Unit III: Deal Valuation and Evaluation

- Methods of valuation; cash flow approaches,
- Economic value added (EVA) (with numerical)
- Sensitivity analysis (with numerical)
- Valuation for slump sale
- Valuation of synergy (with numerical)
- Cost-benefit analysis and
- Swap ratio determination (with numerical)

Situation requiring Valuation

Following are some of the usual circumstances when valuation of shares or enterprise becomes essential:

1. When issuing shares to public either through an initial public offer or by offer for sale of shares of promoters or for further issue of shares to public.
2. When promoters want to invite strategic investors or for pricing a first issue or a further issue, whether a preferential allotment or rights issue.
3. In making investment in a joint venture by subscription or acquisition of shares or other securities convertible into shares.
4. For making an 'open offer' for acquisition of shares.
5. When company intends to introduce a 'buy back' or 'delisting of shares'.
6. In schemes involving mergers/demergers, share valuation is resorted to in order to determine the consideration for the purpose of issue of shares or any other consideration to shareholders of transferor or demerged companies.
7. On directions of Tribunal or Authority or Arbitration Tribunals.

Situation requiring Valuation

Following are some of the usual circumstances when valuation of shares or enterprise becomes essential:

8. For determining fair price for effecting sale or transfer of shares as per Articles of Association of the company.

9. As required by the agreements between two parties.

10. To determine purchase price of a 'block of shares', which may or may not give the holder thereof a controlling interest in the company.

11. To value the interest of dissenting shareholders under a scheme of amalgamation, merger or reconstruction.

12. Conversion of debt instruments into shares.

13. Advancing a loan against the security of shares of the company by the Bank/Financial Institution.

14. As required by provisions of law such as the Companies Act, 2013 or Foreign Exchange Management Act, 1999 or Income Tax Act, 1961 or the SEBI (Substantial Acquisition of Shares and Takeovers) Regulations, 2011 [the Takeover Code] or SEBI (Share Based Employee Benefits) Regulations, 2014 or SEBI (Buy Back of Securities) Regulations, 2018 or Delisting Guidelines.

Factors Affecting Valuation Basics

- The key to valuation is finding a common ground between all of the companies for the purpose of a fair evaluation.

- Determining the value of a business is a complicated and intricate process. Valuing a business requires the determination of its future earnings potential, the risks inherent in those future earnings. A company's fair market value is the price at which the business would change hands between a willing buyer and a willing seller when neither are under any compulsion to buy or sell, and both parties have knowledge or relevant facts.

Factors Influencing Valuation

The process of arriving at this value includes a detailed analysis of its mix of physical and intangible assets, and the general economic and industry conditions.

The other salient factors include:
1) The stock exchange price of the shares of the two companies before the commencement of negotiations or the announcement of the bid.
2) Dividends paid on the shares.
3) Relative growth prospects of the two companies.

Factors Influencing Valuation contd.

The other salient factors include:

4) In case of equity shares, the relative gearing of the shares of the two companies. ('gearing' means ratio of the amount of issued preference share capital and debenture stock to the amount of issued ordinary share capital.)

5) Net assets of the two companies.

6) Voting strength in the merged (amalgamated) enterprise of the shareholders of the two companies.

7) Past history of the prices of shares of the two companies.

8) Merger and amalgamation deals can take a number of months to complete during which time valuations can fluctuate substantially. Hence provisions must be made to protect against such swings.

Preliminary steps in Valuation

A business valuation involves analytical and logical application/analysis of historical/future tangible and intangible attributes of business. The preliminary study to valuation involves the following aspects:

1) Purpose of valuation.
2) Goodwill/Brand name in the market.
3) Business environment of the entity to be valued.
4) Estimation/forecast of future cash flows as accurately as possible.
5) Is company listed on any stock exchange?
6) If listed, whether shares of the company are traded frequently?
7) The industry in which the entity is part of
8) The industry P/E ratio, past and future growth rate.
9) Who are the competitors locally, internationally?
10) Whether any similar valuation has been done recently?
11) The technology concerning the enterprise and its probability of obsolescence.
12) The accepted discounting rate.
13) Study of market capitalization aspects.
14) Identification of hidden liabilities through analysis of material contracts.

The value of a business is a function of the business logic driving the M&A and is based on bargaining powers of buyers and sellers. Thorough due diligence has to be exercised in deciding the valuation parameters since these parameters would differ from sector to sector and company to company.

Some most popular methods of valuation amongst other are:

A. **Assets based valuation**
B. Earnings based valuation
C. Market based valuation
D. Others

Valuation Based on Assets

This valuation method is based on the simple assumption that **adding the value of all the assets of the company and subtracting the liabilities**, leaving a net asset valuation, can best determine the value of a business.

However, for the purposes of the amalgamation the amount of the consideration for the acquisition of a business may be arrived at either by valuing its individual assets and goodwill or by valuing the business as a whole by reference to its earning capacity.

If this method is employed, the fixed assets of all the amalgamating companies should preferably be valued on a going concern basis.

The term 'going concern' means that a business is being operated at not less than normal or reasonable profit and valuer will assume that the business is earning reasonable profits when appraising the assets.

Valuation Based on Assets Contd.

- Balance sheet usually gives an accurate indication of short-term assets and liabilities. This is not the case of long-term ones as they may be hidden by techniques such as "off balance sheet financing".

- Moreover, a balance sheet is a historical record of previous expenditure and existing liabilities.

- As valuation is a forward looking exercise, acquisition purchase prices generally do not bear any relation to published balance sheet.

An asset-based valuation can be further separated into four approaches:

1. Book value

➡ The tangible book value of a company is obtained from the balance sheet by taking the adjusted historical cost of the company's assets and subtracting the liabilities; intangible assets (like goodwill) are excluded in the calculation.

➡ Statutes like the Gift Tax Act etc., have in fact adopted book value method for valuation of unquoted equity shares for companies other than an investment company. Book value of assets does help the valuer in determining the useful employment of such assets and their state of efficiency. In turn, this leads the valuer to the determination of rehabilitation requirements with reference to current replacement values.

➡ In all cases of valuation on assets basis, except book value basis, it is important to arrive at current replacement and realization value. It is more so in case of assets like patents, trademarks, know-how, etc. which may posses value, substantially more or less than those shown in the books.

➡ **Using book value does not provide a true indication of a company's value, nor does it take into account the cash flow that can be generated by the company's assets.**

Valuation Based on Assets Contd.

2. Excess earnings

➡ In order to obtain a value of the business using the excess earnings method, **a premium is added to the appraised value of net assets**. This premium is calculated by comparing the earnings of a business before a sale and the earnings after the sale, with the difference referred to as excess earnings.

➡ In this approach, it is assumed that the business is run more efficiently after a sale; the total amount of excess earnings is capitalized (e.g., the difference in earnings is divided by some expected rate of return) and this result is then added to the appraised value of net assets to derive the value of the business.

Valuation Based on Assets Contd.

3. Replacement cost

➡ Replacement cost reflects the expenditures required to replicate the operations of the company. Estimating replacement cost is essentially a make or buy decision.

Valuation Based on Assets Contd.

4. Liquidation Value / Realizable Value:

➡ Value of asset is based on the presumption that they have to be sold now. In theory, this should be equal to the value obtained from DCF valuations of individual assets, but the urgency associated with liquidating assets quickly may result in a discount on the value. How large the discount will be depend on the number of potential buyers for the assets, the asset characteristics, and the state of the economy.

➡ This method may look simple on the face of it as long as the assets can be valued based on similar assets available in the market. However, if the entity has some intangible assets such as brand, technical know-how, designs, trademark, etc., it gets more complicated because there may not be readily available market value for such intangible assets. The valuation methods for intangible assets are totally different.

Valuation Based on Assets Contd.

4. Liquidation Value / Realizable Value Contd.:

➡ This approach is likely to be used when the business is non-operating such as under corporate insolvency resolution or under liquidation. Under the Insolvency and Bankruptcy Code, 2016, liquidation value is defined as realizable value. This is determined by appointing two independent valuers. The average value given by the valuers based on International Valuation Standards is taken as the liquidation value.

Valuation Based on Assets Contd.

The asset based approach is useful in combination with the other methods such as cash flow methods. For example company-A has net assets of Rs. 15,00,000 whereas company-B has net assets of Rs. 5,00,000. The cash flows of the two companies are same. It is very easy to say that company-B is more valuable than company-A based on the comparison.

However in the worst case scenario of insolvency or liquidation the risk in company-A is less, as it has more assets that can be liquidated.

Question

ABC Ltd. has the following values in its books:

Particulars	(Rs. in thousand)
Land and building	300
Plant and machinery	200
Inventory	200
Investment	100
Receivables	300
Cash	100
Current liabilities	300
Term loans	200

Land and buildings will fetch 500 more. Plant and machinery will fetch 100 less. Inventory will fetch 50 less. Receivables will fetch 50 less. Current liabilities of 50 will not be payable.

Calculate the net realizable value of this business.

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Solution

	Book Value	Appreciation	Realizable Value
Assets			
Land & Buildings	300	+500	800
Plant & Machinery	200	-100	100
Investments	100		100
Inventory	200	-50	150
Receivables 300 -50 250	300	-50	250
Cash 100 100	100		100
TOTAL 1200 300 1500	1200	300	1500
Liabilities			
Bank Borrowings 200 200	200		200
Current Liabilities	300	-50	250
		Net Realisable value	**1050**

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Valuation for M&A

Some most popular methods of valuation amongst other are:

A. Assets based valuation

B. Earnings based valuation

C. Market based valuation

D. Others

Valuation Based on Earnings

The normal purpose of the contemplated purchase is to provide for the buyer the annuity for his outlay. He will expect yearly income, return great or small, stable or fluctuating but nevertheless some return which is commensurate with the price paid therefore.

Valuation based on earnings, **based on the rate of return on capital employed** is a more modern method. From the last earnings declared by a company, items such as tax, preference dividend, if any, are deducted and net earnings are taken.

An alternate to this method is the use of the price-earning (P/E) ratio instead of the rate of return. The P/E ratio of a listed company can be calculated by dividing the current price of the share by earning per share (EPS). Therefore, the reciprocal of P/E ratio is called earnings - price ratio or earning yield.

Thus P/E = P/EPS
Where P is the current price of the shares
The share price can thus be determined as P = EPS x P/E ratio

Valuation Based on Earnings Contd.

1) Discounted Cash Flow / Free Cash Flow: Being the most common technique takes into consideration the future earnings of the business and hence the appropriate value depends on projected revenues and costs in future, expected capital outflows, number of years of projection, discounting rate and terminal value of business.

2) Cost to Create Approach: In this approach the cost for building up the business from scratch is taken into consideration and the purchase price is typically the cost plus a margin.

3) Capitalised Earning Method: The value of a business is estimated in the capitalised earnings method by capitalising the net profits of the business, the current year or average of three years or a projected year at required rate of return.

Discounted Cash Flow Method (DCF)

Discounted Cash Flow Method involves discounting future cash flow projections, from the newly formed company, to its present value. If the present value is higher than the actual cost of merger, then the merger is viable. The present value is calculated using the weighted average cost of capital.

In this method as the name suggests, it involves discounting the cash flows of the entity to be valued. The value of the entity is arrived at by adding the discounted free cash flows. Requirements of this method are:

- Forecast of the free cash flows.
- Estimate the discount rate which will be the weighted average cost of capital.

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Discounted Cash Flow Method (DCF)

Cost of capital is calculated based on the cost of debt and cost of equity and taking a weighted average. The present value of future cash flows is calculated using the standard formula:

➡ $PV = CF_1 / (1+r) + CF_2 / (1+r)^2 + \ldots [TCF / (r - g)] / (1+r)^{n-1}$
Where,
PV = present value
CF_1 = cash flow in year 1
r = discount rate
TCF = the terminal year cash flow
g = growth rate assumption in perpetuity beyond terminal year
n = the number of periods in the valuation model including the terminal year

Discounted Cash Flow Method (DCF)

The formula for calculating free cash flows is:

Free cash flows = operating profit + depreciation +
amortization of goodwill –
capital expenditures – cash taxes –
change in working capital.

Question

The free cash flows of Company A are forecasted as shown below:

	Year 1	Year 2	Year 3	Year 4	Year 5	Terminal Year
Free Cash Flows	100,000	100,000	150,000	180,000	200,000	300,000

Other information is as below:
    The cost of debt is = 12%
    The cost of equity = 16%
    Debt/Equity ratio = 1:1

Calculate the value of the business.

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Solution

- Weighted average cost of capital = (12% +16%)/2 = 14%
- PV of Year 1 cash flows = 100 / (1+14%) = 87.7
- PV of Year 2 Cash flows = 100/ (1+14%)^2 = 76.95
- PV of Year 3 Cash flows = 100/ (1+14%)^3 = 101.2
- PV of Year 4 Cash flows = 100/ (1+14%)^4 = 106.5
- PV of Year 5 Cash flows = 100/ (1+14%)^5 = 103.8
- PV of terminal value = 300/ (1+14%)^5 = 155.8

	Year 1	Year 2	Year 3	Year 4	Year 5	Terminal Year
Free Cash Flows	100,000	100,000	150,000	180,000	200,000	300,000
PV	87700	76950	101200	106500	103800	155800

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Solution

▶ Total of all PVs = 87.7 + 76.95 +101.2 + 106.5 +103.8 +155.8 = 631.95

▶ The value of the business = `6,31,950

Valuation for M&A

Some most popular methods of valuation amongst other are:

A. Assets based valuation
B. Earnings based valuation
C. **Market based valuation**
D. Others

Market Based Valuation

Market based methods help the strategic buyer estimate the business value by **comparison to similar businesses**. Where the company is listed, market price method helps in evaluating on the price on the secondary market.

Average of quoted price is considered as indicative of the value perception of the company by investors operating under free market conditions. To avoid chances of speculative pressures, it is suggested to adopt the average quotations of sufficiently longer period.

The valuer will have to consider the effect of issue of bonus shares or rights shares during the period chosen for average.

Market Based Valuation Contd.

I. Market Price Method is not relevant in the following cases:
   ➡ Valuation of a division of a company
   ➡ Where the shares are not listed or are thinly traded
   ➡ In the case of a merger, where the shares of one of the companies under consideration are not listed on any stock exchange
   ➡ In case of companies, where there is an intention to liquidate it and to realise the assets and distribute the net proceeds.

II. In case of significant and **unusual fluctuations** in market price the market price may not be indicative of the true value of the share. At times, the valuer may also want to ignore this value, if according to the valuer, the market price is not a fair reflection of the company's underlying assets or profitability status. The Market Price Method may also be used as a back up for supporting the value arrived at by using the other methods.

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Market Based Valuation Contd.

III. It is important to note that regulatory bodies have often considered market value as one of the very important basis for preferential allotment, buyback, open offer price calculation under the Takeover Code.

IV. In earlier days due to non-availability of data, while calculating the value under the market price method, high and low of monthly share prices were considered. Now with the support of technology, detailed data is available for stock prices. It is now a usual practice to consider weighted average market price considering volume and value of each transaction reported at the stock exchange.

V. If the period for which prices are considered also has impact on account of bonus shares, rights issue etc., the valuer needs to adjust the market prices for such corporate events.

Methods for Market Based Valuation

Following methods are used for valuation under this approach:

I.   **Comparable companies multiple approach** – Market multiples of comparable listed companies are computed and applied to the company being valued to arrive at a multiple based valuation.

II. **Comparable transaction multiples method** – This technique is mostly used for valuing a company for M&A, the transaction that have taken place in the industry which are similar to the transaction under consideration are taken into account.

III. **Market value approach** – The market value method is generally the most preferred method in case of frequently traded shares of companies listed on stock exchanges having nationwide trading as it is perceived that the market value takes into account the inherent potential of the company.

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Market Comparables

This method is generally, applied in case of unlisted entities. This method estimates value by relating the same to underlying elements of similar companies for past years. It is based on market multiples of 'comparable companies'. For example

- Earnings / Revenue Multiples (Valuation of Pharmaceutical Brands)
- Book Value Multiples (Valuation of Financial Institution or Banks)
- Industry Specific Multiples (Valuation of cement companies based on Production capacities)
- Multiples from recent M&A Transactions.

Though this method is easy to understand and quick to compute, it may not capture the intrinsic value and may give a distorted picture in case of short term volatility in the markets. There may often be difficulty in identifying the comparable companies.

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Market Comparables

➤ This method estimates value by relating the same to underlying elements of similar companies for past years. It is based on market multiples of 'comparable companies'. Philosophical basis behind the method is that there is a comparable asset in the market which is already valued, which can form basis of valuation of an asset. This method of valuation is also known as relative valuation.

➤ Following steps are involved in this method of valuation :
- Comparable assets are identified and their market values are obtained
- Market values are converted into standardized values, since the absolute price cannot be compared
- Standardized value or multiple for the asset being analyzed are compared with the standardized value of the comparable asset, controlling for any difference between the firms that might affect the multiple, to judge whether the asset is under or over valued.

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Market Comparables

The following metric can be used as a basis for relative valuation:
- Sales – EV/Sales
- EBITDA – EV/EBITDA
- EBIT – EV/EBIT
- Earnings/Net Profit – Price-to-Earnings Ratio
- Book Value – Price to Book
- Cash Flow – EV/Cash Flow

➡ Enterprise Value = Market Value Debt + Market Value Equity– Cash & Investments.

➡ The other option is to use Equity Multiples, such as:
- Price / Cash Flow per share
- Price / Sales per share
- Price / Earnings per share
- Price / Book Value per share

➡ Industry Specific variable (Price per ton capacity of steel, per store value in the days of retail boom, price per click in e-commerce).

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Market Comparables

Which multiple should one use?

While a range of values can be obtained from a number of multiples, the best estimate value is obtained using one multiple. Multiple that seems to make the most sense for that sector should be used. For example:

➤ In retailing: The focus is usually on same store sales and profit margins and so the revenue multiple is the most common in this sector.

➤ In financial services: The emphasis is usually on return on equity. Book Equity is often viewed as a scarce resource, since capital ratios are based upon it. Price to book ratios dominate.

➤ In technology: Growth is usually the dominant theme. PEG ratios (Price / Earnings to growth ratio) were invented in this sector. PEG = PE ratio / EPS growth rate

Valuation for M&A

Some most popular methods of valuation amongst other are:

A. Assets based valuation
B. Earnings based valuation
C. Market based valuation
D. **Others**

Valuation for M&A

Other methods:

➤ **Super Profit Method:** This approach is based on the concept of the company as a going concern. The value of the net tangible assets is taken into consideration and it is assumed that the business, if sold, will in addition to the net asset value, fetch a premium. The super profits are calculated as the difference between maintainable future profits and the return on net assets. In examining the recent profit and loss accounts of the target, the acquirer must carefully consider the accounting policies underlying those accounts. Particular attention must be paid to areas such as deferred tax provision, treatment of extraordinary items, interest capitalisation, depreciation and amortisation, pension fund contribution and foreign currency translation policies. Where necessary, adjustments for the target's reported profits must be made, so as to bring those policies into line with the acquirer's policies. For example, the acquirer may write off all R&D expenditure, whereas the target might have capitalised the development expenditure, thus overstating the reported profits.

Valuation for M&A

Other methods:

➤ **Contingent Claim Method:** Contingent Claim valuation uses option pricing models to measure the value of assets that have share option characteristics. Some of these assets are traded financial assets like warrants, and some of these options are not traded and are based on real assets. Projects, patents and oil reserves are examples. The latter are often called real options.

➤ **Accounting Professionals Experts:** The accounting professionals use the various accounting ratios which are beneficial in deriving the swap ratios. These accounting ratios may be: Dividend Payout Ratio (DP Ratio), Price Earnings Ratio (PE Ratio), Debt Equity Ratio, Net Assets Value (NAV).

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Sensitivity Analysis

▶ The profitability of an enterprise may be sensitive to different factors. If we take these factors as independent variables, then given a change in one or more of the variables, how the profitability will change? This technique is known as "Sensitivity Analysis".

▶ In business valuation, there are variables such as discount rate, future growth rate, market share, beta value, required rate of return, etc. Each of these factors can be varied to test the business valuation model.

Sensitivity Analysis contd.

Eg 1:

The variables are Sales and EBT%. How sensitive is the EBT% to decrease or increase in sales.

		Current	10% decline in sales	10% increase in sales	20% decline in sales	32% increase in sales
Sales		100000	90000	110000	88000	132000
Cost of Sales	70%	70000	63000	77000	61600	92400
Gross Profit		30000	27000	33000	26400	39600
Fixed Cost		15000	15000	15000	15000	15000
Interest	10%	5000	5000	5000	5000	5000
Earnings before tax		10000	7000	13000	6400	19600
EBT %		10%	8%	12%	7%	15%

Sensitivity Analysis contd.

As can be seen the sensitivity analysis is:

Variable = Sales	Variable = EBT%
0% change from current	10%
10% decrease	Decrease by 8%
10% increase	increase to 12%
20% decrease	decrease to 7%
32% increase	increase to 15%

Sensitivity Analysis contd.

Example 2:

➡ Business valuation of an enterprise which has 2 crore shares issued and paid-up, has current earnings of Rs.10 per share.

	Current	Earnings decrease by 10%	Earnings increase by 10%	P/E ratio increase by 20%	P/E ratio decrease by 20%
P/E ratio of industry	25	25	25	30	20
Earnings per share (Rs.)	10	9	11	10	10
Market price of share (Rs.)	250	225	275	300	200
Value of the enterprise (Rs. in cr.)	500	450	550	600	400

Swap Ratio

A **swap ratio** is an exchange rate of the shares of the companies that would undergo a merger. This is calculated by the valuation of various assets and liabilities of the merging companies.

The swap ratio determines the control that each group of shareholders of the companies shall have over the combined firm. It is an indicator of relative values of financial and strategic results of the company.

In a merger or acquisition between two companies, the ratio at which the acquiring company offers its own shares in exchange for the target company's shares, is known as the swap ratio.

Exchange Ratio / Swap Ratio

▶ Exchange ratio is defined as the number of shares the acquiring firm is willing to give in exchange for one share of the target firm.

▶ An exchange ratio of 0.5 means that the acquiring firm is willing to give half a share for every share of the target firm.

▶ Swap Ratio : $\dfrac{\text{Parameter of the target company}}{\text{Parameter of the acquiring company}}$

Exchange Ratio / Swap Ratio

Example:

- In October 2017, Indusind Bank acquired a micro finance company Bharat Financial Inclusion Ltd. The swap ratio had been decided at 639 shares of IndusInd Bank for every 1,000 shares of Bharat Financial. This means that the value of one share of Bharat Financial is equal to 0.639 share of Indusind Bank, swap ratio of 1:0.639.

- In 2018, IDFC Bank and Capital First announced merger between the two to form a combined entity with assets under management of `88,000 crore, branch network of 194 and customer base of over 5 million. As per the agreement, IDFC Bank will issue 139 shares for every 10 shares of Capital First. So the swap ratio here is 1:13.9.

Bases for Determining the Exchange ratio

- ➡ Book value per share
- ➡ Earnings per share
- ➡ Market price per share
- ➡ Dividend discount value per share
- ➡ Discounted cash flow value per share

Bases for Determining the Exchange ratio

- Book value per share
  - Do not reflect changes in purchasing power of money.
  - Often different from true economic values.

- Earnings per share
  - Difference in the growth rate of earnings of the two companies.
  - Gains in earnings arising out of merger.
  - Differential risks associated with the earnings of the two companies.
  - Negative earning per share.
  - Wind fall profit, large tax relief.

Bases for Determining the Exchange ratio

- Market price per share
  - Less reliable for stocks which are less traded
  - Does not exists for stocks which are less traded
  - Can be manipulated
- Dividend discount value per share
  - The dividend discounted value per share is the present value of the expected stream of dividends.
  - Can be used when dividends can be predicted
- Discounted cash flow value per share

DCF value per share = Firm value using the DCF method – Debt value
Number of equity shares

  - Cash flow projections are available for a long period.

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Bases for Determining the Exchange ratio

- Book value per share
- Earnings per share
- Market price per share
- Dividend discount value per share
- Discounted cash flow value per share

Boundaries for exchange rate determination

Larson & Gonedes

Conn & Nielson

- ER = Exchange Ratio
- P_1 = Price per share for acquiring company
- P_{12} = Price per share for combined company
- PE_{12} = Price earnings multiple for combined company
- EPS_{12} = Earnings per share for combined company
- E_1 = Earnings for acquiring company
- E_2 = Earnings for acquired company
- S_1 = Number of outstanding equity shares for acquiring company
- S_2 = Number of outstanding equity shares for acquired company

$P_{12} \geq P_1$

$P_{12} = P_1$

$P_{12} = (PE_{12}) (EPS_{12}) = P_1$

$$EPS_{12} = \frac{E_1 + E_2}{S_1 + S_2 (ER_1)}$$

$$P_1 = \frac{(PE_{12}) (E_1 + E_2)}{S_1 + S_2 (ER_1)}$$

$$\mathbf{ER_1} = \frac{-S_1}{S_2} + \frac{(E_1 + E_2) PE_{12}}{P_1 S_2}$$

$P_{12} (ER_2) \geq P_2$

$(PE_{12}) (EPS_{12}) ER_2 = P_2$

$PE_{12} \, x \, \dfrac{E_1 + E_2}{S_1 + S_2 \, (ER_2)} \, x \, ER_2 = P_2$

$\dfrac{E_1 + E_2}{S_1 + S_2 \, (ER_2)} \, x \, ER_2 = \dfrac{P_2}{PE_{12}}$

$E_1 + E_2 \, x \, ER_2 = \dfrac{P_2}{PE_{12}} \, x \, (S_1 + S_2 \, x \, ER_2)$

$E_1 + E_2 \, x \, ER_2 = \dfrac{P_2 S_1}{PE_{12}} + \dfrac{P_2 S_2 \, x \, ER_2}{PE_{12}}$

$$E_1 + E_2 \, x \, ER_2 = \frac{P_2 S_1}{PE_{12}} + \frac{P_2 S_2 \, x \, ER_2}{PE_{12}}$$

$$E_1 + E_2 \, x \, ER_2 - \frac{P_2 S_2 \, x \, ER_2}{PE_{12}} = \frac{P_2 S_1}{PE_{12}}$$

$$(E_1 + E_2) \, x \, ER_2 - \frac{(P_2 S_2)}{PE_{12}} ER_2 = \frac{P_2 S_1}{PE_{12}}$$

$$\left(E_1 + E_2 - \frac{(P_2 S_2)}{PE_{12}}\right) x \, ER_2 = \frac{P_2 S_1}{PE_{12}}$$

$$\mathbf{ER_2} = \frac{\boldsymbol{P_2 S_1}}{\boldsymbol{(PE_{12})(E_1 + E_2) - P_2 S_2}}$$

ER

ER₁ — Maximum exchange ratio acceptable to shareholders of firm 1

II

III

X

I ✓

ER₂ — Minimum exchange ratio required by shareholders of firm 2

IV

PE₁₂

Class Exercise on Exchange Ratio

	Firm 1	Firm 2
Total earnings	Rs. 18 mn	Rs. 6 mn
No. of Outstanding shares	9 mn	6 mn
EPS	Rs. 2	Re. 1
PE ratio	12	8
MPS	Rs. 24	Rs. 8

Maximum exchange ratio acceptable to shareholders of firm 1					
PE_{12}	9	10	11	12	15	20
Max ER_1						

Minimum exchange ratio acceptable to shareholders of firm 2						
PE_{12}	3	9	10	11	12	15	20
Min ER_2							

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Class Exercise on Exchange Ratio

	Firm 1	Firm 2
Total earnings	Rs. 18 mn	Rs. 6 mn
No. of Outstanding shares	9 mn	6 mn
EPS	Rs. 2	Re. 1
PE ratio	12	8
MPS	Rs. 24	Rs. 8

Maximum exchange ratio acceptable to shareholders of firm 1					
PE_{12}	9	10	11	12	15	20
Max ER_1	0	0.17	0.33	0.50	1.0	1.83

Minimum exchange ratio acceptable to shareholders of firm 2					
PE_{12}	3	9	10	11	12	15	20
Min ER_2	3	0.43	0.38	0.33	0.30	0.23	0.17

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Class Exercise on Exchange Ratio

BBA(FIA) Limited is keen on reporting an earnings per share of Rs. 6 after acquiring BMS Limited. The following financial data are given.

	BBA(FIA) Limited	BMS Limited
Earnings per share	Rs. 5	Rs. 5
Market price per share	Rs. 60	Rs. 50
No. of share	10 Lakh	8 Lakh

There is an expected synergy gain of 5%. What exchange ratio will result in a post-merger earnings per share of Rs. 6 for BBA(FIA) Limited?

Solution

- Total earnings of BBA(FIA) limited = Rs. 50,00,000
- Total earnings of BMS limited = Rs. 40,00,000
- Synergy Gain = 5%
- Total earnings of the combined limited =

$$90,00,000 \times 1.05 = 94,50,000 \text{ Rs.}$$

- EPS = 6 = $\dfrac{94,50,000}{10,00,000 + (ER \times 8,00,000)}$

$$ER = 0.71875$$

Question on Exchange Ratio

Alpha Corporation plans to acquire Beta Corporation. The following information is available:

	Alpha Corporation	Beta Corporation
Total current earnings, E	Rs. 50 million	Rs. 20 million
Number of outstanding shares, S	20 million	10 million
Market price per share, P	Rs. 30	Rs. 20

a) What is the maximum exchange ratio acceptable to the shareholders of Alpha Corporation if the PE ratio of the combined entity is 12 and there is no synergy gain?

b) What is the minimum exchange ratio acceptable to the shareholders of Beta Corporation if the PE ratio of the combined entity is 11 and there is a synergy benefit of 5%?

c) Assuming that there is no synergy gain, at what level of PE multiple will the lines ER_1 and ER_2 intersect?

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Solution

a) Maximum exchange ratio acceptable to the shareholders of Alpha Corporation

$$ER_1 = \frac{-S_1}{S_2} + \frac{(E_1 + E_2)PE_{12}}{P_1 S_2}$$

$$ER1 = \frac{-20 \; million}{10 \; million} + \frac{(50+20) \; 12 \; million}{30 \; x10 \; million} = 0.80$$

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b) minimum exchange ratio acceptable to the shareholders of Beta Corporation

$$ER_2 = \frac{P_2 S_1}{(PE_{12})(E_1 + E_2) - P_2 S_2}$$

$$ER_2 = \frac{20\ x\ 20\ million}{11\ x\ (70\ million\ x\ 1.05) - 20\ x\ 10\ million} = 0.657$$

c) Level of PE multiple: The lines ER1 and ER2 will intersect at the weighted average of the two PE multiples, wherein the weights correspond to the respective earnings of the two firms.

$$PE_{12} = \frac{E_1}{E_1 + E_2} PE_1 + \frac{E_2}{E_1 + E_2} PE_2$$

$(PE_1 \, \& \, PE_2 = \text{MPS/EPS})$

$$PE_{12} = \frac{50}{70} PE_1 + \frac{20}{70} PE_2$$

$$PE_{12} = \frac{50}{70} \times 12 + \frac{20}{70} \times 10 = 11.43$$

Class Exercise on Exchange Ratio

The following information is provided relating to the acquiring company BBB(FIA) Ltd. and the target company BMS Ltd.

	BBA(FIA) Ltd.	BMS Ltd.
No. of shares (F.V. Rs. 10 each)	10.00 lakhs	7.5 lakhs
Market capitalisation	500 lakhs	750 lakhs
P/E ratio	10	5
Reserve and Surplus	300 lakhs	165 lakhs
Promoter's Holding (No. of shares)	4.75 lakhs	5 lakhs

Board of Directors of both the companies have decided to give a fair deal to the shareholders and accordingly for swap ratio the weights are decided as 40%, 25% and 35% respectively for Earning, Book value, Market price of share of each company:

1. Calculate the swap ratio and also calculate Promoter's holding % after acquisition.
2. What is the EPS of BBA(FIA) Ltd. after acquisition of BMS Ltd.?
3. What is the expected market price per share and market capitalisation of BBA(FIA) Ltd. after acquisition, assuming P/E ratio of firm BBA(FIA) Ltd. remains unchanged.
4. Calculate free float market capitalisation of the merged firm.

Solution

Particulars	BBA(FIA) Ltd.	BMS Ltd.
Market capitalisation		
No. of shares		
Market price per share		
P/E ratio		
EPS		
Profit / Earnings		
Share capital		
Reserves and surplus		
Total		
Book value per share		

Solution

Particulars	BBA(FIA) Ltd.	BMS Ltd.
Market capitalisation	500 lakhs	750 lakhs
No. of shares	10 lakhs	7.5 lakhs
Market price per share	Rs. 50	Rs. 100
P/E ratio	10	5
EPS	Rs. 5	Rs. 20
Profit / Earnings	Rs. 50 lakhs	Rs. 150 lakhs
Share capital	Rs. 100 lakhs	Rs. 75 lakhs
Reserves and surplus	Rs. 300 lakhs	Rs. 165 lakhs
Total	Rs. 400 lakhs	Rs. 240 lakhs
Book value per share	Rs. 40	Rs. 32

Solution

1. Calculation of swap ratio

   EPS   4   :1   4 x 40%   = 1.6
   Book Value   0.8:1   .8x 25%   = 0.2
   Market Price 2   :1   2 x 35%   = 0.7
                       Total   = 2.5

Swap ratio is for every 1 share of BMS Ltd. to issue 2.5 shares of BFIA Ltd.

Total no. of shares to be issued: 7.5 lakh x 2.5 = 18.75 lakh shares.

Promoters holding= 4.75 lakh shares + (2.5 x 5 lakh shares)
= 4.75 + 12.5 = 17.25 lakh

Promoters holding % = 17.25 lakh / (18.75 + 10 lakh) x 100
= 60%

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2. EPS of BBA(FIA) Ltd. after acquisition of BMS Ltd.
Total no of shares   10 lakh + 18.75 lakh = 28.75 lakh
EPS   Total profit / No. of shares
                                = 50 L + 150 L / 28.75 L = 200 / 28.75
                                = Rs. 6.956

3. Expected market price per share and market capitalisation of BBA(FIA) Ltd. after acquisition, assuming P/E ratio of firm BBA(FIA) Ltd. remains unchanged.

Expected market price =   EPS 6.956 x P/E 10 = Rs. 69.56
Market Capitalisation = 69.56 per share x 28.75 Lakh shares
                                = Rs. 1999.85 Lakh

Solution

4. Free float market capitalisation of the merged firm

Free float of market cap.

= MPS x (Total shares – Promoters holding)

= 69.56 x (28.75L – 17.25L)

= 69.56 x (11.5L)

= Rs. 799.94 Lakh

Economic Value Added

- Concept of EVA was developed by Joel Stern and Bennett Stewart.
- EVA is the after tax cash flow generated by a business minus the cost of the capital it has deployed to generate that cash flow.

EVA= NOPAT - (k_0 x TCE)

EVA

➡ Sales – Total cost (Except interest) = operating Profit

➡ Operating Profit – tax = NOPAT

NOPAT - Total funds * WACC = EVA

Capitalised value = EVA/ WACC

EVA

Approach 1		Approach 2	
Sales	Amount	Sales	Amount
Total Cost (excluding interest)	Less	Total Cost (including interest)	less
Operating Profit (EBIT)	Balance	EBT	Balance
Tax	Less	Tax	Less
NOPAT	Balance	EAT / PAT	Balance
(E+R+P+D) total funds * WACC	Less	E+R * K_E	Less
		P*K_p	Less
EVA	Balance	EVA	Balance

Class Exercise (EVA)

A company generates before tax profit of Rs. 2 million (No interest has been deducted). By deploying a capital expenditure of 0.75 million, it incurs a cost of 10% after tax (cost of debt is 5%, cost of equity is 15% weighted equally). What is EVA generated by the company? (Assume tax rate @ 35%)

Economic Value Added Solution

NOPAT = Rs. 2 x (1-35%) = Rs. 1.3 million
Cost of capital = 10% x 0.75 = Rs. 0.075 million
EVA of the investment is Rs. 1.3 m – Rs. 0.075 m = Rs. 1.225 million

Cost of debt	5%
Cost of equity	15%
Debt / Equity ratio	50%
WACC	10%
EBIT	2000000
Tax rate	35%
EBIT (1-T)	1300000
WACC	10%
Total Capital employed	750000.0
WACC x TCE	75000.0
EVA	1225000
Value of investment	1225000

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Class Exercise (EVA)

A firm generates Rs. 1 million in profits expected to grow at 10% for the next five years and perpetually @ 9%. The cost of capital is 10%, tax rate is 35% and total capital employed is Rs. 0.5 million. The capital expenditure increases at 7.5% per annum. Determine the EVA value of the firm.

Solution (EVA)

Year	EBIT	Tax rate	EBIT(1-T) NOPAT	WACC	Total Capital Employed	WACC x TCE	EVA	PV of EVA
0	1000				500.00			
1	1100	35%	715	10%	537.5	53.75	661.25	601.14
2	1210	35%	786.5	10%	577.81	57.78	728.72	602.25
3	1331	35%	865.15	10%	621.15	62.11	803.03	603.33
4	1464	35%	951.665	10%	667.73	66.77	884.89	604.39
5	1611	35%	1046.8315	10%	717.81	71.78	975.05	605.43
TY	1756	35%	1141.4	10%	771.65	77.17	1064.23	
Total								3016.54
TV							106423	66080.31
Value of Firm								69096.85

Class Exercise (EVA)

The capital structure of BBA(FIA) Ltd. is as under:
- 80,00,000 Equity shares of Rs. 10 each
- 1,00,000, 12% Preference shares of Rs. 250 each
- 1,00,000, 10% Debenture of Rs. 500 each
- Terms loan from bank @ 10%, Rs. 450 lakhs

The company's statement of Profit and Loss for the year showed PAT of Rs. 100 lakhs, after appropriating Equity Dividend @ 20%. The company is in the 40% tax bracket. Treasury bonds carry 6.5% interest and beta factor for the company may be taken as 1.5. The long run market rate of return may be taken as 16.5%. Calculate Economic Value Added.

Solution (EVA)

Calculation of Profit before tax

Particulars	Computation	Rs. In lakhs
Profit before Interest and Taxes		
Less: Interest on Debentures	500 x 10%	
Interest on bank term loan	450 x 10%	
Profit before tax		
Less: Tax @ 40%		
Profit after Tax		
Less: Preference Dividend	250 x 12%	
Profit available for equity SH		
Less: Equity Dividend	800 x 20%	
Net balance in P & L Account		

Solution (EVA)

Calculation of Profit before tax

Particulars	Computation	Rs. In lakhs
Profit before Interest and Taxes		578.33
Less: Interest on Debentures	500 x 10%	(50.00)
Interest on bank term loan	450 x 10%	(45.00)
Profit before tax		483.33
Less: Tax @ 40%		(193.33)
Profit after Tax		290.00
Less: Preference Dividend	250 x 12%	(30.00)
Profit available for equity SH		260.00
Less: Equity Dividend	800 x 20%	(160.00)
Net balance in P & L Account		100.00

Solution Contd. (EVA)

Computation of Cost of equity

$\quad$ = Rf + β x (MR - Rf)

$\quad$ = 6.5% + 1.5 (16.5% - 6.5%) = 21.5%

Computation of Cost of debt

$\quad$ Interest $\qquad$ 45 L +50 L

$\quad$ Less: Tax @40% $\quad$ (18 L)+ (20 L)

$\quad$ Interest after tax $\quad$ 27L+ 30L

$\quad$ 57/950*100= 6%

Cost of debt $\ $ = I (1-t)

$\qquad\qquad$ = 10% (1- 40%) = 6%

Solution Contd. (EVA)

Computation of weighted average cost of capital

Component	Amount Rs. Lakhs	Ratio	Individual cost	WACC
Equity	800	800/ 2000 = 0.40	Ke = 21.5	8.6
Preference	250	250/2000 = 0.125	Kp= 12	1.5
Debt	950	950/ 2000 = 0.475	Kd= 6	2.85
Total	2000			12.95%

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Solution Contd. (EVA)

Particulars	Rs. In Lakhs
Profit before interest and taxes	578.33
Less: Interest (50+45)	(95.00)
Profit before tax	483.33
Less: Taxes	(193.33)
Profit after tax	290.00
Add: Interest (net of tax) [95 x (1- 0.40)]	57.00
Net operating profit after taxes	347.00
Less: Cost of capital (WACC x Capital Employed) (12.95% x 2000)	(259.00)
EVA	88.00

Solution Contd. (EVA)

Particulars Approach 1	Rs. In Lakhs	Particulars Approach 2	Rs. In Lakhs	Particulars Approach 3	Rs. In Lakhs
Profit before interest and taxes	578.33	Profit before interest and taxes	578.33	Profit before interest and taxes	578.33
		Less: Interest (50+45)	(95.00)	Less: Interest (50+45)	(95.00)
		Profit before tax	483.33	Profit before tax	483.33
Less: Taxes	(231.33)	Less: Taxes	(193.33)	Less: Taxes	(193.33)
Profit before interest but after tax	347.00	Profit after tax	290.00	Profit after tax	290.00
		Less: Cost of Kp 12 = 30 Ke 21.5 = 172.0	(202.00)	Add: Interest (net of tax) [95 x (1- 0.40)]	57.00
Net operating profit after taxes	347.00			Net operating profit after taxes	347.00
Less: Cost of capital (WACC x Capital Employed) (12.95% x 2000)	(259.00)			Less: Cost of capital (WACC x Capital Employed) (12.95% x 2000)	(259.00)
EVA	88.00	EVA	88.00	EVA	88.00

Class Exercise (EVA)

Compute EVA of A Ltd. from the information given.

Particulars	Year 1
Average Capital Employed	4,000.00
Operating Profit before Interest and Tax	1600.00
Corporate Income Taxes	120.00
Average Debt (In %)	13.00
Beta Variant	1.30
Risk Free Rate (%)	12.50
Equity Risk Premium (%)	10.00
Cost of Debt (Post Tax) (%)	20.00

Solution Contd. (EVA)
EVA Statement of Sarin Ltd.

Particulars	Year 1
Cost of Equity (Ke) = Risk Free Rate+ (Beta x Equity Risk Premium)	12.5 +(1.3 x 10) = 25.50%
Cost of Debt (Kd) (given)	20.00%
Debt – Equity Ratio (Debt = given; Equity is bal. fig)	13% & 87%
WACC = [(Kd) x Debt % + (Ke) x Equity%]	**24.79%** (25.50 x 87% + 20 x 13%)
Average Capital Employed (given)	4,000.00
Capital Charge (Fair Return to Providers of Capital i.e. Average Capital Employed x WACC)	4,000 x 24.79% = 991.60
Operating Profit before Taxes & Interest	**1,600.00**
Less: Taxes Paid	120.00
Operating Profit after Taxes (This is the return to the Providers of Capital i.e. Debt and Equity)	1,480.00
Capital Charge	991.60
Economic Value Added	**488.40**
EVA as a % of Average Capital Employed	**12.21%**

4

Class Exercise (EVA)

From the following information, compute EVA of A Ltd.

Equity Share Capital	1,000 Lakhs	PE Ratio	5 times
Financial Leverage	1.5 times	12% Debentures	500 Lakhs Deb
Tax rate	35%	PBT	Rs. 120.00 Lakhs

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Solution Contd. (EVA)

Profit and Loss Statement

Particulars	%	Rs. Lakhs
Profit before Interest and Taxes	150%	180.00
Less: Interest on Debentures Rs. 500 x 12%	50%	60.00
Profit before Tax	**100%**	**120.00**
Less: Tax at 35%	35%	42.00
Profit after tax	65%	78.00

Financial Leverage = PBIT / PBT = 1.5.
(Let PBT = 100%), then
PBIT = 150%
hence, Interest = 50%.

Solution Contd. (EVA)

Computation of WACC

Component	Amount	Ratio	Individual Cost	WACC
Equity	Rs. 1,000 Lakhs	2/3	Ke = 1 ÷ PE Ratio = 20%	13.33%
Debt	Rs. 500 Lakhs	1/3	Kd = I (1 - T) = 12% x (1 - 35)= 7.8%	2.60%
Total	**Rs. 1,500 Lakhs**		**Ko = Ke x We + Kd x Wd**	**15.93%**

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Solution Contd. (EVA)

Computation of EVA

Particulars	Rs. Lakhs
Profit before Interest and Taxes	180.00
Less: Taxes	**42.00**
Net Operating Profit After Taxes	138.00
Less: Capital Charge = WACC x Cap. Emp = 1,500 x 15.93%	238.95
Economic Value Added	**Nil**

Class Exercise (EVA)

With the help of the following information of BBA(FIA) Limited compute the Economic Value Added:

Capital Structure	Equity capital Rs. 160 Lakhs Reserves and Surplus Rs. 140 lakhs 10% Debentures Rs. 400 lakhs
Cost of equity	14%
Financial Leverage	1.5 times
Income Tax Rate	30%

Solution Contd. (EVA)

Financial Leverage = PBIT/PBT
1.5 = PBIT / (PBIT – Interest)
1.5 = PBIT / (PBIT – 40)
1.5 (PBIT – 40) = PBIT
1.5 PBIT – 60 = PBIT
1.5 PBIT – PBIT = 60
0.5 PBIT = 60
or PBIT = $\underline{60}$ = Rs. 120 lakhs
          0.5
NOPAT = PBIT – Tax = Rs. 120 lakhs (1 – 0.30) = Rs. 84 lakhs.
Weighted Average Cost of Capital (WACC)
          =14%×(300/700)+(1–0.30)×(10%)×(400/700) =10%
EVA = NOPAT – (WACC × Total Capital)
EVA = Rs. 84 lakhs – (0.10 × Rs. 700 lakhs)
EVA = Rs. 14 lakhs

Class Exercise (EVA)

RST Ltd.'s current financial year's income statement reported its net income as Rs. 25,00,000. The applicable corporate income tax rate is 30%.
Following is the capital structure of RST Ltd. at the end of current financial year:

	Rs.
Debt (Coupon rate = 11%)	40 lakhs
Equity (Share Capital + Reserves & Surplus)	125 lakhs
Invested Capital	165 lakhs

Following data is given to estimate cost of equity capital:

Beta of RST Ltd.	1.36
Risk –free rate i.e. current yield on Govt. bonds	8.5%
Average market risk premium	9%

Required:
(i) Estimate Weighted Average Cost of Capital (WACC) of RST Ltd.; and
(ii) Estimate Economic Value Added (EVA) of RST Ltd.

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Solution (EVA)

Cost of Equity

k_e = Rf + β x Market Risk Premium

$\quad$ = 8.5% + 1.36 x 9%

$\quad$ = 8.5% + 12.24% = 20.74%

Cost of Debt

k_d = 11%(1 – 0.30) = 7.70%

WACC

(k_o) = k_e x W_e + k_d x W_d

$\quad$ = 20.74 x $\dfrac{125}{165}$ + 7.70 x $\dfrac{40}{165}$

$\quad$ = 15.71 + 1.87 = 17.58%

Taxable Income
= Rs. 25,00,000 / (1 - 0.30)
= Rs. 35,71,429 or Rs. 35.71 lakhs

Operating Income
= Taxable Income + Interest
= Rs. 35,71,429 + Rs. 4,40,000
= Rs. 40,11,429 or Rs. 40.11 lacs

EVA
➤ = EBIT (1-Tax Rate) – WACC x Invested Capital
= Rs. 40,11,429 (1 – 0.30) – 17.58% x Rs. 1,65,00,000
➤ = Rs. 28,08,000 – Rs. 29,00,700 = - Rs. 92,700

Class Exercise

BBA(FIA)A Ltd. Wants to acquire BBA(FIA)B Ltd. at a swap ratio of 0.5.

	BFIA_A Ltd.	BFIA_B Ltd.
PAT	18 Lakh	3.6 Lakh
Outstanding Shares	6 Lakh	1.80 Lakh
EPS	Rs. 3 per share	Rs. 2 per share
PE	10 times	7 times
MPS	30 per share	14 per share

1. Calculate the No. of equity shares to be issued by BBA(FIA)A Ltd. For acquisition of BBA(FIA)B Ltd.
2. What is the EPS of BBA(FIA)A Ltd. After acquisition?
3. Determine the equivalent EPS of BBA(FIA)B Ltd.
4. What is the expected market price per share of A Ltd. After the acquisition, assuming that its PE multiple remains unchanged?
5. Determine the market value of the merged firm.

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Class Exercise Solution

1. 90,0000
2. New EPS = Total Net Profit / Total no. of Equity shares

    = 18 L +3.6 L / 6 L + 90000

    = 21.6 L / 6.9 L

    = 3.13 Rs. per share

3. 0.5 ER :1

    ?   : 3.13

     Rs. 1.57 per share

4. New MPS = 10 x 3.13 = Rs. 31.30

5. Market value= 6,90,000 x 31.30 = Rs. 2,15,97,000

Class Exercise

BBAFIA Ltd. is a highly successful company and wishes to expand by acquiring other firms. Its expected high growth in earnings and dividends is reflected in its PE ratio of 17. The Board of Directors of BBAFIA Ltd. has been advised that if it were to take over firms with a lower PE ratio than its own, using a share for share exchange, then it could increase its reported earnings per share. BMS Ltd. has been suggested as a possible target for a takeover, which has a PE ratio of 10 and 1,00,000 shares in issue with a share price of Rs. 15. BBAFIA Ltd. has 5,00,000 shares in issue with a share price of Rs. 12.

Calculate the change in earnings per share of BBAFIA Ltd. if it acquires the whole of BMS Ltd. by issuing shares at its market price of Rs. 12. Assume the price of BMS Ltd. shares remains constant.

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Class Exercise Solution

Total market value of BMS Ltd.	
PE ratio	
Earnings	
Total market value of BBAFIA Ltd.	
PE ratio	
Earnings	
The number of shares to be issued by BBAFIA Ltd.	
Total number of shares of BBAFIA Ltd.	
EPS of new firm	
Present EPS of BBAFIA Ltd.	
Change in EPS	

Class Exercise Solution

Total market value of BMS Ltd.	1,00,000 X Rs. 15 = 15,00,000 Rs.
PE ratio	10
Earnings	15,00,000 / 10 = 1,50,000 Rs.
Total market value of BBAFIA Ltd.	5,00,000 X Rs. 12 = 60,00,000 Rs.
PE ratio	17
Earnings	60,00,000 / 17 = 3,52,941 Rs.
The number of shares to be issued by BBAFIA Ltd.	Rs. 15,00,000 / 12 = 1,25,000
Total number of shares of BBAFIA Ltd.	5,00,000 + 1,25,000 = 6,25,000
EPS of new firm	(3,52,941 + 1,50,000) / 6,25,000 = Rs. 0.80
Present EPS of BBAFIA Ltd.	3,52,941 / 5,00,000 = Rs. 0.71
Change in EPS	0.80 - 0.71 = 0.09

Valuation for Slump Sale under Income-tax Act, 1961

- As per section 2(42C) of Income-tax Act 1961, 'slump sale' means the transfer of one or more undertakings as a result of the sale for a lump sum consideration without values being assigned to the individual assets and liabilities in such sales.

- Section 50B of the Income-tax Act, 1961 provides the mechanism for computation of capital gains arising on slump sale. Section 50B reads as 'Special provision for computation of capital gains in case of slump sale'.

- As per section 50B(1), any profits or gains arising from the slump sale effected in the previous year shall be chargeable to income-tax as capital gains arising from the transfer of long-term capital assets and shall be deemed to be the income of the previous year in which the transfer took place. The salient features of these provisions are:
  - The capital asset was held for more than 36 months preceding the date of transfer
  - The cost of acquisition will be the net worth of the undertaking or division
  - A certificate of Chartered Accountant certifying the net worth will be required to be obtained
- For the purpose of this 'slump sale' the net worth is calculated as shown below:

  Net worth = WDV of assets – liabilities as per books

  (Where the entire value of the asset has been depreciated, its value will be taken as Nil)

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Synergy

Synergy is the additional value that is generated by combining two firms, creating opportunities that would not been available to these firms operating independently.

Operating Synergy

Allow firms to increase their operating income from existing assets, increase growth or both.

1. Economies of scale
2. Economies of scope
3. Greater pricing power
4. Combination of different functional strengths
5. Higher growth in new or existing markets

Operating synergies can affect margins, returns and growth, and through these the value of the firms involved in the merger or acquisition.

Financial Synergy

With financial synergies, the payoff can take the form of either higher cash flows or a lower cost of capital (discount rate) or both.

1. A combination of a firm with excess cash, or cash slack, (and limited project opportunities) and a firm with high-return projects (and limited cash) can yield a payoff in terms of higher value for the combined firm.
2. Debt capacity can increase
3. Tax benefits can arise
4. Diversification

Value of Synergy

Value the combined firm with synergy built in. This may include

i.   a higher growth rate in revenues: growth synergy
ii.   higher margins, because of economies of scale
iii.   lower taxes, because of tax benefits: tax synergy
iv.   lower cost of debt: financing synergy
v.   higher debt ratio because of lower risk: debt capacity

(Subtract)

the value of the target firm (with control premium) + value of the bidding firm (pre-acquisition).

= value of the synergy

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Breaking down the Acquisition Price

Acquisition Premium		**Acquisition Price of target firm**
Goodwill		**Market Price of target firm prior to acquisition**
Book Value of Equity		**Book Value of Equity of Target firm**
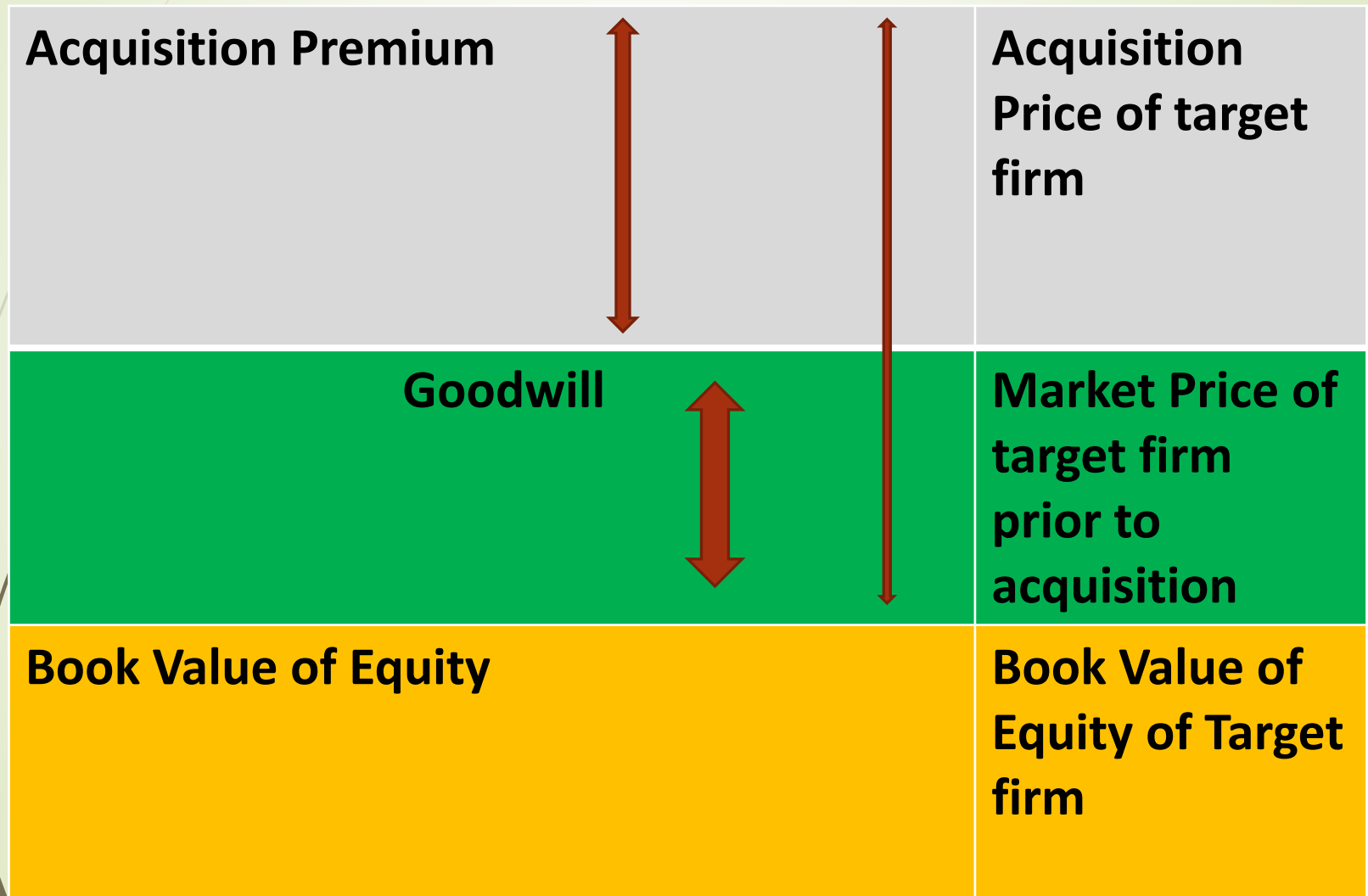
Valuing Operating Synergy in a DCF Framework

Categorizing operating synergies into cost synergies and growth synergies

1. Cost synergies:

One-time cost savings will increase the cash flow in the period of the savings, and thus increase the firm value by the present value of the savings.

Continuing cost savings will have a much bigger impact on value by affecting operating margins (and income) over the long term.

The value will increase by the present value of the resulting higher income (and cash flows) over time.

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Steps in Valuing Operating Synergy

- Value the firms involved in the merger independently

- Value of the combined firm, with no synergy

- Revalue of the combined firm with synergy

- Difference between the value of the combined firm with synergy and the value of the combined firm without synergy

Valuing Cost Synergy

	Acquiring Firm	Target Firm
Beta	0.9	0.9
Pre-tax cost of debt	5%	5%
Corporate tax rate	30%	30%
Debt to capital ratio	10%	10%
Revenue	**Rs. 1,000**	**Rs. 500**
EBIT	**Rs. 50**	**Rs. 25**
Pre-tax return on Capital	15%	15%
Reinvestment Rate	70%	70%
Risk free rate	4.25%	4.25%
Length of Growth period	5 years	5 years
Risk Premium	4%	4%

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Valuing Cost Synergy - Solution

	Acquiring Firm	Target Firm	Combined Firm Value
Cost of Equity = (Rf+ Bx Risk premium)			
After tax cost of debt			
Cost of Capital = Ke x We + Kd x Wd			
After tax return on capital			
Reinvestment Rate			
Expected Growth rate (high growth period) (return on capital x reinvestment rate)			

Valuing Cost Synergy - Solution

	Acquiring Firm	Target Firm	Combined Firm Value
Cost of Equity = (Rf+ Bx Risk premium) (4.25% + 0.9 x 4%) = 4.25+ 3.60	7.85%	7.85%	7.85%
After tax cost of debt = Kd= 5% x 0.7	3.5%	3.5%	3.5%
Cost of Capital = Ke x We + Kd x Wd [7.85x.9 + 3.5 x .1] = 7.42%	7.42%	7.42%	7.42%
After tax return on capital= 15% x 0.7	10.50%	10.50%	10.50%
Reinvestment Rate	70%	70%	70%
Expected Growth rate (high growth period) (return on capital x reinvestment rate)	7.35%	7.35%	7.35%

Valuation of Acquiring Firm

Year	EBIT	EBIT (1-t) T=@30%	Reinvestment Rate	Reinvestment	FCFF	PV of FCFF
0	50.0000					
1	53.67500	37.57250	70%	26.30075	11.27175	10.49316
2	57.62011	40.33408	70%	28.23386	12.10022	10.48546
3	61.85519	43.29863	70%	30.30904	12.98959	10.47548
4	66.40155	46.48108	70%	32.53676	13.94432	10.47658
5	71.28206	49.89744	70%	34.92821	14.96923	10.46799
Terminal Year			?			
Total						52.39745

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Valuing Cost Synergy

Reinvestment rate for perpetuity

Reinvestment Rate = Expected growth Rate in perpetuity/
Return on capital

$$= 4.25\% / 7.42\%$$

$$= 57.28\%$$

We assume that both firms will be in stable growth after year 5, growing 4.25% a year in perpetuity and earning no excess returns (i.e., return on capital = cost of capital).

Valuation of Acquiring Firm

Year	EBIT	EBIT (1-t) T=@30%	Reinvestment Rate	Reinvestment	FCFF	PV of FCFF
0	50.0000					
1	53.67500	37.57250	70%	26.30075	11.27175	10.49316
2	57.62011	40.33408	70%	28.23386	12.10022	10.48546
3	61.85519	43.29863	70%	30.30904	12.98959	10.47548
4	66.40155	46.48108	70%	32.53676	13.94432	10.47658
5	71.28206	49.89744	70%	34.92821	14.96923	10.46799
Terminal Year	74.31155	52.01808	57.28%	29.79596	22.22213	
Total						52.39745

Valuation of Acquiring Firm

	Acquiring Firm	Target Firm	Combined Firm Value
Value of the firm			
Terminal Value			
PV of FCFF	Rs. 52.40		
PV of Terminal Value			
Value of the firm			

Valuation of Acquiring Firm

▶ Terminal Value = $FCFF_6$ / (Cost of capital in stable growth - growth rate in perpetuity)

$$= 22.22213 / (7.42\% - 4.25\%)$$
$$= 22.22213 / 3.17\%$$
$$= 701.0134$$

▶ PV of Terminal Value = 701.0134 / 1.430295
$$= 490.1179$$

▶ Value of Firm = PV of FCFF + PV of Terminal Value
$$= 52.39745 + 490.1179$$
$$= 542.5154$$

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Valuation of Acquiring Firm

	Acquiring Firm	Target Firm	Combined Firm Value
Value of the firm			
Terminal Value	Rs.701.53		
PV of FCFF	Rs. 52.400		
PV of Terminal Value	Rs. 490.117		
Value of the firm	Rs. 542.517		

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Valuation of Target Firm

Year	EBIT	EBIT (1-t) @30%	Reinvest-ment Rate	Reinvest-ment	FCFF	PV of FCFF
0	25					
1						5.2468
2						5.2436
3						5.2404
4						5.2373
5						5.2341
Terminal Year						245.29
Total						

Valuation of Target Firm

Year	EBIT	EBIT (1-t) @30%	Reinvest-ment Rate	Reinvest-ment	FCFF	PV of FCFF
0	25					
1	26.8375	18.78625	70%	13.15038	5.635875	5.246579
2	28.81006	20.16704	70%	14.11693	6.050112	5.243160
3	30.9276	21.64932	70%	15.15452	6.494795	5.239743
4	33.20077	23.24054	70%	16.26838	6.972162	5.236329
5	35.64103	24.94872	70%	17.4641	7.484616	5.232917
Terminal Year	37.15577	26.00904	57.28%	14.89798	11.11106	
Total						26.19873

Valuing Cost Synergy

Reinvestment rate for perpetuity

Reinvestment Rate = Expected growth Rate in perpetuity/
Return on capital

= 4.25% / 7.42%

= 57.28%

We assume that both firms will be in stable growth after year 5, growing 4.25% a year in perpetuity and earning no excess returns (i.e., return on capital = cost of capital).

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Valuation of Target Firm

▶ Terminal Value = $FCFF_6$ / (Cost of capital in stable growth - growth rate)

▶ PV of Terminal Value =

▶ Value of Firm =

Valuation of Target Firm

▶ Terminal Value = $FCFF_6$ / (Cost of capital in stable growth - growth rate)

$$= 11.11106 / (7.42\% - 4.25\%)$$
$$= 11.11106 / 3.17\%$$
$$= 350.5067$$

▶ PV of Terminal Value = 350.5067 / 1.430295
$$= 245.059$$

▶ Value of Firm = PV of FCFF + PV of Terminal Value
$$= 26.19873 + 245.059$$
$$= 271.2577$$

Summarizing the Valuations

	Acquiring Firm	Target Firm	Combined Firm Value
Value of the firm			
Terminal Value	Rs.701.53	Rs. 350.76	
PV of FCFF	Rs. 52.400	Rs. 26.198	Rs. 78.598
PV of Terminal Value	Rs. 490.117	Rs. 245.059	Rs. 735.176
Value of the firm	Rs. 542.517	Rs.271.257	Rs.813.774

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Incorporating the Synergy effect

To value synergy, assume that the combined firm will save Rs. 15 million in pre-tax operating expenses each year, pushing up the combined firm's pre-tax operating income by that same amount.

Combined Firm Valuation with Synergy

	Combined Firm Value	Value of Firm with Synergy
Cost of Equity	7.85%	7.85%
After tax cost of debt	3.5%	3.5%
Cost of Capital	7.42%	7.42%
After tax return on capital	10.35%	10.35%
Reinvestment Rate	70%	70%
Pre-tax operating income = EBIT	**Rs. 75**	**Rs. 90**
Expected Growth rate	7.35%	7.35%

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Combined Firm Valuation with Synergy

Year	EBIT	EBIT (1-t) @30%	Reinvest-ment Rate	Reinvest-ment	FCFF	PV of FCFF
0	90					
1						
2						
3						
4						
5						
Terminal Year						
Total						

Combined Firm Valuation with Synergy

Year	EBIT	EBIT (1-t) @30%	Reinvestment Rate	Reinvestment	FCFF	PV of FCFF
0	90					
1	96.615	67.6305	70%	47.34135	20.28915	18.88768
2	103.7162	72.60134	70%	50.82094	21.7804	18.87538
3	111.3393	77.93754	70%	54.55628	23.38126	18.86308
4	119.5228	83.66595	70%	58.56616	25.09978	18.85078
5	128.3077	89.8154	70%	62.87078	26.94462	18.8385
Terminal Year	133.7608	93.63255	57.28%	53.63273	39.99983	
Total						94.31542

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Valuation of Combined Firm with Synergy

▶ Terminal Value = $FCFF_6$ / (Cost of capital in stable growth - growth rate in perpetuity)

$$= 39.99983 / (7.42\% - 4.25\%)$$
$$= 39.99983 / 3.17\%$$
$$= 1261.824 \text{ Rs.}$$

▶ PV of Terminal Value = 1261.824 / 1.430295
$$= 882.212 \text{ Rs.}$$

▶ Value of Firm = PV of FCFF + PV of Terminal Value
$$= 94.31542 + 882.212$$
$$= 976.527 \text{ Rs.}$$

Value of Synergy

	Combined Firm Value	Combined Firm Value with Synergy	Value of Synergy
Value of the firm			
Terminal Value	Rs.1052.29	Rs. 1261.824	
PV of FCFF	Rs. 78.598	Rs. 94.315	
PV of Terminal Value	Rs. 735.176	Rs. 882.212	
Value of the firm	Rs.813.774	Rs. 976.527	Rs. 162.753

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Valuing Growth Synergy

Categorizing operating synergies into cost synergies and growth synergies

There are at least three different types of growth synergies:

➡ The combined firm may be able to **earn higher returns on its investments**, thus increasing the growth rate.

➡ The combined firm may be able to find **more investments.** The resulting higher reinvestment rates will increase the growth rate.

➡ The combined firm may be in a much **more powerful competitive position**, relative to their peer group. The payoff will be that the combined firm will be able to maintain excess returns and growth for a **longer time period**.

Valuing Synergy from Higher Growth: Better Projects (Higher ROC)

	Combined Firm Value	Combined Firm Value with Synergy	Value of Synergy
Cost of Equity	7.85%	7.85%	
After tax cost of debt	3.50%	3.50%	
Cost of Capital	7.42%	7.42%	
After tax return on capital	**10.50%**	**12.60%**	
Reinvestment Rate	70%	70%	
Pre-tax operating income =EBIT	Rs. 75	Rs. 75	
Expected Growth rate	7.35%	8.82%	
Length of growth period	5 years	5 years	
Value of the firm: PV of FCFF	Rs. 78.61	Rs. 81.89	
Terminal Value	Rs.1052.29	Rs. 1126.34	
Value of the firm	Rs.814.49	Rs. 869.56	Rs. 55.07

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Valuing Synergy from Higher Growth: More Projects (Higher Reinvestment Rate)

	Combined Firm Value	Combined Firm Value with Synergy	Value of Synergy
Cost of Equity	7.85%	7.85%	
After tax cost of debt	3.50%	3.50%	
Cost of Capital	7.42%	7.42%	
After tax return on capital	10.50%	10.50%	
Reinvestment Rate	**70%**	**90%**	
Pre-tax operating income = EBIT	Rs. 75	Rs. 75	
Expected Growth rate	7.35%	9.45%	
Length of growth period	5 years	5 years	
Value of the firm: PV of FCFF	Rs. 78.61	Rs. 27.78	
Terminal Value	Rs.1052.59	Rs. 1159.32	
Value of the firm	Rs.814.49	Rs. 838.51	Rs. 24.02

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Valuing Synergy from Higher Growth: Longer growth period

	Combined Firm Value	Combined Firm Value with Synergy	Value of Synergy
Cost of Equity	7.85%	7.85%	
After tax cost of debt	3.5%	3.5%	
Cost of Capital	7.42%	7.42%	
After tax return on capital	10.50%	10.50%	
Reinvestment Rate	70%	70%	
Pre-tax operating income = EBIT	Rs. 75	Rs. 75	
Expected Growth rate	7.35%	7.35%	
Length of growth period	**5 years**	**10 years**	
Value of the firm: PV of FCFF	Rs. 78.61	Rs. 125.66	
Terminal Value	Rs.1052.29	Rs. 1301.79	
Value of the firm	Rs.814.49	Rs. 860.21	Rs. 45.72

Valuing Synergy - Question

	Acquiring Firm	Target Firm
Beta	0.8	0.9
Pre-tax cost of debt	5%	5%
Corporate tax rate	35%	35%
Debt to capital ratio	10%	10%
Revenue	Rs. 56,741	Rs. 10477
EBIT	Rs. 10,927	Rs. 2645
Capital Invested	Rs. 38,119	-
Pre-tax return on Capital	-	25%
Reinvestment Rate	40%	50%
Risk free rate	4.25%	4.25%
Length of Growth period	5 years	5 years
Risk Premium	4%	4%

Valuing Cost Synergy - Solution

	Acquiring Firm	Target Firm
Beta	0.8	0.9
Pre-tax cost of debt	5%	5%
Corporate tax rate	35%	35%
Debt to capital ratio	10%	10%
Revenue	Rs. 56,741	Rs. 10477
EBIT	Rs. 10,927	Rs. 2645
Capital Invested	Rs. 38,119	Rs. 10,580
Pre-tax return on Capital	28.67%	25%
Reinvestment Rate	40%	50%
Risk free rate	4.25%	4.25%
Length of Growth period	5 years	5 years
Risk Premium	4%	4%

Valuing Synergy

	Acquiring Firm	Target Firm	Combined Firm
Beta	0.8	0.9	?
Pre-tax cost of debt	5%	5%	5%
Corporate tax rate	35%	35%	35%
Debt to capital ratio	10%	10%	10%
Revenue	Rs. 56,741	Rs. 10,477	Rs. 67,218
EBIT	Rs. 10,927	Rs. 2645	Rs. 13,572
Capital Invested	Rs. 38,119	Rs. 10,580	Rs. 48,699
Pre-tax return on Capital	28.67%	25%	?
Reinvestment Rate	40%	50%	?
Risk free rate	4.25%	4.25%	4.25%
Length of Growth period	5 years	5 years	5 years
Risk Premium	4%	4%	4%

Valuing Cost Synergy - Solution

	Acquiring Firm	Target Firm	Combined Firm Value
Cost of Equity = (Rf+ Bx Risk premium)			
After tax cost of debt			
Cost of Capital = Ke x We + Kd x Wd			
After tax return on capital			
Reinvestment Rate			
Expected Growth rate (high growth period) (return on capital x reinvestment rate)			

Valuing Cost Synergy - Solution

	Acquiring Firm	Target Firm	Combined Firm Value
Cost of Equity = (Rf+ Bx Risk premium)	7.45%	7.85%	
After tax cost of debt = Kd= 0.65x5%	3.25%	3.25%	
Cost of Capital = Ke x We + Kd x Wd	7.03%	7.39%	
After tax return on capital	18.63%	16.25%	
Reinvestment Rate	40%	50%	
Expected Growth rate (return on capital x reinvestment rate)	7.45%	8.125%	

Valuation of Acquiring Firm

Year	EBIT	EBIT (1-t) T=@35%	Reinvest-ment Rate	Reinvest-ment	FCFF	PV of FCFF
0	10927					
1	11741.0615	7631.69	40%	3053	4579.014	4278.253
2	12615.77058	8200.251	40%	3280	4920.151	4295.041
3	13555.64549	8811.17	40%	3525	5286.702	4311.896
4	14565.54108	9467.602	40%	3787	5680.561	4328.816
5	15650.67389	10172.94	40%	4070	6103.763	4345.803
Terminal Year	16315.82753	10605.29	60.46%	6412	4193.331	
Total						21559.81

Reinvestment rate for perpetuity Acquiring Firm

Reinvestment Rate = Expected growth Rate in perpetuity/ Return on capital

$$= 4.25\% / 7.03\%$$

$$= 60.46\%$$

We assume that both firms will be in stable growth after year 5, growing 4.25% a year in perpetuity and earning no excess returns (i.e., return on capital = cost of capital).

Valuation of Acquiring Firm

▶ Terminal Value = $FCFF_6$ / (Cost of capital in stable growth - growth rate)

$$= 4193.331 / (7.03\% - 4.25\%)$$
$$= 4193.331 / 2.78\%$$
$$= 150{,}839.2 \text{ Rs.}$$

▶ PV of Terminal Value = 150,839.2 / 1.404519
$$= 107395.7 \text{ Rs.}$$

▶ Value of Firm = PV of FCFF + PV of Terminal Value
$$= 21559.81 + 107395.7$$
$$= 128{,}955.5 \text{ Rs.}$$

Valuation of Target Firm

Year	EBIT	EBIT (1-t) T=@35%	Reinvestment Rate	Reinvestment	FCFF	PV of FCFF
0	2645					
1	2859.91	1859	50%	929	929.47	865.51
2	3092.27	2010	50%	1005	1004.99	871.43
3	3343.52	2173	50%	1087	1086.64	877.40
4	3615.18	2350	50%	1175	1174.93	883.40
5	3908.92	2541	50%	1270	1270.40	889.45
Terminal Year	4075.04	2649	57.51%	1523	1125.47	
Total						4387.186

Reinvestment rate for perpetuity Target Firm

Reinvestment Rate = Expected growth Rate in perpetuity/ Return on capital

= 4.25% / 7.39%

= 57.51%

We assume that both firms will be in stable growth after year 5, growing 4.25% a year in perpetuity and earning no excess returns (i.e., return on capital = cost of capital).

Valuation of Target Firm

▶ Terminal Value = $FCFF_6$ / (Cost of capital in stable growth - growth rate)

$$= 1125.47 / (7.39\% - 4.25\%)$$
$$= 1125.47 / 3.14\%$$
$$= 35,842.87 \text{ Rs.}$$

▶ PV of Terminal Value = 35,842.87 / 1.43
$$= 25094.79 \text{ Rs.}$$

▶ Value of Firm = PV of FCFF + PV of Terminal Value
$$= 4387.186 + 25094.79$$
$$= 29481.98 \text{ Rs.}$$

Value of combined Firm without synergy

Value of combined Firm

$$= 128{,}955.5 + 29{,}481.98 = Rs.\ 158{,}437.48$$

Valuing Synergy

	Acquiring Firm	Target Firm	Combined Firm
Beta	0.8	0.9	?
Pre-tax cost of debt	5%	5%	5%
Corporate tax rate	35%	35%	35%
Debt to capital ratio	10%	10%	10%
Revenue	Rs. 56,741	Rs. 10,477	Rs. 67,218
EBIT	Rs. 10,927	Rs. 2645	Rs. 13,572
Capital Invested	Rs. 38,119	Rs. 10,580	Rs. 48,699
Pre-tax return on Capital	28.67%	25%	?
Reinvestment Rate	40%	50%	?
Risk free rate	4.25%	4.25%	4.25%
Length of Growth period	5 years	5 years	5 years
Risk Premium	4%	4%	4%

Incorporating the Synergy effect

- Increase in Pre tax operating income by Rs. 200.
- 1% increase in after tax return on capital for next five year.
- Reinvestment rate of the combined firm pre and post synergy is 41.95%.

Valuing Synergy

	Combined Firm without synergy	Combined Firm with synergy
Beta	?	?
Pre-tax cost of debt	5%	5%
Corporate tax rate	35%	35%
Debt to capital ratio	10%	10%
Revenue	Rs. 67,218	Rs. 67,218
EBIT	Rs. 13,572	**Rs. 13,572 + 200**
Capital Invested	Rs. 48,699	Rs. 48,699
Post tax return on Capital	?	**? + 1%**
Reinvestment Rate	**41.95%**	**41.95%**
Risk free rate	4.25%	4.25%
Length of Growth period	5 years	5 years
Risk Premium	4%	4%

Working Notes

Pre tax Return on Capital = 13,572 / 48,699

= 27.8691%

Post tax Return on Capital = 27.8691% x .65

= 18.11%

Valuing Synergy

	Combined Firm without synergy	Combined Firm with synergy
Beta	?	?
Pre-tax cost of debt	5%	5%
Corporate tax rate	35%	35%
Debt to capital ratio	10%	10%
Revenue	Rs. 67,218	Rs. 67,218
EBIT	Rs. 13,572	**Rs. 13,572 + 200**
Capital Invested	Rs. 48,699	Rs. 48,699
Post tax return on Capital	**18.11%**	**19.11 %**
Reinvestment Rate	**41.95%**	**41.95%**
Risk free rate	4.25%	4.25%
Length of Growth period	5 years	5 years
Risk Premium	4%	4%

Calculating Beta

Unlevered beta formula $= \dfrac{Levered\ \beta}{1+(1-tax)(\frac{Debt}{Equity})}$

- ➡ Unlevered beta for Acquiring firm $= \dfrac{0.80}{1+(1-0.35)(\frac{0.1}{0.9})} = 0.7461$

- ➡ Unlevered beta for Target firm $= \dfrac{0.90}{1+(1-0.35)(\frac{0.1}{0.9})} = 0.8394$

Calculating Beta

➡ Unlevered beta for combined firm

$$= (0.7461) \left(\frac{128,955.5}{128,955.5 + 29,481.98} \right) + (0.8394)(\frac{29,481.98}{128,955.5 + 29,481.98}) = 0.7635$$

➡ New levered beta or βLevered =

$$= \beta\text{Unlevered} \left[1 + (1 - tax) \frac{Debt}{Equity} \right]$$

$$= 0.7635 \ [1 + (1\text{-}0.35) \ (0.1/0.9)] = 0.8186$$

Valuing Synergy

	Combined Firm without synergy	Combined Firm with synergy
Beta	**0.8186**	**0.8186**
Pre-tax cost of debt	5%	5%
Corporate tax rate	35%	35%
Debt to capital ratio	10%	10%
Revenue	Rs. 67,218	Rs. 67,218
EBIT	Rs. 13,572	**Rs. 13,572 + 200**
Capital Invested	Rs. 48,699	Rs. 48,699
Post tax return on Capital	**18.11%**	**19.11 %**
Reinvestment Rate	**41.95%**	**41.95%**
Risk free rate	4.25%	4.25%
Length of Growth period	5 years	5 years
Risk Premium	4%	4%

Valuing Synergy - Solution

	Combined Firm with synergy
Cost of Equity = (Rf+ Bx Risk premium)	
After tax cost of debt = Kd	
Cost of Capital = Ke x We + Kd x Wd	
After tax return on capital	
Reinvestment Rate	
Expected Growth rate (return on capital x reinvestment rate)	

Calculating Costs

▶ Cost of equity = (Rf+ Bx Risk premium)
     = (4.25% + 0.8186 x 4%)
     = 7.52%

▶ After tax cost of debt = (0.65) 5% = 3.25%

▶ Cost of capital = Ke x We + Kd x Wd
     = 7.52% (0.90) + 3.25% (0.10)
     = 7.10%

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Valuing Cost Synergy - Solution

	Combined Firm with synergy
Cost of Equity = (Rf+ Bx Risk premium)	7.52%
After tax cost of debt = Kd	3.25%
Cost of Capital = Ke x We + Kd x Wd	7.10%
After tax return on capital	19.11%
Reinvestment Rate	41.95%
Expected Growth rate (return on capital x reinvestment rate)	8.02%

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Valuation of combined Firm with Synergy

Year	EBIT	EBIT (1-t) T=@35%	Reinvestm ent Rate	Reinvestment	FCFF	PV of FCFF
0	13772					
1	14876.51	9669.73	41.95%	4056.45	5613.28	5241.16
2	16069.61	10445.25	41.95%	4381.78	6063.47	5286.18
3	17358.39	11282.96	41.95%	4733.20	6549.76	5331.59
4	18750.54	12187.85	41.95%	5112.80	7075.05	5377.39
5	20254.33	13165.31	41.95%	5522.85	7642.47	5423.58
Terminal Year						
Total						26659.898

Reinvestment rate for perpetuity Acquiring Firm

Reinvestment Rate = Expected growth Rate in perpetuity/ Return on capital

$$= 4.25\% / 7.10\%$$

$$= 59.88\%$$

We assume that both firms will be in stable growth after year 5, growing 4.25% a year in perpetuity and earning no excess returns (i.e., return on capital = cost of capital).

Valuation of combined Firm with Synergy

Year	EBIT	EBIT (1-t) T=@35%	Reinvestment Rate	Reinvestment	FCFF	PV of FCFF
0	13772					
1	14876.51	9669.73	41.95%	4056.45	5613.28	5241.16
2	16069.61	10445.25	41.95%	4381.78	6063.47	5286.18
3	17358.39	11282.96	41.95%	4733.20	6549.76	5331.59
4	18750.54	12187.85	41.95%	5112.80	7075.05	5377.39
5	20254.33	13165.31	41.95%	5522.85	7642.47	5423.58
Terminal Year	21115.14	13724.84	59.88%	8218.43	5506	
Total						26659.898

Valuation of Target Firm

▶ Terminal Value = $FCFF_6$ / (Cost of capital in stable growth - growth rate)

$\quad\quad\quad\quad\quad$ = 5506.41 / (7.1% - 4.25%)

$\quad\quad\quad\quad\quad$ = 5506.41 / 2.85%

$\quad\quad\quad\quad\quad$ = 193207.23 Rs.

▶ PV of Terminal Value = 193207.23 / 1.4091

$\quad\quad\quad\quad\quad\quad\quad\quad$ = 137112.17 Rs.

▶ Value of Firm = PV of FCFF + PV of Terminal Value

$\quad\quad\quad\quad\quad$ = 26659.898 + 137112.17

$\quad\quad\quad\quad\quad$ = 163772.07 Rs.

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Value of Synergy

	Combined Firm Value without synergy	Combined Firm Value with Synergy	Value of Synergy
Value of the firm			
Terminal Value		Rs. 193207.23	
PV of FCFF		Rs. 26659.898	
PV of Terminal Value		Rs. 137112.17	
Value of the firm	158,437.48	Rs. 163,772.07	Rs. 5334.59

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Present Value of Synergy

If firm takes three years to create synergy

Present value of synergy = $5334.59 / 1.0710^3$

$$= Rs.\ 4342.428$$

The greater the delay in delivering synergy, the less is the value of the synergy.

Financial Synergy

- Diversification
- Cash slack
- Tax benefit
- Increase in debt capacity

Valuing Synergy - Diversification

	Acquiring Company	Target Company
Beta	1.2	0.9
Pre-tax cost of debt	5%	5%
Corporate tax rate	30%	30%
Debt to capital ratio	10%	10%
Revenue	Rs. 1,000	Rs. 500
EBIT	Rs. 50	Rs. 25
Pre tax return on Capital	15%	15%
Reinvestment Rate	70%	70%
Risk free rate	4.25%	4.25%
Length of Growth period	5 years	5 years
Risk Premium	4%	4%

Valuing Synergy - Solution

	Acquiring Firm	Target Firm
Cost of Equity = (Rf+ Bx Risk premium)		
After tax cost of debt		
Cost of Capital = Ke x We + Kd x Wd		
After tax return on capital		
Reinvestment Rate		
Expected Growth rate (high growth period) (return on capital x reinvestment rate)		

Valuing Synergy - Solution

	Acquiring Firm	Target Firm
Cost of Equity = (Rf+ Bx Risk premium)	9.05%	7.85%
After tax cost of debt	3.50%	3.50%
Cost of Capital = Ke x We + Kd x Wd	8.50%	7.42%
After tax return on capital	10.50%	10.50%
Reinvestment Rate	70%	70%
Expected Growth rate (high growth period) (return on capital x reinvestment rate)	7.35%	7.35%

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Value of Synergy

	Acquiring Firm	Target Firm	Combined Firm value without synergy
Value of the firm			
Terminal Value	Rs. 612.34	Rs. 350.76	
PV of FCFF	Rs. 50.86	Rs. 26.20	
PV of Terminal Value	Rs. 407.33	Rs. 245.30	
Value of the firm	Rs. 458.19	Rs. 271.50	Rs. 729.69

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Valuing Synergy - Solution

	Acquiring Firm	Target Firm	Combined Firm Value
Cost of Equity = (Rf+ Bx Risk premium)	9.05%	7.85%	
After tax cost of debt	3.50%	3.50%	
Cost of Capital = Ke x We + Kd x Wd	8.50%	7.42%	
After tax return on capital	10.50%	10.50%	
Reinvestment Rate	70%	70%	
Expected Growth rate (high growth period) (return on capital x reinvestment rate)	7.35%	7.35%	

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Working Notes

▶ Combined firm cost of equity

$$= 9.05\% \left(\frac{458.19}{458.19+271.50}\right) + 7.85\% \left(\frac{271.50}{458.19+271.50}\right)$$

$$= 8.60\%$$

▶ Combined firm cost of capital

$$= 8.50\% \left(\frac{458.19}{458.19+271.50}\right) + 7.42\% \left(\frac{271.50}{458.19+271.50}\right)$$

$$= 8.09\%$$

Valuing Synergy - Solution

	Acquiring Firm	Target Firm	Combined Firm Value
Cost of Equity = (Rf+ Bx Risk premium)	9.05%	7.85%	8.60%
After tax cost of debt	3.50%	3.50%	3.50%
Cost of Capital = Ke x We + Kd x Wd	8.50%	7.42%	8.09%
After tax return on capital	10.50%	10.50%	10.50%
Reinvestment Rate	70%	70%	70%
Expected Growth rate (high growth period) (return on capital x reinvestment rate)	7.35%	7.35%	7.35%

Reinvestment rate for perpetuity Combined Firm

Reinvestment Rate = Expected growth Rate in perpetuity/ Return on capital

$$= 4.25\% / 8.09\%$$

$$= 52.53\%$$

We assume that both firms will be in stable growth after year 5, growing 4.25% a year in perpetuity and earning no excess returns (i.e., return on capital = cost of capital).

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Valuation of combined Firm

Year	EBIT	EBIT (1-t) T=@35%	Reinvestment Rate	Reinvestment	FCFF	PV of FCFF
0	75					
1	80.51	56.36	70%	39.45	16.91	15.64
2	86.43	60.50	70%	42.35	18.15	15.54
3	92.78	64.95	70%	45.46	19.48	15.43
4	99.60	69.72	70%	48.81	20.92	15.32
5	106.92	74.85	70%	52.39	22.45	15.22
Terminal Year	111.47	78.03	52.53%	40.99	37.04	
Total						77.14

Valuation of Target Firm

$\blacktriangleright$ Terminal Value = $FCFF_6$ / (Cost of capital in stable growth - growth rate)

$$= 37.04 / (8.09\% - 4.25\%)$$
$$= 37.04 / 3.84\%$$
$$= 963.10 \text{ Rs.}$$

$\blacktriangleright$ PV of Terminal Value = 963.10 / 1.47
$$= 652.55 \text{ Rs.}$$

$\blacktriangleright$ Value of Firm = PV of FCFF + PV of Terminal Value
$$= 963.10 + 652.55$$
$$= 729.69 \text{ Rs.}$$

Value of Synergy

	Acquiring Firm	Target Firm	Combined Firm value with synergy
Value of the firm			
Terminal Value	Rs. 612.34	Rs. 350.76	Rs. 963.10
PV of FCFF	Rs. 50.86	Rs. 26.20	Rs. 77.14
PV of Terminal Value	Rs. 407.33	Rs. 245.30	Rs. 652.55
Value of the firm	Rs. 458.19	Rs. 271.50	Rs. 729.69
Synergy		zero	

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Valuing Synergy - Cash Slack

- Lets assume that firm A is cash rich and project poor and has a cash balance of $ 10 billion.
- Lets assume that firm B is cash poor and project rich and would have rejected projects with a collective net present value of Rs. 1 billion because of its cash constraints.
- The value of cash slack in this merger is Rs. 1 billion and can be considered synergy.
- However, this is based upon the assumption that failure to take these projects this year translates into losing them forever. To the extent that the cash poor firm could have deferred taking these investments to future years, the value of synergy will be the loss in present values in waiting to take these investments rather than the entire Rs. 1 billion today.

Valuing Synergy – Debt Capacity

After merger the debt capacity for the combined firm were increased to 20% from 10% (leading to an increase in the beta to 1.1866 and no change in the cost of debt), the value of the combined firm after the takeover can be estimated as shown in the next slide.

Valuing Synergy – Debt Capacity

	Acquiring Firm	Target Firm	Combined Firm Value
Beta	1.2	0.9	1.1866
Debt ratio	10%	10%	20%
Cost of Equity = (Rf+ Bx Risk premium)	9.05%	7.85%	9.00%
After tax cost of debt	3.50%	3.50%	3.50%
Cost of Capital = Ke x We + Kd x Wd	8.50%	7.42%	7.90%
After tax return on capital	10.50%	10.50%	10.50%
Reinvestment Rate	70%	70%	70%
Expected Growth rate (high growth period) (return on capital x reinvestment rate)	7.35%	7.35%	7.35%

Valuing Synergy – Debt Capacity

	Acquiring Firm	Target Firm	Combined Firm value with synergy
Value of the firm			
Terminal Value	Rs. 612.34	Rs. 350.76	Rs. 963.10
PV of FCFF	Rs. 50.86	Rs. 26.20	Rs. 77.56
PV of Terminal Value	Rs. 407.33	Rs. 245.30	Rs. 674.97
Value of the firm	Rs. 458.19	Rs. 271.50	Rs. 752.53
Synergy		Rs. 22.84	

Valuing Synergy – Tax Benefits

- Assume that an firm with expected operating income of Rs. 1 billion next year acquires a firm with a net operating loss carry forward of Rs. 1 billion.
- The computation of the synergy from this acquisition is the savings in taxes that accrue to the acquiring firm.
- For instance, with a marginal tax rate of 40%, the savings in taxes this year assuming that the tax authorities will allow offsetting the target firm's operating loss against the acquiring firm's gain is Rs. 400 million.
- This is the value of the tax savings synergy, if we assume that the target firm could never have used the net operating loss.

Valuing Synergy – Tax Benefits

- If the acquiring firm was expected to generate Rs. 250 million in operating income for the next 4 years and the target firm's net operating loss was used to shelter income in each year, the savings in taxes will still be Rs. 400 million, but spread out as Rs. 100 million in savings each year for four years.

- To value the tax saving synergy, we would have to discount these cash flows back to the present at a rate that reflects the uncertainty associated with receiving the benefits.

- Thus, if the cost of capital of the combined firm is 8.10% and the savings are Rs. 100 million a year for the next 5 years, the present value of the savings can be estimated as follows:

- Value of tax savings = Rs. 100 million (PV of annuity, 5 years, 8.10%) = Rs. 398 million

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Sharing Synergy Gain

If synergy adds significant value,

Who should get the benefits of this synergy?
✓ stockholders in the acquiring firm or
✓ stockholders in the target firm?

How synergy benefits actually get shared between acquirer and target.

How acquiring firms can improve their odds on getting a larger share of synergy benefits.

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Sharing Synergy Gain

If only the acquiring firm has the components necessary for the synergy firm, it should receive a large share of the synergy benefits.

If the acquiring firm's strengths are not unique and could be offered by other firms as well, the bargaining power shifts to the target firm and its stockholders should receive the bulk of the benefits.

Class Exercise

BBA(FIA) A Ltd. wants to acquire BBA(FIA) B Ltd. and the cash flows of BBA(FIA) A Ltd. and the merged entity [BBA(FIA) AB Ltd.] are given below:

					(Rs. In Lakhs)
Year	1	2	3	4	5
BBA(FIA) A Ltd.	175	200	320	340	350
BBA(FIA)AB Ltd.	400	450	525	590	620

Earnings would have witnessed 5% constant growth rate without merger and 6% with merger on account of economies of operations after 5 years in each case. The cost of capital is 15%.

The number of shares outstanding in both the companies before the merger is the same and the companies agree to an exchange ratio of 0.5 shares of BBA(FIA)A Ltd. for each share of BBA(FIA)B Ltd.

You are required to:

1. Compute the value of BBA(FIA)A Ltd. before and after merger.
2. Value of acquisition
3. Gain to shareholders of BBA(FIA)A Ltd.

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Solution

1. Present Value of cash flows upto 5 years

Year End	CF of A Ltd.	PVF @15%	PV of CF	CF of merged entity	PV of CF of Merged entity
1	175	0.870	152.25	400	348.00
2	200	0.756	151.20	450	340.20
3	320	0.658	210.56	525	345.45
4	340	0.572	194.48	590	337.48
5	350	0.497	173.95	620	308.14
			882.44		1679.27

PV of cash flows of BBA(FIA) A Ltd. after the forecast period

$$TV = \frac{CF_5 (1+g)}{K_e - g} = \frac{350 (1+0.05)}{0.15 - 0.05} = \frac{367.50}{0.10} = Rs.\, 3675\, Lakhs$$

PV of TV= Rs. 3675 x 0.497 = Rs. 1826.475

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Solution

1. Present Value of cash flows upto 5 years

Year End	CF of A Ltd.	PVF @15%	PV of CF	CF of merged entity	PV of CF of Merged entity
1	175	0.870	152.25	400	348.00
2	200	0.756	151.20	450	340.20
3	320	0.658	210.56	525	345.45
4	340	0.572	194.48	590	337.48
5	350	0.497	173.95	620	308.14
			882.44		1679.27

PV of cash flows of BBA(FIA) AB Ltd. after the forecast period

$$TV = \frac{CF_5 \, (1+g)}{K_e - g} = \frac{620 \, (1+0.06)}{0.15-0.06} = \frac{657.20}{0.09} = Rs. \, 7302.22 \; Lakhs$$

PV of TV= Rs. 7302.22 x 0.497 = Rs. 3629.20

Solution

Value of BFIA A Ltd. and BBA FIA AB Ltd.

	Before merger (Rs. L)	After merger (Rs. L)
PV of CF (1-5 Years)	882.440	1679.27
Add PV of TV	1826.475	3629.20
Total	2708.915	5308.47

Solution

2. Value of Acquisition
   = Value of merged entity – value of BBA(FIA) A Ltd.
   = Rs. 5308.47 L – Rs. 2708.915 L = Rs. 2599.555 L

3. Gain to shareholders of BBA(FIA) A Ltd.

Share of BBA(FIA) A Ltd. in merged entity
   = Rs. 5308.47 L x 1/1.5 = Rs. 3538.98 L

Gain to shareholder
   = Share of BBA(FIA) A Ltd. in merged entity – value of
                    BBA(FIA) A Ltd. before merger
   =Rs. 3538.98 L – Rs. 2708.915 = Rs. 830.065 L

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Class Exercise

BBAFIA Ltd. and BMS Ltd. are planning to merge. The total value of the companies are dependent on the fluctuating business conditions. The following information is given for the total value (debt + equity) structure of each of the two companies:

Business Condition	Probability	BBAFIA Ltd.	BMS Ltd.
High Growth	0.20	820	1050
Medium Growth	0.60	550	825
Slow Growth	0.20	410	590

The current debt of BBAFIA Ltd. is Rs. 460 lakhs and BMS Ltd. is Rs. 65 lakhs.
Calculate the expected value of debt and equity separately for the merged entity.

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Solution

Value of Equity for BBAFIA Ltd.

	High Growth	Medium Growth	Slow Growth
Debt + Equity	820	550	410
Less: Debt	460	460	460
Equity	360	90	-50

	High Growth		Medium Growth		Slow Growth		Expected Value
	Prob.	Value	Prob.	Value	Prob.	Value	
Debt	0.20	460	0.60	460	0.20	410	450
Equity	0.20	360	0.60	90	0.20	0	126
Total		820		550		410	576

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Solution Contd.

Value of Equity for BMS Ltd.

	High Growth	Medium Growth	Slow Growth
Debt + Equity	1050	825	590
Less: Debt	65	65	65
Equity	985	760	525

	High Growth		Medium Growth		Slow Growth		Expected Value
	Prob.	Value	Prob.	Value	Prob.	Value	
Debt	0.20	65	0.60	65	0.20	65	758
Equity	0.20	985	0.60	760	0.20	525	65
Total		1050		825		590	823

Solution Contd.

Expected Values

Equity		Debt	
BBAFIA Ltd.	126	BBAFIA Ltd.	450
BMS Ltd.	758	BMS Ltd.	65
	884		515

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Class Exercise

A Ltd. is considering acquiring B Ltd., the following information is available:

Company	Profit after tax	No. of equity shares	Market value per share
A Ltd.	Rs. 80,00,000	16,00,000	200.00
B Ltd.	Rs. 35,00,000	3,50,000	160.00

Exchange of equity shares for acquisition is based on current market value as above. There is no synergy advantage available:

1. Find the earning per share for company A Ltd. after merger.

2. Find the exchange ratio so that shareholders of B Ltd. would not be at a loss.

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Solution

1. Earning per share for company A. Ltd. after merger:
   Exchange ratio 160:200 = 4:5 or 0.8:1
   Total no. of shares to be issued = 0.8 * 3,50,000 shares
                                    = 2,80,000 shares
   Total no. of shares of A Ltd. and B Ltd.
        = 16,00,000 + 2,80,000 = 18,80,000

   Total profit after tax= 80,00,000+ 35,00,000= 115,00,000

   EPS = 115,00,000 / 18,80,000 = Rs. 6.11 per share

Solution

2. Find the exchange ratio so that shareholders of B Ltd. would not be at a loss.

A Ltd. EPS without merger = 80,00,000 / 16,00,000 = Rs. 5 per share

B Ltd. EPS without merger = 35,00,000 / 3,50,000 = Rs. 10 per share

Therefore, Exchange ratio should be: 10 shares of A Ltd. for every 5 shares of B Ltd.

Shares to be issued to B Ltd. = 3,50,000 * 10 / 5 = 7,00,000

Total no. of shares of A Ltd. & B Ltd.= 16,00,000 + 7,00,000= 23,00,000

EPS after merger of A Ltd. = 115,00,000 / 23,00,000 = Rs. 5 per share

Total earnings available to shareholders of B Ltd. after merger
= Rs. 7,00,000 * Rs. 5 = 35,00,000

This is equal to the earnings prior merger for B Ltd.

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Class Exercise

The CEO of a company thinks that shareholders always look for EPS. Therefore, he considers maximization of EPS as his company's objective. His company's current Net Profits are Rs. 80.00 lakhs and P/E multiple is 10.5. He wants to buy another firm which has current income of Rs. 15.75 lakhs & P/E multiple of 10.

What is the maximum exchange ratio which the CEO should offer so that he could keep EPS at the current level, given that the current market price of both the acquirer and the target company are Rs. 42 and Rs. 105 respectively?

If the CEO borrows funds at 15% and buys out Target company by paying cash, how much should he offer to maintain his EPS? Assume tax rate of 30%.

Solution

	Acquirer Co.	Target Co.
Net Profit	Rs. 80 Lakhs	Rs. 15.75 Lakhs
PE Multiple	10.50	10.00
Market capitalization	Rs. 840 Lakhs	Rs. 157.50 Lakhs
Market price	Rs. 42	Rs. 105
No. of shares	20 Lakhs	1.50 Lakhs
EPS	Rs. 4	Rs. 10.50

Maximum exchange ratio – 10.50:4 or 2.625:1

Thus, for every one share of Target co. 2.625 shares of acquirer co.

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Solution

2. Let Y lakhs be the amount paid by acquirer company to target company. Then to maintain the same EPS i.e., Rs. 4, the no. of shares to be issued will be:

EPS = Earning / No. of shares

4 = [(80Lakhs + 15.75 Lakhs) –(0.70 x 15% x Y)] / 20 Lakhs

4 = 95.75 – 0.105 Y / 20

Y = Rs. 150 Lakhs

Thus Rs. 150 Lakhs shall be offered in cash to target company to maintain same EPS.

Class Exercise

A Ltd. plans to acquire B Ltd. The relevant financial details of the two firms prior to the merger announcement are:

	A Ltd.	B Ltd.
Market price per share	Rs. 50	Rs. 25
Number of outstanding shares	20 Lakhs	10 lakhs

The merger is expected to generate gains, which have a present value of Rs. 200 lakhs. The exchange ratio agreed to is 0.5. What is the true cost of merger from the point of view of A Ltd.

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Solution

▶ Shareholders of B Ltd. will get 5 lakh share of A Limited, so they will get:
= 5 lakh / (20 lakh + 5 lakh) = 20% of shares A Limited

The value of A Ltd. after merger will be:
= Rs.50 x 20 lakh + Rs. 25 x 10 lakh + Rs. 200 lakh

= Rs.1000 lakh + Rs.250 lakh + Rs.200 lakh = Rs.1450 lakh

True Cost of Merger will be:
(Rs. 1450 x 20%) Rs. 290 lakhs – Rs. 250 lakhs = Rs. 40 lakhs

Q7.

ABC Ltd. is intending to acquire XYZ Ltd. by merger and the following information is available in respect of the companies:

	ABC Ltd.	XYZ Ltd.
Number of equity shares	10L	6L
Earnings after tax	50L	18L
Market value per share	42	28

You are to calculate:
(i) What is the present EPS of both the companies?
(ii) If the proposed merger takes place, what would be the new earning per share for ABC Ltd.? Assume that the merger takes place by exchange of equity shares and the exchange ratio is based on the current market price.
(iii) What should be exchange ratio, if XYZ Ltd. wants to ensure the earnings to members are as before the merger takes place?

Solution

What is the present EPS of both the companies?
- ➡ ABC Ltd. : 50,00,000 / 10,00,000 = Rs. 5
- ➡ XYZ Ltd. : 18,00,000 / 6,00,000 = Rs. 3

Solution

If the proposed merger takes place, what would be the new earning per share for ABC Ltd.? Assume that the merger takes place by exchange of equity shares and the exchange ratio is based on the current market price.

Exchange Ratio = 28/ 42

6,00,000 x 28/42 = 4,00,000 shares

Total Earnings = 68 L
Total Shares = 10L + 4 L = 14L
EPS = 68L / 14L = Rs. 4.86

Solution

What should be exchange ratio, if XYZ Ltd. wants to ensure the earnings to members are as before the merger takes place?

Shares to be exchanged based on EPS = 3/5x 6,00,000
= 3,60,000 shares

EPS after merger = 68,00,000 / 13,60,000 = Rs. 5

Total earnings in ABC Ltd. available to shareholders of XYZ Ltd. = 3,60,000x5 = Rs. 18,00,000

New exchange ratio = 0.6

XYZ Ltd., is considering merger with ABC Ltd. XYZ Ltd.'s shares are currently traded at Rs. 20. It has 2,50,000 shares outstanding and its earnings after taxes (EAT) amount to Rs. 5,00,000. ABC Ltd., has 1,25,000 shares outstanding; its current market price is Rs. 10 and its EAT are Rs. 1,25,000. The merger will be effected by means of a stock swap (exchange). ABC Ltd., has agreed to a plan under which XYZ Ltd., will offer the current market value of ABC Ltd.'s shares:

A. What is the pre-merger EPS and P/E ratios of both the companies?

B. If ABC Ltd.'s P/E ratio is 6.4, what is its current market price? What is the exchange ratio? What will XYZ Ltd.'s post-merger EPS be?

C. What should be the exchange ratio; if XYZ Ltd.'s pre-merger and post-merger EPS are to be the same?

Solution

What is the pre-merger EPS and P/E ratios of both the companies?

	XYZ	ABC
MPS	Rs. 20	Rs. 10
Outstanding Shares	2,50,000	1,25,000
EAT	5,00,000	1,25,000
EPS	2	1
PE Ratio	10	10

Solution Contd.

- If ABC Ltd.'s P/E ratio is 6.4, what is its current market price? What is the exchange ratio? What will be XYZ Ltd.'s post-merger EPS?

PE Ratio = MPS / EPS
6.4 = MPS / 1
MPS = Rs. 6.4

Target share price / Acquirer share price = Exchange ratio
6.4 / 20 = .32

Total earnings = 5,00,000 + 1,25,000 = 6,25,000
Total shares = 2,50,000 + 1,25,000x.32 = 2,90,000
Post merger EPS = 6,25,000 / 2,90,000 = Rs. 2.15

Solution

▶ What should be the exchange ratio; if XYZ Ltd.'s pre-merger and post-merger EPS are to be the same?

EPS = EAT / Outstanding shares
2 = 6,25,000 / OS
OS = 3,12,500

ABC + XYZ = 3,12,500
ABC = 3,12,500 – 2,50,000 = 62,500 shares

Exchange Ratio
1,25,000 (x) = 62,500
X = 62,500 / 1,25,000 = 0.5

Thank You