

# Answer to PTP\_Final\_Syllabus 2012\_Jun2014\_Set 2

## Paper-14: ADVANCED FINANCIAL MANAGEMENT

Time Allowed: 3 Hours

Full Marks: 100

The figures in the margin on the right side indicate full marks.

Answer Question No. 1 which is compulsory.

From Section A: Answer any two questions.

From Section B: Answer any one question.

From Section C: Answer any one question.

From Section D: Answer any one question.

Working Notes should form part of the answer.

“Whenever necessary, suitable assumptions should be made and indicated in answer by the candidates.”

1. (a) “NBFCs can’t accept deposits from NRI’s”. Comment. [2]

(b)

Machine (Original Cost)	₹ 1,00,000
Life of Machine	5 Years
WDV	Nil
Resale Value	₹10,000
No other use of the machine.	

Offer: to use the machine for construction of a Guest House for 1 year. Resale Value after 1 year is ₹1,000. Find out the Opportunity Cost of Machine. [2]

(c) Write down the criticism of Modern Portfolio Theory. [3]

(d) Calculate the NAV of Great Fund the following data:

Size of the fund ₹200 Crores, Face Value ₹10/- per unit, Market Value of Investments – ₹280 Crores, Receivables – ₹2 Crores, Accrued Income – ₹2 Crores, Liabilities – ₹1 Crore, Accrued Expenses – ₹1 Crore. [2]

(e) MS. MOUSHIP holds a portfolio consisting of two stocks-stock A and stock B. Stock A has a standard deviation of returns of 0.6 and stock B has a standard deviation of 0.80. The correlation co-efficient of the two stock returns is 0.50. If MS. Mouship holds equal amount of each stock, what will be risk of the portfolio consisting of two stocks? [2]

(f) The following portfolio details of a fund are available:

Stock	Share	Price (₹)
A	2,00,000	35
B	3,00,000	40
C	4,00,000	20
D	6,00,000	25

The fund has accrued management fees with the portfolio manager totaling ₹30,000. There are 40 lakhs shares outstanding. What is the NAV of the fund? If the fund is sold with a front end load of 5%, What is the sale price? [2]

(g) Why Purchasing Power Parity Theory does not always work in practice? [5]

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(h) Zee Ltd. has a Beta of 1.15. Return on market portfolio is 14%. Return on Zed is 15.85%. Risk free rate is 5%.

What is the value of Alpha for Zed Ltd.?

[2]

Answer: 1

(a) Effective from April 24, 2004, NBFCs cannot accept deposits from NRIs except deposits by debit to NRO account of NRI provided such amount does not represent inward remittance or transfer from NRE/FCNR (B) account. However, the existing NRI deposits can be renewed.

(b) Relevant cost of utilizing machine in order to complete the offer is ₹ 9,000 (10,000 – 1,000), that is benefit lost due to acceptance of offer.

If the machine has no other use then Relevant Cost is difference of Resale Value.

(c) Despite its theoretical importance, critics of MPT question whether it is an ideal investing strategy, because its model of financial markets does not match the real world in many ways.

Efforts to translate the theoretical foundation into a viable portfolio construction algorithm have been plagued by technical difficulties stemming from the instability of the original optimization problem with respect to the available data. Recent research has shown that instabilities of this type disappear when a regularizing constraint or penalty term is incorporated in the optimization procedure.

(d)

$$\text{NAV} = \frac{\text{Market Value of Investments} + \text{Receivables} + \text{Accrued Income} - \text{Liabilities} - \text{Accrued Expenses}}{\text{Number of units outstanding}}$$

$$= \frac{280 + 2 + 2 - 1 - 1}{200/10} = ₹14.10 \text{ per unit.}$$

(e)

$$\begin{aligned} \sigma_p &= \sqrt{W_A^2 \sigma_A^2 + W_B^2 \sigma_B^2 + 2W_A W_B \rho_{AB} \sigma_A \sigma_B} \\ &= \sqrt{0.5^2 \times 0.6^2 + 0.5^2 \times 0.8^2 + 2 \times 0.5 \times 0.5 \times 0.5 \times 0.6 \times 0.8} \\ &= \sqrt{0.09 + 0.16 + 0.12} = 0.61 \end{aligned}$$

Hence Risk of the Portfolio is 0.61.

(f) The following portfolio details of a fund are available:

Stock	Shares	Price (₹)	Value
A	2,00,000	35	70,00,000
B	3,00,000	40	1,20,00,000
C	4,00,000	20	80,00,000
D	6,00,000	25	1,50,00,000
Total			<b>4,20,00,000</b>

$$\text{NAV of the fund} = (4,20,00,000 - 30,000) / 40,00,000 = ₹10.4925$$

$$\begin{aligned} \text{Sale Price} &= \text{NAV} (1 + \text{Load \%}) \\ &= 10.4925 * (1.05) = ₹11.02 \text{ approx.} \end{aligned}$$

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**(g)** The limits to free trade of goods are many. The larger limits are:

- (i) Import and Export Restrictions viz., quotas, tariffs, laws imposed by different countries make free trade difficult or impossible at times.
- (ii) Travel Costs. Expensive freight costs from one market to another market may cause a difference in the two market prices.
- (iii) Perishable Goods. These goods may not keep for long without extra care or cost being borne for them to sell in another market.
- (iv) Location. Utility of two real estates is not the same. Neither can two pieces of land qualify for exchange.

The above are the reasons for the anomaly noted in the Purchasing Power Parity Theory in practice. As a practical matter, a relative version of PPP has evolved, which states that the changes in the exchange rates of the two countries.

**(h)** Actual return – CAPM Return

$$a = R_p - [R_f + (R_m - R_f) \beta]$$

$$= 15.85 - \{5 + 1.15(14 - 5)\} = 0.50\%$$

### SECTION A

(Answer any two of the following.)

2. (a) A petrochemical plant needs to process 10,000 barrels of oil in three months time. To hedge against the rising price the plant needs to go long on the futures contract of crude oil. The spot price of crude oil is ₹ 1,950 per barrel, while futures contract expiring three months from now is selling for ₹ 2,200 per barrel. By going long on the futures the petrochemical plant can lock-in the procurement at ₹ 2,200 per barrel. Assuming the size of one futures contract of 100 barrels, the firm buys 100 futures to cover its exposure of 10,000 barrels.  
Find out the price that would be payable under two scenarios of rise in price to ₹ 2,400 or fall in price to ₹ 1,800 per barrel after three months.
- (b) Write short notes on Multi-Commodity Exchange of India Limited (MCX)
- (c) Find out NAV per unit from the following information of Scheme Money Plant

Name of the scheme	Money Plant
Size of the scheme	₹100 Lakhs
Face value of the shares	₹100
Number of the outstanding shares	₹1 Lakhs
Market value of the fund's investments	₹180 Lakhs
Receivables	₹2 Lakhs
Liabilities	₹1 Lakh

[3+6+3]

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Answer:

(a)

Figures [in ₹/barrel]

Price after 3 months	₹ 1,800/barrel	₹ 2,400/barrel
Actual purchase price	1,950	1,950
<b>Gain/loss on futures</b>		
Bought futures at	2,200	2,200
Sold futures at	1,800	2,400
Profit/loss on futures	-400	+ 200
<b>Effective Price (₹/barrel)</b>	<b>2,200</b>	<b>2,200</b>

Here we observe that the loss in the physical position is offset by the gain in the futures position and vice versa. This results in effective price equal to the price of futures at the time of setting up the hedge.

(b) MCX, an independent and de-mutualised multi commodity exchange has permanent recognition from Government of India for facilitating online trading, clearing and settlement operations for commodity futures markets across the country. Key shareholders of MCX are Financial Technologies (India) Ltd., State Bank of India, NABARD, NSE, HDFC Bank, State Bank of Indore, State Bank of Hyderabad, State Bank of Saurashtra, SBI Life Insurance Co. Ltd., Union Bank of India, Bank Of India, Bank Of Baroda, Canara Bank, Corporation Bank.

Headquartered in Mumbai, MCX is led by an expert management team with deep domain knowledge of the commodity futures markets. Through the integration of dedicated resources, robust technology and scalable infrastructure, since inception MCX has recorded many first to its credit.

Inaugurated in November 2003 by Shri Mukesh Ambani, Chairman & Managing Director, Reliance Industries Ltd, MCX offers futures trading in the following commodity categories: Agri Commodities, Bullion, Metals- Ferrous & Non-ferrous, Pulses, Oils & Oilseeds, Energy, Plantations, Spices and other soft commodities.

MCX has built strategic alliances with some of the largest players in commodities ecosystem, namely, Bombay Bullion Association, Bombay Metal Exchange, Solvent Extractors' Association of India, Pulses Importers Association, Shetkari Sanghatana, United Planters Association of India and India Pepper and Spice Trade Association.

Today MCX is offering spectacular growth opportunities and advantages to a large cross section of the participants including Producers / Processors, Traders, Corporate, Regional Trading Centers, Importers, Exporters, Cooperatives, Industry Associations, amongst others MCX being nation-wide commodity exchange, offering multiple commodities for trading with wide reach and penetration and robust infrastructure, is well placed to tap this vast potential.

3. (a) Explain the typical attributes of hard infrastructure.

(b) What are the differences between Merchant Banks and Commercial Banks?

[8+4]

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**Answer:**

**(a)** Hard infrastructure generally has the following attributes:

**(i) Capital assets that provide services**

These are physical assets that provide services. The people employed in the hard infrastructure sector generally maintain, monitor, and operate the assets, but do not offer services to the clients or users of the infrastructure. Interactions between workers and clients are generally limited to administrative tasks concerning ordering, scheduling, or billing of services.

**(ii) Large networks**

These are large networks constructed over generations, and are not often replaced as a whole system. The network provides services to a geographically defined area, and has a long life because its service capacity is maintained by continual refurbishment or replacement of components as they wear out.

**(iii) Historicity and interdependence**

The system or network tends to evolve over time as it is continuously modified, improved, enlarged, and as various components are rebuilt, decommissioned or adapted to other uses. The system components are interdependent and not usually capable of subdivision or separate disposal, and consequently are not readily disposable within the commercial marketplace. The system interdependency may limit a component life to a lesser period than the expected life of the component itself.

**(iv) Natural monopoly**

The systems tend to be natural monopolies, insofar that economies of scale means that multiple agencies providing a service are less efficient than would be the case if a single agency provided the service. This is because the assets have a high initial cost and a value that is difficult to determine. Once most of the system is built, the marginal cost of servicing additional clients or users tends to be relatively inexpensive, and may be negligible if there is no need to increase the peak capacity or the geographical extent of the network.

In public economics theory, infrastructure assets such as highways and railways tend to be public goods, in that they carry a high degree of non-excludability, where no household can be excluded from using it, and non-rivalry, where no household can reduce another from enjoying it. These properties lead to externality, free ridership, and spill over effects that distort perfect competition and market efficiency. Hence, government becomes the best actor to supply the public goods.

**(b)** The differences between merchant banks and commercial banks are:-

- (i) Commercial banks do banking business i.e. accept deposits and use deposits for giving loan but merchant bank works as consultancy type business i.e. helps in issue of management, issue of shares etc.
- (ii) The nature of loan given by commercial bank is debt related but loan given by merchant bank is equity related.
- (iii) Commercial bank does not take any risk of client but merchant bank takes risk of client.
- (iv) Commercial bank acts as a financier but merchant bank acts as a financial advisor.
- (v) Commercial Banks are regulated by the Banking Regulation Act, 1949 and is under the control of RBI whereas merchant bankers are governed by rules and regulations framed by SEBI.
- (vi) Commercial banks do mass banking with general public but merchant bank deals with a class of selected clients.

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4. Gargi Ltd has promoted an open-ended equity oriented scheme in 2004 with two plans — Dividend Reinvestment Plan (Plan X) and Bonus Plan (Plan Y); the face value of the units was ₹10 each. P and Q invested ₹5 Lakhs each on 01.04.2006 respectively in Plan X and Plan Y, when the NAV was ₹42.18 for Plan X and ₹35.02 for Plan Y. P and Q both redeemed their units on 31.03.2013. Particulars of dividend and bonus declared on the units over the period were as follows —

Date	Dividend	Bonus Ratio	NAV for Plan X	NAV for Plan Y
15.09.2006	15	—	46.45	29.10
28.07.2007	—	1 : 6	42.18	30.05
31.03.2008	20	—	48.10	34.95
31.10.2008	—	1 : 8	49.60	36.00
15.03.2009	18	—	52.05	37.00
24.03.2010	—	1:11	53.05	38.10
27.03.2011	16	—	54.10	38.40
28.02.2012	12	1:12	55.20	39.10
31.03.2013	—	—	50.10	34.10

You are required to calculate the annual return for P and Q after taking into consideration the following information —

(a) Securities Transaction Tax at 2% on redemption

(b) Liability of Capital Gains to Income Tax —

(i) Long Term Capital Gains — Exempt

(ii) Short Term Capital Gains —10% Plus Education Cess at 3%.

[6+6]

**Answer:**

**Note:** Under Dividend Reinvestment Plan, dividend will be declared as percentage of the face value of units outstanding, and units will be allotted for the amount of dividend based on the NAV on the date of dividend declaration.

### 1. Plan X for Mr. P

#### (a) Units Purchased

Particulars	Value
Amount Invested	₹5,00,000
NAV per Unit on 01.04.2006	₹42.18
No. of Units Purchased [₹5,00,000 ÷ ₹42.18]	11,853.96

#### (b) Units Allotted under Dividend Reinvestment

Date of Dividend	Units Outstanding	Dividend Rate	Dividend Amount	NAV on that date	Additional Units Allotted	Total Units
1	2	3	$4 = 2 \times ₹10 \times 3$	5	$6 = 4 \times 5$	7

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15.09.2006	11,853.96	15%	₹ 17,780.94 [11,853.96 x ₹10 x 0.15]	₹46.45	382.79 [17780.94 ÷ 46.45]	12,236.75
31.03.2008	12,236.75	20%	₹24,473.50 [12,236.75 X ₹10 X 0.20]	₹48.10	508.80 [24473.50 ÷ 48.10]	12,745.55
15.03.2009	12,745.55	18%	₹22,941.99 [12,745.55 x ₹10 X 0.18]	₹52.05	440.77 [22941.99 ÷ 52.05]	13,186.32
27.03.2011	13,186.32	16%	₹21,098.11 [13,186.32 x ₹10 x 0.16]	₹54.10	389.98 [21098.11 ÷ 54.10]	13,576.30
28.02.2012	13,576.30	12%	₹16,291.56 [13,576.30 x ₹10 X 0.12]	₹55.20	295.14 [13576.3 ÷ 55.20]	13,871.44

### (c) Redemption Proceeds and Annual Return

Particulars		Value
Units Redeemed		13,871.44
NAV per Unit on 31.03.2013 (date of redemption)		₹50.10
Less:	Gross Redemption Proceeds [13,871.44 Units X ₹50.10]	₹6,94,959.14
	Securities Transaction Tax @ 2%	₹13,899.18
	Net Proceeds	₹6,81,059.96
Less:	Initial Investment	₹5,00,000.00
Total Return for 7 Years		₹1,81,059.96
Annual Return		5.17%
$= \frac{\text{Total Return}}{\text{Initial Investment}} \times \frac{1}{\text{Period of Investment}}$ $= \frac{1,81,059.96}{5,00,000} \times \frac{1}{7 \text{ Years}} = 5.17\%$		

**Note:** Since all the units redeemed are held for more than 12 months, all the units are long term capital assets under the income tax, and therefore, gain on their redemption is exempt from income tax.

### 2. Plan Y for Mr. Q

#### (a) Units Purchased

Particulars		Value
Amount Invested		₹5,00,000
NAV per Unit on 01.04.2006		35.02
No. of Units Purchased [₹5,00,000 ÷ ₹35.02]		14,277.56

#### (b) Units Allotted under Bonus

Date	Description	Units
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01.04.2006	Purchase of Units for ₹5,00,000 at ₹35.02 per Unit	14,277.56
28.07.2007	Add: Bonus Issue at 1 : 6 = $1/6 \times 14,277.56$	2,379.59
31.10.2008	Total Units after First Bonus Issue	16,657.15
	Add: Bonus Issue at 1 : 8 = $1/8 \times 16,657.15$	2,082.14
24.03.2010	Total Units after Second Bonus Issue	18,739.29
	Add: Bonus Issue at 1 : 11 = $1/11 \times 18,739.29$	1,703.57
28.02.2012	Total Units after Third Bonus Issue	20,442.86
	Add: Bonus Issue at 1 : 12 = $1/12 \times 20,442.86$	1,703.57
31.03.2012	<b>Total Units after Fourth Bonus Issue</b> <b>= Units Outstanding on the date of redemption i.e. 31.03.2013</b>	<b>22,146.43</b>

### (c) Redemption Proceeds and Annual Return

Particulars		Value
Units Redeemed		22,146.43
NAV per Unit on 31.03.2013 (date of redemption)		₹34.10
Less:	Gross Redemption Proceeds [22,146.43 Units X ₹34.10]	₹7,55,193.26
	Securities Transaction Tax @ 2%	₹15,103.87
Less:	Net Proceeds	₹7,40,089.39
	Initial Investment	₹5,00,000.00
Total Return for 7 Years		₹2,40,089.39
Annual Return		6.86%
$= \frac{\text{Total Return}}{\text{Initial Investment}} \times \frac{1}{\text{Period of Investment}}$ $= \frac{2,40,089.39}{5,00,000} \times \frac{1}{7 \text{ Years}} = 6.86\%$		

**Note:** Since all the units (financial assets) redeemed are held for more than 12 months, all the capital assets under the income tax law, and therefore, gain on their redemption is exempt from units are long term income tax.

### SECTION B

(Answer any one of the following.)

5. (a) Unitech DLS's, international transfer of funds amounts to US \$20 Lakhs monthly. Presently the average transfer time is 10 days. It has been proposed that the transfer of funds be turned over to one of the larger international banks, which can reduce the transfer time to an average of two days. A charge of 0.5% of the volume of transfer has been proposed for this service. In view of the fact that the firm's opportunity cost of funds is 12%, should this offer be accepted?



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(b) Illustrate types of Liquidity risk.

(c) You as a dealer in foreign exchange have the following position in Swiss Francs on 31.10.2013-

Particulars	SFr.	Particulars	SFr.
Balance in the Nostro A/c Credit	1,00,000	Forward purchase contract	30,000
Opening Position Over bought	50,000	cancelled	
Purchased a bill on Zurich	80,000	Remitted by TT	75,000
Sold forward TT	60,000	Draft on Zurich cancelled	30,000

What steps would Mr. Sen take, if he required maintaining a credit balance of S Fr. 30,000 in the Nostro A/c and keeping as over bought position on SFr. 10,000?

(d) State the benefits of using Financial Derivatives?

[5+5+6+4]

**Answer:**

(a) **Effective Yield on Saving**

Period Saved = 10 Days <b>Less</b> 2 Days	8 Days
Cost of Funds	12%p.a.
Percentage Yield for the period saved $(8/365 \times 12\% \text{p.a.})$	0.263%

### Evaluation

- (i) The cost of international transfer of 0.5% is more than the amount of interest saved at 0.263% i.e. more by around 0.237%. Therefore, prima facie the Company should not opt for the proposal of transferring through International Bank.
- (ii) However, saving in time also reduces the exposure of funds to various foreign exchange risks. The Company has to consider the effect of such exposure and decide on the proposal of the International Bank. If expected cost of such exposure is more than 0.237%, then the Company should go for transfer through International Banks.

(b) **Types of Liquidity Risk**

**Market liquidity** - An asset cannot be sold due to lack of liquidity in the market – essentially a sub-set of market risk. This can be accounted for by:

- ❖ Widening bid/offer spread
- ❖ Making explicit liquidity reserves
- ❖ Lengthening holding period for VaR calculations

**Funding liquidity** - Risk that liabilities:

- ❖ Cannot be met when they fall due
- ❖ Can only be met at an uneconomic price
- ❖ Can be name-specific or systemic

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### Example:

Liquidity risk generally arises when a business or individual with immediate cash needs holds a valuable asset that it cannot trade or sell at market value due to a lack of buyers or due to an inefficient market where it is difficult to bring buyers and sellers together. For example, consider a \$1,000,000 home with no buyers. The home obviously has value, but due to market conditions at the time, there may be no interested buyers. In better economic times when market conditions improve and demand increases, the house may sell for well above that price. However, due to the home owner's need of cash to meet near term financial demands, the owner may be unable to wait and have no other choice but to sell the house in an illiquid market at a significant loss. Hence, the liquidity risk of holding this asset.

(c)

Particulars	Sw. Fcs	Particulars	Sw.Frcs
To Balance b/d	50,000	By Sales of Forward TT	60,000
To Purchase of Bill on Zurich	80,000	By Forward Purchase Contract	
To Cancellation of Draft	30,000	Cancellation	30,000
To Buy Spot TT (Nostro)	5,000	By Remittance by TT (Nostro)	75,000
To Buy Forward (To maintain Balance)	10,000	By Balance c/ d (Given)	10,000
	<b>1,75,000</b>		<b>1,75,000</b>

Dr.	Nostro Account		Cr.
Particulars	Sw. Fcs	Particulars	Sw. Frcs
To Overbought Remittance	75,000	By Balance b/d	1,00,000
To Balance c/d	30,000	By Buy Spot TT (To maintain Balance)	5,000
	<b>1,05,000</b>		<b>1,05,000</b>

### Courses of Action

The Bank has to buy spot TT Sw. Fcs. 5,000 to increase the balance in Nostro Account to Sw. Fcs. 30,000.

Since the bank requires an overbought position of Sw. Fcs. 10,000, it has to buy forward Sw. Fcs. 10,000.

### (d) Benefits of Using Financial Derivatives

The general benefits of using financial derivatives are as follows:

- (i) A prudent use of financial derivatives can provide a new mechanism to manage or reduce various business risks at low transaction cost.
- (ii) The innovative use of financial derivatives can greatly help end-users cut their financing cost.

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- (iii) Financial derivatives can provide more access to financial markets, especially to unfamiliar ones at lower costs. Put another way, they can create more complete markets to investors.
- (iv) Financial derivative instruments play an important role in asset management due to their lower transaction costs relative to the spot market instruments.
- (v) The users of financial derivatives can expect to be offered opportunities on taking advantage of asymmetries in tax and regulatory requirements across different countries, markets or securities.
- (vi) Financial derivatives can be used to speculate and make profits by assuming certain risks, probably with suitable degree.

6. (a) What are the basic elements of joint venture?

(b) Company A has outstanding debt on which it currently pays fixed rate of interest at 9.5%. The company intends to refinance the debt with a floating rate interest. The best floating rate it can obtain is LIBOR + 2%. However, it does not want to pay more than LIBOR. Another company B is looking for a loan at a fixed rate of interest to finance its exports. The best rate it can obtain is 13.5%, but it cannot afford to pay more than 12%. However, one bank has agreed to offer finance at a floating rate of LIBOR + 2%. Citibank is in the process of arranging an interest rate swap between these two companies.

(i) With a schematic diagram, show how the swap deal can be structured,

(ii) What are the interest savings by each company?

(iii) How much would Citi bank receive?

[5+(6+4+5)]

**Answer:**

**(a) Contractual Agreement.** JVs are established by express contracts that consist of one or more agreements involving two or more individuals or organizations and that are entered into for a specific business purpose.

**Specific Limited Purpose and Duration.** JVs are formed for a specific business objective and can have a limited life span or long-term. JVs are frequently established for a limited duration because (a) the complementary activities involve a limited amount of assets; (b) the complementary assets have only a limited service life; and/or (c) the complementary production activities will be of only limited efficacy.

**Joint Property Interest.** Each JV participant contributes property, cash, or other assets and organizational capital for the pursuit of a common and specific business purpose. Thus, a JV is not merely a contractual relationship, but rather the contributions are made to a newly-formed business enterprise, usually a corporation, limited liability company, or partnership. As such, the participants acquire a joint property interest in the assets and subject matter of the JV.

**Common Financial and Intangible Goals and Objectives.** The JV participants share a common expectation regarding the nature and amount of the expected financial and intangible goals and objectives of the JV. The goals and objectives of a JV tend to be

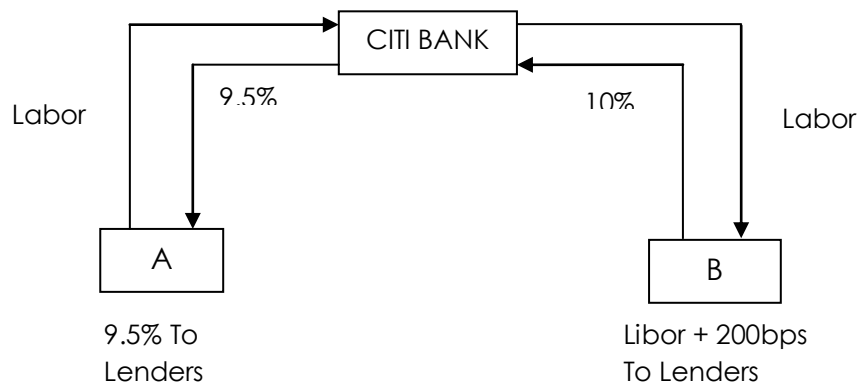
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narrowly focused, recognizing that the assets deployed by each participant represent only a portion of the overall resource base.

**Shared Profits, Losses, Management, and Control.** The JV participants share in the specific and identifiable financial and intangible profits and losses, as well as in certain elements of the management and control of the JV.

(b) First let us tabulate the details to find the quality spread differential:

Cost of Funds to Company A and B			
	Objective	Fixed rate	Floating rate
<b>Company A</b>	Floating	9.50% p.a.	Libor + 200bp
<b>Company B</b>	Fixed	13.50% p.a.	Libor + 200bp
<b>Differential</b>		400 bps	0bps



The differential between the two markets = 400 bps - 0 = 400 bps. A total of 400 bps needs to be shared between A, B and Citi bank. Since A cannot afford to pay more than Libor, it needs 200 bps benefits out of the total 400 bps (Libor +2% - Libor). Similarly B cannot pay more than 12% as against the existing available fixed rate funding of 13.5%, it requires 150 bps benefits out of 400 bps. The balance 50 bps would be shared / charged by the Citi bank.

The swap can therefore be structured as follows:

Firm	Paid to Bank	Received from Bank	Paid to market	Net Cost	Savings
<b>A</b>	Libor	9.5%	9.5%	Libor	(Libor+2%)- (Libor)=200bps
<b>B</b>	10%	Libor	Libor +200bps	12%	(13.5-12.0)= 150bps

Company A gets floating rate funds at Libor as against Libor + 2%, thereby getting an advantage of 200 bps, Company B gets fixed rate funds at 12% as against 13.5%, thereby getting an advantage of 150 bps and finally Citi bank gets 50 bps commission.

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### SECTION C

(Answer any one of the following.)

7. Write short notes on any four. [4 × 4]
- (a) Earning per Share
  - (b) Price to Earning Ratio
  - (c) Price to Sales Ratio
  - (d) Price to Book Ratio
  - (e) Projected Earnings Growth Rate-PEG Ratio

Answer:

**(a) Earnings per Share**

The overall earnings of a company is not in itself a useful indicator of a stock's worth. Low earnings coupled with low outstanding shares can be more valuable than high earnings with a high number of outstanding shares. Earnings per share are much more useful information than earnings by itself. Earnings per share (EPS) is calculated by dividing the net earnings by the number of outstanding shares.

$$\text{EPS} = \text{Net Earnings} / \text{Outstanding Shares}$$

For example: ABC company had net earnings of \$1 million and 100,000 outstanding shares for an EPS of 10 (1,000,000 / 100,000 = 10). This information is useful for comparing two companies in a certain industry but should not be the deciding factor when choosing stocks.

**(b) Price to Earnings Ratio**

The Price to Earnings Ratio (P/E) shows the relationship between stock price and company earnings. It is calculated by dividing the share price by the Earnings per Share.

$$\text{P/E} = \text{Stock Price} / \text{EPS}$$

For Example: ABC company the EPS is 10 so if it has a price per share of \$50 the P/E is 5 (50 / 10 = 5). The P/E tells you how many investors are willing to pay for that particular company's earnings. P/E's can be read in a variety of ways. A high P/E could mean that the company is overpriced or it could mean that investors expect the company to continue to grow and generate profits. A low P/E could mean that investors are wary of the company or it could indicate a company that most investors have overlooked. Either way, further analysis is needed to determine the true value of a particular stock.

**(c) Price to Sales Ratio**

When a company has no earnings, there are other tools available to help investors judge its worth. New companies in particular often have no earnings, but that does not mean they are bad investments. The Price to Sales ratio (P/S) is a useful tool for judging new companies. It is calculated by dividing the market cap (stock price times number of outstanding shares) by total revenues. An alternate method is to divide current share

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price by sales per share. P/S indicates the value the market places on sales. The lower the P/S the better the value.

$$PSR = \frac{\text{Share Price}}{\text{Revenue Per Share}}$$

### (d) Price to Book Ratio

Book value is determined by subtracting liabilities from assets. The value of a growing company will always be more than book value because of the potential for future revenue. The price to book ratio (P/B) is the value the market places on the book value of the company. It is calculated by dividing the current price per share by the book value per share (book value / number of outstanding shares). Companies with a low P/B are good value and are often sought after by long term investors who see the potential of such companies. A lower P/B ratio could mean that the stock is undervalued. However, it could also mean that something is fundamentally wrong with the company. As with most ratios, be aware that this varies by industry. This ratio also gives some idea of whether you're paying too much for what would be left if the company went bankrupt immediately. It is also known as the "price-equity ratio".

$$P/B = \text{Share Price} / \text{Book Value per Share}$$

$$P/B \text{ Ratio} = \frac{\text{Stock Price}}{\text{Total Assets} - \text{Intangible Assets and Liabilities}}$$

### (e) Projected Earnings Growth Rate-PEG Ratio

A ratio used to determine a stock's value while taking into account earnings growth. The calculation is as follows:

$$\text{PEG Ratio} = \frac{\text{Price/Earning Ratio}}{\text{Annual EPS Growth}}$$

PEG is a widely used indicator of a stock's potential value. It is favoured by many over the price/earnings ratio because it also accounts for growth. Similar to the P/E ratio, a lower PEG means that the stock is more undervalued.

Keep in mind that the numbers used are projected and, therefore, can be less accurate. Also, there are many variations using earnings from different time periods (i.e. one year vs. five year). Be sure to know the exact definition your source is using.

### 8. (a) A Ltd., and B Ltd., has the following risk and return estimates

$R_A$	$R_B$	$\sigma_A$	$\sigma_B$	(Correlation coefficient) = $r_{AB}$
20%	22%	18%	15%	-1.50

Calculate the proportion of investment in A Ltd., and B Ltd., to minimize the risk of Portfolio.

(b) The beta co-efficient of equity stock of ATRO Ltd. is 1.6. The risk free rate of return is 12% and the required rate of return is 15% on the market portfolio. If the dividend expected

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during the coming year is ₹ 2.50 and the growth rate of dividend and earnings is 8%, at what price the stock of ATRO Ltd. can be sold (based on CAPM)?

(c) X Ltd., has an expected return of 20% and Standard Deviation of 40%.

Y Ltd., has an expected return of 22% and Standard Deviation of 38%.

X Ltd., has a beta of 0.86 and Y Ltd., a beta of 1.24.

The correlation coefficient between the return of X Ltd. and Y Ltd., is 0.72. The Standard deviation of the market return is 20%.

**Suggest.**

(i) Is investing in Y Ltd., better than investing in X Ltd.?

(ii) If you invest 30% in Y Ltd., and 70% in X Ltd., what is your expected rate of return and Portfolio Standard Deviation?

(iii) What is the market Portfolio's expected rate of return and how much is the risk free rate?

(iv) What is the beta of portfolio if X Ltd.'s weight is 60% and Y Ltd.'s weight is 40%?

[4+2+(2+3+3+2)]

**Answer: (a)**

**(i) Basic Values of Factors for Determination of Portfolio Risk**

Standard Deviation of Security A	$\sigma_A$	18%
Standard Deviation of Security B	$\sigma_B$	15%
Correlation co-efficient of Securities A and B	$\rho_{AB}$	-1.50
Weight of Security A	$W_A$	a
Weight of Security B	$W_B$	1-a

**(ii) Computation of Investment in Security A ( $W_A$ )**

$$\text{Proportion or Investment in A Ltd., } W_A = \frac{\sigma_A^2 - \text{Cov}_{AB}}{\sigma_A^2 + \sigma_B^2 - 2\text{Cov}_{AB}}$$

$$\text{Proportion of Investment in B Ltd., } W_B = 1 - W_A$$

**a. Computation of Covariance**

$$\text{Cov}_{AB} = \rho_{AB} \times \sigma_A \times \sigma_B$$

$$= -1.50 \times 18 \times 15 = -405$$

**b. Proportion of investment in A Ltd.**

$$W_A = [\sigma_Y^2 - \text{Cov}_{XY}] \div [X^2 + Y^2 - 2\text{Cov}_{XY}]$$

$$W_A = [15^2 - (-405)] \div [18^2 + 15^2 - 2 \times (-405)]$$

$$W_A = [225 + 405] \div [324 + 225 + 810] = 630/1359 = 0.46$$

**c. Proportion of investment in B Ltd.**

$$W_B = 1 - 0.46 = 0.54$$

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(b) Expected rate of return: (By applying CAPM)

$$\begin{aligned}R_e &= R_f + \beta (R_m - R_f) \\ &= 12\% + 1.6(15\% - 12\%) \\ &= 12\% + 4.8\% = 16.80\%\end{aligned}$$

Price of Stock: (with the use of dividend growth model formula)

$$\begin{aligned}R_e &= D_1 \div P_0 + g \\ \text{or, } 0.168 - 0.08 &= 2.50 \div P_0 \\ \text{or, } P_0 &= 2.50 \div 0.088 = ₹ 28.41\end{aligned}$$

(c)

(i) **Better Investment**

- X Ltd., has lower return and higher risk than Y Ltd.,
- Investing in Y Ltd., is better than in X Ltd., because the Returns are higher and the Risk lower.
- However, investing in both will yield diversification advantage.

(ii) **Expected Return and Standard Deviation of the Portfolio**

- **Return on the Portfolio of X and Y:** 70% of Return on Security X + 30% of Return on Security Y  
i.e.  $70\% \times 20\% + 30\% \times 22\% = 15.4\% + 7.2\% = 20.6\%$
- **Risk on the Portfolio of X and Y:**

$$\begin{aligned}\sigma_{XY} &= \sqrt{\sigma_X^2 \times W_X^2 + \sigma_Y^2 \times W_Y^2 + 2\sigma_X \times W_X \times \sigma_Y \times W_Y \times \rho_{XY}} \\ &= \sqrt{0.40^2 \times 0.70^2 + 0.38^2 \times 0.30^2 + 2 \times 0.40 \times 0.70 \times 0.38 \times 0.30 \times 0.72} \\ &= \sqrt{0.0784 + 0.012996 + 0.04596} \\ &= \sqrt{0.137356} = 37.06\%\end{aligned}$$

(iii) **Market Portfolio's Expected Rate of Return**

The Risk free rate and Market Rate will be the same for X and Y Ltd.

Expected Return on Security =  $R_f + \beta (R_m - R_f)$

$$E(R_X) = 20 = R_f + 0.86 X (R_m - R_f) \quad (1)$$

$$E(R_Y) = 22 = R_f + 1.24 X (R_m - R_f) \quad (2)$$

$$(1) - (2)$$

$$E(R_X) - E(R_Y) = -2$$

$$(R_m - R_f) \times (0.86 - 1.24) = -2$$

$$(R_m - R_f) = (-2) \div (-0.38)$$

$$(R_m - R_f) = 5.26\%$$

Substituting  $(R_m - R_f) = 5.26\%$  in (1)

$$E(R_X) = R_f + 0.86 \times (R_m - R_f)$$

$$20 = R_f + 0.86 \times 5.26$$

$$20 = R_f + 4.52$$



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$$R_f = 20 - 4.52 = 15.48\%$$

$$R_m - R_f = 5.26\%$$

$$R_m = 5.26 + R_f = 5.26 + 15.48 = 20.74\%$$

(iv) Beta of the Portfolio if X Ltd.'s weight is 60% and Y Ltd.'s weight is 40%

$$\beta_{XY} = \beta_X W_X + \beta_Y W_Y$$

$$= 0.86 \times 0.6 + 1.24 \times 0.4 = 1.012$$

### SECTION D

(Answer any one of the following.)

9. (a) Mr. Samik, a business man has two independent investments A and B available to him: but he lacks the capital to undertake both of them simultaneously. He can choose to take A first and then stop, or if A is successful then take B, or vice versa. The probability of success on A is 0.7, while for B it is 0.4. Both investments require an initial capital outlay of ₹ 2,000, and both return nothing if the venture is unsuccessful. Successful completion of A will return ₹ 3,000 (over cost), and successful completion of B will return ₹ 5,000 (over cost). Draw the decision tree and determine the best strategy.
- (b) A publishing house has bought out a new monthly magazine which sells at ₹ 25 per copy. The cost of purchasing it by newsstand is ₹ 20 per copy. A newsstand estimates the sales pattern of the magazine as under:

Demand copies	Probability
0 < 200	0.18
200 < 400	0.32
400 < 600	0.25
600 < 800	0.15
800 < 1000	0.06
1000 < 1200	0.04

The newsstand has contracted for 500 copies of the magazine per month from the publisher. The unsold copies are returnable to the publisher who will take them back at cost less ₹ 2 per copy for handling charges.

The newsstand manager wants to simulate the pattern of demand and profitability.

The following random number may be used for simulation of sales pattern of each month.

26    14    55    17    97    70  
51    33    60    82    96    68

You are required to:

(i) Allocate random numbers to the demand pattern forecast by the newsstand.

(ii) Simulate twelve months sales and calculate the monthly and annual profit/loss.

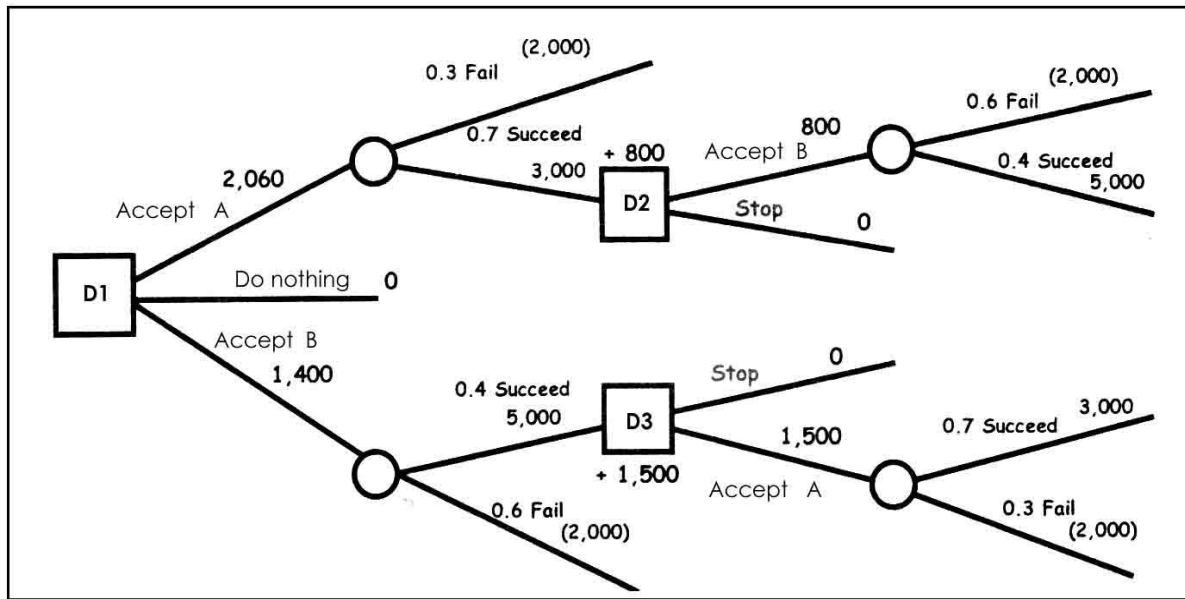
(iii) Calculate the loss on lost sales.

[(4+6)+(3+6+1)]

Answer:

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(a) The required decision tree is as shown below:



There are three decision points in this tree. These are indicated as 1, 2 and 3.

### Evaluation of decision point 3:

I. Accept A

(₹)

Outcome	Probability	Conditional Values	Expected Values
Success	0.7	3,000	2,100
Failure	0.3	(2,000)	(600)
			1,500

II. Stop: Expected Value = 0

### Evaluation of decision point 2:

I. Accept B

(₹)

Outcome	Probability	Conditional Values	Expected Values
Success	0.4	5,000	2,000
Failure	0.6	(2,000)	(1,200)
			800

II. Stop: Expected Value = 0

### Evaluation of decision point 1:

I. Accept A

(₹)

Outcome	Probability	Conditional Values	Expected Values
Success	0.7	3,000+800	2,660
Failure	0.3	(2,000)	(600)
			2,060

II. Accept B

(₹)

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Outcome	Probability	Conditional Values	Expected Values
Success	0.4	5,000+1,500	2,600
Failure	0.6	(2,000)	(1,200)
			1,400

- III. Do Nothing: Expected Value = 0  
Hence, the best strategy is to accept A first, and if it is successful, then accept B.

(b) Profit per copy of magazine = ₹ 25 – 20 = 5. If unsold copy is returned, loss per copy = ₹ 2.

**(i) Allocation of random numbers:**

Demand	Probability	Cumulative Probability	Random Nos. allocated
0 < 200	0.18	0.18	00 - 17
200 < 400	0.32	0.50	18 – 49
400 < 600	0.25	0.75	50 – 74
600 < 800	0.15	0.90	75 – 89
800 < 1000	0.06	0.96	90 – 95
1000 < 1200	0.04	1.00	96 - 99

**(ii) Simulation of monthly pattern of demand and profitability:**

Month	Random Number	Demand	Sales Copies	Returned Copies	Profit on sales ₹	Loss on return ₹	Net Profit (loss) ₹	Lost sale Copies
1	26	300	300	200	1,500	400	1,100	--
2	14	100	100	400	500	800	(300)	--
3	55	500	500	--	2,500	--	2,500	--
4	17	100	100	400	500	800	(300)	--
5	97	1,100	500	--	2,500	--	2,500	600
6	70	500	500	--	2,500	--	2,500	--
7	51	500	500	--	2,500	--	2,500	--
8	33	300	300	200	1,500	400	1,100	--
9	60	500	500	--	2,500	--	2,500	--
10	82	700	500	--	2,500	--	2,500	200
11	96	1,100	500	--	2,500	--	2,500	600
12	68	500	500	--	2,500	--	2,500	--
					24,000	2,400	21,600	1,400

(iii) Loss due to lost sales 1,400 copies × ₹ 5 = ₹ 7,000

10. (a) Your company is considering to acquire an additional computer to supplement its time-share computer services to its clients. It has two options:

(i) To purchase the computer for ₹ 22 lakhs.

(ii) To lease the computer for three years from a leasing company for ₹ 5 lakhs as annual lease rent plus 10% of gross time-share service revenue. The agreement also requires an additional payment of ₹ 6 lakhs at the end of the third year. Lease rents are payable at the year-end and the computer reverts to the lessor after the contract period.

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The company estimates that the computer under review will be worth ₹ 10 lakhs at the end of third year.

Forecast Revenues are:

Year	1	2	3
Amount (₹ in lakhs)	22.5	25	27.5

Annual operating costs excluding depreciation/lease rent of computer are estimated at ₹ 9 lakhs with an additional ₹ 1 lakh for start up and training costs at the beginning of the first year. These costs are to be borne by the lessee. Your company will borrow at 16% interest to finance the acquisition of the computer. Repayments are to be made according to the following schedule:

Year end	1	2	3
Principal (₹'000)	500	850	850
Interest (₹'000)	352	272	136

The company uses straight line method (SLM) to depreciate its assets and pays 50% tax on its income. The management approaches you to advice which alternative would be recommended and why?

Note: The PV factor at 8% and 16% rates of discount are:

Year	1	2	3
8%	0.926	0.857	0.794
16%	0.862	0.743	0.641

(b) Describe the applications of the Behavioral Finance Theory?

[12+8]

Answer:

(a) Working Notes:

- Depreciation: ₹ 22,00,000 – 10,00,000/3 = ₹ 4,00,000 p.a.
- Effective rate of interest after tax shield:  $0.16 \times (1 - 0.50) = 0.08$  or 8%.
- Operating and training costs are common in both alternatives hence not considered while calculating NPV of cash flows.

**Calculation of NPV**

**(i) Alternative I: Purchase of Computer**

Particulars	Year 1	Year 2	Year 3
	₹	₹	₹
Instalment Payment			
Principal	5,00,000	8,50,000	8,50,000
Interest	3,52,000	2,72,000	1,36,000
Total (A)	8,52,000	11,22,000	9,86,000

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Tax shield @ 50%;			
Interest payment	1,76,000	1,36,000	68,000
Depreciation $\left[ \frac{22-10}{3} \times 50\% \right]$	2,00,000	2,00,000	2,00,000
Total (B)	3,76,000	3,36,000	2,68,000
Net Cash outflows (A – B)	4,76,000	7,86,000	7,18,000
PV factor at 8%	0.926	0.857	0.794
PV of Cash outflows	4,40,776	6,73,602	5,70,092
Total PV of Cash outflows:			16,84,470
Less: PV of salvage value (₹ 10 lakhs × 0.794)			7,94,000
Net PV of cash outflows			8,90,470

### (ii) Alternative II: Lease of the Computer

Particulars	Year 1	Year 2	Year 3
	₹	₹	₹
Lease rent	5,00,000	5,00,000	5,00,000
10% of gross revenue	2,25,000	2,50,000	2,75,000
Lump sum payment	-	-	6,00,000
Total Payment	7,25,000	7,50,000	13,75,000
Less: Tax shield @ 50%	3,62,500	3,75,000	6,87,500
Net Cash outflows	3,62,500	3,75,000	6,87,500
P.V. Factor @ 8%	0.926	0.857	0.794
PV of Cash outflows @ 8%	3,35,675	3,21,375	5,45,875
<b>Total PV of cash outflows</b>			<b>12,02,925</b>

**Recommendation:** Since the Present Value (PV) of net cash outflow of Alternative I is lower, the company should purchase the computer.

### (b) Applications of the Behavioral Finance Theory

There are several ways that financial advisors and individuals can use the lessons of behavioral finance to their advantage:

- (i) **Learning to recognize mistakes.** As mentioned above, there are a number of mistakes that investors and consumers make time and time again. Understanding

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- behavioral finance allows them to notice their mistakes and rectify them. For example, I noticed when I was buying a car recently, that I wasn't too motivated to negotiate the price down, even though I could have easily gotten a hundred dollars off of the sale price. Afterward, I was kicking myself thinking how hard I would have to work to get that \$100 and how easy it would have been to get that money off the ticket price. I clearly placed more value on the money I would have earned than saved. Other investors might realize that they constantly make decisions based on limited knowledge. After they are made aware of this common heuristic, they may notice it in themselves and take steps to fix it.
- (ii) **Understanding and adapting to other people's decision making processes.** In addition to recognizing people's mistakes, it is sometimes important just to understand people and the way they think. It is ideal for money managers to understand their client's behavior so that they can give them better advice. In confrontational situations (such as legal settlements), many professionals will play to the other party's weaknesses using behavioral finance in order to ensure that they get the better end of the settlement. This is commonly referred to as game theory.
  - (iii) **Evaluating market trends.** Behavioral finance is the concept behind understanding markets trends, because these trends are the basis for how people make financial decisions. One application is through the use of technical analysis, which involves using charts and graphs to predict future price movements. The principle behind technical analysis is that humans rely on both conscious and subconscious patterns when investing. Those patterns can be followed and used to predict other future behavior.
  - (iv) **Facilitating the planning process.** Forecasters are able to predict significant variables such as the number of units of a particular product they are likely to sell under a given set of circumstances. This is key to understanding financial models. Many forecasters find their numbers are off because they erroneously assumed that consumers or investors would behave in a rational manner. Predicting how consumers and investors will behave rather than how they *should* behave will lead to more accurate forecasts and models.
  - (v) **Impacts of events on the market.** Typically, following long standing trends (such as price patterns over the course of a month or more) is a popular idea among trenders and technical analysts, but financial planners can track security prices based on onetime events as well. Human beings are expected to reach a certain way after an event and this information can be used to their advantage.
  - (vi) **Promoting products to consumers.** In a lot of ways, behavioral finance overlaps with marketing. They both rely on the psychology of individuals and groups, and how it can be influenced through strategically influencing others. While it could be considered unethical, companies regularly study the decision-making errors of consumers to find out how they can be exploited to convince consumers to purchase their products.

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Keep in mind that some of these concepts contradict the efficient market hypothesis, which should not necessarily be completely discounted. There is evidence to suggest that concepts such as technical analysis are valid trading tools. They are based off of the logical concept that human beings tend to follow behavioral patterns not always obvious to the majority of investors. Therefore, it may still be possible to profit from them.