COACHING CLASS ON

Management Accounting
&
Financial Management

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FINANCIAL MANAGEMENT

Summary of Course Contents

Financial Management:

1. **Time Value of Money:**
Concept of Present Value, Future Value, Annuity, Perpetuity, Islamic Concept of Time Value of Money

2. **Capital Budgeting:**
Non Discounted Cash flow Techniques: Accounting Rate of Return (ARR), Pay Back Period (PPB)
Discounted Cash flow Techniques: NPV, IRR, PI, Capital Rationing and their Applications on Business

3. **Working Capital Management, Short, Medium and Long Term Finance:**
Different Financing Mix: Short Term Financing Vs. Long Term Financing

4. **Lease Financing :**
Types of Lease Financing: Operating Lease Vs. Financial Lease, HPSM and their Implications

5. **Cost of Capital and Dividend Policy:**
Components of Cost of Capital: Cost of Common Stock, Cost of Preferred Stock and Cost of Debt
Weighted Average Cost of Capital, Marginal Cost of Capital, Cost of Capital in Islam
Types of Dividend Policy, Factors influencing Dividend Policy, Rationale of High and Low Pay-Out Ratio

Understanding the Basics

Time Preference Theory:

Which would you prefer- Tk. 1000 today or Tk.1000 after one year from now?

Common sense tells us to take the Tk.1000 today because we recognize that there is a *time value of money*. The concept of preference is known to as **"Time Preference Theory".**

1. **Consumption:** Human being, by nature, prefers current consumption to future consumption. If he/she is refrained from current consumption, he/she will obviously require some compensation.
2. **Uncertainty:** Uncertainty is another argument behind the time preference theory. Future is always uncertain. If we allow for uncertainty surrounding cash flows to enter into our analysis, it will be necessary to add a risk premium as compensation for uncertainty.
3. **Investment opportunity:** Investment opportunity should also be taken into consideration because there is an opportunity cost of money.
4. **Inflation:** This is the most important argument behind the time preference theory. The purchasing power of people reduces in the passage of time due to inflation. You cannot purchase as many goods after one year with Tk.1000 as you can purchase today with the same amount of money.

Understanding the Basics

Time Value of Money: Key Concepts

The Interest/Profit Rate: Money paid or earned for the use of money is called interest. Another to say, it is the cost of using money. That is, it is the additional amount of money gained between the beginning and the end of a time period.

Future Value (Terminal Value): The value at some future time of a present amount of money, or a series of payments, evaluated at a given interest/profit rate. This future value will include both the principal amount and the interest/ profit amount.

Present Value: is the value of an expected income stream determined as of the date of valuation. The present value is usually less than the future value because money has interest/profit-earning potential

Compounding: Compounding is the process whereby interest/profit is credited to an existing principal amount as well as to interest/profit already paid.

Understanding the Basics

Time Value of Money: Key Concepts

Present Value to Future Value:

$FV_n = PV_0 (1+i)^n$…….. (1)

Where,

FV_n= Future value after n period.

PV_0= Present value or initial investment.

i= Interest/Profit rate.

n= Number of years.

Example: At the end of ten years, how much is an initial deposit of Tk.100 worth, assuming a compound annual interest rate 8%?

Solution:

We know,

$FV_n = PV_0 (1+i)^n$

$FV_{10} = 100 (1+.08)^{10}$

$= 100(2.1589)$ [Take at least four digit after points at the time of using formula]

$=$ Tk. 215.89

So you will have an amount of Tk.215.89 at the end of ten years if you get a compound interest rate of 8% compounded yearly.

Understanding the Basics

Time Value of Money: Key Concepts

Instead of using the formula, you can use **table value** to solve the problem.

$$FV_n = PV_0 (FVIF_{i, n})$$

Let us solve the above problem through using the table value.

$FV_n = PV_0 (FVIF_{i, n})$

$FV_{10} = 100 (FVIF_{8\%, 10 \text{ years}})$

$= 100(2.159)$ [Using the table value]

$= Tk.215.90$

*** FVIF=Future Value Interest Factor**

Future value interest factors of a mixed stream cash flow

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
1	1.010	1.020	1.030	1.040	1.050	1.060	1.070	1.080	1.090	1.100
2	1.020	1.040	1.061	1.082	1.103	1.124	1.145	1.166	1.188	1.210
3	1.030	1.061	1.093	1.125	1.158	1.191	1.225	1.260	1.295	1.331
4	1.041	1.082	1.126	1.170	1.216	1.262	1.311	1.360	1.412	1.464
5	1.051	1.104	1.159	1.217	1.276	1.338	1.403	1.469	1.539	1.611
6	1.062	1.126	1.194	1.265	1.340	1.419	1.501	1.587	1.677	1.772
7	1.072	1.149	1.230	1.316	1.407	1.504	1.606	1.714	1.828	1.949
8	1.083	1.172	1.267	1.369	1.477	1.594	1.718	1.851	1.993	2.144
9	1.094	1.195	1.305	1.423	1.551	1.689	1.838	1.999	2.172	2.358
10	1.105	1.219	1.344	1.480	1.629	1.791	1.967	2.159	2.367	2.594
11	1.116	1.243	1.384	1.539	1.710	1.898	2.105	2.332	2.580	2.853
12	1.127	1.268	1.426	1.601	1.796	2.012	2.252	2.518	2.813	3.138
13	1.138	1.294	1.469	1.665	1.886	2.133	2.410	2.720	3.066	3.452
14	1.149	1.319	1.513	1.732	1.980	2.261	2.579	2.937	3.342	3.797
15	1.161	1.346	1.558	1.801	2.079	2.397	2.759	3.172	3.642	4.177

Understanding the Basics

Time Value of Money: Key Concepts

Future Value to Present Value:

We Know from formula(1), $FV_n = PV_0 (1+i)^n$

Rearranging the term, we can solve it for present value-

$PV_0 = FV_n [1/ (1+i)^n]$…….. **(2)**

So we can find out the present value of Tk.2000 after 10 years at 8% discount rate.

$PV_0 = FV_n [1/ (1+i)^n]$

$PV_0 = 2000 [1/ (1+.\ 08)^{10}]$

$PV_0 = 2000 [1/ (1+i)^n]$

$= 2000(0.4631)$

$=$ Tk.926

We can also solve the problem by using table value:

$PV_0 = FV_{10} (PVIF_{8\%,\ 10\ years})$

$=2000\ (0.463)$

$=$ Tk.926

*** PVIF=Present Value Interest Factor**

Present value of $1 at end period (partial)

Period	1%	1.50%	2%	3%	4%	5%	6%	7%	8%	9%	10%
1	0.9901	0.9852	0.9804	0.9709	0.9615	0.9524	0.9434	0.9346	0.9259	0.9174	0.9091
2	0.9803	0.9707	0.9612	0.9426	0.9246	0.9070	0.8900	0.8734	0.8573	0.8417	0.8264
3	0.9706	0.9563	0.9423	0.9151	0.8890	0.8638	0.8396	0.8163	0.7938	0.7722	0.7513
4	0.9610	0.9422	0.9238	0.8885	0.8548	0.8227	0.7921	0.7629	0.7350	0.7084	0.6830
5	0.9515	0.9283	0.9057	0.8626	0.8219	0.7835	0.7473	0.7130	0.6806	0.6499	0.6209
6	0.9420	0.9145	0.8880	0.8375	0.7903	0.7462	0.7050	0.6663	0.6302	0.5963	0.5645
7	0.9327	0.9010	0.8706	0.8131	0.7599	0.7107	0.6651	0.6227	0.5835	0.5470	0.5132
8	0.9235	0.8877	0.8535	0.7894	0.7307	0.6768	0.6274	0.5820	0.5403	0.5019	0.4665
9	0.9143	0.8746	0.8368	0.7664	0.7026	0.6446	0.5919	0.5439	0.5002	0.4604	0.4241
10	0.9053	0.8617	0.8203	0.7441	0.6756	0.6139	0.5584	0.5083	0.4632	0.4224	0.3855
11	0.8963	0.8489	0.8043	0.7224	0.6496	0.5847	0.5268	0.4751	0.4289	0.3875	0.3505
12	0.8874	0.8364	0.7885	0.7014	0.6246	0.5568	0.4970	0.4440	0.3971	0.3555	0.3186
13	0.8787	0.8240	0.7730	0.6810	0.6006	0.5303	0.4688	0.4150	0.3677	0.3262	0.2897
14	0.8700	0.8119	0.7579	0.6611	0.5775	0.5051	0.4423	0.3878	0.3405	0.2992	0.2633
15	0.8613	0.7999	0.7430	0.6419	0.5553	0.4810	0.4173	0.3624	0.3152	0.2745	0.2394

Understanding the Basics

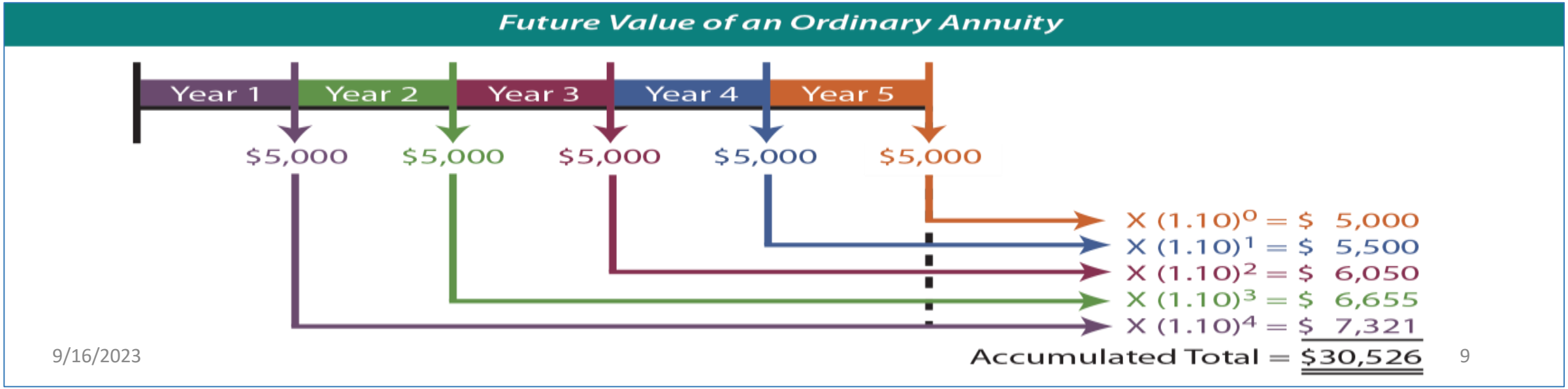
Time Value of Money: Key Concepts

Annuity: An annuity is a series of equal receipts or payments occurring over a specified number of periods.

Types of Annuity: Annuity can be of two types based on the timing of cash flows. These are:

- **Ordinary annuity:** Payments or receipts occur at the end of each period.
- **Annuity due:** Payments or receipts occur at the beginning of the period

Future Value of Annuity (Ordinary): Many of us have MSS (DPS) account in banks, which is required to pay a certain amount of money at the end of/at the beginning of each certain period. Bank gives us interest/profit on deposited money. You might ask the bank about the total amount of money that you will receive after a certain period while you deposit a certain amount (Say Tk.5000) at the end of each year for next 5 years.



Understanding the Basics

Time Value of Money: Key Concepts

Future Value of Annuity:

$$FVA_n = PMT\ ([(1+i)^n - 1]/i) \quad \text{.....(3)}$$

Where,

FVA_n= Future value of annuity after n period

PMT= Periodic payments.

i= Interest/profit rate

n = Number of years.

Thus,

$FVA_5 = PMT\ ([(1+i)^n - 1]$

$= 5000([(1+0.10)^5 - 1]/0.10)$

$= 5000(6.1052)$

= Tk. 30,526

Alternatively FVA_n= PMT ($FVIFA_{i,\ n}$)

$FVA_n = 5000\ (FVIFA_{10\%,\ 5\ years})$

$= 5000(6.105)$

= Tk.30,525

If Annuity due (payment made at the beginning of period):

$$FVAD_n = PMT\ ([(1+i)^n - 1]/i)(1+i) \quad \text{.....(4)}$$

Or, $FVAD_n = PMT\ (FVIFA_{i,\ n})\ (1+i)$

Future Value of an Ordinary Annuity Table

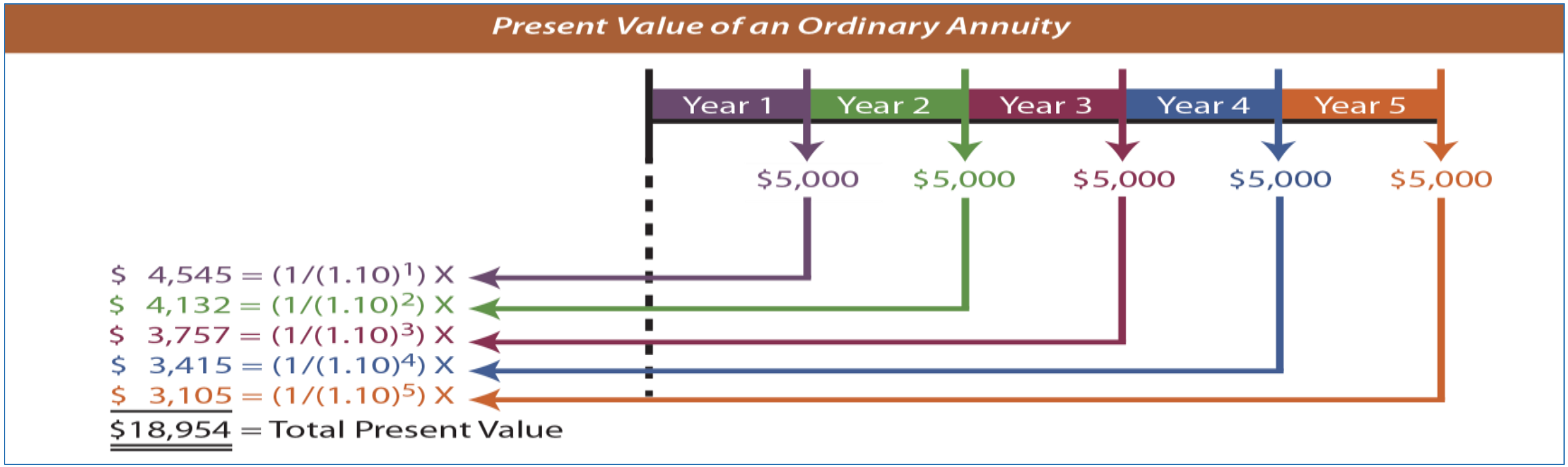
$$\text{Factor} = \frac{[(1+i)^n - 1]}{i}$$

Period (*n*)	Rate (*i*)						
	1%	2%	3%	5%	8%	10%	12%
1	1.000	1.000	1.000	1.000	1.000	1.000	1. 000
2	2.010	2.020	2.030	2.050	2.080	2.100	2.120
3	3.030	3.060	3.091	3.153	3.246	3.310	3.374
4	4.060	4.122	4.184	4.310	4.506	4.641	4.779
5	5.101	5.204	5.309	5.526	5.867	6.105	6.353
6	6.152	6.308	6.468	6.802	7.336	7.716	8.115
7	7.214	7.434	7.662	8.142	8.923	9.487	10.089
8	8.286	8.583	8.892	9.549	10.637	11.436	12.300
9	9.369	9.755	10.159	11.027	12.488	13.579	14.776
10	10.462	10.950	11.464	12.578	14.487	15.937	17.549
11	11.567	12.169	12.808	14.207	16.645	18.531	20.655
12	12.683	13.412	14.192	15.917	18.977	21.384	24.133
13	13.809	14.680	15.618	17.713	21.495	24.523	28.029
14	14.947	15.974	17.086	19.599	24.215	27.975	32.393
15	16.097	17.293	18.599	21.579	27.152	31.772	**37.280**

Understanding the Basics

Time Value of Money: Key Concepts

Present Value of Annuity: The present value of an annuity is **the cash value of all of your future equal payments/receipts**. The rate of return or discount rate is part of the calculation. An annuity's future payments are reduced based on the discount rate. Thus, the higher the discount rate, the lower the present value of the annuity is.



Understanding the Basics

Time Value of Money: Key Concepts

Present Value of Ordinary Annuity:

$PVA_n = PMT\ [(1-[1/(1+i)^n]/i]$..... (5)

Where, PVA= Present Value of Annuity (Ordinary)

$PVA_n = 5000[(1-[1/(1+0.10)^5]/0.10]$

Or, $PVA_n = 5000\ (3.7908)$

$=$Tk. 18,954

Alternatively, $PVA_n = PMT\ (PVIFA_{i,n})$

Or, $PVA_n = 5000\ (PVIFA_{10\%,\ 5\ years})$

$= 5000(3.791)$

$=$ TK. 18,955

If Annuity due (payment made at the beginning of period):

***$PVAD_n = PMT\ [(1-[1/(1+i)^n]/i]\ (1+i)$..... (6)**

Or, $PVADn = PMT\ (PVIFA_{i,n})\ (1+i)$

*PVAD=Present Value of Annuity Due

Present Value of an Ordinary Annuity Table

Period (n) \ Rate (i)	1%	2%	3%	5%	8%	10%
1	0.990	0.980	0.971	0.952	0.926	0.909
2	1.970	1.942	1.913	1.859	1.783	1.736
3	2.941	2.884	2.829	2.723	2.577	2.487
4	3.902	3.808	3.717	3.546	3.312	3.170
5	4.853	4.713	4.580	4.329	3.993	3.791
6	5.795	5.601	5.417	5.076	4.623	4.355
7	6.728	6.472	6.230	5.786	5.206	4.868
8	7.652	7.325	7.020	6.463	5.747	5.335
9	8.566	8.162	7.786	7.108	**6.247**	5.759

Understanding the Basics

Time Value of Money: Key Concepts

Problems of Mixed Flow:

Many time value of money problems that we face involve neither a single cash flow nor a single annuity. Instead, we may encounter a mixed or uneven pattern of cash flows.

Future value of mixed flows:

Example: Suppose you have decided to deposit the following cash (given in the table below) in a commercial bank at 10% annual interest/Profit rate. What will be the future value after five years of your deposited money?

Beginning of the year	Deposit (Tk.)
1	1000
2	2000
3	3000
4	4000
5	5000

$FV_n = PV_0 (1+i)^n$

Calculation of Future Value of Mixed Cash Flows:

Future value after five years (FV_5) of Tk.1000 (1st year) = 1000 $(1+.10)^5$= Tk. 1,610.51

Future value after five years (FV_5) of Tk.2000 (2nd year)= 2000 $(1+.10)^4$= Tk. 2,928.20

Future value after five years (FV_5) of Tk.3000 (3rd year) = 3000 $(1+.10)^3$= Tk. 3,993.00

Future value after five years (FV_5) of Tk.4000 (4thyear) = 4000 $(1+.10)^2$= Tk. 4,840.00

Future value after five years (FV_5) of Tk.5000 (5thyear) = 5000 $(1+.10)^1$= Tk. 5,500.00

Future value after five years (FV_5) of all deposited money = Tk.18,871.71

Understanding the Basics

Time Value of Money: Key Concepts

Present Value of Mixed Flows: Present value of mixed cash flows help in determining the investment decision.

Example: Suppose you have an investment opportunity of investing Tk. 50,000 now. The investment will generate the following cash inflows. If the discount rate is 8% will it be wise to invest in the project?

End of the year	Cash Inflow (Tk.)
1	15,000
2	20,000
3	15,000
4	15,000
5	10,000

$PV_0 = FV_{n/} (1+i)^n$

Decision: Since NPV is positive, the project is accepted

Calculation of Present Value of Future Cash Inflow:

Present value (PV_0) of Tk. 15,000 received after one year = 15,000/ (1+. 08) ^{1}= Tk.13,888.88

Present value (PV_0) of Tk. 20,000 received after two year = 20,000/ (1+. 08) ^{2}= Tk.17,146.78

Present value (PV_0) of Tk. 15,000 received after three year =15,000/ (1+. 08) ^{3}= Tk.11,907.48

Present value (PV_0) of Tk. 15,000 received after four year = 15,000/ (1+. 08) ^{4}= Tk.11,025.44

Present value (PV_0) of Tk. 10,000 received after five year = 10,000/ (1+. 08) ^{5}= Tk. 6,805.83

Present value of all cash inflows	**Tk. 60,774.41**
(-) Initial Investment	**Tk. 50,000.00**
Net present value (NPV)	**Tk. 10,774.41**

Understanding the Basics

Time Value of Money: Key Concepts

Compounding more than once a year:

$$FV_n = PV_0 (1 + [i/m])^{mn} \text{.....(7)}$$

Where, m=Number of compounding in year

The future value after 3 years of Tk.100 @ 8% Interest Rate under **quarterly compounding**-

$FV_3 = 100 (1 + [.08/4])^{(4)(3)}$

$= 100 (1 + .02)^{12}$

$=$ Tk.126.82

The future value after 3 years of Tk.100 @ 8% Interest Rate under **semiannual compounding**-

$FV_3 = 100 (1 + [.08/2])^{(2)(3)}$

$= 100 (1 + .04)^{6}$

$=$ Tk.126.53

The future value after 3 years of Tk.100 @ 8% Interest Rate under **annual compounding**-

$FV_3 = 100 (1 + [.08/1])^{(1)(3)}$

$= 100 (1 + .08)^{3}$

$=$ Tk.125.97

The more the number of compounding in a year, the more the future value

Understanding the Basics

Time Value of Money: Key Concepts

Effective Annual Interest Rate:
Effective interest rate is the actual rate of interest earned (paid) after adjusting the *nominal* rate for factors such as the number of compounding periods per year.

Effective Annual Interest Rate= $(1+ [i/m])^{m}-1$…….. (8)

Problem: A savings plan offered a nominal interest rate of 8%. What will be the effective interest rate if the interest is compounded: a) Yearly; b)Semiannually; c)Quarterly & d)Monthly.

Solution: Effective Annual Interest Rate= $(1+ [i/m])^{m}-1$

a) $EAIR_{(yearly)} = (1+ [.08/1])^{1}-1$
$= .08 = 8\%$

b) $EAIR_{(Semiannually)} = (1+ [.08/2])^{2}-1$
$= .0816= 8.16\%$

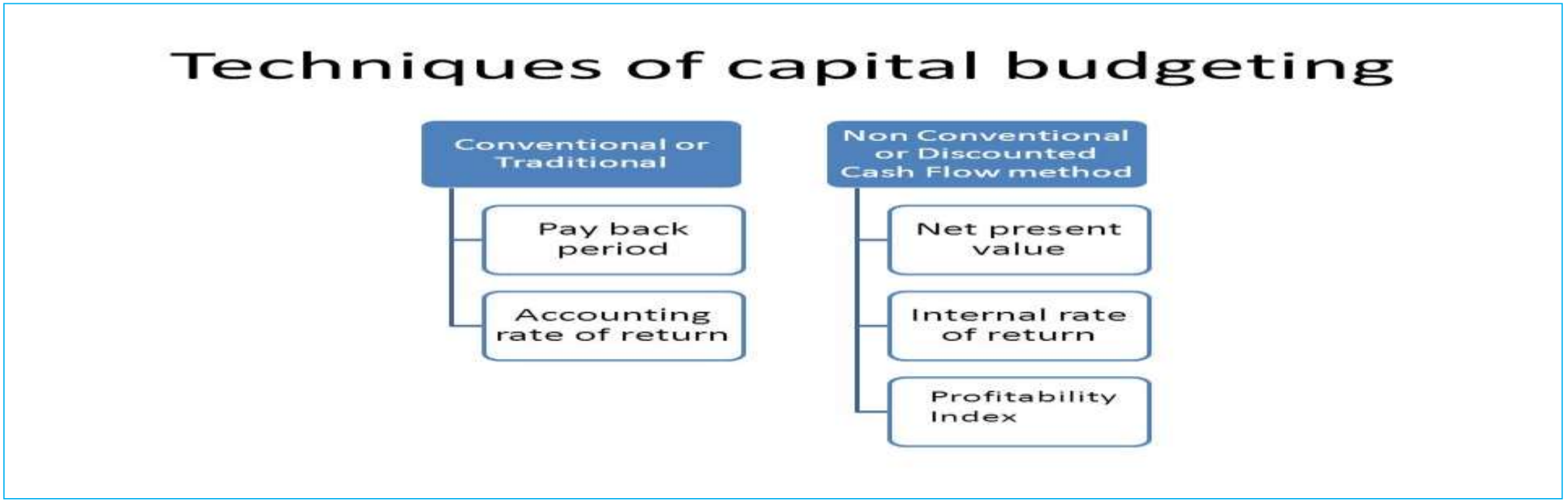
c) $EAIR_{(Quarterly)} = (1+ [.08/4])^{4}-1$
$= .0824= 8.24\%$

d) $EAIR_{(Monthly)} = (1+ [.08/12])^{12}-1$
$= .0829= 8.29\%$

Understanding the Basics

Capital Budgeting Techniques

Capital budgeting techniques are **the methods to evaluate an investment proposal in order to help the company** decide upon the desirability of such a proposal. These techniques are categorized into two heads: traditional methods and discounted cash flow methods.



Understanding the Basics

Capital Budgeting Techniques: Traditional

1. Payback Period: The payback period (PBP) of an investment project tells us the number of years required to recover our initial cash investment based on the project's expected cash flows.

Initial investment: $200,000

Year	Cash inflow	Cumulative cash inflow
1	$ 70,000	$ 70,000
2	60,000	130,000
3	55,000	185,000
4	40,000	225,000
5	30,000	255,000
6	25,000	280,000

$$\text{Payback Period} = \text{Full Years Until Recovery} + \frac{\text{Uncovered Cost at the Beginning of the Recovery Year}}{\text{Cash Flow During the Recovery Year}}$$

Payback Period (PBP): 3 Years+ (200,000-185,000)/40,000 = (3+0.375) Years= 3.375 Years

Decision Criteria:

If the calculated PBP<Acceptable PBP----Accept the Project

If the calculated PBP>Acceptable PBP---- Reject the Project

Understanding the Basics

Capital Budgeting Techniques: Traditional

2. Accounting Rate of Return:

Accounting rate of return (ARR) is a formula that reflects the percentage rate of return expected on an investment, or asset, compared to the initial investment's cost.

Particulars	Amount in Tk.
Initial Investment	100,000
Profit Net Income Y1	10,000
Profit Net Income Y2	20,000
Profit Net Income Y3	25,000
Profit Net Income Y4	30,000
Profit Net Income Y5	35,000
Average Net Income	24,000
ARR (Average Net Income/Initial Investment)	24%

Decision Criteria:

If the calculated ARR>Acceptable ARR---- Accept the Project

If the calculated ARR<Acceptable ARR---- Reject the Project

Understanding the Basics

Capital Budgeting Techniques: Discounted Cash Flow Technique

1. Net Present Value:

NPV is used in capital budgeting and investment planning to analyze the profitability of a projected investment or project. Net present value (NPV) is the difference between the present value of cash inflows and the present value of cash outflows over a period of time. Calculate the NPV of the following problem @ 12% discount rate

Particulars	Initial Year	Year 1	Year 2	Year 3	Year 4
Cash Outflow	(100,000)	-	-	-	-
Cash Inflow	-	34,432	39,530	39,359	32,219

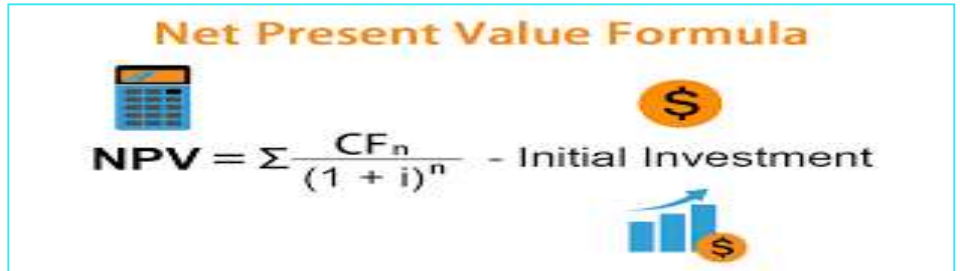
$$NPV = \frac{Tk.34,432}{(1+.12)^1} + \frac{Tk.39,530}{(1+.12)^2} + \frac{Tk.39,359}{(1+.12)^3} + \frac{Tk.32,219}{(1+.12)^4} - Tk.100,000$$

Or, alternatively,

$NPV=[Tk.34,432(PVIF_{12\%,1})+Tk.39,530(PVIF_{12\%,2})+Tk.39,359(PVIF_{12\%,3})+Tk.Tk.32,219(PVIF_{12\%,4})]-Tk.100,000$

$=[Tk.30,748+Tk.31,505+Tk.28,024+Tk.20,491]-Tk.100,000$

$=Tk.\ 10,768.$



$$NPV = \frac{CF_1}{(1+i)^1} + \frac{CF_2}{(1+i)^2} + \ldots\ldots\ldots + \frac{CF_n}{(1+i)^n} - ICO$$

Decision Criteria:

If NPV>0 --- Accept the Project

If NPV<0 --- Reject the Project

Understanding the Basics

Capital Budgeting Techniques: Discounted Cash Flow Technique

2. Internal Rate of Return:

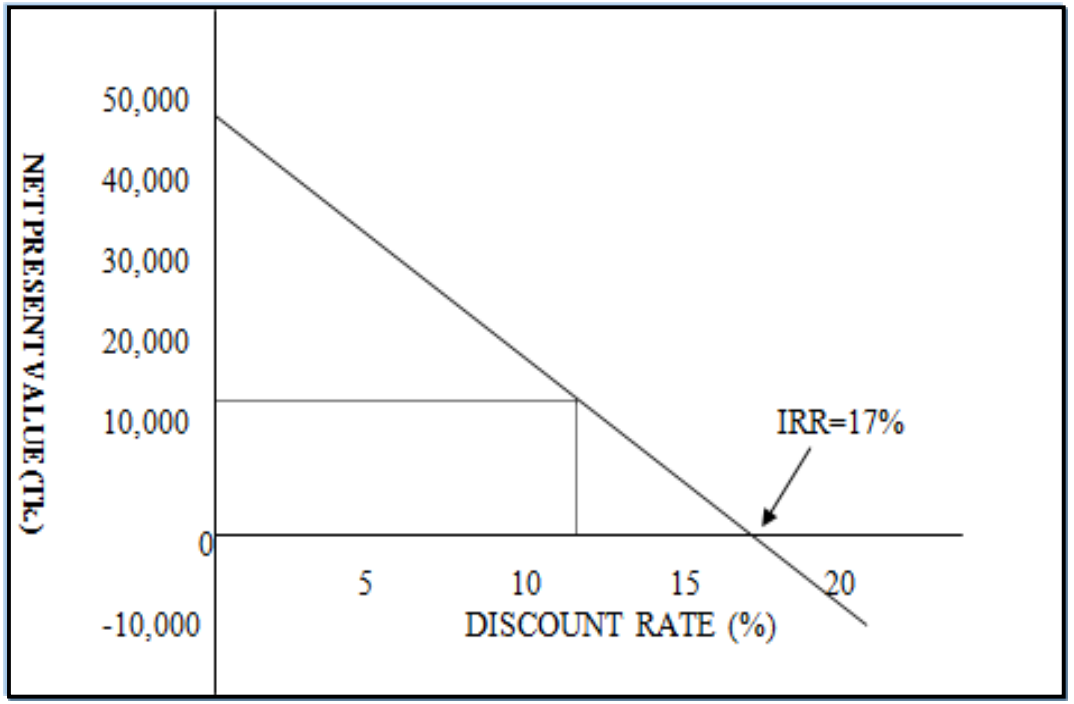
The internal rate of return (IRR) for an investment proposal is the discount rate that equates the present value of the expected net cash flows (CFs) with the initial cash outflow (ICO).

That is, IRR is the rate at which Present Value of Cash Inflows=Initial Investment/Present Value of Cash Outflow.

$$\text{ICO}= \frac{CF_1}{(1+IRR)^1} + \frac{CF_2}{(1+IRR)^2} + \ldots\ldots + \frac{CF_n}{(1+IRR)^N}$$

Decision Criteria:

If IRR> Discount Rate---- Accept the Project
If IRR< Discount Rate----- Reject the Project
If IRR= Discount Rate----- NPV=0



Understanding the Basics

Capital Budgeting Techniques: Discounted Cash Flow Technique

Calculation of IRR:

Particulars	Initial Year	Year 1	Year 2	Year 3	Year 4
Cash Outflow	(100,000)	-	-	-	-
Cash Inflow	-	34,432	39,530	39,359	32,219

$$IRR = r_a + \frac{NPV_a}{NPV_a - NPV_b}(r_b - r_a)$$

r_a = lower discount rate chosen
r_b = higher discount rate chosen
N_a = NPV at r_a
N_b = NPV at r_b

YEAR	NET CASH FLOWS		PVIF AT 15%		PRESENT VALUES
1	34,432	x	.870	=	29,955.84
2	39,530	x	.756	=	29,884.68
3	39,359	x	.658	=	25,898.22
4	32,219	x	.572	=	18,429.27
Present Value of Cash Inflow					104,168.01
NPV @ 15% Discount Rate					4,168.01

YEAR	NET CASH FLOWS		PVIF AT 20%		PRESENT VALUES
1	34,432	x	.833	=	28,681.86
2	39,530	x	.694	=	27,433.82
3	39,359	x	.579	=	22,788.86
4	32,219	x	.482	=	15,529.56
Present Value of Cash Inflow					94,434.10
NPV @20% Discount Rate					-5,565.90

IRR= 0.15+ 4,168.01/[(4,168.01- (-5,565.90)] *(0.20-0.15)
= 0.15+ (4,168.01/9,733.91)*0.05
= 0.15+0.0214= 0.1714= 17.14%

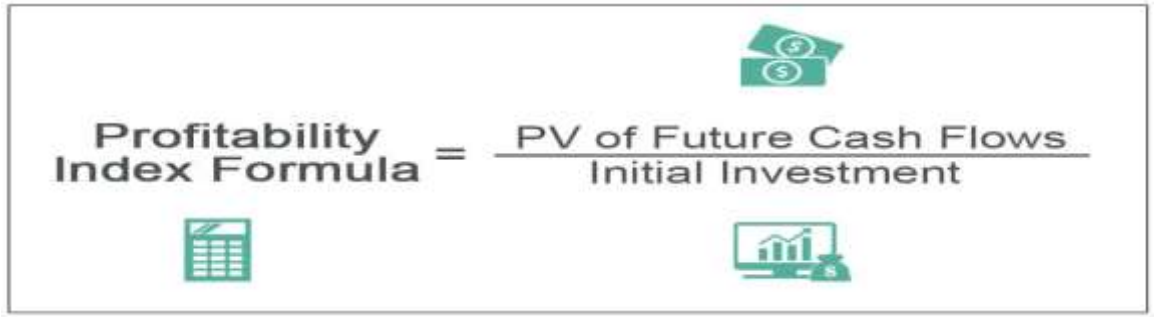
Understanding the Basics

Capital Budgeting Techniques: Discounted Cash Flow Technique

3. Profitability Index

The profitability index (PI), or benefit-cost ratio, of a project is the ratio of the present value of future net cash flows to the initial cash outflow. It can be expressed as:

$$PI = \left[\frac{CF_1}{(1+K)^1} + \frac{CF_2}{(1+K)^2} + \ldots\ldots + \frac{CF_n}{(1+k)^n} \right] \div ICO$$



PI= (30,748+ 31, 505+28,024+20, 491) ÷100, 000
= 110,768 ÷100,000
=1.11

Thus, the Project is acceptable.

Decision Criteria:

If PI> 1---- Accept the Project
If PI< 1----- Reject the Project
If PI= 1----- NPV=0

Understanding the Basics

Capital Budgeting Techniques: Discounted Cash Flow Technique

Capital Rationing:

- Capital rationing is a strategy used by companies or investors to limit the number of projects they take on at a time. If there is a pool of available investments that are all expected to be profitable, capital rationing helps the investor or business owner choose the most profitable ones to pursue.
- With a capital rationing constraint, the firm attempts to select the combination of investment proposals that will provide the greatest increase in the value of the firm subject to not exceeding the budget ceiling constraint.

PROJECT	INITIAL CASH OUTFLOWS (TK.)	IRR (%)	NPV(Tk.)	PI
A	50,000	15	12,000	1.24
B	35,000	19	15,000	1.43
C	30,000	28	42,000	2.40
D	25,000	26	1,000	1.04
E	15,000	20	10,000	1.67
F	10,000	37	11,000	2.10
G	10,000	25	13,000	2.30
H	1,000	18	100	1.10

Requirements:

Which Projects would you choose if you have budget constraint of Tk.65,000?

Definitely you should choose the projects that will generate higher NPV. In order to solve the problem you have to go by PI

Projects C (PI-2.40), G(PI-2.30), F (PI-2.10) and E (PI-1.67) will have NPV of Tk.76,000 which is the highest in all combination of investment of Tk.65,000 of budget ceiling

Understanding the Basics

Capital Budgeting Techniques: Discounted Cash Flow Technique

Selected by NPV			Selected by IRR				Selected by PI			
Project	NPV	Fund	Project	IRR	Fund	NPV	Project	PI	Fund	NPV
C	42,000	30,000	F	37%	10,000	11,000	C	2.4	30,000	42,000
B	15,000	35,000	C	28%	30,000	42,000	G	2.3	10,000	13,000
	57,000	65,000	D	26%	25,000	1,000	F	2.1	10,000	11,000
					65,000	54,000	E	1.67	15,000	10,000
									65,000	76,000

PROJECT	INITIAL CASH OUTFLOWS (TK.)	IRR (%)	NPV(Tk.)	PI
A	50,000	15	12,000	1.24
B	35,000	19	15,000	1.43
C	30,000	28	42,000	2.40
D	25,000	26	1,000	1.04
E	15,000	20	10,000	1.67
F	10,000	37	11,000	2.10
G	10,000	25	13,000	2.30
H	1,000	18	100	1.10

Understanding the Basics

Financing Mix

Table 8.1 Classification of Sources of Funds

Source of Funds Classification

- On the basis of period
  - **Long-term**
    - Equity shares
    - Retained earnings
    - Preference shares
    - Debentures
    - Loan from financial institutions
    - Loan from banks
  - **Medium-term**
    - Loan from banks
    - Public deposits
    - Loan from financial Institutions
    - Lease financing
  - **Short-term**
    - Trade credit
    - Factoring
    - Banks
    - Commercial paper
- On the basis of ownership
  - **Owner's Funds**
    - Equity shares
    - Retained earnings
  - **Borrowed Funds**
    - Debentures
    - Loans from banks
    - Loans from financial institutions
    - Public deposits
    - Lease financing
    - Commercial Papers
- On the basis of source of generation
  - **Internal Sources**
    - Equity share capital
    - Retained earnings
  - **External Sources**
    - Financial institutions
    - Loan from banks
    - Preference shares
    - Public deposits
    - Debenture
    - Lease financing
    - Commercial papers
    - Trade credit
    - Factoring

Understanding the Basics

Lease Financing

What is Lease Financing?

Lease financing is one of the important sources of medium- and long-term financing where the owner of an asset gives another person, the right to use that asset against periodical payments. The owner of the asset is known as lessor and the user is called lessee.

Types of Lease: Depending upon the transfer of risk and rewards to the lessee, the period of lease and the number of parties to the transaction, lease financing can be classified into two categories. Finance lease and operating lease.

Finance Lease: It is the lease where the lessor transfers substantially all the risks and rewards of ownership of assets to the lessee for lease rentals. In other words, it puts the lessee in the same condition as he/she would have been if he/she had purchased the asset.

Operating Lease: Lease other than finance lease is called operating lease. Here risks and rewards incidental to the ownership of asset are not transferred by the lessor to the lessee. The term of such lease is much less than the economic life of the asset and thus the total investment of the lessor is not recovered through lease rental

Understanding the Basics

Cost of Capital

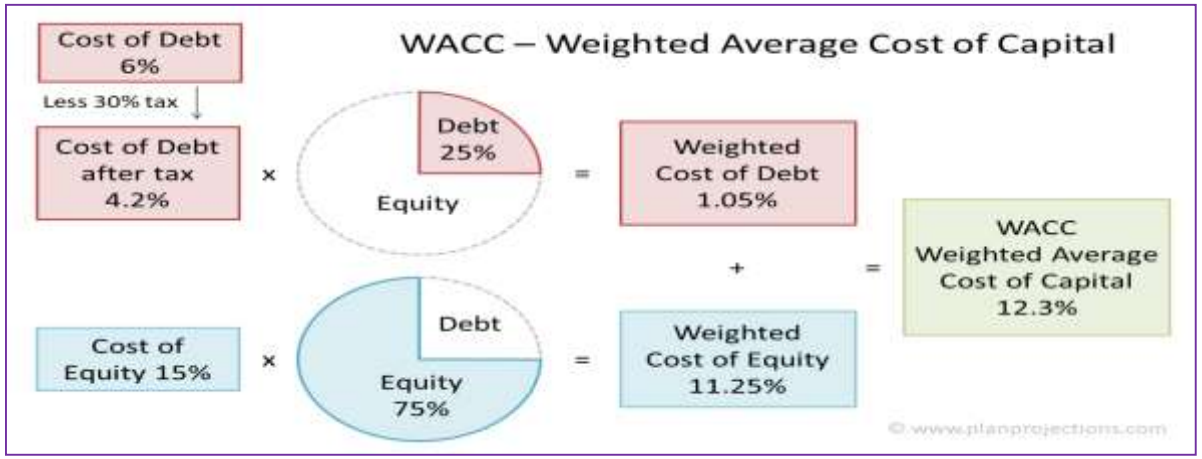
What is Cost of Capital?

In economics and accounting, the **cost of capital** is the cost of a company's funds (both debt and equity), or, from an investor's point of view it is the required rate of return on a portfolio company's existing securities. It is used to evaluate new projects of a company. It is the minimum return that investors expect for providing capital to the company, thus setting a benchmark that a new project has to meet.

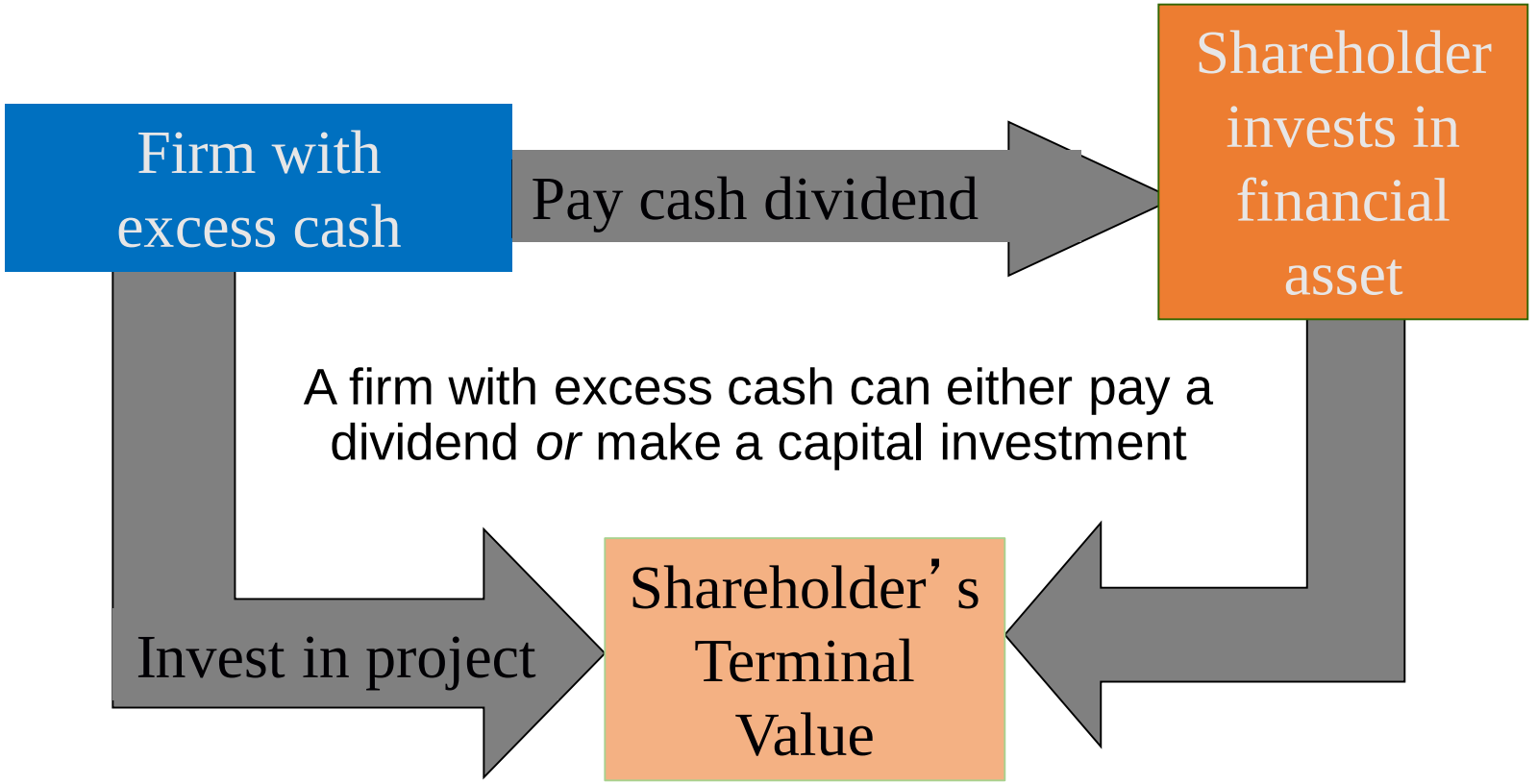
What is Weighted Average Cost of Capital?

The weighted average cost of capital (WACC) is a calculation of a firm's cost of capital in which each category of capital is proportionately weighted. All sources of capital, including common stock, preferred stock, bonds, and any other long-term debt, are included in a WACC calculation.

WACC Formula = [Cost of Equity x % of Equity] + [Cost of Debt x % of Debt x (1 – tax rate)]



The Cost of Equity Capital



The Cost of Equity Capital: Capital Assets Pricing Model

- From the firm's perspective, the expected return is the Cost of Equity Capital:

$$\overline{R}_S = R_F + \beta(\overline{R}_M - R_F)$$

- To estimate a firm's cost of equity capital, we need to know three things:

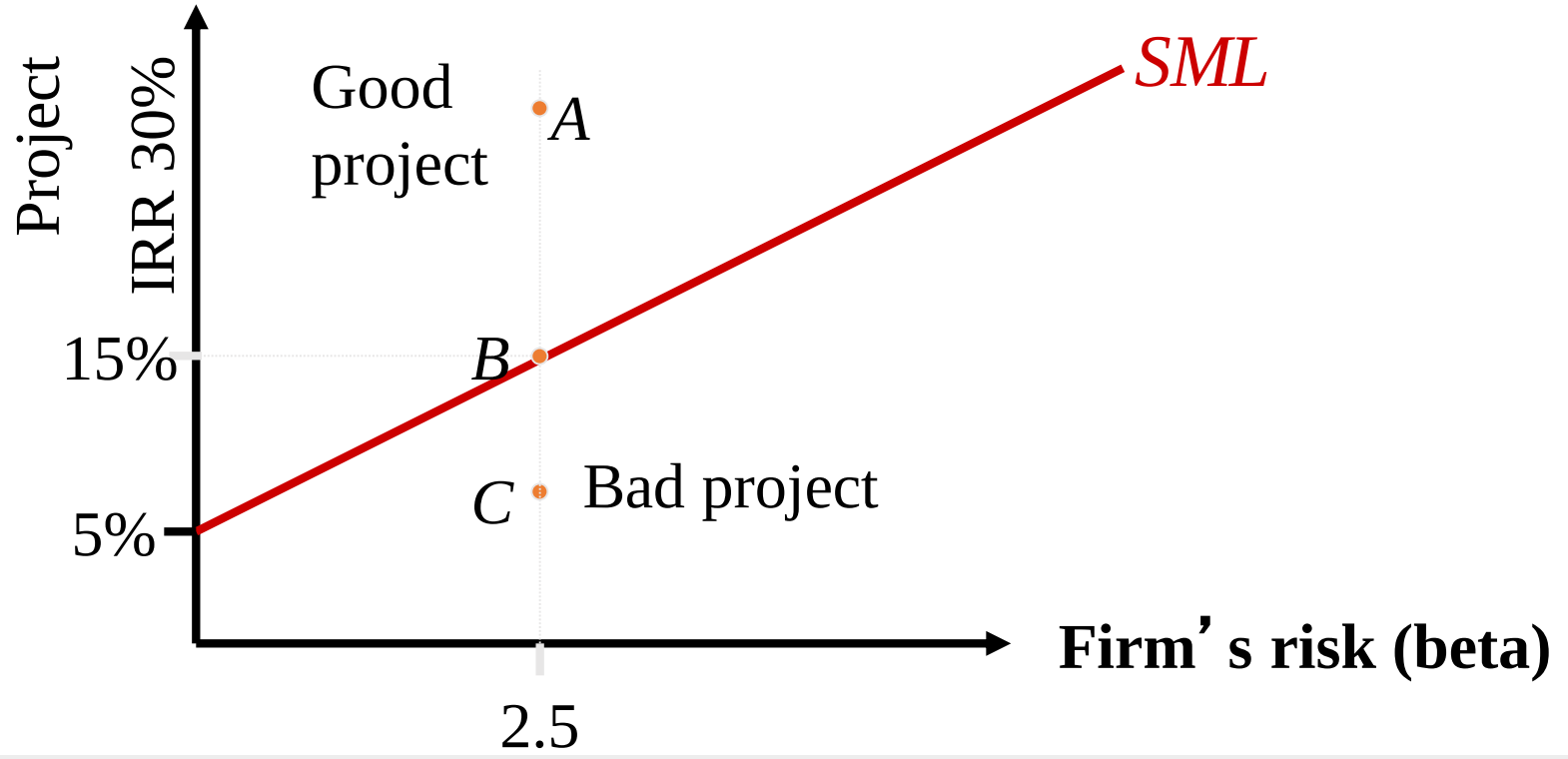
1. The risk-free rate, R_F
2. The market risk $\overline{R}_M - R_F$
3. The company beta (Sensitivity of a stock's return to the return on the market portfolio.

Determinants of Beta

- Business Risk
  1. Cyclicality of Revenues
  2. Operating Leverage (the degree of operating leverage measures how sensitive a firm (or project) is to its fixed costs.

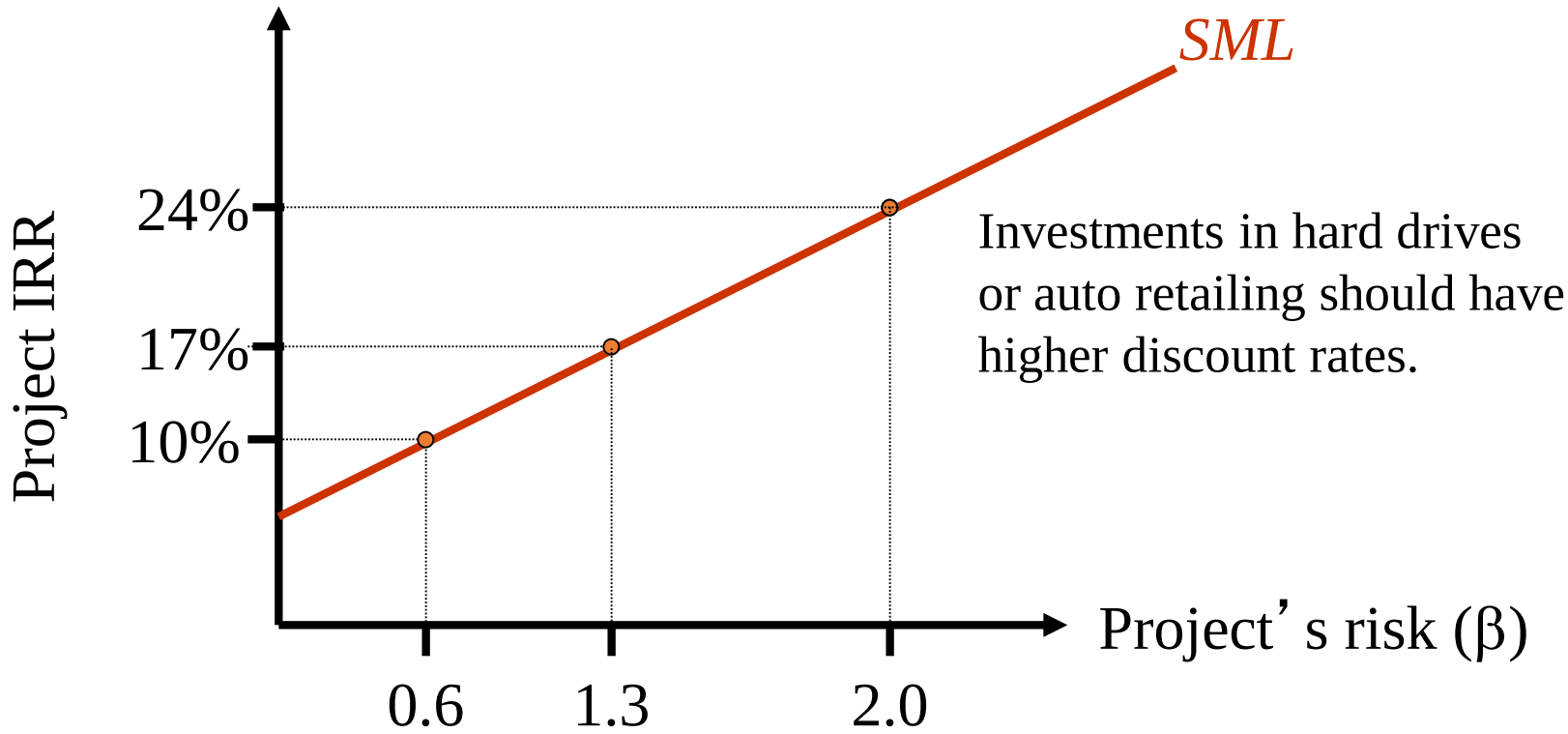
- Financial Risk
  3. Financial Leverage (Financial leverage is the sensitivity to a firm's fixed costs of financing)

Using the Security Market Line(SML)



An all-equity firm should accept projects whose IRRs exceed the cost of equity capital and reject projects whose IRRs fall short of the cost of capital.

Capital Budgeting & Project Risk



$R = 4\% + 0.6 \times (14\% - 4\%) = 10\%$

10% reflects the opportunity cost of capital on an investment in electrical generation, given the unique risk of the project.

The Cost of Equity Capital:

Dividend Discount Model (DDM)

$$R_s = \frac{D_1}{P} + g$$

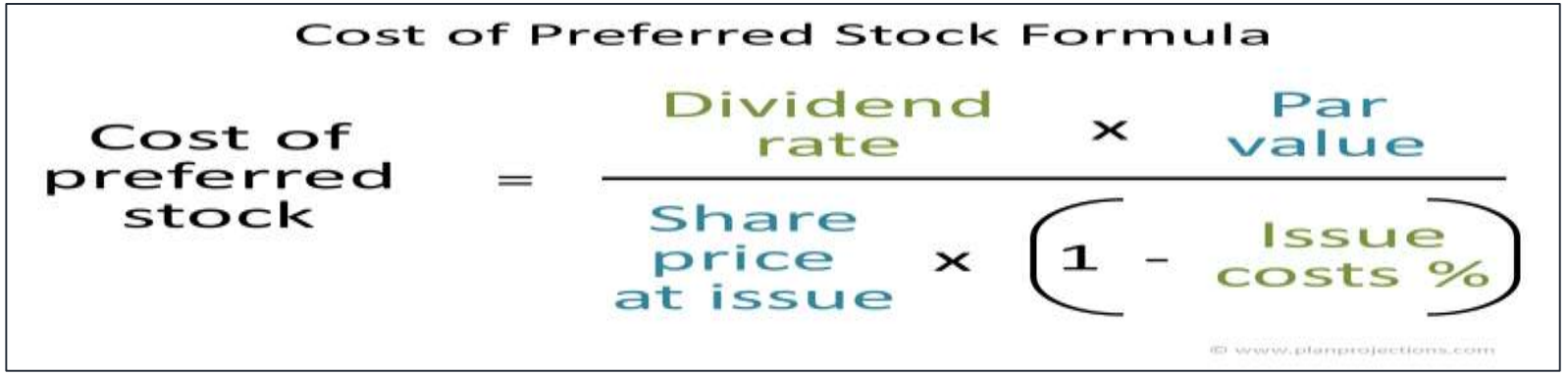
- Where D1=Dividend of the next years, P=Market Price; g= Growth Rate
- The DDM is an alternative to the CAPM for calculating a firm's cost of equity.
- The DDM and CAPM are internally consistent, but academics generally favor the CAPM and companies seem to use the CAPM more consistently.
- The CAPM explicitly adjusts for risk and it can be used on companies that do not pay dividends.

Cost of Debt

- The cost of debt is **the effective rate that a company pays on its debt**, such as bonds and loans.
- The after-tax cost of debt is the interest paid on debt less any income tax savings due to deductible interest expenses.

Cost of Preferred Stock

- Preferred stock is a highbred security which carries both the feature of bond and equity
- Preferred stock is a perpetuity, so its price is equal to the coupon paid divided by the current required return.



Identification of Problem is the Half of Solution

Problems & Solutions

1) ABC Company is considering a proposal to purchase a machine costing Tk. 10,00,000 initially. The machine is expected to have economic life of 5(five) years with salvage value of Tk.100,000. The expected profit before depreciation and tax is shown in the following table. The company follows straight line depreciation method. Assume tax rate is 50% and also assume cost of capital is 15%.

End of the year	Amount of cash flow (in Tk.)	Present Value Interest Factor(PVIF) @15% Discount Rate
1	250,000	0.870
2	300,000	0.756
3	350,000	0.658
4	250,000	0.572
5	200,000	0.497

Requirements:
1) Will it be wise to purchase the machine? Give your decision based on NPV method.
2) Calculate the Payback Period of the machine

1)

End of the year (1)	Cash Flow Before Tax and Depreciation (2)	Depreciation (3)	EBT 4= (2-3)	Tax @50% 5=50% of 4	EAT 6=4-5	Net Cash Benefit 7=(6+3)	Cumulative Cash Flow (8)	PVIF@15% Discount Rate (9)	PV of NCB 10=(7*9)
1	250,000	180,000	70,000	35,000	35,000	215,000	215,000	0.870	187,050
2	300,000	180,000	120,000	60,000	60,000	240,000	455,000	0.756	181,440
3	350,000	180,000	170,000	85,000	85,000	265,000	720,000	0.658	174,370
4	250,000	180,000	70,000	35,000	35,000	215,000	935,000	0.572	122,980
5	200,000	180,000	20,000	10,000	10,000	190,000	1,125,000	0.497	94,430
5	100,000 (SV)					100,000	1,225,000	0.497	49,700
							PV of NCB		**809,970**
							Less Net Cash Outflow		**(1,000,000)**
							NPV		**(190,030)**

1) Decision: It will not be wise to purchase the machine as NPV of the machine is Negative

Calculation of Depreciation of Machine= (Cost of Machine-Salvage Value)/Estimated Life
= (10,00,000-100,000)/5
= Tk. 180,000

2. Payback Period = 4 Years +(10,00,000-935,000)/290,000
=4.22 Years

Problems & Solutions

2) RB Fashion has the following capital structure on December 31, 2020

Source of Capital:	Amount (Tk.)
Ordinary Share Capital (800,000 Shares)	8,000,000
10% Preference Share	2,000,000
14% Debenture	6,000,000
Total	16,000,000

The share of the company sells for Tk.20. It is expected that company will pay next year a dividend of Tk.2 per share which will grow @5% forever. Assume 40% tax rate.

Requirements:

i) **Compute weighted average cost of capital (WACC) based on existing capital structure**

ii) **Compute the new weighted average cost of capital (WACC) if the company raises an additional Tk. 40,00,000 debt by issuing 15% subordinated bond. This would result to increase in expected dividend to Tk.3 per share with same growth rate.**

2(i)

Ordinary Share	8,000,000
10% Preference Share	2,000,000
14% Debenture	6,000,000
Current Market Price	20
Growth Rate	0.05
Dividend of Next Year (D1)	2

Cost of Common Stock	Ke=(D1/Current Market Price) +G=(2/20)+0.05	=0.15=15%
Cost of Preferred Stock @10%	Dps=Rate of Preferred Dividend	=0.10=10%
Cost of Debenture @14%	**De=Dc(1-Tax Rate)=0.14*(1-0.40)**	**=0.084=8.40%**

i) Weighted Average Cost of Capital

Particulars (1)	**Amount(2)**	**Weightage(3)**	**Cost(4)**	**Weighted Cost (5=3*4)**
Ordinary Share	8,000,000	0.500	0.150	0.0750
10% Preference Share	2,000,000	0.125	0.100	0.0125
14% Debenture	6,000,000	0.375	0.084	0.0315
Total	16,000,000	1.000	**WACC**	**0.1190=11.90%**

D1=D0(1+G)=2.1 [If D1 is not given]
(where D0=Dividend of Current year

2(ii)

Ordinary Share	8,000,000
10% Preference Share	2,000,000
14% Debenture	6,000,000
15% Subordinated Bond	**4,000,000**
Current Market Price	20
Growth Rate	0.05
Dividend/Share of Next Year (D1)	**3**

Revised Cost of Common Stock	Ke=(D1/Current Market Price) +G=(3/20)+0.05	=0.20=20%
Cost of Subordinated Bond	Ds=DSc (1-Tax Rate)=0.15*(1-0.40)	=0.09=9%

ii) Weighted Average Cost of Capital

Particulars (1)	Amount(2)	Weightage (3)	Cost (4)	Weighted Cost(5=3*4)
Ordinary Share	8,000,000	0.40	0.200	0.08
10% Preference Share	2,000,000	0.10	0.100	0.01
14% Debenture (from previous)	6,000,000	0.30	0.084	0.0252
15% Subordinated Bond	4,000,000	0.20	0.090	0.018
Total	20,000,000	1.00	**WACC**	**13.32%**

Problems & Solutions

3) Mr. X wishes to purchase an annuity contract that will pay him Tk. 7,000 a year for the rest of his life. The Delta Life Insurance Company figures that his life expectancy is 9 years, based on actuary tables. The company imputes a compound annual profit rate of 10% in its annuity contract.

Requirements:

i) How much will he have to pay for the annuity?

ii) How much would he have to pay if the profit rate were 8%?

3)

We are Given,

Payment (PMT)	Tk. 7000
Interest Rate (i)	i) 10% and ii) 8%
Number of Years (n)	9 Years
How much Mr. X Will have to Pay Now?	i.e., Present Value of Annuity (PVA)

We Know, $PVA_n = PMT\ [(1-[1/(1+i)^n]/ i]$

Or, $PVA_n = PMT\ (PVIFA_{i, n})$

i) $PVA_9 = 7{,}000\ (PVIFA_{10\%, 9})$

$= 7{,}000 * 5.759$

$= 40{,}313$

ii) $PVA_9 = 7{,}000\ (PVIFA_{8\%, 9})$

$= 7{,}000 * 6.247$

$= 43{,}729$

Present Value of an Ordinary Annuity Table

Period (n) \ Rate (i)	1%	2%	3%	5%	8%	10%
1	0.990	0.980	0.971	0.952	0.926	0.909
2	1.970	1.942	1.913	1.859	1.783	1.736
3	2.941	2.884	2.829	2.723	2.577	2.487
4	3.902	3.808	3.717	3.546	3.312	3.170
5	4.853	4.713	4.580	4.329	3.993	3.791
6	5.795	5.601	5.417	5.076	4.623	4.355
7	6.728	6.472	6.230	5.786	5.206	4.868
8	7.652	7.325	7.020	6.463	5.747	5.335
9	8.566	8.162	7.786	7.108	**6.247**	5.759

Problems & Solutions

4) You have currently Tk. 100,000 to deposit in an Islamic Bank under Mudaraba Term Deposit (MTDR) on Auto Renewal basis. You have been informed that the provisional rate of profit for 3 months MTDR is 7% followed by 7.50% for 6 months and 7.75% for 12 months.

Requirements:
i) What would you get at the end of three years on each alternative?
ii) What would be the effective rate of return on each alternative and which plan should you choose?

4) (i)

We are Given,

Principal Amount	Tk. 100,000
Profit Rate Rate (i)	1) 7% for 3 months MTDR 2) 7.5% for 6 months MTDR 3) 7.75% for 1 year MTDR
Number of Years (n)	3 Years
i) How much you will get after 3 three years for each alternative?	**Future value after 3 years for all the three alternatives**
ii) What will be the Effective Annual Interest Rate (EAIR) for each alternative and which one will you choose?	Calculate the Effective Annual Interest Rate (EAIR) for each alternative and the best alternative will be where the EAIR is the highest.

We Know, $FV_n = PV_0 (1 + [i/m])^{mn}$

[If number of compounding is more than once in a year]

1) $FV_{3\ (\text{Three Months MTDR})} = PV_0 (1 + [i/m])^{mn}$ **where, i=7%, m=4**

$= 100{,}000\ (1 + [0.07/4])^{4*3}$

$= \mathbf{123{,}143.93}$

2) $FV_{3\ (\text{Six Months MTDR})} = PV_0 (1 + [i/m])^{mn}$ **where, i=7.50%, m=2**

$= 100{,}000\ (1 + [0.075/2])^{2*3}$

$= \mathbf{124{,}717.85}$

3) $FV_{3\ (\text{1 Year MTDR})} = PV_0 (1 + [i/m])^{mn}$ **where, i=7.75%, m=1**

$= 100{,}000\ (1 + [0.0775/1])^{1*3}$

$= \mathbf{125{,}098.42}$

4) (ii)

We are Given,

Principal Amount	Tk. 100,000
Profit Rate Rate (i)	1) 7% for 3 months MTDR 2) 7.5% for 6 months MTDR 3) 7.75% for 1 year MTDR
Number of Years (n)	3 Years
i) How much you will get after 3 three years for each alternative?	Future value after 3 years for all the three alternatives
ii) What will be the Effective Rate of Return (ERR) for each alternative and which one will you choose?	Calculate the Effective Rate of Return (ERR) for each alternative and the best alternative will be where the ERR is the highest.

Effective Annual Interest Rate= $(1+ [i/m])^{m}-1$

1) **EAIR (quarterly)= $(1+ [i/m])^{m}-1$**
= $(1+ [0.07/4])^{4}-1$
=7.19%

2) **EAIR (Semi Annually))= $(1+ [i/m])^{m}-1$**
= $(1+ [0.075/2])^{2}-1$
=7.64%

3) **EAIR (Yearly)= $(1+ [i/m])^{m}-1$**
= $(1+ [0.0775/1])^{1}-1$
=7.75%

Q&A

Thank You!

to all!