or controls would lead to an unexpected loss.

Operational risk could stem from a broad range of sources. These include deficiencies in the information system, inadequate procedures in the capture and settlement of trades, or failure to minimise human error.

One important aspect of operational risk is 'rogue behaviour'. This results from persons deliberately breaching procedures, and the failure of controls to prevent or detect such behaviour early. That the collapse of Barings Bank stemmed from the rogue behaviour of a single dealer illustrates the importance of having proper controls.

Managing Operational Risk

The institution can put in place structures and procedures to ensure that its day-to-day functions are carried out in an efficient, error-free manner. The efficiency of operations can be monitored by tracking error or loss rates. Problem areas should be identified and rectified. **Periodic audits** to review and check on whether procedures are followed is a way of improving efficiency.

Training is a way of ensuring that staff understand their roles and how to perform them.

Banks usually have **back-up plans** and facilities to allow them to continue operating in the event of a disruption like a power failure or if a fire breaks out.

Clear separation of roles and reporting lines can help prevent circumvention of controls and procedures, and will help in the detection of rogue behaviour.

Reconciliation – Nostro and Vostro

Banks make payments in various currencies of countries in which they are not located. These payments may arise as a result of transactions with their customers or from the bank's own trading activities. To effect these payments, banks need to access the country's payments system through a bank (this could be a branch of the bank in that country) that is located in that country.

Therefore, banks maintain accounts with banks (or their own bank branches) overseas. **Nostro accounts** are accounts that a bank maintains with other banks. From the counterparty bank's perspective, these are **Vostro accounts**, i.e. an account that other banks maintain with the bank. (The terms stem from the Latin root 'noster' meaning mine, and 'voster' meaning yours.)

For any single account, banks on both sides of an account keep track of the transactions that go through the account. In theory, both the nostro side and the vostro side should match transaction for transaction. In practice however, given the volume that goes through the account, not all transactions may be captured correctly.

It is usual procedure for the vostro side of the account to send a record of the transactions that have settled the day before. The nostro side will then check to see if this corresponds to their own record of transaction. Any differences will then be highlighted through this process of **reconciliation** of the account. Regular and timely reconciliation acts to reduce operational risk and settlement risk.

6.7 Legal Risk

Legal Risk

Legal risk can surface in two ways. The first is related to whether transactions are documented properly and are legally enforceable. The case study for such risk is exemplified by the case of Hammersmith and Fulham Town Council, where the UK courts threw out the claims of banks against the town council on the basis that the town council had no authority to enter into derivatives contracts for which the banks were making claims for.

The second aspect of legal risk is whether the institution discharged its legal and regulatory responsibilities to customers appropriately. In the wake of the Credit Crisis, many fund distributors had to compensate clients for losses from investment products based on credit derivatives, which had been touted as safe investments.

Managing Legal Risk

The first step is to lay down a procedure to make sure that proper documentation is in place before any transaction is done. Standardised agreements like those issued by ISMA or ISDA will go a long way to prevent disputes, as well as allow firms to follow through claims in court.

Having an expert that can advise on legal or regulatory aspects of a transaction can help address the legal issues (such as structuring a transaction appropriately) and help prevent losses either from inadequate documentation or mis-selling charges.

6.8 Risk Capital

Risk Capital

We have seen that firms operating in the financial markets are exposed to different forms of risk, particularly market risks. These risks imply the possibility of making losses, even as the firms attempt to profit from such risk taking. As a result, firms require capital that can act as a cushion to absorb such losses and allow the firm to continue operating. This form of capital is called **risk capital**.

Capital Adequacy Directive

The world's central banks have drawn guidelines that banks do have a minimum level of risk capital against the activities that banks undertake. These guidelines, called the **Capital Adequacy Directive** (CAD), are contained in the **Basel 2 Accord** promulgated by the Bank of International Settlements.

The CAD takes the approach that banks should have 8% risk capital backing its risk weighted exposures, whether these risk exposures are on-balance sheet or off. **Risk weighted exposures** are calculated according to formulae laid down by the CAD:

Risk Weighted Exposure = CAD Risk Weighting × Notional Exposure

The CAD risk weighting varies with the type of instrument. For example, the risk weighting on AAA government bonds is zero, while that on unsecured loans to companies is 100%. For loans to other banks, the risk weighting is 20%. For open FX exposure, the risk weighting is 100%.

Risk Capital Type

The 8% risk capital comprises two tiers of capital of which Tier 1 must form at least 50% of that 8%:

- **Tier 1** Capital is made up of ordinary shares, disclosed reserves as well as profits made in the current year. This is the first line of cushion and if there are losses, they will be taken against Tier 1 capital.
- **Tier 2** Capital is made up of perpetual securities issued, undisclosed reserves (usually from asset revaluation), shares that are redeemable at the option of the issuer, and subordinated debt with maturity longer than 5 years. Tier 2 Capital cannot form more than 100% of Tier 1 Capital; excess Tier 2 is not counted.

A third tier of capital, **Tier 3** Capital is used to support the trading book of a bank. It is made up of subordinated debt longer than 2 years and daily trading profits.

The 8% target laid down by the CAD is a minimum standard. In an increasingly volatile environment, banks may believe that a higher level of capital is needed for it to operate comfortably.

Question 1

FX risk, interest rate risk, credit spread risk and basis risk are examples of:

- **A.** Market risk
- **B.** Legal risk
- **C.** Forward FX risk
- **D.** Corporate bond risk

ANSWER: A

These are all examples of market risk, where the risk from the exposure to changes in the value of an instrument is due to changes of market prices.

Question 2

Deficiencies in the information system, inadequate procedures in the capture and settlement of trades are examples of:

- **A.** Legal risk
- **B.** Operational risk
- **C.** Settlement risk
- **D.** Documentation risk

ANSWER: B

These are examples of operational risk.

Question 3

Herstatt risk is also known as:

- **A.** Credit risk
- **B.** Settlement risk
- **C.** Operational risk
- **D.** FX risk

ANSWER: B

Herstatt risk is named after Herstatt Bank, which failed to settle USD payments on its FX transactions on the day its banking license was withdrawn.

Question 4

Ensuring that a client is authorised to undertake a transaction is a way of mitigating:

- **A.** Market risk
- **B.** Settlement risk
- **C.** Legal risk
- **D.** Operational risk

ANSWER: C

Legal risk takes the form of 1) inadequate documentation of transactions; and 2) suitability of a transaction taken by a counterparty. Checking on the authority of a client is a way of ensuring suitability.

Question 5

Which of the following types of risk are present in a forward FX transaction?

1) FX risk
2) Interest rate risk
3) Counterparty risk
4) Model risk

A. (1) only
B. (1) and (2)
C. (1), (2) and (3)
D. (1), (2), (3) and (4)

ANSWER: C

A forward FX transaction has elements of FX, interest rate and counterparty risk.

Question 6

Which of the following types of risk are present for a bank that takes a 3-month deposit?

1) FX risk
2) Interest rate risk
3) Settlement risk
4) Counterparty risk

A. (2) only
B. (2) and (3)
C. (2), (3) and (4)
D. (1), (2), (3) and (4)

ANSWER: B

A taker of term deposits has both interest rate risk and the risk that the placer of deposits will not deliver on his placement.

Question 7

A bank has $100 mm in US 1 month T-bills. How much of risk capital is required by the Capital Adequacy Directive to support this holding?

- **A.** 0
- **B.** USD20 mm
- **C.** USD50 mm
- **D.** USD100 mm

ANSWER: A

The risk weighting for AAA government bonds is zero. As such, the risk weighted exposure and the required risk capital would be zero.

Question 8

Under the CAD of the Basel 2 Accord, banks have to hold:

- **A.** Risk capital of at least 4% of their risk weighted assets.
- **B.** Risk capital of at least 8% of their risk weighted assets, with at least 4% being tier 1 capital.
- **C.** Risk capital of 8% of their risk weighted assets.
- **D.** Risk capital of at least 12% of their risk weighted assets.

ANSWER: B

Banks have to hold at least 8% risk capital, of which 50% (or 4% in total) must be tier 1 capital.

TOPIC 7

The Model Code

The ACI Model Code is a set of recommendations on principles, practices and conventions – they are widely accepted and are the industry standards, particularly in providing guidelines for handling disputes that arise from day-to-day dealings.

First issued in 2000, it consolidated existing codes from the major dealing centres, making it a global code.

It covers OTC markets and instruments including: FX, FX options, money markets, interest rate options, FRAs, interest rate and currency swaps, bullion and precious metals.

The Model Code is continually updated by ACI's Committee for Professionalism (CFP) in order to take into account the advent of new products and technologies. The latest update of the Model Code is available at ACI's website www.aciforex.org.

TOPIC 7 The Model Code

Annotation in this Topic follows that of the Model Code for easy reference to the Code. The various chapters of the Code cover:

Chapter 1 Business Hours and Time Zones

Chapter 2 Personal Conduct Issues

Chapter 3 Back Office, Payments and Confirmations

Chapter 4 Disputes, Differences, Mediation and Compliance

Chapter 5 Authorisation, Documentation and Telephone Taping

Chapter 6 Brokers and Brokerage

Chapter 7 Dealing Practice

Chapter 8 Dealing Practice for Specific Transactions

Chapter 9 General Risk Management Principles for Dealing

Chapter 10 Additional Guidelines for Corporate/Commercial Clients

Chapter 11 Market Terminology

Appendices 1–6

1) After Hours/24 Hours and Off Premises Dealing

Dealing outside of normal working hours and off-premises requires clear written guidelines from management on the following:

- Deals that are permitted and the applicable limits;
- Names of dealers who have the authority to deal off-hours and off-premises;
- Procedure for prompt reporting and recording of trades; and
- Safeguards to prevent erasure of such record of transactions without senior management approval.

2) Market Opening and Closing Hours

Opening and closing times define the period of normal trading conditions in the context of round-the-clock, round-the-world trading. These are:

Opening time: 5 a.m. Sydney time Monday;
Closing time: 5 p.m. New York Friday.

3) New Bank Holidays/Special Holidays/Market Disruption

In the event that a holiday is declared by a country that would prevent the settlement of a transaction, the value date will be adjusted on outstanding transactions maturing on that date.

- The value date will be the first common business day (for both currencies in the case of FX transactions) following the original value date, **except**:

  where the new bank holiday declared is the last business day of the month, the new value date will be the preceding common business day prior to the end of the month.

- Value dates in FX will not be split unless agreed by both parties or where local practice allows for split delivery as is the case in certain Islamic countries.
- There will be no adjustment in the exchange rate even as value dates are adjusted.

4) Stop-Loss Orders

The Model Code emphasises the principles of clear concise documentation and ongoing communication in accepting and executing stop-loss orders:

- A clear understanding of conditions for triggering a stop order, the constraints and discretion allowed when accepting a stop order.
- There should be adequate lines of communication for the party accepting the order to contact the party giving the order in case of an unusual or extreme price movements.
- There is no guarantee of execution at a given price unless otherwise agreed previously in writing. However, the party accepting a stop order has an obligation to uphold high standards of integrity and professionalism in executing stop orders, and respect the trust and confidentiality placed with them.
- Users of E-trading platforms, which automatically execute stop orders regardless of market conditions, should be aware of the implications when leaving orders on such platforms.

5) Position Parking

Position parking is the practice whereby two counterparties agree to a deal with the understanding that the deal will be reversed at a later date, at or near the original market rate irrespective of market movements.

Position parking is usually done to keep positions off an institution's books, thereby excluding it from management or regulatory oversight. The Model Code states clearly that:

- The parking of positions is forbidden.

6) Market Disruption

There are, at times, events occurring that are beyond the control of a party that prevents it from fulfilling a transaction that the party has committed to. These events include: capital controls, illiquidity, illegality, acts of God, etc.

The Model Code recommends that all parties include provisions to cover such events in their transaction agreements. Industry groups such as ISDA have developed standard provisions and parties should adopt the appropriate provisions to avoid possible disputes.

However, since not all circumstances can be foreseen, there will be cases where provisions may not adequately cover the situation. In such cases:

- The relevant authority or industry group may provide regulation, guidance and recommendations; and/or
- Industry groups may convene a meeting to reach a consensus on resolving the issue. Parties should be aware of and honour the market consensus that is reached.

To the extent that the standing local or global procedures governing market disruptions do not conflict with provisions in a written agreement, these local and global rulings should be strictly adopted.

If these local and global rulings are mandatory, and conflict with the provisions of an agreement, parties should consult with their local legal counsel.

If the rulings are not mandatory and conflict with an agreement, the parties should consult with each other on whether to:

- Adhere to their original agreement; or
- Amend the agreement to adopt the new ruling.

1) Drugs and Abused Substances

The abuse of drugs or alcohol may compromise the ability of persons to perform their jobs or make them vulnerable to improper inducements to act against the best interest of their firms and clients. The Model Code recommends that management:

- Educate their staff against substance abuse; and
- Put in place policies to deal with staff found to be substance abusers.

2) Entertainment and Gifts

While gifts and entertainment can be offered in the normal course of business, care must be taken to ensure that they are neither excessive in value or frequency, nor seen as improper inducements to conduct business. Management should:

- Monitor the form, frequency and cost of gifts/entertainment that dealers receive;
- Have a clear policy on the giving and receiving of gifts, and ensure that the policy is observed;
- Establish procedures for dealing with the receipt of gifts of excessive value, which cannot be declined without causing offence; and
- Ensure transparency of all entertainment received or given. In particular, entertainment where the host underwrites the cost but does not attend, should neither be offered nor accepted.

3) Gambling/Betting between Market Participants

Gambling between market participants, which can begin as small bets or wagers on financial indicators or sports events, can lead to abuse and have serious consequences. Management should:

- Strongly discourage gambling or betting between market participants; and
- Have a clear policy on the control of this activity.

4) Fraud

Attempts at fraud occur regularly and can be meticulously planned. Prevention requires vigilance and putting in place control measures.

- In the case of telephone dealings without standard settlement details, deal and settlement details should be confirmed by telex seeking an answerback to ensure the deal is genuine.
- Particular care should be taken in checking authenticity where the beneficiary is not the transaction counterparty.
- Any suspicious circumstance should be reported to management.

5) Dealing for Personal Account

The ability of staff to trade for their own accounts raises potential conflict of interest issues, where the firm's or clients' interests can be compromised. Management should put in place written policies and procedures covering the trading or investment activities of staff and management, as well as their family and related parties. Staff should know that they have an obligation to identify and avoid conflicts of interest.

- The potential for conflict of interest issues is especially high when staff are personally trading in instruments and products that are related to those they are also trading for the firm or clients. One way to prevent such situations is to specify instruments that the trader is allowed to trade for their own account.

Where day trading for a staff's personal account is allowed, there is the risk of front-running. This occurs when a trader executes personal orders ahead of the institution's or clients' orders.

- Procedures to prevent front running, such as giving priority to clients orders, will mitigate this risk.

6) Confidentiality

Both dealers and brokers are privy to highly confidential information. To maintain a reputable market, market participants should exercise strict confidentiality in handling such information. Care should be taken to prevent confidential information from being disclosed unintentionally (e.g., overheard by eavesdroppers).

Measures to maintain confidentiality include:

- Being careful of information that is communicated over open channels, such as loudspeakers;
- Controlling access to sensitive areas, such as dealing rooms;
- Discouraging the broking of deals outside a broker's office; and
- Avoiding coercion of dealers or brokers to divulge confidential information such as client identity.

All breaches of confidentiality should be investigated and documented according to a written procedure to deal with such cases.

7) Misinformation and Rumours

Dealers and brokers should not relay any information, which they know to be untrue. Care should be taken when discussing unsubstantiated information suspected to be inaccurate.

8) Customer Relationship, Advice and Liability

Given the complexity of some financial products, sales and advisory personnel need to be mindful of their clients' level of knowledge and financial sophistication when discussing these products and services. The institution should provide as much information as can be reasonably expected of a product, especially when it is requested by the client.

To avoid misunderstanding and potential liability, clients should be informed in writing from the outset, unless stated otherwise:

- It is assumed that a customer understands the terms, conditions and risk of the transaction, and has made his own assessment upon entering into the transaction.
- There is no advisory or fiduciary relationship between the client and the institution. Therefore, discussions between the sales person and the client should not be construed either as investment advice or recommendations.
- If the institution does provide advice, it should do so in good faith and in a commercially reasonable manner.
- Local laws and regulations differ from jurisdiction to jurisdiction, and may impose obligations on a financial institution in its dealings with clients, despite written caveats and disclaimers. One example is the duty of care of institutions when dealing with non-sophisticated clients. Institutions should be familiar with applicable rules and regulations. Where appropriate, it should seek legal advice, and incorporate such advice in its policies and procedures.

9) Use of Confidential Information

Care should be taken when handling confidential information, especially market sensitive material and non-public information:

- Staff should not seek to benefit, nor aid others to benefit, from material non-public information. They should also familiarise themselves with the rules and regulations governing insider trading and market abuse. Breaches may have consequences at the firm or regulatory level.
- Firms must have in place clearly-documented policies and procedures, and strong systems for dealing with confidential information. An example is Chinese Wall procedures that restrict the internal distribution of sensitive information only to staff that are essential to a transaction.
- Where there are external regulations governing confidential information, management should put in place procedures to ensure that staff understand and comply with these regulations.

1) Back Office Location and Segregation of Duties/Reporting

Given the advances in communications technology, it is possible for the back office function to be in a separate location from the front office. There is a trend for the front office to be at various locations close to clients, whereas the back office is consolidated near the head office. The Model Code is fine with this, although this may require local regulatory approval.

It is important to have a clear separation of the front, (and where applicable, middle) and back office functions. These functions must be performed by separate personnel with duties and reporting lines that are clearly segregated.

- Segregation of front and back office functions will ensure that the integrity of monitoring, reporting and settlement activities performed by the middle and back office is not compromised.
- Compensation plans of the back and middle function staff should not be directly tied to the performance of the front office.

2) Confirmation or Automatic Matching of Transactions

The practice of back offices to mutually send written confirmations to confirm a transaction is an important risk control measure. This prevents settlement problems by identifying discrepancies early, and it also ensures that dealers are properly reporting their trades. To ensure the integrity of the process:

- Confirmations should be promptly sent out to the back office of the counterparty by secure means, without being intercepted by the counterparty's front office.
- The previous practice of sending an initial (electronic) confirmation followed by a written confirmation may cause confusion, and is not recommended.
- All confirmations should contain at a minimum:
  - Date of transaction
  - Means by which the transaction was effected (e.g., phone, broker, telex, etc.)
  - Name and location of counterparty
  - Rate, amount, and currency,
  - Type and side of deal
  - Value date, maturity date and other relevant information (e.g., exercise)
  - Standard terms/ conditions applicable (e.g., ISDA. ICOM, FRABBA, etc.)
  - Other relevant information (e.g., settlement details)
- Brokers should confirm transactions to both counterparties.
- Upon receipt of confirmations, counterparties should promptly check for any discrepancies. If there is a discrepancy, the counterparty should be immediately informed. The counterparty, whose original confirmation was incorrect, should send an amended confirmation or an acknowledgement of the correction.
- There are jurisdictions where only one party sends confirmation of the transaction. In such cases, the other party should promptly check and acknowledge the confirmation. If acknowledgement is not forthcoming, management has to decide on how to treat such unconfirmed transactions.

- Transactions on multilateral automatic trading systems (ATS) and multilateral central clearing counterparties (CCP) are automatically matched and relayed to the back office of the counterparties, so it becomes unnecessary for parties to issue their own confirmations. The ATS or CCP provider should satisfy themselves that its confirmation process and the confirmations are valid under the law as evidence of a transaction.

3) Verbal Transactions

The prompt checking of confirmations is a key element in quickly identifying discrepancies in transactions. Counterparties may also have the practice of doing additional intra-day verbal checks that help in keeping the size and number of discrepancies down. This practice is highly recommended.

- Upon completion of a verbal check, counterparties should acknowledge that all transactions are accounted for, or highlight where discrepancies need to be resolved.
- Where a discrepancy has been identified and is an open risk, it should be immediately closed out, pending resolution of the dispute.

4) Payment and Settlement Instructions

For parties that transact regularly, the use of standardised settlement instructions (SSIs) can reduce payment errors. These SSIs should be established by authenticated SWIFT or confirmed letter.

Payment instructions should be conveyed as quickly as possible to facilitate prompt settlement. Changes to settlement instructions should be supported by written confirmations, whose receipt should be acknowledged.

5) Netting

Netting can substantially reduce settlement and credit risk between financial institutions. The BIS and central banks have exerted pressure on banks to use netting (bilateral or multilateral) arrangements. The Model Code recommends the adoption of netting in the settlement of transactions.

Agreement between parties to novate their transactions, allows the gross amount of many transactions to be netted, and be replaced by one single transaction for the net amount. This substantially reduces settlement and credit risk.

In recent times, banks have come together to create the Continuous Linked Settlement (CLS) group, the first real-time global settlement system for FX transactions. CLS allows for real-time intra–day settlement of transactions between participating banks in the CLS system by matching payment instructions from two parties, and applying a payment versus payment (PvP) system.

Chapter 4 Disputes, Differences, Mediation and Compliance

1) Disputes and Mediation

Disputes often arise from:

- Failure of dealers to be clear and unambiguous in their use of terminology, resulting in ambiguity on transaction details (date, amount, buy/sell, etc.); and
- Failure of back office to promptly and accurately check confirmations.

Addressing these failings will reduce the occurrence of disputes.

Many of these disputes can be resolved directly between the two parties with integrity and in an atmosphere of mutual respect.

Where normal avenues of resolving the dispute are exhausted, the ACI Committee for Professionalism (CFP) can assist in resolving the dispute through its 'Expert Determination Service'. The CFP will use the Model Code in guiding its decisions, except in the case where:

- Disputes and Mediation. The dispute concerns legal issues such as whether a contract has been made, misinterpretation of a contract, or accounting and tax issues;
- The material facts giving rise to the situation, or a key factor in resolving the case are in dispute; and
- The dispute is between two local parties, and where differences exist between the local Code of Conduct and the ACI Model Code. In such cases, the local Code of Conduct will take precedence.

2) Differences between Principals

All parties should move towards an equitable resolution of the dispute:

- Senior management should be informed early and be involved in resolving the dispute, thereby making disputes inter-institutional rather than one between the individual dealers or brokers.

Where the dispute involves amount, currency, buy/sell side, or other factors leading to an open risk position, the open position should be closed off so as to limit further cost arising from the dispute. This is an act of prudence pending resolution of the dispute, and not an admission of liability by any party.

In the case of erroneous payments, neither principals nor other parties should seek to benefit from the error (e.g., free use of funds). The aim should be for an equitable resolution of the dispute.

3) Differences with Brokers and the Use of 'Points'

Where a broker quotes a firm price but is subsequently unable to substantiate the quote when a deal is proposed, the proposing bank is entitled to hold the broker to his quote. This effectively means that the broker must make good the difference between the quoted price and the price dealt.

Where such differences arise:

- Senior management should be informed early and be involved in resolving the dispute, thereby making disputes inter-institutional rather than one between individuals (dealer and broker).
- Compensation should be in the form of a cheque to the bank, or as a reduction in the brokerage bill. It is bad practice to insist on a trade at the original price.
- All such incidents should be documented by each firm.

The settlement of differences through the use of 'points' or advantageous adjustment to prices of subsequent trades is not recommended. However, the CFP acknowledges that it may be an acceptable practice in certain centres. This practice must be subject to proper systems and controls.

4) Compliance and Complaints

Compliance with the Model Code ensures a high standard of integrity in the markets. If any institution believes another institution has breached the letter or spirit of the Model Code in a transaction, it should bring it to the attention of the offending institution, and attempt to resolve it amicably.

Failing this, the breach can be raised with the ACI Committee for Professionalism (CFP), which can then:

- Investigate the complaint;
- Consult the local ACI body; and
- Where justified, raise the issue with the appropriate regulatory body.

5) Money Laundering and Terrorist Financing

Money laundering is the process through which funds obtained from criminal or illegal activities are put through the bank system to make it appear as though the funds are from legitimate sources of activity. Money laundering can take many forms but usually involve the following steps:

1. Placement: Introducing the illegal proceeds, usually in the form of cash, into the financial system.
2. Layering: Separating the proceeds from their illegal origin through layers of complex financial transactions.
3. Integration: Providing an apparently legitimate explanation for the illegal proceeds.

Money laundering prevention focuses on stopping the introduction of illegal funds into the banking system.

In terrorist financing prevention, the focus is on impeding or stopping the movement of funds through the banking system that will be used to finance terrorist activities through the banking system.

In both instances, criminals and terrorists look to exploit 'fault lines' between national regulatory regimes, e.g., the confidentiality offered in areas such as private banking, and the ease of cross border transactions offered by remote counterparties.

Firms should have strong measures to guard against these illegal transactions. These measures can take the following forms:

- Appointment of a person (usually the compliance officer) whom staff can report suspected transactions to, and who in turn can report such activities to the regulatory authorities.
- Training staff to recognise the tell-tale signs of these illegal transactions. These signs include: unnecessary complexity of transactions, unusual transaction activity, unnecessary routing through third-party accounts, dealings with parties in high risk countries identified by the Financial Action Task Force (FATF).

A key principle that firms should follow in countering money laundering and terrorist financing is to 'know your client'. This allows firms to have expectations of what should be counted as 'normal activities', and to flag 'unusual' activities and transactions.

Further information can be found at the FATF website: www.fatf-gafi.org

Chapter 5 Authorisation, Documentation and Telephone Taping

1) Authorisation and Responsibility for Dealing Activity

Management should control the activities of all personnel (both dealers and support staff) involved in dealing by clearly stating (in writing) the responsibilities and authority of staff. These written guidelines should cover dealing policy, reporting procedures, authority delegated to respective staff, approved instruments, limits, confirmation and settlement procedures. It should also spell out guidelines that staff should follow in dealings with banks, brokers and customers.

It is also good practice to inform counterparties and customers in writing of the authority that has been delegated to those individual staff members who act on the firms' behalf.

2) Terms and Documentation

OTC market trades such as swaps and FRAs are commonly subject to legal documentation. If these are not already in place, legal documentation should be completed and exchanged as soon as possible. The use of standard terms issued by industry groups (as listed in Appendix 3 of the Model Code) is recommended.

Any modification of terms should be made clear and agreed to prior to dealing. A transaction is considered binding when it is dealt. It is bad practice to make a transaction subject to the completion of the legal documentation.

3) Qualifying and Preliminary Dealing Procedures

Where quoted prices are subject to qualifying conditions, the Model Code insists that these conditions be made clear when the price is quoted. Examples of conditions include:

- Subject to credit approval; or
- Subject to execution of an associated transaction.

4) Recording Telephone Conversations and Electronic Text Messages

The recording of telephone conversations in dealing rooms is now a common practice. Experience has shown that access to these records can help resolve many disputes quickly. Likewise, the record generated by other communication media used by dealers e.g., email, etc. can also be helpful.

Recommendations regarding the recording of communications:

- All conversations between dealers and brokers should be recorded, together with back office lines used for confirming trades or giving payment instructions.
- Counterparties and clients should be made aware that their conversations are being recorded. New counterparties and clients should be informed at the point that they are taken on as counterparties.
- Tapes and records should be kept for a period of at least 2 months. Records can be kept for longer periods where they pertain to longer term transactions e.g., FRAs, where errors are found only at a later date.

The recording of conversations should be in line with local laws e.g., privacy laws.

Access to recording equipment, tapes and other records should be restricted so as to prevent inadvertent or deliberate tampering of records and recording equipment. These safeguards will ensure that records remain credible and can be accepted as evidence in a court of law. Access to records should be documented.

- Access should be given to compliance officers, internal auditors and anti-money laundering officers.
- Access for other reasons should be approved and supervised by a senior line officer (e.g., Chief Dealer or Head of Operations).

5) Use of Mobile Devices for Transacting Business

The use of wireless and mobile devices can undermine the controls (recording, audit trials, etc.) put in place to ensure the integrity of the dealing environment. Management should have a clear policy on the use of such devices. The guidelines should cover information as to whether they can be used or allowed in the dealing room, and procedures to allow for an end-to-end transaction audit trial.

The use of wireless devices for front office or back office transactions is not recommended by the Model Code.

6) Dealing Room Security

It is commonly understood that the dealing room is a sensitive area. The Model Code recommends that strict security controls – covering access to the dealing area, dealing room equipment and systems – be put in place. There should also be controls to cover access to treasury IT equipment and confidential information.

Access by non-treasury personnel and visitors should be limited. Procedures specifying management approval, time limits, security checks, introduction of outside devices into the dealing room should be specified and enforced.

1) The Role of Brokers and Dealer/Broker Relationship

The Model Code recommends that senior management at both trading and broking institutions take an active role in overseeing the dealer/broker relationship to prevent abuses and potential disputes. Management should define the terms of the broking services that is to be provided, and ensure that staff are aware of compliance and the internal policies that govern the relationship.

- Trading institutions should have policies regarding the choice of brokers and monitor usage to avoid the undue concentration of business.
- Brokers only help to arrange deals and should not take on a discretionary investment management role.

2) Commission/Brokerage

Brokerage commissions are often negotiable. Negotiations should be made at senior management level. Agreement on rates need to be documented.

- Deviations from previously agreed rates need to be approved and recorded.
- Brokerage bills should be settled promptly as overdue bills are taken as a charge against the broker's capital, thus, disadvantaging the broker.

3) Electronic Broking

Electronic execution platforms (whether broker, proprietary or vendor provided) is now accepted as part of the global OTC market. However, the difference in the nature of such platforms from traditional voice platforms raises many technical and business issues. While the Model Code recommendations still applies, this necessitates additional policies in the use of these platforms:

1) Transactions on the electronic execution platform are governed by the vendor's rule book. The vendor's rule book should stipulate terms of use of the platform and procedures in the event of a communications breakdown when a deal is being consummated, off-market discrepancies, and software inadequacies. Dealers should familiarise themselves with the rule book and operational procedures.
   - Electronic broking raises the potential for off-market trades from input errors. Care should be taken while inputting orders.
   - The automatic nature of trade execution also raises potential abuse of the system, especially in volatile market conditions. This is considered bad practice and against the spirit of the Model Code.

4) Passing of Names by Brokers

This describes the responsibilities of brokers and dealers in divulging or seeking the identity of counterparties prior to a trade.

- Dealers should give brokers indications of counterparties that they are unable or unwilling to transact with.
- Brokers should not divulge names until both sides display a serious intent to transact.
- In money markets, a lender may refuse a borrower's name due to absent or insufficient credit limits, However, there is an obligation to deal at the price once the question 'Who pays?' is asked, particularly when an alternative, acceptable name is offered. A borrower may turn down a lender when there is a lack of reciprocal limits.
- In the case of instruments, the seller may not be the issuer of the instrument. The issuer of the paper will be disclosed to the potential buyer, once the question 'Who sells?' is asked. Unless the issuer is unacceptable, the buyer is committed to deal with the seller or an acceptable alternative.

5) Name Substitution/Switching by Brokers

In FX markets, the name of a party may, at times, be found unacceptable after a trade is done due to the unavailability of credit limit. Brokers will attempt to substitute a third party to stand in between, to facilitate the trade. This practice is acceptable.

- As substitution trades are done at off-market rates, they should be identified as such and approved by management.
- A dealer should not seek favours from brokers for switching names to facilitate a trade.

1) Dealing at Non-current Rates and Rollovers

Non-current rates could potentially be used to conceal profit or loss, perpetrate fraud, tax evasion or unauthorised extension of credit. Therefore, the use of non-current rates should be avoided as far as possible.

Where it is necessary (for example in swaps or certain deals with corporate clients), the use of non-current rates should only be done with the approval of senior management, and must be monitored carefully to avoid potential problems.

In FX markets, it is common practice to omit the 'big figure' in price quotations for the sake of brevity and efficiency. This can lead to misunderstandings.

- It is best practice to include the 'big figure' in outright spot and forward FX transactions.
- It is unethical to hold a party to a deal where the erroneously agreed rate is clearly out of market. The deal can be checked against market price/time data to determine the market price range at the time of the deal.
- However, in fast-moving markets, where the market data may not be verifiable or correct, the agreed-to price will prevail.

2) Consummation of a Deal

Dealers should themselves be bound to a deal when within a market maker/user conversation, words offering a deal (e.g., yours, mine) or accepting a deal (e.g., okay, done) are used. The Model Code describes the use of market jargon in Chapter 11, Market Terminology. Dealers and brokers should familiarise themselves with the terms.

Verbal agreements are binding. Where documentation follows a deal, it is bad practice to make the deal subject to the completion of documentation. To minimise disputes, material points should be quickly agreed upon in the course of verbal negotiations prior to a deal.

Brokers have an obligation to inform a quoting dealer if the dealer's quotation is dealt on. A deal is considered done only when the quoting dealer acknowledges the deal.

- When a quotation is simultaneously hit by multiple parties for an amount greater than what the quoted price is good for, the broker shall apportion the amount prorate among dealing parties, at the same time informing all parties of such apportionment.

3) Dealing Quotations, Firmness, Qualification and Reference

All market participants, whether dealers or brokers, have an obligation to make clear what basis on which a price quotation is made. Unless a quotation is otherwise qualified, it is assumed that the quotation is 'firm' for at least the minimum marketable amount in that particular market. Additionally, any qualifications to the quote (e.g., acceptable counterparties) should be made known when quoting, rather than after it is hit. A quoting dealer should work with the broker to establish a range of acceptable counterparties for whom the dealer's quotation is firm, subject to credit availability.

In fast moving markets, the dealer may wish to place a time limit on the validity of his quote. The onus is on quoting dealers to state this at the outset, or to satisfy themselves that their quotation has been withdrawn. A broker on his part should make an effort to check with dealers to ensure that a dealer's interest in a quotation is current.

Quotations are considered current, unless:

- They have been dealt on;
- They have been cancelled or withdrawn;
- They have been superceded by a better bid or offer; or
- The broker has closed another transaction for the same instrument with a different counterparty, but at a different price.

In the last two instances, the broker should consider the original offer or bid no longer valid unless reinstated by the dealer.

4) Dealing with Unidentified/Unnamed Principals

Institutional fund managers/investment advisors deal on behalf of their clients. In dealings with the fund mangers, the identity of the final principal may not be known to the dealer at the point of transaction. This raises potential issues such as money laundering, credit risks, etc.

The Model Code acknowledges the desire for anonymity and confidentiality. However, it recommends that the identity of the final principal be made known to certain departments of the dealing firm, such as Compliance, Legal and Credit. This would ensure that the dealing firm has recourse to the final principal. Client codes can be used so as to preserve the anonymity of the principal at the dealing staff level.

Management should have appropriate written policies to safeguard confidentiality internally.

5) Internet/Online Trading

The use of the Internet as a medium for dealing with customers has attracted the interest of many dealing institutions, who see its potential for widening their customer base. However, the ability to deal online without direct communication with dealers, raises such issues as money laundering.

Dealing institutions offering Internet trading facilities should put together controls and rules regarding client's use of the facility as well as rules governing access, authentication and identification of personnel who can access the facility.

The application of 'know your client' and money laundering provisions set out in Chapter 4 has application here and should be adhered to.

6) Dealing Reciprocity

The Model Code encourages the development of reciprocal dealing relations between institutions. However, these informal bilateral arrangements are not binding and are not enforceable. The willingness to quote, say in volatile market conditions, is a matter between two institutions, and for them to decide upon in the light of their evolving relationship.

1) Deals Using a Connected Broker

Where a broking firm is quoting a price on behalf of a related party (e.g., a party that is a significant shareholder in the broking firm), the existence of the relationship should be disclosed to clients so as to avoid any conflicts of interest.

2) Assignments and Transfers

Certain instruments covered by the Model Code may be transferred to another principal (e.g., interest rate swaps). Principals who enter into swap transactions with the intention of transferring the deal to a third party should make clear their intentions. It is recommended that the confirmation should indicate such intentions along with the transfer procedure. The transferee should be informed before its name is released to a third party. At the same time, the transferee is obligated to provide information to enable the transaction to take place.

3) Repos and Stock Lending

Given the nature of repo and stock lending transactions, legal documentation must be in place before such transactions take place. Legal opinion should be sought as to the enforceability of the terms contained in such documentation.

Chapter 9 General Risk Management Principles for the Dealing Business

This chapter outlines the basic approach that both management and market participants should adopt in addressing business risks. This is given as 14 principles:

1) Promote the highest standard of conduct and ethics.

2) Ensure senior management involvement and supervision.

3) Organisational structure ensuring independent risk management and controls.

4) Ensure involvement of thoroughly professional management in all administrative processes.

5) Provide appropriate systems and operational support.

6) Ensure timely and accurate risk measurements.

7) Control market risk exposure by assessing maximum likely exposure under various market conditions.

8) Always recognise the importance of market and cash flow liquidity.

9) Consider the impact of diversification and risk return trade-offs.

10) Accept only the highest and most rigorous client relationship standards. (For example, ensure that the client has the necessary authority to undertake transactions, and that these transactions are legally, socially and ethically acceptable.)

11) Clients should understand transactions (See Chapter 11, Market Terminology).

12) Risk management based on sound legal foundations and documentation

13) Ensure adequate expertise and human resources support trading and risk taking

14) Use judgement and common sense. (For example, respecting the spirit of controls laid down, and applying experience and expertise when confronted with new situations.)

Chapter 10 Additional Guidelines for Dealing with Corporate/Commercial Clients

The recommendations in the Model Code apply when dealing with all types of parties. Dealing with corporate clients, who would not be considered wholesale market participants require additional care, particularly with regard to the suitability of products sold to these clients.

This chapter reiterates some recommendations of special note:

1) **Authorisation** - make sure information on authority granted to personnel on both sides are exchanged.
2) **Segregation of duty** – segregation of the front and back office responsibilities should also be practised by the client.
3) **Complex product information** – the dealing institution should be conscious of the suitability of products, and should ensure that as much information as is reasonable is provided to the client.
4) **Confidentiality** – neither principals nor clients should disclose confidential information on transactions – whether in progress or completed – to third parties.
5) **Entertainment and gifts** – there should be controls against excesses.
6) **Historic FX rates/FX rollovers** – use of non-current rates should be approved and documented by senior management on both sides.
7) **Legal documentation** - this should be in place especially for complex transactions.
8) **Margin account/Collateralised trading** – documentation must be in place. Forced close out procedures for margin positions when there is negative equity should be clearly spelt out. There should be regular mark-to-market and reconciliation of positions.
9) **Know your customer** – provisions on money laundering must be observed.
10) **Internet/Online trading** – recommendations as outlined in Chapter 7.5, Dealing Practice should be implemented.

Chapter 11 Market Terminology

Transactions may be entered into orally, and often market jargon is used to effect a transaction. Market participants need to ensure that these terms are understood by both contracting parties to have the same meaning.

Model Code Chapter 11 lays down the meaning of terms used in dealing in various instruments. Market participants in those instruments should review and familiarise themselves with the terminology.

Appendices 1–6

The Appendices cover the following topics:

1) ACI rules for OTC financial instruments dispute resolution

2) Markets and instruments covered by the Model Code

3) Terms and conditions for financial instruments

4) Other published Codes of Conduct and Approval for translating

5) The Charter of the ACI – The Financial Markets Association

6) SWIFT currency codes

Question 1

If a holiday is declared by a country and the day a deposit matures falls on that holiday, the maturity payment date will be:

A. Adjusted to the next business day.

B. Adjusted to the preceding business day, if original settlement date was the last business day of the month.

C. Not adjusted.

D. Both A and B.

ANSWER: D

Model Code Chapter 1.3 recommends that A and B be followed.

Question 2

Under the Model Code, position parking:

A. Is forbidden.

B. Is allowed, but must be documented.

C. Is allowed, but must be approved by senior management.

D. Should be reported to the local authorities.

ANSWER: A

Position parking allows positions to be kept off an institution's books, away from management and regulatory oversight. It is forbidden by Model Code Chapter 1.5.

Question 3

You are attending the wedding dinner of an important client. All the guests at the wedding are given a diamond-encrusted watch commemorating the wedding. Rejecting the gift at the wedding may be socially offensive. You should:

A. Reject the gift.

B. Accept the gift and thank the client for it.

C. Accept the gift subject to your firm's internal procedure and report the gift to management and compliance, so that procedures for receiving gifts of excessive value can be followed.

D. Call compliance immediately to ask for advice on dealing with the situation.

ANSWER: C

You should follow procedures for handling the receipt of gifts of excessive value that cannot be rejected without giving offence. (Model Code Chapter 2.2)

Question 4

To avoid misunderstanding and liability when offering a product to a client, a bank should inform a client that:

A. Discussions should not be construed as investment advice or recommendation.

B. It is assumed the client understands the transaction and should make his own assessment.

C. No fiduciary relationship exists between the bank and the client.

D. All of the above.

ANSWER: D

Model Code Chapter 2.8 recommends that A, B and C should be stated to the client.

Question 5

Where dealing for personal account is allowed, management must:

A. Establish clear guidelines for such dealing.

B. Prevent insider trading with appropriate internal controls.

C. Set appropriate procedures to prevent front running.

D. All of the above.

ANSWER: D

Model Code Chapter 2.5 highlights the potential conflict of interest that arises when staff are allowed to deal for their own account. This can be mitigated and prevented by adopting clear internal policies and procedures to prevent abuse.

Question 6

On small bets between market participants on the outcome of economic indicators, the Model Code's recommendation is that:

A. It should be encouraged as it helps develop risk taking skills.

B. It should be strongly discouraged as it can easily lead to abuse.

C. Unless there are local prohibitions, it should be allowed to continue.

D. A maximum bet size should be stipulated.

ANSWER: B

Gambling activity between market participants is strongly discouraged as it can lead to abuse. A policy to control this activity should be put in place (Model Code Chapter 2.3).

Question 7

To maintain the confidentiality of information, procedures that can be followed are:

1) **Restrict access to sensitive areas, such as dealing rooms.**
2) **No broking activity should be done outside a broker's office.**
3) **Dealers and brokers must not discuss business outside of offices.**
4) **Care should be taken when information is communicated over open channels.**

Which of the above procedures are recommended by the Model Code?

A. (1) and (2) only
B. (1) and (2) and (3)
C. (1), (2) and (4)
D. All of the above

ANSWER: C

Model Code Chapter 2.6 recommends that care be taken in the handling of confidential information. However, it does not prohibit business discussions outside offices except that care must be taken to ensure that such discussions are not overheard.

Question 8

The Model Code recommends that:

A. The front and back offices should be located in one geographical location.
B. The front and back offices should be located in two distinct locations.
C. The front and back offices should be functionally distinct with separate reporting lines and personnel.
D. Compensation of the back office be tied to the performance of the front office.

ANSWER: C

An important Model Code recommendation, regardless of the physical arrangements of the front and back offices, is that they should be functionally distinct to ensure the integrity of the back office function (Model Code Chapter 3.1).

Question 9

The practice of doing intra-day verbal checks on verbal transactions is:

A. Discouraged as it interferes with automated checking systems.

B. Recommended as it can help keep the size and number of discrepancies down.

C. Has no validity unless there is prior agreement between counterparties.

D. Is provided for under ISDA documentation.

ANSWER: B

Intra-day verbal checks help reduce the size and number of discrepancies. It complements the confirmations process, and is recommended by the Model Code (Model Code Chapter 3.3).

Question 10

To reduce settlement risks, the Model Code recommends that banks adopt:

A. Bilateral netting.

B. Multilateral netting.

C. The Continuous Linked Settlement (CLS) system.

D. All of the above.

ANSWER: D

These three ways can reduce settlement risk by reducing the amount needed to flow between various counterparties (Model Code Chapter 3.5).

Question 11

Trade confirmations should be sent promptly:

A. To the counterparty's front and back office.

B. To the counterparty's back office without being intercepted by the front office.

C. Electronically by the front office, followed by a written confirmation by the back office.

D. By the front offices to each other.

ANSWER: B

Model Code Chapter 3.2 recommends that confirmations be sent by the back offices to each other, without the interception of the front office to maintain integrity of the confirmation process. Sending confirmation twice in both electronic and written form is not recommended.

Question 12

When a discrepancy that results in an open position is detected, the open position should be:

A. Closed off immediately and reported to senior management.

B. Should be managed to minimise the disputed amount.

C. Left to senior management of both sides to decide.

D. Allowed to run until the dispute is settled.

ANSWER: A

As a matter of prudence, the open position should be closed off to limit further cost arising from the dispute (Model Code Chapter 4.2). The matter should be reported to senior management so that disputes can be resolved at that level.

Question 13

Where there is a dispute that does not involve a question of law, which cannot be resolved by the two counterparties involved in the dispute, they should next:

A. Call for legal arbitration.

B. Call for the ACI Committee for Professionalism's 'Expert Determination' service.

C. File a claim in the local court.

D. File a claim in the international court.

ANSWER: B

The ACI Committee for Professionalism's (CFP) 'Expert Determination' service will give an independent opinion using the Model Code in guiding its conclusions. This will help move parties towards a resolution to the dispute (Model Code Chapter 4.1).

Question 14

You encounter a series of client transactions, which you suspect to be part of a scheme to launder money through the banking system. You should:

- **A.** Report the transactions to the regulatory authorities.
- **B.** Report the transactions to the police.
- **C.** Report the transactions to the bank's compliance officer.
- **D.** Do nothing until definitive proof is found.

ANSWER: C

As part of procedures recommended to combat money laundering and terrorist financing activities, banks should appoint a person (usually the compliance officer to whom staff can report suspicious activities. The compliance will then take further action in reporting the relevant authorities if found necessary (Model Code Chapter 4.5).

Question 15

The key principle in combating money laundering and terrorist financing is to:

- **A.** Know your client.
- **B.** Clear all transactions through compliance.
- **C.** Limit client transactions to specified types of transactions.
- **D.** Cap the amount of a single transaction.

ANSWER: A

Knowing your client will allow you to have expectations of what are 'normal' activities, and to flag any 'unusual' activities (Model Code Chapter 4.5) to management.

Question 16

When a dealer holds a broker to a quote that the broker cannot substantiate when a deal is proposed, the Model Code recommends the price difference be made up by:

- **A.** Cheque payment or a reduction in the brokerage bill.
- **B.** 'Points' adjustment on subsequent transactions.
- **C.** A credit note to be offset in subsequent transactions.
- **D.** All of the above.

ANSWER: A

The Model Code recommends settlement through a cheque payment or a reduction in the brokerage bill. Properly controlled, the 'points' system may be accepted in some centres but is not recommended by the Model Code Chapter 4.3. Senior management should be aware of and approve of any compensation arrangements.

Question 17

The Model Code recommends that tape recordings and records of transactions should be kept for a period of at least:

A. 1 month
B. 2 months
C. 3 months
D. 6 months

ANSWER: B

Records and tapes be kept for at least 2 months. Records of longer term transactions (e.g., FRAs) should be kept for longer periods (Model Code Chapter 5.4).

Question 18

The use of wireless devices such as mobile phones for transactions:

A. Is prohibited under the Model Code.
B. Is not recommended; where used, there should be clear procedures to allow for an audit trial of transactions.
C. Is allowed for front office transactions but not for back office transactions.
D. Is allowed for back office transactions but not for front office transactions.

ANSWER: B

The Model Code discourages the use of mobile devices for transactions but does not prohibit it. There should be proper procedures to allow for an end-to-end transaction audit trial (Model Code Chapter 5.5).

Question 19

The negotiation of brokerage commissions should be made between:

A. Senior management of the dealing and broking institutions.

B. The dealer and individual broker, and should be documented.

C. The dealer and the broking institution.

D. All of the above.

ANSWER: A

The relationship should be managed by the senior management of both the dealing and broking institutions. This includes commission discussions (Model Code Chapter 6.1).

Question 20

If a rate shown by a bank to a broker is 'firm subject to credit' and the name of the counterparty is not acceptable to the bank is shown, the bank should:

A. Complete the deal since the name has already been disclosed.

B. Complete the deal but adjust the rate to reflect the additional credit risk.

C. Complete the deal with another acceptable counterparty without any rate adjustment.

D. Reject the deal outright.

ANSWER: C

According to the Model Code, the dealer is ethically bound to deal at the original rate once the question 'Who pays?' is asked. This may involve a substitution for an acceptable credit to facilitate the transaction (Model Code Chapter 6.4).

Question 21

A fund manager wishes to preserve the anonymity of his client when transacting with your bank. An acceptable way to do this is to:

A. Assume that the fund manager is the counterparty.

B. Assign account codes to the client after the identity is shown to the bank's compliance and credit departments, without the dealers knowing the client's identity.

C. Do a pass-through trade through the fund manager's account.

D. All of the above.

ANSWER: B

The Model Code recommends that the identity of the client be made known to certain departments of the dealing bank so that it has recourse for the transaction (Model Code Chapter 7.4).

Question 22

An offer left with a broker has been superseded by a better offer. The order has not been dealt on or cancelled by the dealer. The broker should:

A. Treat the order as invalid unless reinstated by the dealer.

B. Treat the order as valid since the order has not been withdrawn.

C. Treat the order as valid since it has not been dealt on.

D. Adjust the order to match the better offer in the market.

ANSWER: A

Once superseded, an order is invalid unless reinstated (Model Code Chapter 7.3).

Question 23

Where a sale and repurchase agreement is entered into:

- **A.** Legal documentation should be in place prior to the transaction.
- **B.** Legal documentation can be put in place after the transaction.
- **C.** Legal documentation can be negotiated at the time of transaction.
- **D.** Legal documentation is not required if the transaction has been approved by senior management of both dealing parties.

ANSWER: A

The Model Code recommends that documentation be in place before the transaction takes place. Doing a transaction that is subject to legal documentation is considered bad practice (Model Code Chapter 8.3).

Question 24

When dealing with corporate and commercial clients, the use of non-current rates for rollovers of FX forwards:

- **A.** Is not allowed.
- **B.** Is allowed but has to be documented and approved by senior management of the dealing institution and the client.
- **C.** Has to be cleared with the compliance department.
- **D.** Is allowed subject to notification from the client.

ANSWER: B

The Model Code appreciates that corporate clients may ask for the use of historic rates but this can proceed only after approval from senior management of the dealing institution, the client, and with the proper documentation (Model Code Chapter 10.6).

Question 25

Where there is a dispute between a dealer and a broker, the dispute should be resolved by:

- **A.** Senior management of the dealing and broking institutions.
- **B.** The dealer and individual broker, and should be documented.
- **C.** The dealer and the broking institution.
- **D.** All of the above.

ANSWER: A

The relationship should be managed by the senior management of both the dealing and broking institutions. This includes commission discussions (Model Code Chapter 6.1).

Question 26

The name of a counterparty shown to a quoting dealer by a broker is not acceptable to the quoting bank. The quoting bank:

A. Should complete the deal since the name has already been disclosed.

B. Should complete the deal but adjust the rate to reflect the additional credit risk.

C. Should complete the deal with another acceptable counterparty without any rate adjustment if an alternative name is immediately offered.

D. Should reject the deal outright.

ANSWER: C

According to the Model Code, the dealer is ethically bound to try to complete a deal at the original rate once the question 'Who pays?' is asked. This may involve a substitution for an acceptable credit to facilitate the transaction (Model Code Chapter 6.4).

Question 27

In the FX market, where the dealer says 'My risk' after receiving a quote, it means:

A. The dealer is asking for a better price than the initial quote.

B. The dealer is taking the offer.

C. The dealer acknowledges that the quote needs to be refreshed before any action on the dealer's part.

D. The market is very volatile.

ANSWER: C

The dealer is acknowledging that the quote needs to be refreshed before it can be dealt on (Model Code Chapter 11.1).

Question 28

In the FX market, a dealer quotes '90 choice'. It means that the dealer:

A. Is telling the receiver of the quote that the quote is only good for 90 seconds.

B. Is informing the seller that he will bid at X.XX90.

C. Is willing to sell or buy at the same price of X.XX90.

D. Is asking the other party for a quote if he is not dealt on.

ANSWER: C

A choice price is a quote where the offer and bid are both the same, and the receiver of the quote has a choice of which side he would like to deal on (Model Code Chapter 11.1).

Question 29

Under the Model Code, where the dealer shouts 'Done' or 'Yours' at the same time a broker shouts 'Off':

A. The deal is done for the full amount.
B. The deal is done for half the full amount.
C. No deal is done.
D. The dealer and broker should go for dispute resolution.

ANSWER: D

No deal is done. Under guidelines of the Model Code, a deal is done only if acknowledged by the quoting dealer (Model Code Chapter 7.2).

Question 30

Which of the following is not covered by the Model Code?

A. Spot and forward FX transactions
B. Money market transactions
C. Bond securities transactions
D. Gold bullion and precious metals transactions

ANSWER: C

Appendix 2 of the Model Code gives a list of instruments covered by the Model Code. Bond securities are not covered.

Beyond the Dealing Certificate

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Exploring Further

This study guide is focused on the syllabus of the Dealing Certificate. As with the Dealing Certificate, the study guide is meant as an introduction and primer to the foreign exchange and money markets. The candidate is encouraged to go beyond the coverage in this study guide by exploring the material listed below:

Publications

- Stigum, Marcia and Crescenzi, Anthony (2007). *Stigum's Money Markets*, 4th. Ed. New York: MacGraw-Hill.
- Riehl, Heinz (1998). *Managing Risk in the Foreign Exchange, Money and Derivative Markets*. New York: MacGraw-Hill.
- Kolb, Robert W. and Overdahl, James A. (2007). *Futures, Options and Swaps*, 5th. Ed. MA: Wiley-Blackwell.
- Das, Satyajit (2005). *Risk Management*. Singapore: Wiley Finance.
- Weithers, Timothy (2006). *Foreign Exchange: A Practical Guide to the FX Markets*. New Jersey: Wiley Finance.

Websites

- ACI –The Financial Markets Association: www.aciforex.org
- Bank of England: www.bankofengland.co.uk
- Bank of International Settlements: www.bis.org
- European Central Bank: www.ecb.int
- The Federal Reserve Bank: www.federalreserve.gov