Chapter 6: Session 11–Raising Finance from International Markets

International Financial Markets:

The International Financial Market is the place where financial wealth is traded between individuals and typically between the countries.

When funds flow across national boundaries and the transfer is between parties residing in different countries, there comes into existence the international financial markets.

The Participants of International Financial Markets (Wholesale Markets):

The wholesale segment is also known as the interbank market as the exchange transactions take place between banks, that are primary dealers.

Commercial Banks:

Commercial banks undertook foreign exchange trading as their principal business. As commercial banks trade in large volumes of foreign exchange, the wholesale segment of the foreign exchange market has become an interbank market.

Investment Banks and other Financial Institutions:

Investment banks, insurance companies, pension funds, mutual funds, hedge funds and other financial institutions have become direct competitors to commercial banks.These new institutions have emerged as important foreign exchange service providers to a variety of customers in competition with the commercial banks.

Corporations and High Net-Worth Individuals:

Corporations and high-net worth individuals, domestic as well as multinational corporations may buy foreign currency to make import payments, interest payments and loan payments and to invest funds abroad.

Central Banks:

Central banks of different countries participate in the foreign exchange market to control factors such as money supply,inflation, and interest rates by influencing exchange rate movements in a particular direction. Reserve Bank of India intervenes in the foreign exchange market specially to arrest violent fluctuations in exchange rate due to demand supply mismatch in the domestic foreign exchange market.

The Participants of International Financial Markets (Retail Markets):

The retail segment of the foreign exchange market consists of tourist, restaurants, hotel, shops banks and other bodies and individuals. Travellers and other individuals exchange one currency for another,to meet their specific requirements.Currency notes, travellers' cheques and bank drafts are the common instruments in the retail market.Authorised restaurants, hotels, shops,banks, and other entities buy and sell foreign currencies, bank drafts and travellers' cheques to provide easy access to foreign exchange for individual customers and also to convert their foreign currency into their home currency.

Euro-Dollar Market:

Effectively the euro dollar market began in the 1950s, when the Soviet Union began moving its dollar denominated oil revenues out of US banks to prevent US from freezing its assets. Euro-dollar is meant for all U.S. dollar deposits in banks outside the United States, including the foreign branches of U.S. banks. It bears the same exchange rate as an ordinary U.S. dollar has in terms of other currencies. In short, the term Euro-dollar is used as a common term to include the external markets in all the major convertible currencies.

Euro-dollar market performs 3 important functions:

- It acts as an international conduit for short and medium-term capital from surplus nations to deficient nations.
- It enables cover operations in foreign exchange.
- Euro dollar market acts as financial intermediary within the border of a single country's currency.

The Euro-dollar market has two facts:

- It is a market which accepts dollar deposits from the non-banking public and gives credit in dollars to the needy non-banking public.
- It is an inter-bank market in which the commercial banks can adjust their foreign currency position through inter-bank lending and borrowing.

Following benefits seem to have accrued to the countries involved in the Euro-dollar market:

1. It has provided a truly international short-term capital market, owing to a high degree of mobility of the Euro-dollars.

2. It has enabled importers and exporters to borrow dollars for financing trade, at cheaper rates than otherwise obtainable.

3. It has enabled monetary authorities with inadequate reserves to increase their reserves by borrowing Euro-dollar deposits.

4. It has enlarged the facilities available for short-term investment.

International Capital Market Instruments:

American Depository Receipts:

A foreign company might make issue in U.S. by issuing securities through appointment of Bank as depository. By keeping the securities issued by the foreign company, the U.S. Bank will issue receipts called American Depository Receipts (ADRs) to the investors.

It is a negotiable instrument recognizing a claim on foreign security. The holder of the ADRs can transfer the instrument as in the case of domestic instrument and is also entitled for dividends as and when declared.

An ADR can be described as a negotiable instrument denominated in US dollars, representing a non-US Company's local currency equity shares or known as depository receipts.

These are created when the local currency shares of an Indian Company are delivered to an overseas depository bank's domestic custodian bank, against which depository receipts in US dollars are issued.

Each depository receipt may represent one or more underlying shares. These depository receipts can be listed and traded as any other dollar denominated security.

Benefits to Indian Company:

- Better corporate image both in India and abroad which is useful for strengthening the business operations in the overseas market.
- Means of raising capital abroad in foreign exchange.
- Increased recognition internationally by bankers, customers, suppliers etc.
- No risk of foreign exchange fluctuations as the company will be paying the interest and dividends in Indian rupees to the domestic depository bank.

Benefits to Overseas Investors:

- Assured liquidity due to presence of market makers.
- Convenience to investors as ADRs are quoted and pay dividends in U.S. dollars, and they trade exactly like other U.S. securities.
- Cost-effectiveness due to elimination of the need to customize underlying securities in India.
- Overseas investors will not be taxed in India in respect of capital gains on transfer of ADRs to another non-resident outside India.

Chapter 6: Session 12 – Raising Finance from International Markets

Global Depository Receipts:

Global Depository Receipt (GDR) is a dollar denominated instrument of a company, traded in stock exchanges outside the country of origin i.e. in European and South Asian Markets. It represents a certain number of underlying equity shares.

Foreign Currency Convertible Bonds:

Foreign Currency Convertible Bonds (FCCBs) are issued in accordance with the scheme and subscribed by a non-resident in foreign currency and convertible into ordinary share of the issuing company in any manner, either in whole or in part based on only equity related warrants attached to debt instrument. The FCCB is almost like the convertible debentures issued in India.

The Bond has a fixed interest or coupon rate and is convertible into certain number of shares at a prefixed price. The bonds are listed and traded on one or more stock exchanges abroad. Till conversion the company must pay interest on FCCBs in dollars (or in some other foreign currency) and if the conversion option is not exercised, the redemption also has to be done in foreign currency. These bonds are generally unsecured.

External Commercial Borrowing:

External Commercial Borrowings (ECBs) is a borrowing of over 180 days. ECB is the borrowing by corporate and financial institutions from international markets. ECBs include commercial bank loans, buyers' credit, suppliers' credit, security instruments such as floating rate notes and fixed rate bonds, credit from export-credit agencies, borrowings from international financial institutions such as IFC etc.ECBs are approved with an overall annual ceiling. Consistent with prudent debt-management keeping in view the balance of payments position and level of foreign exchange reserves.

Regulatory Aspects:

In theory, financial regulation around the world is governed by standards set by three main groups of regulators. For banking, it is the Basel Committee, set up under the auspices of the BIS. For securities firms and markets, it is the International Organisation of Securities Commissions (IOSCO), and for insurance companies it is the International Association of Insurance Supervisors (IAIS). All three organisations have established principles of good regulatory practice, to which most countries in the world are, at least nominally, signed up. These principles describe the appropriate structures for regulation.

Once currencies came under pressure, and inadequate external liquidity became the issue, the opacity of local accounting standards, the insecure basis of provisioning policies, uncertainties in enforcing collateral, dubious corporate governance and the inability of central banks and supervisory authorities to impose discipline were all important factors undermining confidence and aggravating the collapse.

There is a need to enhance supervision, particularly in economies open to capital flows, and to strengthen their compliance with internationally agreed best practices.The groups of supervisors themselves do not have the basis on which to enforce rules among their voluntary membership. The Basel Committee has tried hard, and with some success, to reach out beyond its membership, but of course it has no firm mandate to do so.Instead, the necessary expertise, resources and willingness to pass judgement on compliance with these standards are being put together by the IMF and the World Bank.

The IMF has a worldwide responsibility for economic surveillance, has only recently been extended to cover financial systems in any depth. A desire by the international financial community to consider more carefully the threats to financial stability, to put in place better incentives for avoiding such crises, and to bring together the key government officials, supervisors, central banks and the financial institutions, through the new Financial

StabilityForum is very important for the regulation of International Financial Market.

Chapter 7: Session 13 - Time Value for Money

Introduction:

According to the concept of Time Value for money "a rupee which we have today has a better value than the rupee receivable sometime in future."

Reasons for changes in the value of money with time may be attributed to:

- Rate of Return
  It means that the money which we have today can generate a return depending on the kind of investment made.
- Inflation
  (Rs. 1,00,000 today, after 1 year assuming 8% inflation, you need to spend Rs. 1,08,000 to buy the same item)
- Risk and Uncertainty
  P=1 - Certainty, P=0 – Uncertainty, P= Between 0 to 1 – Risk
- Preference for Present Consumption (Bird in Hand Approach)

Most of the financial decisions involve cash flows occurring at different time periods. Any decision on the arithmetic value of the same will not be appropriate. Therefore, all of them should be brought in to one common reference point for logical and reasonable comparison. Hence, we need to know how to bring them on to a common platform. The concepts compounding and discounting would enable us to do the same. Majority of our decisions in Both personal and professional life utilise the concept of time value for money. before that we should understand the type of cash flows that will occur.

Types of cash flows:

The cash flows may be divided in to

1. Single Cash Flow
2. Multiple Cash Flows (Stream of Cash Flows)
   a. Uneven Cash Flow Stream
   b. Even Cash Flow Stream - Annuity

Determination of Time Values is broadly divided in to two categories:

Future Value:

When we want to know the value of money known to us today, after some time in future, then we will be applying the logic of future value calculations.

In Future Value calculations, unless otherwise specified, it is assumed that investments will be done at the beginning of the year and value will be determined at the end of the year i.e. t_0 = 'X' (Beg), t_n =? (End)

Future Value of Single Cash Flow (Onetime Investment):

$$FV = PV(1 + r)^n$$

Where $(1 + r)^n$ is nothing but the future value interest factor.

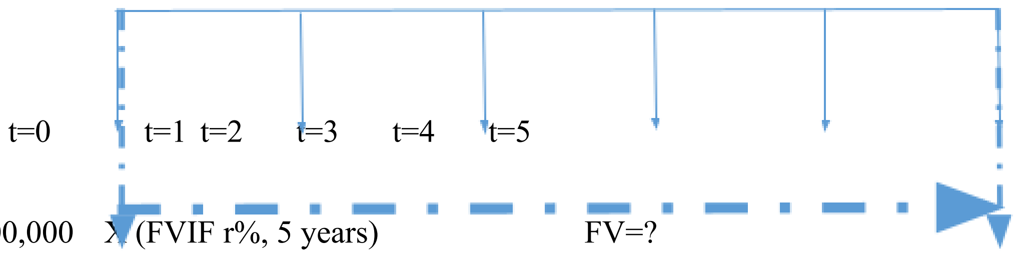
This is also known as compounding factor.

The table gives us the value of one unit of currency invested today for different combinations of the rate of interest and the time periods.

Once we know the value of one unit of currency, determination of the value for any amount would be very simple.

$$FV = PV \times (FVIF\ r\%,\ n\ y)$$

Timeline of Future Value Determination



Future Value calculations are directly proportionate to the rate of interest and/or the number of years i.e. $FV \propto r\%\ and\ n\ y$

Chapter 7: Session 14 - Time Value for Money

Future Value of Uneven Cash Flow Stream (Multiple Cash Flows):

"Uneven cash flow stream means, some amount of money over some specified period of time, periodically"

In this case the 1st year amount will earn interest for 'n' years, 2nd year amount will earn interest for 'n-1' years and so on and finally the nth year amount will earn interest for 1 year. Then it will be totalled to find out the total future value at the end of the 'n' years.

Future Value of Annuity (Even Cash Flow Stream)

An annuity is a stream of constant cash flows.

The 2 conditions that must be satisfied to call a cash flow as an annuity are,

1. The amount of money must be the same, and
2. the time gap between any 2 time periods must be the same.

When the cash flows occur at the end of each period the annuity is called ordinary annuity and when the cash flows occur at the beginning of each period, the annuity is called an annuity due.

Best examples for an annuity are life insurance premium payments, recurring deposit payments.

$$FV = A \times \frac{(1+r)^n - 1}{r}$$

$\frac{(1+r)^n - 1}{r}$ is also known as future value interest factor for an annuity.

The table gives the value of one unit of currency deposited for each of the period for different combinations of the rate of interest and time.

$$FV = A \times (FVIFA\, r\%,\ n\, y)$$

Illustration:

Mr. Nadakarni, is planning to send his son to USA for higher studies after 5 years and expects that it would cost him Rs. 100,00,000 by then. How much should he save annually when the rate of interest is 10 percent per annum.

n = 5 Years, FV = 100L and r =10%; A=?

$FV = A \times (FVIFA\, r\%,\ n\, y)$, $100L = A \times (FVIFA\, 10\%, 5\, y)$, A = $\frac{100L}{6.1051}$ = Rs. 16,37,975

Implied Rate of Interest in transactions:

Any time value calculation involves 4 parameters. When we know any 3, we will be able to identify the other parameter. The next most important decision would be the determination of rate of interest involved in the transactions.

Illustration:

A finance company promises to pay you Rs. 10,00,000 after 6 years if you deposit with them Rs. 1,40,000 a year. What interest rate is being offered by the finance company in this offer?

FV = 10L, n = 6 years, A = 1.4L; r=?

$$FV = A \times (FVIFA\, r\%,\ n\, y),$$

$$10L = 1.4L \times (FVIFA\, r\%,\ 6\, y),$$

$$FVIFA\, r\%,\ 6\, y = \frac{10L}{1.4L} = 7.1428$$

Table:

FVIF 6%, 6 y = 6.9753, FVIF 7%, 6 y = 7.1533

Interpolation or Linear Approximation for FV

$$r = LR + \{[\frac{Req.Value - Min.Value}{Max.Value - Min.Value}] \times (HR - LR)\},$$

$$r = 6 + \left\{\left[\frac{7.1428 - 6.9753}{7.1533 - 6.9753}\right] \times (7 - 6)\right\};\ r = 6.941\%$$

Chapter 7: Session 15 - Time Value for Money

Present Value:

When we want to know the value of money as on today, which is receivable after some time in future, then we will be applying the logic of present value calculations.

In Present Value calculations, unless otherwise specified, it is assumed that the amounts are received at the end of the year and value will be determined at the beginning of the year i.e.t_n = 'X' (End), t_0 =? (Beg)

Present Value of Single Cash Flow (Onetime Investment):

$$PV = FV \times \frac{1}{(1+r)^n} = FV \times (1 + r)^{-n}$$

Where $(1 + r)^{-n}$ is nothing but the present value interest factor.

This is also known as discounting factor.

The table gives us the value of one unit of currency receivable in future for different combinations of the rate of interest and the time periods.

$$PV = FV \times (PVIF\ r\%,\ n\ y)$$

Timeline of Present Value Determination

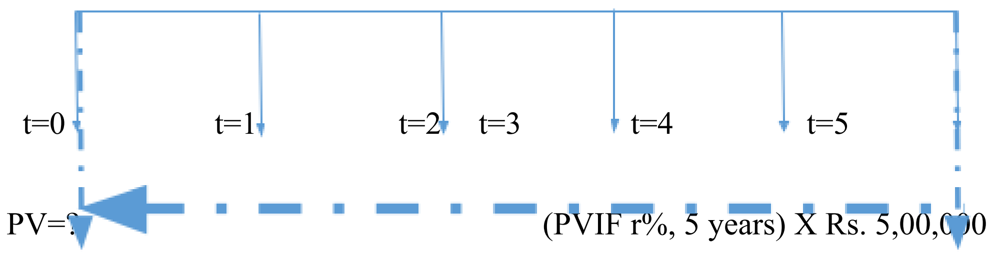


Illustration:

What is the present value of Rs. 200 lakhs receivable after 10 years from now, when the rate of interest is 15% per annum?

FV = 200L, n = 10y, r = 15%, PV =?

PV = $FV \times (PVIF\ r\%,\ n\ y)$

PV = $200L \times (PVIF\ 15\%,\ 10\ y)$

= 200L X 0.2472 = Rs. 49,44,000

Present Value calculations are indirectly proportionate to the rate of interest and/or the number of years i.e. $PV \propto \frac{1}{r\%\ and\ n\ y}$

Present Value of Uneven Cash Flow Stream (Multiple Cash Flows):

In this case the amount receivable in the 1st year will be discounted for '1' year, the amount receivable in the 2nd year will be discounted for '2' years and so on and finally the amount receivable in the nth year will be discounted for n years. Then it will be totalled to find out the total present value at the beginning of the period i.e. today.

Illustration:

ABC Ltd. is expecting the following benefits from an investment activity over a period of 5 years, what will be the total value as on today, when the rate of interest is 20% per annum.

Year1 – 25,00,000, Year2 – 5,00,000, Year3 – 45,00,000, Year4 – 1,00,000 and Year5 – 1,00,00,000

Year	Amount	$PVIF\ r\%,\ n\ y$	PVIF@20%	PV
1	2500000	$PVIF\ r\%,\ 1\ y$	0.8333	2083250
2	500000	$PVIF\ r\%,\ 2\ y$	0.6944	347200
3	4500000	$PVIF\ r\%,\ 3\ y$	0.5787	2604150
4	100000	$PVIF\ r\%,\ 4\ y$	0.4823	48230
5	10000000	$PVIF\ r\%,\ 5\ y$	0.4019	4019000
Total Present Value				9101830

Chapter 7: Session 16 – Time Value for Money

Present Value of Annuity (Even Cash Flow Stream):

An annuity is a stream of constant cash flows.

The 2 conditions that must be satisfied to call a cash flow as an annuity are,

1. The amount of money must be the same, and
2. the time gap between any 2 time periods must be the same.

$$PV = A \times \frac{(1+r)^n - 1}{r\,(1+r)^n}$$

$\frac{(1+r)^n - 1}{r\,(1+r)^n}$ is also known as present value interest factor for an annuity.

The table gives the value of one unit of currency receivable for each of the period for different combinations of the rate of interest and time.

$$PV = A \times (PVIFA\, r\%,\ n\, y)$$

Illustration:

At the time of his retirement Mr. Shyam has been given a choice between 2 alternatives. Alternative 1: Rs. 5 Crores immediately or Alternative 2: Rs. 1 Crore every year as long as he is alive. He expects that he would be alive for the next 15 years. Which option should he choose when the rate of interest is 1) 15% 2) 20%?

Alternative 1: Rs. 5 Crores now and Alternative 2: 1 Crore every year as long as he is alive

n= 15 years and r = 15% or 20%

When the rate is 15%

PV of alternative 1 = 5 Cr.

PV of alternative 2 =
$A \times (PVIFA\, r\%,\ n\, y) = 1Cr \times PVIFA\, 15\%,\ 15y = 1Cr \times 5.8474 = 5.8474Cr.$

Decision: Choose alternative 2.

When the rate is 20%

PV of alternative 1 = 5 Cr.

PV of alternative 2 =
$A \times (PVIFA\, r\%,\ n\, y) = 1 \times PVIFA\, 20\%,\ 15y = 1 \times 4.6755 = 4.6755Cr.$

Decision: Choose alternative 1.

Implied Rate of Interest in transactions:

Any time value calculation involves 4 parameters. When we know any 3, we will be able to identify the other parameter. The next most important decision would be the determination of rate of interest involved in the transactions.

Illustration:

In a deposit scheme of a finance company, you would be paid Rs. 20,00,000 after 7 years if you deposit with them Rs. 12,00,000 today. What interest rate is implicit in this offer?

FV = 20L, n = 7 years, PV = 12L; r=?

$$PV = FV \times (PVIF\, r\%,\ n\, y), 12L = 20L \times (PVIF\, r\%,\ 7\, y), PVIF\, r\%,\ 7\, y = \frac{12L}{20L} = 0.6$$

Table:

PVIF 7%, 7 y = 0.6227, PVIF 8%, 7 y = 0.5835

Interpolation or Linear Approximation for PV

$$r = LR + \left\{\left[\frac{Max.Value - Req.Value}{Max.Value - Min.Value}\right] \times (HR - LR)\right\}, r = 7 + \left\{\left[\frac{0.6227 - 0.6}{0.6227 - 0.5835}\right] \times (8 - 7)\right\};$$

$$r = 7.5791\%$$

Chapter 7: Session 17 - Time Value for Money

Effective Rate of Interest:

When we deposit Rs. 10,000 today, that will be Rs.11,000 by the end of one year, when the rate of interest is 10% per annum i.e. 10,000, 10%, 1 Year = 11,000

Alternatively, when we deposit 10,000 today at the rate of 10% for the first half year then the amount would be Rs. 10,500 along with the interest and when we deposit this total amount for the remaining half year at the same rate of 10% then the final amount by the end of the year would be Rs. 11,025. i.e. 10,000, 10%, 0.5 Year = 10,500; 10%, 0.5 Year = 11,025.

Though the starting amount is the same i.e. Rs. 10,000, the rate of interest i.e. 10% and the period i.e. 1 year are also the same, it effectively resulted in a higher amount.

This leads to the concept of effective rate of interest when there is higher frequency of compounding than the annual compounding.

If one should get Rs. 11,025 on an investment of Rs. 10,000 for one year then the rate of interest should have been 10.25% and this is called effective rate of interest i.e. 11,025 after 1 Year on 10,000; Rate = 10.25%

Frequency of Compounding (m):

"Frequency of Compounding (m) is the number of times the interest is added to the principal amount"

If interest is added	Frequency (m)	Name
Once in 12 months	1	Annual/Yearly Compounding
Once in 6 months	2	Semi-annual/Half-yearly Compounding
Once in 3 months	4	Quarterly Compounding
Once in 1 month	12	Monthly Compounding

Once in 1 day	365/366	Daily Compounding
Once in Every Moment	∞	Continuous Compounding

Illustration:

What will be the effective rate of interest when the rate of interest is 10% and compounding is done semi-annually?

$$r = 10\%, m=2, r_e = (1 + \frac{r}{m})^m - 1, \; r_e = (1 + \frac{0.1}{2})^2 - 1 = 0.1025 = 10.25\%$$

Illustration:

You are planning to deposit an amount of Rs. 100 crores and approached the various banks and their quotes are as follows:
SBI: 12.6% compounded annually, Canara Bank: 12.4% compounded semi-annually, HDFC: 12.2% compounded quarterly and PNB: 12% compounded monthly.
Which bank would you choose?
Effective Rate:
SBI:

$$r_e = (1 + \frac{0.126}{1})^1 - 1 = (1 + 0.126)^1 - 1 = 1.126 - 1 = 0.126 = 12.6\%$$

Canara:

$$r_e = (1 + \frac{0.124}{2})^2 - 1 = (1 + 0.062)^2 - 1 = 1.127844 - 1 = 0.1278441 = 12.7844\%$$

HDFC:

$$r_e = (1 + \frac{0.122}{4})^4 - 1 = (1 + 0.0305)^4 - 1 = 1.127696 - 1 = 0.127696 = 12.7696\%$$

PNB:

$$r_e = (1 + \frac{0.12}{12})^{12} - 1 = (1 + 0.01)^{12} - 1 = 1.126825 - 1 = 0.126825 = 12.6825\%$$

Decision: Choose Canara Bank as the effective rate is the highest.

Very Important Note:
In the interest factors, wherever "r" is there, divide by 'm', and wherever "n" is there multiply by 'm'.

$$\textbf{XXIF}\,(\frac{r}{m}\%,\ n\times m\ years)$$

Then the resultant factor will be equal to that of with the effective rate for the that period of years.

Illustration:
What will be the value of Rs. 10 lakhs after 5 years when the rate of interest is 12% compounded quarterly?

PV= 10 Lakhs, r = 12%, n= 5 years, compounded quarterly (m=4)
If effective rate of interest logic is applied:

$$r_e = (1 + \frac{0.12}{4})^4 - 1 = (1 + 0.03)^4 = 1.12551 - 1 = 0.12551 = 12.55\%$$

$$FV = 10L(1 + 0.1255)^5 = 10L\,X\,1.8060 = 18.06\,Lakhs$$

If factor is adjusted, then

$$\text{FV} = \text{10L X(FVIF}\frac{12}{4}\%,\ 5\times4\ years)$$

$$= 10LXFVIF\ 3\%,\ 20\ years$$

$$= 10L\,X\,1.8061 = 18.061\,Lakhs$$

Chapter 7: Session 18 - Time Value for Money

Annuity:

The 2 Conditions that must be satisfied to call them as annuity are;

1. Amount should be the same.
2. Time Gap should also be same.

Present Value of a Growing Annuity:

Growing Annuity:

An amount that grows at a constant rate for a specified period is called growing annuity.

The present value of a growing annuity can be determined by using the following formula.

$$PV = A_1\left\{\frac{1-\left(\frac{1+g}{1+r}\right)^n}{r-g}\right\}$$

Present Value of Perpetuity:

A perpetuity is an annuity of infinite duration. Which means forever from today.

In simple Same Amount from Year 1 to Year ∞.

$$PV = \sum_{t=1}^{\infty}\frac{A}{(1+r)^t} = \frac{A}{r}$$

Present Value of a Growing Perpetuity:

$$PV = \frac{A_1}{r-g}$$

“Growing perpetuity is that amount which grooves at a constant rate forever that is from year one to year Infinity. The growth rate may be constant, but the amount will be variable i.e. increasing.”

In simple the amount grows at constant rate for ever.

Illustration:

The Dividends of ABC Ltd are expected to grow at 7% p.a. for ever. What is the value of the share today, when required rate is 10% and the company has just declared a dividend of Rs. 5.

g = 7%, r = 10%, $A_0 = 5$

$$A_1 = A_0(1 + g)^1 = 5\,(1 + 0.07) = 5.35$$

$$PV = \frac{A_1}{r-g} = \frac{5.35}{0.10-0.07} = 178.33$$

Doubling Period:

"Doubling period is the time period required to double the amount."

There are 2 thumb rules to calculate the doubling period.

According to Rule of 72; Doubling Period = $\frac{72}{R}$

Therefore,

when r = 12%, DP = $\frac{72}{12}$ = 6 years and when r = 18%, DP =$\frac{72}{18}$ = 4 years

According to Rule of 69; Doubling Period = $0.35 + \frac{69}{R}$

Therefore,

when r = 12%, DP =$0.35 + \frac{69}{12}$ =6.1 years and when r = 18%, DP = $0.35 + \frac{69}{18}$ = 4.1833 years

Illustration:

Mr. Karthik is planning to invest Rs. 5 Lakhs today and expect that it should become 640 Lakhs. How long will it take for this transaction when the rate of interest is 12% per annum? Note: Use rule of 72.

5 Lakhs – 640 Lakhs

R = 12%; when r = 12%, DP = $\frac{72}{12}$ = 6 years

5- 10; 1DP, 10-20; 2DP, 20-40; 3DP, 40-80; 4 DP, 80-160; 5DP, 160-320; 6DP, 320-640; 7DP.

In this transaction, there are 7 doubling periods of 6 years are involved and therefore the total time period to make 5 Lakhs to 640 Lakhs is: 7DP = 7 X 6 = 42 years

Illustration:

A finance company promises to give you Rs 16,00,000 after 12 years if you deposit with them Rs. 2,00,000 today. What interest rate is employed in this offer? Note: Use rule of 69.

2L – 16L; 12 years; r=?

2-4; 1 DP, 4-8; 2 DP, 8-16; 3 DP

The time period involved in this transaction is 12 years.

Which means 3 doubling periods is equal to 12 years. 3 DP = 12 years

Therefore, each doubling period is 4 years. DP = 4 years

Doubling Period = $0.35 + \frac{69}{R}$

4 = $0.35 + \frac{69}{R}$; $\frac{69}{R} = 4 - 0.35$; R = 69/3.65 = 18.90%

Chapter 8: Session 19 - Time Value for Money

Analysis of Case study ABC Wealth Advisors

Chapter 9: Session 20 – Introduction to Risk and Return

Any rational human being will be considering 2 things when making decisions as rational human beings i.e. the rate of return and risk.

Rate of Return:

When we are referring to the rate of return, It is always per annum and represented in percentage. Unless otherwise specified it is assumed that it is compounded annually.

Expected Return

This is the return from an asset that an investor anticipates or expects to earn over some future period. These returnsare subject to uncertainty or risk.

The total return for a period is given by

$$Total\ Return\ = \frac{Cash\ payment\ received\ during\ the\ period + Price\ change\ over\ the\ period}{Price\ of\ the\ investment\ at\ the\ beginning}$$

$$R\ = \frac{C + (P_E - P_B)}{P_B}$$

R = Rate of Return, C = Cash Benefit, P_E = Price at the end of the period, P_B = Price at the beginning of the period

Illustration:

Mrs. Prathiksha has purchased shares of ABC limited at a price of Rs. 240 per share. She has received a dividend of Rs. 24 per share during the year and by the end of the year she could sell it for Rs. 276. What is the rate of return on this investment?

$$R\ = \frac{C + (P_E - P_B)}{P_B} = \frac{24 + (276-240)}{240} = \frac{24+36}{240} = \frac{60}{240} = 25\%$$

Components of the Rate of Return

The rate of return has two components i.e. current yield and capital gains yield.

$$Total\ Return\ = Current\ Yield\ + Capital\ Gains\ Yield$$

$$R\ = \frac{C}{P_B} + \frac{(P_E - P_B)}{P_B}$$

Illustration:

Mrs. Prathiksha has purchased shares of ABC limited at a price of Rs. 240 per share. She has received a dividend of Rs. 24 per share during the year and by the end of the year she could sell it for Rs. 276. What is the current yield and capital gains yield?

$$Current\ Yield\ = \frac{24}{240} = 10\% Capital\ Gains\ Yield\ = \frac{(276-240)}{240} = \frac{36}{240} = 15\%$$

$$R\ = \frac{24}{240} + \frac{(276-240)}{240} = \frac{24}{240} + \frac{36}{240} = 10\ +\ 15\ =\ 25\%$$

$$Total\ Return\ = Current\ Yield\ + Capital\ Gains\ Yield\ = 10\%\ +\ 15\%\ =\ 25\%$$

Average Annual Return:

It is nothing but the arithmetic mean of the historical or realised return for each year during the years.

The mean return is given by $\overline{R} = \frac{R_1 + R_2 + R_3 + ... + R_n}{n} = \frac{\sum_{t=1}^{n} R_t}{n}$

$\overline{R} = Mean\ Return$, R_t =Return of a particular year (t= 1 to n), n = No. of years

Illustration:

From the following rate of returns relating to the past 5 years, calculate the mean return.

Year	1	2	3	4	5
Rate of Return	21	16	22	-10	15

$$\overline{R} = \frac{R_1 + R_2 + R_3 + ... + R_n}{n} = \frac{21 + 16 + 22 - 10 + 15}{5} = \frac{64}{5} = 12.8\%$$

Geometric Mean:

The average compound rate of growth for a period of time is called geometric mean.

$$Geometric\ Mean = \sqrt[n]{(1 + r_1)(1 + r_2)........(1 + r_n)} - 1$$

Where, 'n' is the number of years and 'r' is the rate of interest in decimal form.

Illustration:

From the following rate of returns relating to the past 5 years, calculate the geometric mean.

Year	1	2	3	4	5
Rate of Return	18	16	24	12	-9

$$GM = \sqrt[5]{(1 + 0.18)(1 + 0.16)(1 + 0.24)(1 + 0.12)(1 - 0.09)} - 1 = \sqrt[5]{(1.18)(1.16)(1.24)(1.1}$$

Expected Return:

Expected returns are subjected to possibility of occurrences. As we know it very well, it can take various possible values. When the possibilities can be expected in the form of a probability distribution, the main return is calculated as expected return.

$$\overline{R} = E(R) = p_1 \times R_1 + p_2 \times R_2 + p_3 \times R_3 + ... + p_n \times R_n = \sum_{i=1}^{n} p_i \times R_i$$

$\overline{R} = Expected\ Return\ or\ Mean\ Return$, $p_i = Probability\ of\ occurance\ of\ ith\ return$

$R_i = Rate\ of\ Return\ of\ ith\ possibilty$

Illustration:

From the following rate of returns and their associated probabilities of the past 5 years, calculate the expected (mean) return.

Year	1	2	3	4	5
Rate of Return	21	16	22	10	15
Probability	0.05	0.20	0.40	0.25	0.10

Year	Probability	Rate of Return	Prob. X Rate
1	0.05	20	0.05x20 = 1.00
2	0.20	16	0.20x16 = 3.20
3	0.40	22	0.40x22 = 8.80
4	0.25	10	0.25x10 = 2.50
5	0.10	15	0.10x15 = 1.50
Expected Return E(R) = $\overline{R}$			17.05

Risk:

Risk may be defined as the chance that the actual outcome from an investment will differ from the expected outcome. This means that the more variable the possible outcomes that can occur i.e. the broader the range of possible outcomes, the greater the risk.

Among all the measures quantifying risk, variance and standard deviation are the most popular measures of quantifying the risk.

Measurement of Risk:

Risk is associated with the dispersion in the likely outcomes. If an asset has no variability it has no risk.

The variance of an asset's rate can be found as the sum of the squared deviations of each possible rate of return from the expected rate of return multiplied by the probability that the rate of return occurs.

Standard deviation denoted by 'σ' is simply the square root of the variance of the rates of return.

$$Variance = \sigma^2 = \left\{ \frac{\sum_{t=1}^{n} \left(R_i - \overline{R}\right)^2}{n-1} \right\} \sigma = \sqrt{Variance} = \sqrt{\sigma^2}$$

Illustration:From the following rate of returns relating to the past 5 years, calculate the mean and standard deviation of the return.

Year	1	2	3	4	5
Rate of Return	21	16	22	10	15

Year	Rate (R_i)	$(R_i - \overline{R})$	$(R_i - \overline{R})^2$
1	23	23-18 = 5	25
2	16	16-18 = 2	4
3	22	22-18 = 4	16
4	14	14-18 = 4	16
5	15	15-18 = 3	9
	$\sum R_i = 90$		$\sum (R_i - \overline{R})^2 = 70$

$$\bar{R} = \frac{\Sigma R_i}{N} = \frac{90}{5} = 18 Variance = \sigma^2 = \left\{\frac{\sum_{t=1}^{n}\left(R_i - \bar{R}\right)^2}{n-1}\right\} = \frac{70}{4} = 17.5$$

$$\sigma = \sqrt{Variance} = \sqrt{17.5} = 4.1833$$

Chapter 9: Session 21 – Introduction to Risk and Return

Standard Deviation of a Return with Probability Distribution:

The variance of a probability distribution is the sum of the squares of the deviations of actual returns from the expected returns weighted by the associated probabilities.

$$Variance = \sigma^2 = \sum_{i=1}^{n} p_i \times \left(R_i - \bar{R}\right)^2 \text{ and } \sigma = \sqrt{Variance} = \sqrt{\sigma^2}$$

Portfolio Return and Risk:

A portfolio is a combination of 2 or more assets that are owned by an investor. What really matters is not the risk and return of stocks in isolation, but the risk and return of the portfolio as a whole. This is based on a simple adage that an investor should not put all his eggs in one basket.

Expected return of a portfolio:

The expected return on a portfolio is simply the weighted average of the expected returns of the assets comprising the portfolio.

For example, when a portfolio consisted of two securities, its expected return is

$$E\left(R_p\right) = W_1 \times E\left(R_1\right) + \left(1 - W_1\right) \times E\left(R_2\right)$$

When a portfolio consists of ‘n’ securities, the expected return on the portfolio is

$$E\left(R_p\right) = W_1 \times E\left(R_1\right) + W_1 \times E\left(R_2\right) + \dots + W_n \times E\left(R_n\right)$$

$$E\left(R_p\right) = \sum_{i=1}^{n} W_i \times E\left(R_i\right)$$

Portfolio Risk:

If an investor is planning to invest his money in 2 securities either in A or in B or in both with equal weightage (portfolio).

The details of the returns and their probability occurrence is as follows:

State of Economy	A	B	C	D	E
Probability (p_i)	0.2	0.2	0.2	0.2	0.2
Return on Security A (%)	15	5	25	-5	35
Return on Security B (%)	25	35	-5	15	5

Return and Risk on Security A:

State of Economy	Probability (p_i)	Return on Security A (%)	p_i X R_A	p_i X $(R_A – E(R_A))^2$

A	0.2	15	3	0
B	0.2	5	1	20
C	0.2	25	5	20
D	0.2	-5	-1	80
E	0.2	35	7	80
			$E(R_A) = 15$	Variance $_A = 200$

$$\sigma_A = \sqrt{Variance} = \sqrt{200} = 14.14$$

Return and Risk on Security B:

State of Economy	Probability (p_i)	Return on Security B (%)	p_i X R_B	p_i X $(R_B - E(R_B))^2$
A	0.2	25	5	20
B	0.2	35	7	80
C	0.2	-5	-1	80
D	0.2	15	3	0
E	0.2	5	1	20
			$E(R_B) = 15$	Variance $_B = 200$

$$\sigma_B = \sqrt{Variance} = \sqrt{200} = 14.14$$

Return and Risk on Portfolio A&B:

State of Economy	Prob. (p_i)	Return on Security A (%)	Return on Security B (%)	Return on Portfolio A&B	p_i X $R_{A\&B}$	p_i x $(R_{A\&B} - E(R_{A\&B}))^2$
A	0.2	15	25	20	4	5
B	0.2	5	35	20	4	5
C	0.2	25	-5	10	2	5
D	0.2	-5	15	5	1	20
E	0.2	35	5	20	4	5
					$E(R_{A\&B}) =$ 15	Variance $_{A\&B} =$ 40

$$\sigma_{A\&B} = \sqrt{Variance} = \sqrt{40} = 6.3246$$

Diversification of Risk:

In the above example if we look at investment ‘A’ or ‘B’ has the same characteristic features of the mean return of 15% and standard deviation of 14.14%.

When both the securities are combined in equal proportion, though the mean return of the portfolio is still standing at 15%, but the standard deviation has decreased to 6.3246%.

From this we can understand that when we combine securities the total risk is coming down. But this happens only when the securities are negatively correlated. Higher the negativity better will be the possibility of diversification.

Total Risk

= Unique Risk + Market Risk

= Diversifiable Risk + Non-diversifiable Risk

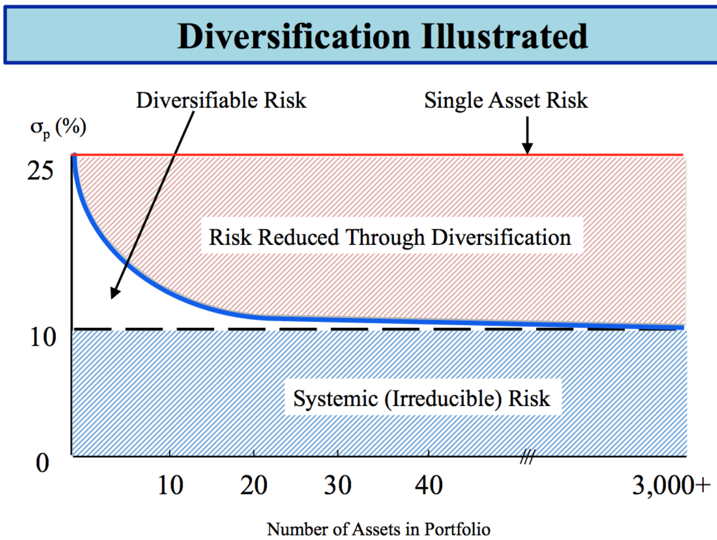
= Unsystematic Risk + Systematic Risk

Unique risk:

Unique risk of a security represents that portion of its total risk which stems from the specific factors of the business entity like development of a new product, labour unrest, competitors etc. Events of this nature or specific to that business entity but not to all in general. Therefore, the unique risk of business entity can be washed away by combining it with other stocks or assets. The unique risks of different businesses or stocks tend to cancel each other and thus this portion of the risk can be brought down to some extent but of course cannot be removed in total. Therefore, it is also referred to as diversifiable risk or unsystematic risk.

Market risk:

Market risk of a stock represents that portion of the risk which is attributable to the economy as a whole. The facts like the growth rate of GDP, the government spending, money supply, interest rates, inflation rates etc. contribute to the market risk. The factors will affect all the firms in the economy. Therefore, it cannot be diversified and hence it is also referred to as systematic risk or non-diversifiable risk.



Chapter 9: Session 22 – Introduction to Risk and Return

Measurement of Market Risk:

The market risk of security reflects its sensitivity to market movements. The sensitivity of the security to market movements is called beta (β). The beta for the market portfolio is one. Higher the beta higher will be the systematic risk.

Calculation of beta (β):

The calculation of beta is based on the following equation.

$$R_{jt} = \alpha_j + \beta_j R_{Mt} + e_j$$

Beta reflects the slope of the above relationship.

$$\beta_j = \frac{Covariance\ (R_j, R_m)}{Variance\ of\ Market} = \frac{\rho_{iM}\sigma_j\sigma_M}{\sigma_M^2} = \frac{\rho_{iM}\sigma_j}{\sigma_M}$$

Relationship between Risk and return:

The following points are very important in understanding the relationship between risk and return

- Securities are risky because their returns are variable, which means the investor is not guaranteed of a fixed return.
- The most commonly used measure of risk is standard deviation.
- Total risk of security is the combination of unique risk and market risk.
- Unique risk emanates from the business specific factors whereas the market risk emanates from economy related factors.
- By portfolio diversification the unique risk can be minimised, but market risk cannot be avoided.
- When a portfolio is thoroughly diversified the total risk of the portfolio is equal to the systematic risk and such portfolios are known as market portfolios.
- The beta of a security or a portfolio measures the sensitivity of its returns to the general market movements.

Capital Asset Pricing Model (CAPM):

The CAPM establishes a linear relationship between the required rate of return of a security and its systematic risk i.e. beta.

This model is based on certain assumptions

The concept of CAPM is explained in 2 categories

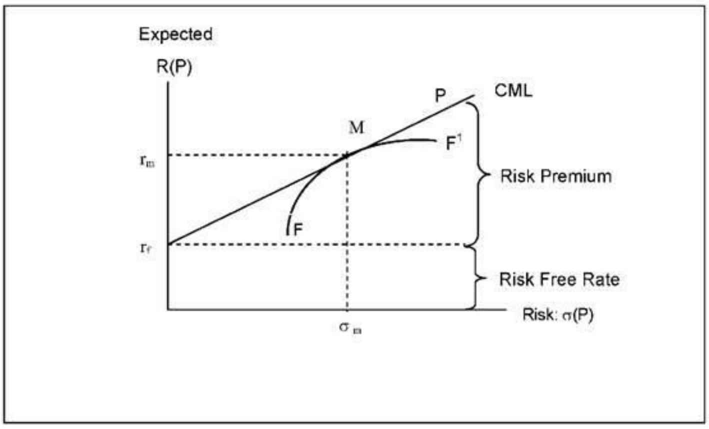
1. Capital Market Line (CML) and
2. Security Market Line (SML)

Capital market line explains the portfolio returns, whereas security market line explains the expected returns of individual security.

Capital Market Line (CML):

The line used in the capital asset pricing model to present the rates of returns of deficient portfolios is called capital market line. These rates will vary depending upon the risk-free rate of return and the level of risk of a particular portfolio. The capital market line shows a positive linear relationship between the returns and portfolio lenders.

The market portfolio is completely diversified, carries only systematic risk, and its expected return is equal to the expected market return as a whole.

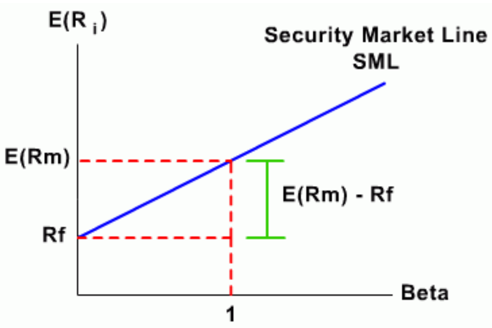


$$E\left(R_j\right) = R_f + \lambda\, \sigma_j, \;\; \lambda = \frac{E\left(R_M\right) - R_f}{\sigma_M}$$

Security Market Line (SML):

It shows the relationship between the expected return of a security and its risk measured by its beta coefficient.

In other words, the SML displays the expected return for any given beta or reflects the risk associated with any given expected return.



Required Rate of Return = Risk-free Rate of Return + Risk Premium

$$R_j = R_f + \beta_j \left(R_M - R_f\right)$$

Note:
Rate of interest applicable on Treasury bills or 10-year Government of India bonds is taken as a proxy for risk-free rate of interest when it is not given
$R_M - R_f$, is called market risk premium
$\beta_j \left(R_M - R_f\right)$, is called security risk premium

$$\beta_j = \frac{Covariance\ (R_j, R_m)}{Variance\ of\ Market} = \frac{\rho_{iM}\sigma_j\sigma_M}{\sigma_M^2} = \frac{\rho_{iM}\sigma_j}{\sigma_M}$$

Dividend Capitalisation Model:

According to the dividend capitalisation model, the value of an equity share is equal to the present value of dividends expected from its ownership plus the present value of the sale price expected when the equity share is sold.

For applying the dividend discount model, we should make the following assumptions:

(i) dividends are paid annually- this seems to be a common practice for business firms in India; and (ii) the first dividend is received one year after the equity share is bought.

Zero Growth model

If we assume that the dividend per share remains constant year after year at a value of D, the present value of the share is given by

$$Po = \frac{D1}{(1+r)^1} + \frac{D2}{(1+r)^2} + \ldots\ldots + \frac{D\infty}{(1+r)^\infty} = \sum_{t=1}^{\infty} \frac{D_t}{(1+r)^t}, \text{ On simplification, } Po = \frac{D}{r}$$

It is a straightforward application of the logic present value of perpetuity.

Constant Growth Model:

One of the most popular dividend discount models assumes that the dividend per share grows at a constant rate (g).

The value of a share, under this assumption is:

$$P_0 = \frac{D_1}{(1+r)^1} + \frac{D_2}{(1+r)^2} + \ldots\ldots + \frac{D_\infty}{(1+r)^\infty} = \sum_{t=0}^{\infty} \frac{D_t}{(1+r)^t}$$

$$P_0 = \frac{D_0(1+g)^1}{(1+r)^1} + \frac{D_0(1+g)^2}{(1+r)^2} + \ldots\ldots + \frac{D_0(1+g)^\infty}{(1+r)^\infty} = \sum_{t=0}^{\infty} \frac{D_0(1+g)^\infty}{(1+r)^\infty}$$

Applying the formula for the sum of a geometric progression, the above expression can be simplifiedas:

$$Po = \frac{D_1}{r-g}$$

Chapter 10: Session 23 – Cases on Risk and Return

Chapter 10: Session 24 – Cases on Risk and Return