

Markets and Transaction

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Chapter-2 Markets and Transactions

Financial Markets:

Financial market is a place where financial assets are exchanged. It can be defined as a mechanism bringing together buyers and sellers of financial assets in order to facilitate trading. Financial market is of two types:

1. On the basis of maturity of claim:

a. Money Market

Money market are the markets for short-term debt securities. Examples of money market securities are Treasury Bills, Banker's Acceptance, Commercial papers and negotiable certificate of deposit issued by government and financial institutions.

b. Capital Market

The capital market is the market for long-term debt and equity capital. The capital market includes the stock market, the bond market and the primary market. Company's and government can raise funds for long-term investment by the capital market.

* Difference between money market and Capital market.

Basis	Money Market	Capital Market
Meaning	Market where short term securities are traded.	Market where long term securities are traded.
Nature	It is informal market.	It is a formal market.
Maturity	Securities having life one year or less than one year are traded.	Securities having life more than one year are traded.
Instruments	Treasury bills, Commercial paper, certificate of deposit, etc.	Common stock, corporate bond, preferred stock, governmental bond, etc.
Risk	Less Risky	More Risky
Return	Provide low return	Provide High return
liquidity	High liquidity	low liquidity

2. On the basis of seasoned / security traded:

a. Primary Market

It is the market for new securities. The security market transfer the funds from savers to investors through the primary market. Hence, the transaction of securities issued for the first time takes place in this market.

It can be sub-divided into seasoned and unseasoned issue. Seasoned issue involves the issue of more of an existing security which is already traded in the market whereas unseasoned issue have no track record. They are issue of completely new securities and are often referred to as initial Public offering (IPOs).

b. Secondary Market

It is the market for the existing securities. Second hand securities are bought and sold in this market. It's main function is to provide liquidity to the purchasers of securities. Nepal Stock Exchange (NEPSE) is an example of secondary market in Nepal.

* Difference between Primary market and secondary market.

Basis	Primary Market	Secondary Market
Meaning	Market where first hand securities are traded.	Market where second hand securities are traded.
Purpose	Provides funds to the issuing company.	Provide the liquidity of the security.
Transaction between	Company and Investor	Between Investors
Risky	less risky	More risky
Intermediary	Underwriters	Brokers
Price	Fixed price	Fluctuates, depends upon the demand and supply.
Number of transactions	less transactions	More transactions

* Difference between Organized market and Over-the counter (OTC) Market

Basis	Organized market	OTC Market
Type of securities	Formal market	Informal market
Determination of price	By demand and supply.	By negotiation
Commission	fixed	Negotiated
Securities traded	listed securities are traded	Unlisted securities are traded.
Location and timing	Location and timing for trading is fixed.	Physical location and time is not fixed. Anywhere can be traded.
Registration	Registered in government agency	Registered in the authorized dealer like NASDAQ in America.
Specialist	There is specialist for scrutiny of securities.	There is no any specialist.

Other Markets:

Broker Markets: The organized markets where buy and sell orders of investors are executed. through the licensed broker is broker market.

Dealer Markets: A security market mechanism where in multiple dealers post prices at which they are agreed to buy or sell a specific security is dealer market. eg: OTC Market

Bull Markets: A market condition that shows securities prices are rising and investors are building up confidence in the market is bull market.

Bear Markets: A bear market is the opposite to a bull market. A market condition that shows securities prices are falling and investors are pessimistic about the market is bear market.

* Transactions | Buying and Selling securities:

While buying and selling securities (shares) investors may follow one of the following position:

1. Long position
2. Margin purchase > Buy
3. Short position > Sell
4. Short Sell

* Long position and Margin Purchase:

Purchasing a security today with the expectation that its price will increase in the future is called long position and margin purchase. In long position, investor invest total required amount from his own pocket but in margin purchase he/she uses certain percentage of total required amount as loan from the brokerage firm.

Long Position:

Rate of Return | Holding Period Return (HPR)

$$= \frac{(\text{Ending Price} - \text{Beginning Price}) + \text{Dividend}}{\text{Beginning price}} \times 100$$

$$= \frac{(\text{Selling price} - \text{Purchase price}) + \text{Dividend}}{\text{Purchase price}} \times 100$$

$$= \frac{(P_1 - P_0) + D_1}{P_0} \times 100$$

$$= \frac{P_1 - P_0}{P_0} \times 100 + \frac{D_1}{P_0} \times 100$$

= Capital Gain Yield + Dividend Yield

= CGY + DY

* Margin purchase:

Example:

ABC. Co
1000 shares

$P_0 = 50$

↓
Own pocket money = Rs. 30

↓
Loan from Brokerage Firm = Rs. 20

Initial Margin (IM) = 60%

loan = 40 %

or

Margin Requirement

Collateral → Purchased shares

or

Interest (i)

Down Payment

1. If $P_0 = 50$

$$\text{Initial margin (IM)} = \frac{50 - 20}{50} = 60\%$$

2. If stock price rises to Rs. 60

$$\text{Actual Margin (AM)} = \frac{60 - 20}{60} = 66.67\%$$

3. If stock price decreases to Rs. 30

$$\text{Actual margin (AM)} = \frac{30 - 20}{30} = 33.33\%$$

$$\therefore \text{Actual Margin (AM)} = \frac{P_0 - \text{LPS}}{P_0}$$

where, P_0 = market price
LPS = loan per share

OR,

$$\text{Actual Margin (AM)} = \frac{\text{Assets} - \text{Debt}}{\text{Assets}}$$

where,

$$\text{Assets} = N \times P_0$$

$$\text{Debt/Loan} = N \times P_0 (1 - \text{IM})$$

N = Number of shares

* Maintenance Margin (MM)

It is the minimum actual margin quoted by the brokerage firm. If actual margin decreases due to decrease in stock price and touches or falls below the maintenance margin level, the brokerage firm calls the investor which is called margin call.

$$\therefore \text{Margin Call Price / Trigger Price (TP)} = \frac{1 - \text{IM}}{1 - \text{MM}} \times P_0$$

Where,

IM = Initial Margin

MM = Maintenance Margin

P_0 = Beginning Price / Purchase Price

$$\text{Margin Call Value / Minimum Collateral} = \frac{\text{Debt / Loan}}{1 - \text{Maintenance Margin}}$$

Decision:

1. If AM (calculated) $>$ MM (Given) $\rightarrow$ No Margin Call
2. If AM (calculated) $\leq$ MM (Given) $\rightarrow$ Margin Call

OR,

1. If Actual Stock price (P_0) $>$ Trigger price (TP) $\rightarrow$ No margin call
2. If Actual Stock price (P_0) $\leq$ Trigger price (TP) $\rightarrow$ Margin call

* Margin Purchase:

Holding Period Return / Rate of Return (HPR)

$$= \frac{(\text{Ending Price} - \text{Beginning price}) + \text{Dividend} - \text{Interest}}{\text{Beginning price} \times \text{Initial margin}} \times 100$$

$$= \frac{(P_1 - P_0) + D - I}{P_0 \times IM} \times 100$$

$$= \frac{P_1 - P_0 + D - I}{BEPS} \times 100$$

Where,

P_1 = Selling price per share

P_0 = Purchase price per share

D = Dividend

I = Interest

$BEPS$ = Beginning Equity per share

Note:

Return on margin purchase will always be higher than under long position because margin purchase allows the investors to take the advantage of leverage.

Problem 2.1:

Solⁿ

Given: Long Position;

Number of shares (N) = 1000 share

Beginning price (P_0) = Rs. 500

Dividend (D) = 0

(a) Ending price (P_1) = Rs. 600

$$\text{Rate of Return (HPR)} = \frac{P_1 - P_0 + D}{P_0} \times 100$$

$$= \frac{600 - 500 + 0}{500} \times 100$$

$$= 20\%$$

(b) Ending price (P_1) = Rs. 500

$$\text{Rate of Return (HPR)} = \frac{P_1 - P_0 + D}{P_0} \times 100$$

$$= \frac{500 - 500 + 0}{500} \times 100$$

$$= 0$$

(c) Ending price (P_1) = Rs. 400

$$\text{Rate of Return (HPR)} = \frac{P_1 - P_0 + D}{P_0} \times 100$$

$$= \frac{400 - 500 + 0}{500} \times 100$$

$$= -20\%$$

Problem 2.2

Solⁿ

Given: Long Position:

Beginning price (P_0) = Rs. 200

Dividend (D) = Rs. 20

Ending Price (P_1) = Rs. 230

Rate of Return (HPR) = ?

We know that,

$$\text{Rate of Return (HPR)} = \frac{P_1 - P_0 + D}{P_0} \times 100$$

$$= \frac{230 - 200 + 20}{200} \times 100$$

$$= 25\%$$

Problem 2.3

Solⁿ

Given:

Number of shares (N) = 100 shares

Beginning price (P_0) = Rs. 40

Initial margin (IM) = 70%

Debt/Loan = $N \times P_0 (1 - IM)$

$$= 100 \times 40 (1 - 0.70) = \text{Rs. } 1200$$

If stock price moves up to Rs. 65

$$\begin{aligned}\text{Actual Margin (AM)} &= \frac{\text{Assets} - \text{loan}}{\text{Assets}} \\ &= \frac{100 \times 65 - 1200}{100 \times 65} \\ &= 81.54\%\end{aligned}$$

If the stock price decreases to Rs. 30

$$\begin{aligned}\text{Actual Margin (AM)} &= \frac{\text{Assets} - \text{loan}}{\text{Assets}} \\ &= \frac{100 \times 30 - 1200}{100 \times 30} \\ &= 60\%\end{aligned}$$

If stock price decreases, margin also decreases.

Problem 2.4

Soln

Given:

Beginning Price (P_0) = Rs. 600

Margin Requirement (IM) = 50%

Interest Rate (i) = 9%

Maintenance Margin (MM) = 30%

a. Long position without using margin.

Ending price (P_1) = Rs. 700

$$\begin{aligned}\text{Rate of Return (HPR)} &= \frac{P_1 - P_0 + D}{P_0} \times 100 \\ &= \frac{700 - 600 + 0}{600} \times 100 \\ &= 16.67\%\end{aligned}$$

b. Long position using margin:

$$\begin{aligned}\text{(i) Trigger Price (TP)} &= \frac{1 - IM}{1 - MM} \times P_0 \\ &= \frac{1 - 0.50}{1 - 0.30} \times 600 \\ &= \text{Rs. } 428.57\end{aligned}$$

If the stock price falls below Rs. 428.57, investor will receive a margin call.

(ii) Ending price (P_1) = Rs. 700

$$\begin{aligned}\text{Rate of Return (HPR)} &= \frac{P_1 - P_0 + D - I}{P_0 \times IM} \times 100 \\ &= \frac{700 - 600 + 0 - 27}{600 \times 0.50} \times 100 \\ &= 24.33\%\end{aligned}$$

Where,

$$\begin{aligned} I &= N \times P_0 (1 - IM) \times i \\ &= 1 \times 600 (1 - 0.50) \times 0.09 \\ &= 27 \end{aligned}$$

- c. Return on margin purchase is always higher than long position because margin purchase allows the investors to take the advantage of leverage.

Problem 2.5

Solⁿ

Given:

Number of shares (N) = 300 shares

Beginning price (P₀) = 400

Loan / Debt = Rs. 40,000

Interest rate (i) = 8%

$$\begin{aligned} \text{a. Initial Margin (IM)} &= \frac{\text{Assets} - \text{loan}}{\text{Assets}} \\ &= \frac{300 \times 400 - 40,000}{300 \times 400} \\ &= 66.67\% \end{aligned}$$

Hence, the margin in her account when she first purchased the stock is 66.67%.

- b. If stock price falls to Rs. 300 per share by the end of the year.

$$\begin{aligned}\text{Actual Margin (AM)} &= \frac{\text{Assets} - \text{loan}}{\text{Assets}} \\ &= \frac{300 \times 300 - 40,000}{300 \times 300} \\ &= 55.56\%\end{aligned}$$

Since, the actual margin (55.56%) is higher than the maintenance margin (30%), she will not receive a margin call.

- c. Beginning Value (BV) = $300 \times 400 = \text{Rs. } 120,000$
Ending Value (EV) = $300 \times 300 = \text{Rs. } 90,000$
Interest (I) = $8\% \text{ of } 40,000 = \text{Rs. } 3,200$

$$\begin{aligned}\text{Rate of Return (HPR)} &= \frac{(EV - BV) + \text{Div.} - \text{Interest}}{BV \times IM} \times 100 \\ &= \frac{(90,000 - 120,000) + 0 - 3,200}{120,000 \times 0.6667} \times 100 \\ &= -41.50\%\end{aligned}$$

Problem 2.6

Solⁿ

Given:

Number of shares (N) = 200 shares

Beginning Price (P₀) = Rs. 100

Initial Margin (IM) = 50%

Maintenance Margin (MM) = 30%

$$\begin{aligned}\text{Trigger Price (TP)} &= \frac{1 - \text{IM}}{1 - \text{MM}} \times P_0 \\ &= \frac{1 - 0.50}{1 - 0.30} \times 100 \\ &= \text{Rs. } 71.43\end{aligned}$$

Since, the stock price falls to Rs. 60 which is lower than trigger price, Mr. Sharma should put an additional investment of Rs. 2286 $[(71.43 - 60) \times 200]$ to maintain the margin in account.

Problem 2.7

Solⁿ

Given:

Beginning Price (P₀) = Rs. 500

Own pocket money (Equity) = Rs. 50,000

Loan / Debt = Rs. 50,000

Total Assets = Equity + Debt = 50,000 + 50,000 = 1,00,000

Interest Rate (i) = 8%

$$\text{Initial Margin (IM)} = \frac{\text{Assets} - \text{loan}}{\text{Assets}} = \frac{100,000 - 50,000}{100,000} = 50\%$$

a. If the stock price rises by 10%

$$\text{Beginning Value (BV)} = \text{Rs. } 100,000$$

$$\text{Ending value (EV)} = 100,000 + 10\% \text{ of } 100,000 \\ = \text{Rs. } 110,000$$

$$\text{Interest (I)} = 8\% \text{ of } 50,000 = 4000$$

$$\begin{aligned} \text{Rate of Return (HPR)} &= \frac{\text{EV} - \text{BV} + \text{Div.} - \text{Interest}}{\text{BV} \times \text{IM}} \times 100 \\ &= \frac{110,000 - 100,000 + 0 - 4000}{100,000 \times 0.50} \times 100 \\ &= 12\% \end{aligned}$$

b. Maintenance Margin (MM) = 30%

$$\begin{aligned} \text{Trigger Price (TP)} &= \frac{1 - \text{IM}}{1 - \text{MM}} \times P_0 \\ &= \frac{1 - 0.50}{1 - 0.30} \times 500 \\ &= \text{Rs. } 357.14 \end{aligned}$$

If the stock price falls below Rs. 357.14, the investor will receive a margin call.

Problem 2.8

Solⁿ

Given:

Number of shares (N) = 5,000 shares

Beginning price (P_0) = Rs. 300

Initial Margin (IM) = 55%

Interest rate (i) = 15%

Dividend per share (D) = Rs. 10

a. Ending Price (P_1) = Rs. 400

$$\begin{aligned}\text{Rate of Return (HPR)} &= \frac{P_1 - P_0 + D - I}{P_0 \times \text{IM}} \times 100 \\ &= \frac{400 - 300 + 10 - 20.25}{300 \times 0.55} \times 100 \\ &= 54.39\%\end{aligned}$$

where,

$$\begin{aligned}I &= N \times P_0 (1 - \text{IM}) \times i \\ &= 1 \times 300 (1 - 0.55) \times 0.15 \\ &= 20.25\end{aligned}$$

b. Ending Price (P_1) = Rs. 200

$$\begin{aligned}\text{Rate of Return (HPR)} &= \frac{P_1 - P_0 + D - I_1}{P_0 \times \text{IM}} \times 100 \\ &= \frac{200 - 300 + 10 - 20.25}{300 \times 0.55} \times 100 \\ &= -66.81\%\end{aligned}$$

c. Long position:

Ending price (P_1) = Rs. 400

$$\begin{aligned}\text{Rate of Return (HPR)} &= \frac{P_1 - P_0 + D_1}{P_0} \times 100 \\ &= \frac{400 - 300 + 10}{300} \times 100 \\ &= 36.67\%\end{aligned}$$

Ending price (P_1) = Rs. 200

$$\begin{aligned}\text{Rate of Return (HPR)} &= \frac{P_1 - P_0 + D_1}{P_0} \times 100 \\ &= \frac{200 - 300 + 10}{300} \times 100 \\ &= -30\%\end{aligned}$$

d.

$P_0 = 300$

	Margin purchase	long position
$P_1 = 400$	54.39%	36.67%
$P_1 = 200$	-66.81%	-30%

If the stock price increases, margin purchase results higher profit than long position, but if the stock price decreases margin purchase results into higher loss than long position. The margin purchase is more risky than long position or cash purchase.

Problem 2.9

Solⁿ

Given:

Number of shares (N) = 500 shares

Beginning price (P₀) = Rs. 100

Initial margin (IM) = 70%

$$\begin{aligned} \text{a. Debit Balance (Debt)} &= N \times P_0 (1 - IM) \\ &= 500 \times 100 (1 - 0.70) \\ &= \text{Rs. } 15,000 \end{aligned}$$

$$\begin{aligned} \text{b. Equity Capital} &= \text{Assets} - \text{Debt} \\ &= (500 \times 100) - 15,000 \\ &= 50,000 - 15,000 \\ &= \text{Rs. } 35,000 \end{aligned}$$

OR,

$$\begin{aligned} \text{Equity} &= N \times P_0 \times IM \\ &= 500 \times 100 \times 0.70 \\ &= \text{Rs. } 35,000 \end{aligned}$$

$$\begin{aligned} \text{c. Actual Margin (AM)} &= \frac{\text{Assets} - \text{Debt}}{\text{Assets}} \\ &= \frac{(500 \times 160) - 15,000}{500 \times 160} \\ &= 81.25\% \end{aligned}$$

Problem 2.10

Solⁿ

Given:

Number of shares (N) = 100 shares

Beginning price (P_0) = Rs. 100

Ending price (P_1) = Rs. 175

i. Initial Margin (IM) = 25 %

$$\begin{aligned}\text{Rate of Return} &= \frac{P_1 - P_0}{P_0 \times \text{IM}} \times 100 \\ &= \frac{175 - 100}{100 \times 0.25} \times 100 \\ &= 300 \%\end{aligned}$$

ii. Initial margin (IM) = 50 %

$$\begin{aligned}\text{Rate of Return} &= \frac{P_1 - P_0}{P_0 \times \text{IM}} \times 100 \\ &= \frac{175 - 100}{100 \times 0.50} \times 100 \\ &= 150 \%\end{aligned}$$

iii. Initial Margin (IM) = 75 %

$$\text{Rate of Return} = \frac{P_1 - P_0}{P_0 \times \text{IM}} \times 100$$

$$= \frac{175 - 100}{100 \times 0.75} \times 100$$

$$= 100\%$$

b. Ending Price (P_1) = Rs. 75

i. Initial margin (IM) = 25%

$$\text{Rate of Return} = \frac{P_1 - P_0}{P_0 \times \text{IM}} \times 100$$

$$= \frac{75 - 100}{100 \times 0.25} \times 100$$

$$= -100\%$$

ii. Initial margin (IM) = 50%

$$\text{Rate of Return} = \frac{P_1 - P_0}{P_0 \times \text{IM}} \times 100$$

$$= \frac{75 - 100}{100 \times 0.50} \times 100$$

$$= -50\%$$

iii. Initial margin (IM) = 75%

$$\text{Rate of Return} = \frac{P_1 - P_0}{P_0 \times \text{IM}} \times 100$$

$$= \frac{75 - 100}{100 \times 0.75} \times 100$$

$$= -33.33\%$$

c.	IM = 25%	IM = 50%	IM = 75%
$P_1 = 175$	300%	150%	100%
$P_1 = 75$	-100%	-50%	-33.33%

If the stock price is increasing, lower initial margin results higher profit and if the stock price is decreasing lower initial margin results higher loss.

d. If Investor has to pay commission on margin transaction, the rate of return will decrease. In the same way, dividend income will increase the rate of return and interest expenses will decrease the rate of return.

Problem 2.11

Solⁿ

Given:

Beginning Price (P_0) = Rs. 100

Number of shares (N) = 500 shares

Beginning value (Assets) = $500 \times 100 = \text{Rs. } 50,000$

Own pocket money (Initial Equity) = Rs. 37,500

Loan/Debt = Assets - Equity = $50,000 - 37,500 = \text{Rs. } 12,500$

Initial Margin (IM) = $\frac{37,500}{50,000} = 75\%$

Interest rate (i) = 8%

Calculation of percentage increase in Net worth (Equity)

No. of shares (N)	share Price	Value of Assets	Debt	Equity = Assets - Debt	Initial Equity	change	% change
500	Rs. 110	55,000	12,500	42,500	37,500	+5,000	$\frac{5000}{37,500} = 13.3\%$
500	Rs. 100	50,000	12,500	37,500	37,500	0	0
500	Rs. 90	45,000	12,500	32,500	37,500	-5,000	-13.33%

The rate of return on margin is higher when the stock price is higher at end and the decrease in stock price decreases the percentage return.

b. Maintenance margin (MM) = 25%

$$\begin{aligned}\text{Trigger price (TP)} &= \frac{1 - \text{IM}}{1 - \text{MM}} \times P_0 \\ &= \frac{1 - 0.75}{1 - 0.25} \times 100 \\ &= \text{Rs. } 33.33\%\end{aligned}$$

The Stock price can fall to Rs. 33.33 to get a margin call.

c. Initial Equity = Rs. 25,000

$$\begin{aligned}\text{Initial Margin (IM)} &= \frac{25,000}{50,000} \\ &= 50\%\end{aligned}$$

$$\begin{aligned}\text{Trigger price (TP)} &= \frac{1-1M}{1-MM} \times P_0 \\ &= \frac{1-0.50}{1-0.25} \times 100 \\ &= \text{Rs. } 66.67\end{aligned}$$

The stock price can fall to Rs. 66.67 to get a margin call.

$$\begin{aligned}\text{d. Interest} &= NX P_0 (1-1M) \times i \\ &= 1 \times 100 (1-0.75) \times 0.08 = 2\end{aligned}$$

$$\text{Rate of Return} = \frac{P_1 - P_0 - I}{P_0 \times 1M} \times 100$$

$$\text{i. If } P_1 = 110$$

$$\text{Rate of Return} = \frac{110 - 100 - 2}{100 \times 0.75} \times 100 = 10.67\%$$

$$\text{ii. If } P_1 = 100$$

$$\text{Rate of Return} = \frac{100 - 100 - 2}{100 \times 0.75} \times 100 = -2.67\%$$

$$\text{iii. If } P_1 = 90$$

$$\text{Rate of Return} = \frac{90 - 100 - 2}{100 \times 0.75} \times 100 = -16\%$$

Problem 2.12

Solⁿ

Given:

Number of shares (N) = 200 shares

Beginning price (P_0) = Rs. 550

Initial Margin (IM) = 60%

Maintenance Margin (MM) = 30%

If the stock price decrease to Rs. 250 (P_1)

$$\text{Actual Collateral (Assets)} = N \times P_1 = 200 \times 250 = \text{Rs. } 50,000$$

$$\text{Minimum Collateral} = \frac{\text{Debt}}{1 - \text{MM}} = \frac{44000}{1 - 0.30} = \text{Rs. } 62,857.14$$

where,

$$\begin{aligned} \text{Debt} &= N \times P_0 (1 - \text{IM}) \\ &= 200 \times 550 (1 - 0.60) \\ &= \text{Rs. } 44,000 \end{aligned}$$

Since, the actual collateral is less than minimum collateral, the investor will receive a margin call.

Problem 2.13

Soln

Given:

Number of shares (N) = 200 shares

Beginning price (P_0) = Rs. 160

Margin (Initial) (IM) = 60%

Annual Dividend Per share (D) = Rs. 2

Annual interest rate (i) = 8%

$$\begin{aligned}\text{Rate of Return (6-months)} &= \frac{P_1 - P_0 + D - I}{P_0 \times IM} \times 100 \\ &= \frac{208 - 160 + 1 - 2.56}{160 \times 0.60} \times 100 \\ &= 48.375\%\end{aligned}$$

Where,

$$\text{Six-month dividend} = 2 \times \frac{6}{12} = \text{Rs. } 1$$

$$\begin{aligned}\text{Six-month interest (I)} &= N \times P_0 (1 - IM) \times i \times \frac{6}{12} \\ &= 1 \times 160 (1 - 0.60) \times 0.08 \times \frac{6}{12} \\ &= \text{Rs. } 2.56\end{aligned}$$

$$\begin{aligned}\text{Annualized Rate of Return} &= \text{6-month Return} \times 2 \\ &= 48.375 \times 2 \\ &= 96.75\%\end{aligned}$$

Problem 2.14

Solⁿ

Given:

Number of shares (N) = 300 shares

Beginning price (P₀) = Rs. 550

Initial Margin (IM) = 50%

Four months dividend = Rs. 15

Annual interest rate (i) = 9%

Maintenance Margin (MM) = 25%

a. Initial Value (Assets) = $N \times P_0 = 300 \times 550 = \text{Rs. } 165,000$

$$\begin{aligned}\text{Debit Balance (Debt)} &= N \times P_0 (1 - IM) \\ &= 300 \times 550 (1 - 0.50) \\ &= \text{Rs. } 82,500\end{aligned}$$

$$\begin{aligned}\text{Equity} &= \text{Assets} - \text{Debt} \\ &= 165,000 - 82,500 \\ &= \text{Rs. } 82,500\end{aligned}$$

OR,

$$\begin{aligned}\text{Equity} &= N \times P_0 \times IM \\ &= 300 \times 550 \times 0.50 \\ &= \text{Rs. } 82,500\end{aligned}$$

b. Calculation of Actual Margin:

No. of Shares (N)	Share Price (P _i)	(N × P _i) Assets	Debt	AM = $\frac{\text{Assets} - \text{Debt}}{\text{Assets}}$	Remarks
300	450	135,000	82,500	38.89%	Restricted
300	700	210,000	82,500	60.71%	Excess Equity
300	350	105,000	82,500	21.43%	margin call

c.

$$\text{Total Dividend Received (4-months)} = 300 \times 15 = \text{Rs. } 4500$$

$$\text{Total Interest Paid (4-months)} = 82,500 \times 0.09 \times \frac{4}{12} = \text{Rs. } 2475$$

d.

i. Ending Price (P_i) = Rs. 500

$$\text{Ending value} = N \times P_i = 300 \times 500 = \text{Rs. } 150,000$$

$$\begin{aligned} \text{Rate of Return (4-months)} &= \frac{\text{Ending Value} - \text{Beginning value} + \text{Div.} - \text{Interest}}{\text{Beginning value} \times \text{IM}} \times 100 \\ &= \frac{150,000 - 165,000 + 4500 - 2475}{165,000 \times 0.50} \times 100 \\ &= -15.73\% \end{aligned}$$

$$\text{Annualized Rate of Return} = -15.73\% \times 3 = -47.19\%$$

ii. Ending price (P_1) = Rs. 600

Ending value (EV) = $300 \times 600 = \text{Rs. } 180,000$

$$\begin{aligned}\text{Rate of Return (4-months)} &= \frac{\text{EV} - \text{BV} + \text{Div.} - \text{Int.}}{\text{BV} \times \text{TM}} \times 100 \\ &= \frac{180,000 - 165,000 + 4,500 - 2,475}{165,000 \times 0.50} \times 100 \\ &= 20.64\%\end{aligned}$$

$$\text{Annualized Rate of Return} = 20.64\% \times 3 = 61.92\%$$

iii. Ending price (P_1) = Rs. 700

Ending value (EV) = $300 \times 700 = \text{Rs. } 210,000$

$$\begin{aligned}\text{Rate of Return} &= \frac{(\text{Ending value} - \text{Beginning value}) + \text{Div.} - \text{Interest}}{\text{Beginning value} \times \text{TM}} \times 100 \\ &= \frac{210,000 - 165,000 + 4,500 - 2,475}{165,000 \times 0.50} \times 100 \\ &= 57\%\end{aligned}$$

$$\text{Annualized Rate of Return} = 57\% \times 3 = 171\%$$

Problem 2.24

Solⁿ

Given:

Beginning price (P_0) = Rs. 100

Initial Margin (IM) = 50%

(MM) = 30%

(i) = 10%

(N) = 1000 shares

(P_1) = Rs. 120

a. Long position without using margin:

$$\begin{aligned}\text{Rate of Return} &= \frac{P_1 - P_0 + D}{P_0} \times 100 \\ &= \frac{120 - 100 + 0}{100} \times 100 \\ &= 20\%\end{aligned}$$

b. Long position Using margin:

$$\begin{aligned}\text{Rate of Return} &= \frac{P_1 - P_0 + D - I}{P_0 \times IM} \times 100 \\ &= \frac{120 - 100 + 0 - 5}{100 \times 0.50} \times 100 \\ &= 30\%\end{aligned}$$

where,

$$I = N \times P_0 (1 - IM) \times i = 1 \times 100 (1 - 0.50) \times 0.10 = \text{Rs. } 5$$

C. Balance sheet (At Beginning)

Assets (1000 X 100)	100,000	Debt	50,000
		Equity (Bal. Fig.)	50,000
	<u>100,000</u>		<u>100,000</u>

Where,

$$\begin{aligned}
 \text{Debt} &= NX P_0 (1 - IM) \\
 &= 1000 \times 100 (1 - 0.50) \\
 &= \text{Rs. } 50,000
 \end{aligned}$$

(i) If stock price increases to Rs. 110

Balance sheet

Assets (1000 X 110)	Rs. 110,000	Debt	50,000
		Equity (Bal. Fig.)	60,000
	<u>110,000</u>		<u>110,000</u>

(ii) If stock price decreases to Rs. 90

Balance sheet

Assets (1000 X 90)	90,000	Debt	50,000
		Equity (Bal. Fig.)	40,000
	<u>90,000</u>		<u>90,000</u>

e. If the stock price decreases to Rs. 80.

$$\begin{aligned}\text{i. Actual Margin (AM)} &= \frac{\text{Assets} - \text{Debt}}{\text{Assets}} \\ &= \frac{(1000 \times 80) - 50,000}{1000 \times 80} \\ &= 37.5\%\end{aligned}$$

Since, the actual margin (37.5%) is higher than the minimum maintenance margin (30%), the investor will not receive a margin call.

ii.

$$\begin{aligned}\text{Trigger Price (TP)} &= \frac{1 - IM}{1 - MM} \times P_0 \\ &= \frac{1 - 0.50}{1 - 0.30} \times 100 \\ &= \text{Rs. } 71.43\end{aligned}$$

Since, the stock price (Rs. 80) is higher than the trigger price Rs. 71.43, the investor will not receive a margin call.

*** Short position and short selling:**

Selling the security today with an expectation that its price will decrease in the future is short position or short sell. Short selling is made due to clamities (आर्थिक मंदी).

"First sell High and buy at lower price."

*** Short position:**

$$\text{Rate of Return (HPR)} = \frac{\text{Beginning value} - \text{Ending value} - \text{Dividend}}{\text{Beginning value}} \times 100$$

$$= \frac{(\text{Beginning price} - \text{Ending price}) - \text{Dividend}}{\text{Beginning price}} \times 100$$

$$= \frac{P_0 - P_1 - D}{P_0} \times 100$$

Where,

P_0 = Beginning (short sell) price

P_1 = Ending (purchase) price

D = Dividend paid to brokerage firm.

* Short Selling:

Short selling is the sale of security that is not owned by the seller or that the seller has borrowed. Short selling is motivated by the belief that a security's price will decline enabling it be bought back at a lower price to make profit.

$$\text{Rate of Return (HPR)} = \frac{(\text{Beginning value} - \text{Ending value}) - D_1 + I_1}{\text{Beginning value} \times IM} \times 100$$

$$= \frac{(\text{Beginning price} - \text{Ending price}) - D_1 + I_1}{\text{Beginning price} \times IM} \times 100$$

$$= \frac{P_0 - P_1 - D_1 + I_1}{P_0 \times IM} \times 100$$

$$\text{Actual Margin (AM)} = \frac{\text{Assets} - \text{Debt}}{\text{Debt}}$$

Where,

$$\text{Debt} = NX P_1$$

$$\text{Assets} = NX P_0 (1 + IM)$$

Note:

- i. If $AM (\text{calculated}) > MM (\text{Given}) \rightarrow \text{No margin call}$
- ii. If $AM (\text{calculated}) \leq MM (\text{Given}) \rightarrow \text{Margin call}$

$$\text{Trigger Price (TP)} = \frac{1+IM}{1+MM} \times P_0$$

Decision:

1. If $P_0 < TP \rightarrow$ No margin call
2. If $P_0 \geq TP \rightarrow$ Margin call.

$$\text{Margin call Value} \mid \text{Minimum Collateral} = \frac{\text{Assets}}{1+MM}$$

* Difference in formula of long position and short position:

Long position

short position

$$HPR_{lp} = \frac{P_1 - P_0 + D}{P_0} \times 100$$

$$HPR_{sp} = \frac{P_0 - P_1 - D}{P_0} \times 100$$

$$HPR_{mp} = \frac{P_1 - P_0 + D - I}{P_0 \times IM} \times 100$$

$$HPR_{ss} = \frac{P_0 - P_1 - D + I}{P_0 \times IM} \times 100$$

$$AM = \frac{\text{Assets} - \text{Debt}}{\text{Assets}}$$

$$AM = \frac{\text{Assets} - \text{Debt}}{\text{Debt}}$$

$$TP = \frac{1-IM}{1-MM} \times P_0$$

$$TP = \frac{1+IM}{1+MM} \times P_0$$

$$\text{Margin call value} = \frac{\text{Debt}}{1-MM}$$

(Minimum collateral)

$$\text{Assets} = N \times P_0$$

$$\text{Debt} = N \times P_0 (1-IM)$$

$$\text{Margin call value} = \frac{\text{Assets}}{1+MM}$$

$$\text{Assets} = N \times P_0 (1+IM)$$

$$\text{Debt} = N \times P_1$$

Problem 2.15

Solⁿ

Calculation of Rate of Return

Beginning Price (P_0)	Ending price (P_1)	Rate of Return = $\frac{P_1 - P_0}{P_0} \times 100$
500	300	= 40%
500	400	20%
500	500	0
500	600	-20%
500	700	-40%

Problem 2.16

Solⁿ

Given:

Beginning price (P_0) = Rs. 600

Number of shares (N) = 100 shares

a. Repurchase price (P_1) = Rs. 700 (short sell)

$$\text{Loss} = N \times (P_0 - P_1) = 100 (600 - 700) = -\text{Rs. } 10,000 \text{ (Loss)}$$

b. Long position

Ending price (P_1) = Rs. 750

$$\text{Gain} = N \times (P_1 - P_0) = 100 (750 - 600) = \text{Rs. } 15,000$$

c. Short sell:

Repurchase price (P_1) = Rs. 450

$$\text{Gain} = NX(P_0 - P_1) = 100(600 - 450) = \text{Rs. } 15,000$$

d. Long position:

Ending price (P_1) = Rs. 600

$$\text{Gain} = N(P_1 - P_0) = 100(600 - 600) = 0$$

Problem 2.17

Solⁿ

Beginning Price (P_0) = Rs. 450

Number of shares (N) = 200 shares

Initial Margin (IM) = 60%

Balance sheet (Initial)

Assets (200 shares @ Rs. 450)	90,000	Debt (40%)	36,000
		Equity (60%)	54,000
	90,000		90,000

Balance sheet (if stock price increased to Rs. 600)

Assets (200 shares @ 600)	120,000	Debt	36,000
		Equity → (9F)	84,000
	120,000		120,000

$$\text{Equity} = \text{Assets} - \text{Debt} = 120,000 - 36,000 = 84,000$$

Balance sheet (Additional 300 shares, IM = 50%)

Assets (500 shares @ 600)	300,000	Debt	150,000
		Equity (50%)	150,000
	300,000		300,000

$$\begin{aligned}\therefore \text{Addition @ Equity} &= \text{Rs. } 150,000 - 84,000 \\ &= \text{Rs. } 66,000\end{aligned}$$

Problem 2.18

Soln

Given: Short Sell

Number of shares (N) = 500 shares

Beginning price (P_0) = Rs. 450

Initial Margin (IM) = 55%

Maintenance Margin (MM) = 35%

$$\begin{aligned}\text{Trigger Price (TP)} &= \frac{1+IM}{1+MM} \times P_0 \\ &= \frac{1+0.55}{1+0.35} \times 450 \\ &= \text{Rs. } 516.67\end{aligned}$$

Since the stock price (Rs. 500) is less than trigger price Rs. 516.67, the investor will not receive a margin call in short position.

Problem 2.19

Solⁿ

Given: Short sell:

Number of shares (N) = 1000 shares

Beginning price (P_0) = Rs. 400

Initial Margin (IM) = 50%

Ending price (P_1) = Rs. 500

Dividend (D_1) = Rs. 20

$$a. \text{ Actual Margin} = \frac{\text{Assets} - \text{Debt} - \text{Dividend}}{\text{Debt}}$$

$$= \frac{600,000 - 500,000 - 20,000}{500,000}$$

$$= 16\%$$

where:

$$\begin{aligned} \text{Assets} &= NX P_0 (1 + IM) = 1000 \times 400 (1 + 0.50) \\ &= \text{Rs. } 600,000 \end{aligned}$$

$$\text{Debt} = NX P_1 = 1000 \times 500 = \text{Rs. } 500,000$$

$$\text{Dividend} = NX D_1 = 1000 \times 20 = \text{Rs. } 20,000$$

b. Since, Actual margin (16%) is lower than maintenance margin (30%), Mr. Sapkota will receive a margin call.

$$\begin{aligned}
 \text{c. Rate of Return} &= \frac{P_0 - P_1 - D}{P_0 \times IM} \times 100 \\
 &= \frac{400 - 500 - 20}{400 \times 0.50} \times 100 \\
 &= -60\%
 \end{aligned}$$

Problem 2.20

Solⁿ

Given:

Number of shares (N) = 100 shares

Beginning price (P₀) = Rs. 500

a. Initial Margin (IM) = 50%.

$$\begin{aligned}
 \text{Initial Margin Deposit} &= N \times P_0 \times (1 + IM) \\
 \text{(Beginning Value)} &= 100 \times 500 \times (1 + 0.50) \\
 &= \text{Rs. } 75000
 \end{aligned}$$

OR,

$$\begin{aligned}
 \text{Initial Margin Deposit} &= N \times P_0 \times IM \\
 &= 100 \times 500 \times 0.50 \\
 &= \text{Rs. } 25000
 \end{aligned}$$

b. Maintenance Margin (MM) = 30%.

$$\text{Trigger price (TP)} = \frac{1 + IM}{1 + MM} \times P_0$$

$$= \frac{1 + 0.50}{1 + 0.30} \times 500$$

$$= \text{Rs. } 576.92$$

The stock price can increase to Rs. 576.92 before a margin call.

c. Ending price (P_1) = Rs. 400

$$\text{Equity} = \text{Assets} - \text{Debt}$$

$$= N \times P_0 (1 + IM) - N \times P_1$$

$$= 100 \times 500 (1 + 0.50) - 100 \times 400$$

$$= \text{Rs. } 35,000$$

$$\text{Actual Margin} = \frac{\text{Assets} - \text{Debt}}{\text{Debt}}$$

$$= \frac{75,000 - 40,000}{40,000}$$

$$= 87.5\%$$

Since, actual margin (87.5%) is greater than maintenance margin (30%), we will not receive a margin call.

$$\text{d. Rate of Return} = \frac{P_0 - P_1 - D}{P_0 \times IM} \times 100$$

$$= \frac{500 - 550 - 25}{500 \times 0.50} \times 100$$

$$= -30\%$$

Problem 2.21

Solⁿ

Given: Short sell

Number of shares (N) = 100 shares

Beginning price (P_0) = Rs. 500

Initial Margin (IM) = 50%

Maintenance Margin (MM) = 35%

$$a. \text{ Trigger Price (TP)} = \frac{1+IM}{1+MM} \times P_0$$

$$= \frac{1+0.50}{1+0.35} \times 500$$

$$= \text{Rs. } 555.56$$

If the stock price rises above Rs. 555.56, the investor will get a margin call.

b. Calculation of Rate of Return

Ending Price (P_1)	Beginning price (P_0)	Rate of Return (Without Margin) $= \frac{P_0 - P_1}{P_0} \times 100$	Rate of Return (With Margin) $= \frac{P_0 - P_1}{P_0 \times IM} \times 100$
200	500	60%	120%
300	500	40%	80%

400	500	20%	40%
500	500	0	0
600	500	+20%	-40%
700	500	-40%	-80%
800	500	-60%	-120%

Problem 2.22

Solⁿ

Given:

Beginning price (P_0) = Rs. 250

Margin Requirement (RM) = 50%

Maintenance Margin (MM) = 30%

a. Short position with 100% Initial margin

Ending price (P_1) = Rs. 200

$$\text{Rate of Return} = \frac{P_0 - P_1}{P_0} \times 100$$

$$= \frac{250 - 200}{250} \times 100$$

$$= 20\%$$

b.

$$\begin{aligned} 1. \text{ Trigger Price (TP)} &= \frac{1+IM}{1+MM} \times P_0 \\ &= \frac{1+0.50}{1+0.30} \times 250 \\ &= \text{Rs. } 288.5 \end{aligned}$$

If the stock price rises above Rs. 288.5, the investor will get a margin call.

$$2. \text{ Ending price (P}_1\text{)} = \text{Rs. } 200$$

$$\begin{aligned} \text{Rate of Return} &= \frac{P_0 - P_1}{P_0 \times IM} \times 100 \\ &= \frac{250 - 200}{250 \times 0.50} \times 100 \\ &= 40\% \end{aligned}$$

c. The rate of return with 50% initial margin is higher because it can take the advantage of leverage in short selling.

Problem 2.23

Solⁿ.

Given:

Number of shares (N) = 500 shares

Beginning price (P_0) = Rs. 120

Initial Margin Deposit = Rs. 45,000

Initial Margin (IM) = 45000

$$500 \times 120 = 75\%$$

a. Calculation of Rate of Return

Ending Price (P_1)	Beginning Price (P_0)	Rate of Return = $\frac{P_0 - P_1}{P_0 \times IM} \times 100$
132	120	-13.33%
120	120	0
108	120	13.33%

b. Maintenance Margin (MM) = 25%.

$$\begin{aligned}\text{Trigger Price (TP)} &= \frac{1 + IM}{1 + MM} \times P_0 \\ &= \frac{1 + 0.75}{1 + 0.25} \times 120 \\ &= \text{Rs. 168}\end{aligned}$$

If the stock price rises above Rs. 168, the investor will get a margin call.

c. Calculation of Rate of Return

Ending Price (P_1)	Beginning Price (P_0)	Dividend (D_1)	Rate of Return $\frac{P_0 - P_1 - D_1}{P_0 \times 100}$
182	120	3	-16.67%
120	120	3	-3.33%
108	120	3	10%

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