

Illustration 32.2: DCF Valuation of an Acquisition

The management of Sangam Fertilisers Company (SFC) is concerned about the fluctuating sales and earnings. The variability of the company's earnings has caused its P/E ratio at about 22 to be much lower than the industry average of about 45. Tables 32.1 and 32.2 contain SFC's most recent summarised profit and loss account and balance sheet. Currently, SFC's share is selling for Rs 57.60 in the market. To boost its sales and bring stability to its earnings, SFC's management has identified Excel Chemicals Company as a possible target for acquisition. Excel is known for its quality of products and its nation-wide markets. The company has not been performing well in the recent past due to poor management (see Tables 32.3 and 32.4 for Excel's summarised financial performance). Its sales have grown at 4 per cent per year during the 2000–04 against the industry growth rate of 8 per cent per year. The current price of Excel's share is Rs 24.90.

Table 32.3: SFC: Summarised Profit and Loss Account during the Year Ending on 31 March, 2004

<i>(Rs in crore)</i>	
Profit and Loss Items	
Net Sales	8,205
Cost of goods sold	5,975
Depreciation	143
Selling & administrative	1,020
Total expenses	7,138
PBIT	1,067
Interest	284
PBT	783
Tax	380
PAT	403
Per Share Data	
EPS (Rs)	2.56
DPS (Rs)	1.80
Book value (Rs)	27.49
Market Value (Rs):	
High	75.05
Low	38.00
Average	56.53
P/E ratio:	
High	29.32
Low	14.84
Average	22.08

The management of SFC is confident that after acquisition, they could turn around Excel. They could increase Excel's growth rate to 8 per cent within two-three years and reduce cost of goods sold to 66 per cent of sales and selling and administrative expenses to 15 per cent. SFC anticipates that to support the growth in Excel's sales, capital expenditure (CAPEX) equal to 5 per cent of sales may be needed each year. The capital will maintain its capital structure in the market value terms at the current level. The market borrowing rate is 15 per cent. The corporate tax rate is 35 per cent.

What is the value of Excel if SFC acquires it? At what price should SFC pay for each share of Excel?

Table 32.4: SFC: Summarised Balance Sheet as on 31 March, 2004

	(Rs in crore)	
Source of Funds		
Shareholders' Funds		
Paid up capital (157.50 crore shares @ Rs 10)	1,575	
Reserves and Surplus	2,755	4,330
Borrowed Funds:		
Secured	1,203	
Unsecured	967	2,170
Capital Employed		6,500
Uses of Funds		
Gross Block	6,231	
Less: Depreciation	1,626	
Net Block	4,605	
Investment	29	4,634
Current Assets	3,726	
Less: Current Liabilities	1,860	
Net Current Assets		1,866
Net Assets		6,500

Table 32.5: Excel Chemicals Company: Summarised Profit and Loss Statement and Per Share Data

	(Rs in crore)				
	2000	2001	2002	2003	2004
Profit and Loss Items					
Net Sales	1,442	1,477	1,580	1,642	1,695
Cost of goods sold	995	1,042	1,125	1,165	1,195
Depreciation	37	40	45	45	40
Selling and admin. expenses	260	275	280	292	302
Total expenses	1,292	1,357	1,450	1,502	1,537
PBIT	150	120	130	140	158
Interest	19	15	23	25	30
PBT	131	105	107	115	128
Tax	45	34	35	40	45
PAT	86	71	72	75	83

(Contd.)

	(Rs in crore)				
	2000	2001	2002	2003	2004
Per Share Data					
EPS (Rs)	3.44	2.84	2.88	3.00	3.32
DPS (Rs)	1.70	1.50	1.50	1.70	2.20
Book value (Rs)	23.76	25.00	26.28	27.68	29.20
Market Value (Rs):					
High	30.84	44.04	42.25	35.48	28.16
Low	22.12	25.80	24.38	16.28	13.14
Average	26.48	34.92	33.32	25.88	20.65
P/E ratio:					
High	8.97	15.51	14.67	11.83	8.48
Low	6.43	9.08	8.47	5.43	3.96
Average	7.70	12.30	11.57	8.27	6.22

Table 32.6: Excel Chemicals Company: Summarized Balance Sheet as on 31 March, 2004

	(Rs in crore)	
Balance Sheet Items		
Source of Funds		
Shareholders' Funds		
Paid up capital (25,000 shares of Rs 10 each)	250	
Reserves and Surplus	425	675
Borrowed Funds:		
Secured	200	
Unsecured	95	295
Capital Employed		970
Uses of Funds		
Gross Block	657	
Less: Depreciation	285	
Net Block		372
Investment		23
Current Assets	753	
Less: Current Liabilities	178	
Net Current Assets		575
Net Assets		970

We can use the DCF approach to determine the value of Excel to SFC. The economic gain from the merger of Excel with SFC would basically come from the higher sales growth and improved profitability due to reduction in the cost of goods sold and the selling and administrative expenses. It is expected that if SFC acquires Excel, it would be able to improve Excel's overall management, use its strong distribution system for increasing sales, and consolidate its operations, systems and functions to facilitate operating economies and cost reduction.

Estimating Free Cash Flows

Revenues and expenses The first step in the estimation of cash flows is the projection of sales. Excel in the past has grown at an average annual rate of 4 per cent. After acquisition, sales are expected to grow at 8 per cent per year. We assume that SFC would need a few years to achieve this growth rate. Thus sales may be assumed to grow at 5 per cent in 2005, 6 per cent in 2006, 7 per cent in 2007 and thereafter, at 8 per cent per annum. The second step is to estimate expenses. Due to operating efficiency and consolidation of operations, costs are expected to decline. Excel's cost of goods sold has averaged around 70–71 per cent of sales and is now anticipated to be brought down

to 66 per cent of sales. We may assume that SFC would take about two-three years to reduce the cost of goods sold. Selling and administrative expenses can also be estimated in the similar way.

Capex and depreciation Depreciation can be estimated keeping in mind the anticipated capital expenditure in each year (*viz.*, 5 per cent of sales) and average annual depreciation rate (*viz.*, about 11 per cent for Excel during the past five years). We have assumed a diminishing balance method for depreciation.¹ Thus, depreciation for 2005 and 2006 would be as follows:

$$\begin{aligned} \text{DEP}_{05} &= 0.11(372 + \text{CAPEX}_{04}) \\ &= 0.11(372 + 0.05 \times 1780) \\ &= 0.11(372 + 89) = 0.11(461) = 51 \\ \text{DEP}_{06} &= 0.11(461 - 50 + 0.05 \times 1887) \\ &= 0.11(411 + 94) = 56 \end{aligned}$$

CAPEX and depreciation for other years can be similarly calculated as shown in Table 32.5.

Working capital changes In the calculation of the cash flows, we should also account for increase in net working capital (NWC) due to expansion of sales. Excel's net working capital to sales ratio in 2004 is 34 per cent. If assume that working capital is managed as in the past, we can

expect NWC to sales ratio to remain as 34 per cent. Note that since we shall be calculating the value of Excel (representing the value of both shareholders and lenders), using the weighed cost of capital as the discount rate, interest charges would not be subtracted in calculating free flows. Excel has been paying an average tax of 34 per cent. This might be due to tax incentives available to the company. The company will pay tax at current marginal tax rate of 35 per cent. Table 32.7 provides the estimation of net cash flows.

Estimating the Cost of Capital

Since we are determining Excel's value, the discount rate should be Excel's average cost of capital. In the year 2004, the outstanding debt of the company is Rs 295 crore and interest paid is Rs 30 crore. Thus, the interest rate works out to 10.2 per cent. The current rate of borrowing is 15 per cent. On the after-tax basis, the cost of debt would be: $0.15(1 - 0.35) = 0.0975$ or 9.75 per cent.

We can calculate the company's cost of equity using the dividend-growth model. Excel's current share price is Rs 24.90, and it paid a dividend of Rs 2.20 in 2004. Thus, its dividend yield is: $2.20/24.90 = 0.088$ or 8.8 per cent. The company has been paying about 55 per cent of its earnings as dividend and retaining 45 per cent. The average return (over last five years) on equity has been about 12 per cent. Thus, the company's growth rate is: $0.45 \times 0.12 = 0.054$ or 5.4 per cent. Excel's

Table 32.7: Excel Chemicals Company

Estimation of Cash Flows

(Rs in crore)

Year	Actual				Estimates						
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Net sales	1695	1780	1887	2019	2180	2354	2543	2746	2966	3203	3460
Cost of goods sold	1195	1246	1302	1360	1439	1554	1678	1813	1958	2114	2283
S&A expenses	302	302	302	302	327	353	381	412	445	480	519
Depreciation	40	51	56	61	66	72	78	84	91	99	107
Total expenses	1537	1599	1660	1723	1832	1979	2137	2309	2494	2693	2909
PBIT	158	181	227	296	348	376	405	438	472	510	550
Tax @ 35%	55	63	79	104	122	132	142	153	165	178	193
NOPAT	103	118	148	192	226	244	264	284	307	331	358
Plus: Depreciation	40	51	56	61	66	72	78	84	91	99	107
Funds from operations	143	168	203	253	292	316	341	369	398	430	465
Less: Increase NWC*		30	36	45	55	59	64	69	75	81	87
Cash from operations		138	167	208	237	257	277	299	324	350	378
Less: Capex		89	94	101	109	118	127	137	148	160	173
Free cash flows		49	72	107	128	139	150	162	175	189	205
Add: Salvage value											2369
NCF		49	72	107	128	139	150	162	175	189	2574
PVF at 13%		.885	.783	.693	.613	.543	.480	.425	.376	.333	.295
Present value	1355	43	56	74	78	75	72	69	66	63	759
* NWC (34% of sales)	575	605	641	686	741	801	865	934	1008	1089	1176

1. It is assumed that 11 per cent represent the average of the WDV depreciation rates for the various blocks of assets, as prescribed under the Indian tax rules.

cost of equity is: $0.088 + 0.054 = 0.142$ or 14.20 per cent. The company has outstanding debt of Rs 295 crore and the market value of equity is Rs 622.50 crore (25 crore $\times$ Rs 24.90). Thus debt ratio is: $295/622.50 = 0.32$ or 32 per cent. Given its capital structure in the year 2004, its weighted average cost of capital is about 13 per cent (see Table 32.8).

Table 32.8: Excel's Weighted Average Cost of Capital

	Amount (Rs in crore)	Weighted	Cost	Weight Cost
Equity	622.50	0.68	0.1420	0.097
Debt	295.00	0.32	0.0975	0.031
	917.50	1.000		0.128

Terminal Value

Terminal value is the value of cash flows after the horizon period. It is difficult to estimate the terminal value of the firm. One approach is to capitalise the net operating profit after tax (NOPAT) at the end of the horizon period at WACC. NOPAT at the end of horizon period (tenth year) is Rs 358 crore and the discount rate is 13 per cent. Thus, the salvage value is:

$$\text{Salvage value} = \frac{\text{NOPAT}}{\text{Cost of capital}} = \frac{358}{0.13} = \text{Rs } 2,754$$

The conceptually more appropriate approach is to consider net cash flows (not earnings) for calculating the salvage value. We may take a conservative approach and assume that after horizon period, cash flows will not grow. Thus the terminal value will be as follows:

$$\text{Salvage value} = \frac{\text{NCF}}{\text{Cost of capital}} = \frac{205}{0.13} = \text{Rs } 1,577$$

The alternative assumption is that net cash flows would grow at a constant normal rate of 4 per cent. Then, the salvage value can be calculated using a method similar to the dividend-growth model as follows:

$$\begin{aligned} SV_n &= \frac{NCF_n(1+g)}{k-g} \\ &= \frac{205(1.04)}{0.13-0.04} = \frac{213.20}{0.09} = \text{Rs } 2,369 \end{aligned}$$

We have used this value, (Rs 2,369 crore) in our calculations in Table 32.7.

Value of Excel's Shares

We can discount the net cash flows in Table 32.5 to calculate Excel's value. It is Rs 1,300 crore. Since EXCEL has Rs 295 crore outstanding debt in the year 2004, the value of its shares is:

	(Rs in crore)
Excel's Value	1355
Less: Debt	295
Value of Excel's Shares	1060
Value per share = $\frac{1060}{25}$	= Rs 42.40

The maximum price per share that SFC may be prepared to pay for Excel's share is Rs 42.40. The current market price of the share is Rs 24.90. Thus, SFC may have to pay a premium of

about 70 per cent over the current market price. How should SFC finance acquisition of Excel? Should it exchange shares or pay in cash?

FINANCING A MERGER

Cash or exchange of shares or a combination of cash, shares and debt can finance a merger or an acquisition. The means of financing may change the debt-equity mix of the combined or the acquiring firm after the merger. When a large merger takes place, the desired capital structure is difficult to be maintained, and it makes the calculation of the cost of capital a formidable task. Thus, the choice of the means of financing a merger may be influenced by its impact on the acquiring firm's capital structure. The other important factors are the financial condition and liquidity position of the acquiring firm, the capital market conditions, the availability of long-term debt etc.

Cash Offer

A cash offer is a straightforward means of financing a merger. It does not cause any dilution in the earnings per share and the ownership of the existing shareholders of the acquiring company. It is also unlikely to cause wide fluctuations in the share prices of the merging companies. The shareholders of the target company get cash for selling their shares to the acquiring company. This may involve tax liability for them.

Let us assume that SFC decided to offer a price of Rs 42.40 per share to acquire Excel's shares. If SFC wants to pay cash for the shares, it would need Rs 1,060 crore in cash. It can borrow funds as well as use its tradable (temporary) investment and surplus cash for acquiring Excel. SFC's current debt is Rs 2,170 crore, which is 50 per cent of its book value equity. After merger, the combined firm's debt would be Rs 2,465 crore (Rs 2,170 crore of SFC and Rs 295 crore of Excel). The debt capacity of the combined firm would depend on its target debt-equity ratio. Assuming that it is 1:1, then it can have a total debt of Rs 4,330 crore (i.e., equal to the combined firm's equity, which is, pre-merger equity of SFC). Thus, unutilised debt capacity is Rs 1,865, crore (i.e., Rs 4,330 crore minus the combined debt of SFC and Excel, Rs 2,465 crore). Further, both companies have marketable investments of Rs 52 crore, which may also be available for acquisition. Given SFC has unutilised debt capacity (Rs 1,865 crore), it can borrow Rs 1,060 crore to acquire Excel.

Share Exchange

A share exchange offer will result into the sharing of ownership of the acquiring company between its existing shareholders and new shareholders (that is, shareholders of the acquired company). The earnings and benefits would also be shared between these two groups of shareholders. The precise extent of net benefits that accrue to each group depends on the **exchange ratio** in terms of the market prices of the shares of the acquiring and the acquired companies. In an exchange of shares, the receiving shareholders would not pay any ordinary income tax immediately. They would pay capital gains tax when they sell their shares after holding them for the required period.

SFC, instead of paying cash, could acquire Excel through the exchange of shares. For simplicity, let us assume that SFC's

share price is fairly valued in the market. If the company feels that its shares are either under-valued or over-valued in the market, it can follow a similar procedure as in the case of Excel to calculate the value of its shares. SFC's current price per share is Rs 57.80 and it has 157.50 crore outstanding shares. At its current share price, the company must exchange: Rs 1,060 crore/ Rs 57.80 = 18.34 crore shares to pay Rs 1,060 crore to Excel. After acquisition, SFC would have 175.84 crore (157.50 crore + 18.34 crore) shares outstanding. Thus, in the combined firm, Excel's shareholders would hold about 10.4 per cent of shares (i.e., 18.34/175.84). Excel's shares are valued at Rs 1,060 crore and the value of SFC's shares at the current market price is Rs 9,104 crore (157.5 crore × Rs 57.80). Thus the post-merger value of the combined firm is Rs 10,164 crore, and per share value is: Rs 10,164/175.84 = Rs 57.80. Thus there is no loss, no gain to SFC's shareholders.

Table 32.8: Impact of SFC and Excel Merger on EPS

SFC's (the acquiring firm) PAT before merger, PAT _a (Rs in crore)	403.00
Excel's (the acquired firm) PAT if merged with SFC, PAT _b (Rs in crore)	83.00
PAT of the combined firms after merger, PAT _a + PAT _b = PAT _c (Rs in crore)	486.00
SFC's EPS before merger (EPS _a) (Rs)	2.56
Maximum number of SFC's shares maintaining EPS of Rs 2.56: (486/2.56) (crore)	189.84
SFC's (the acquiring firm) outstanding shares before merger (N _a) (crore)	157.50
Maximum number of shares to be exchanged without diluting EPS: (189.84–157.50) (crore)	32.34

SFC would be offering 18.34 crore shares for 25 crore outstanding shares of Excel, which means 0.734 shares of SFC for one share of Excel or a **swap ratio** of 0.734:1. The book value of SFC's share in 2004 is Rs 27.49 while that of Excel is Rs 29.20. Thus, SFC alternatively could offer 0.94 shares for each outstanding share of Excel without diluting its present book value. Since it is exchanging only 0.734 shares, its book value of equity should increase.

Impact on Earnings per Share Would SFC's EPS be diluted if it exchanged 18.34 crore shares to Excel? Or, what is the maximum number of shares, which SFC could exchange without diluting its EPS? Let us assume the earnings of both firms at 2004 level. We can calculate the maximum number of SFC's shares to be exchanged for Excel's shares without diluting the former company's EPS after merger as shown in Table 32.8.

We can also directly calculate the maximum number of shares as follows:

Maximum number of share to be exchanged without EPS dilution

$$= \frac{\text{Acquiring firm's post-merger earnings}}{\text{Acquiring firm's pre-merger EPS}} - \text{Acquiring firm's pre-merger shares}$$

$$= \frac{\text{PAT}_a + \text{PAT}_b}{\text{EPS}_a} - N_a$$

$$= \frac{403 + 83}{2.56} - 157.5 = 32.34 \text{ crore}$$

Thus SFC (the acquiring firm) could exchange 1.294 (i.e., 32.34/25) of its shares for one share of Excel (the acquired firm) without diluting its EPS after merger. Since it is exchanging only 0.734 shares, its EPS after merger would be as shown below:

SFC's PAT after merger (Rs 403 crore + Rs 83 crore)	486.00
Number of shares after merger (157.50 + 18.34)	175.84
SFC's EPS after merger: 486/175.84	2.76

Table 32.9 summarizes the effect of the merger of Excel with SFC on EPS, market value and price-earning ratio with an exchange ratio of 0.734.

Table 32.9: Merger of Excel with SFC: Impact on EPS, Book Value, Market Value and P/E Ratio

	SFC (before merger)	Excel	SFC (after merger)
1. Profit after tax (Rs in crore)	403.00	83.00	486.00
2. Number of shares (crore)	157.50	25.00	175.84
3. EPS (Rs)	2.56	3.32	2.76
4. Market value per share (Rs)	57.80	24.90	57.80
5. Price-earnings ratio (times)	22.60	7.50	20.94
6. Total market capitalisation (Rs in crore)	9,104	1,060	10,164

Notes:

- In line 2 SFC's number of shares after merger would be: 157.5 + (0.734 × 25) = 175.84 crore.
- In line 6, the value of Excel's share is based on its evaluation by SFC reflecting future growth and cost savings. At the current market value of Rs 24.90, the market capitalisation in Rs 622.50 crore.
- Market value per share after merger would be: Rs 10,164/175.84 = Rs 57.80.

You may observe that for Excel's (the acquired firm) pre-merger EPS of Rs 3.32, the price paid is Rs 42.40. Thus, the price-earnings ratio paid to Excel is: Rs 42.40/3.32 = 12.2 times. Since the price-earnings ratio exchanged is less than SFC's (the acquiring firm) price-earnings ratio of 22.6, SFC's EPS after merger increases. However, in terms of value, there is no change. In fact, the post merger price-earnings ratio falls to: Rs 57.8/ Rs 2.76 = 20.94 times.

We can notice from Table 32.9 that after merger the market value per share is Rs 57.80 and total capitalisation increases to Rs 10,164 crore, more by Rs 437.50 crore of the sum of the capitalization of individuals firms (Rs 57.80 × 157.50 crore plus Rs 24.90 × 25 crore) = Rs 9,104 crore + Rs 622.50 crore = Rs 9,726.50 crore. This increased wealth, however, does not benefit the shareholders of SFC since it is entirely transferred to Excel's shareholders as shown below:

Total capitalisation of Excel's shareholders after merger (Rs in crore)	1,060.00
Total capitalisation of Excel's shareholders before merger (Rs in crore)	622.50
Net gain (Rs in crore)	437.50

Would the shareholders of SFC gain if there was no economic gain from the merger and the exchange ratio was in terms of the current market price of the two companies' shares? The market price **share exchange ratio** (SER) would be:

$$\text{SER} = \frac{\text{Share price of acquired firm}}{\text{Share price of the acquiring firm}} = \frac{P_b}{P_a} = \frac{24.90}{57.80} = 0.431 \quad (2)$$

Bootstrapping: SFC would issue 10.77 (i.e., 25×0.431) shares to Excel in terms of current prices SER. Does the acquiring firm benefit if shares are exchanged in proportion of the current share prices? Let us assume that there are no benefits of acquisition. Table 32.10 summaries the impact of the share exchange in terms of the current market prices (without any gain from merger/acquisition). SER at current share prices implies that the acquiring company (SFC) pays no premium to the acquired company (Excel).

Table 32.10: Impact of the Acquisition of Excel by SFC: SER 0.431

	SFC (before merger)	Excel	SFC (after merger)
1. Profit after tax (Rs in crore)	403.00	83.00	486.00
2. Number of shares (crore)	157.50	25.00	168.30
3. EPS (Rs)	2.56	3.32	2.89
4. Market value per share (Rs)	57.80	24.90	57.80
5. Price-earnings ratio (times)	22.60	7.50	20.00
6. Total market capitalisation (Rs in crore)	9,104.00	622.50	9,726.50

Notes:

- In line 2 SFC's number of shares after merger would be: $157.50 + (0.431 \times 25) = 168.30$ crore.
- In line 6, the value of Excel's share is taken as the current market price.
- Market value per share after merger would be: $\text{Rs } 9,726.50 / 168.30 = \text{Rs } 57.80$.

There is no gain from the merger and the market value after acquisition of Excel remains the same. However, SFC is able to increase its EPS from Rs 2.56 to Rs 2.89 after acquisition. The reason is that its profit after tax increases by 20.6 per cent after acquisition while the number of shares increases by 6.9 per cent only. The price-earnings ratio declines to 20 ($P/E = \text{Rs } 57.8 / 2.89 = 20$) as there is no change in the market value per share and EPS increases after merger. This is known as the **bootstrapping phenomenon**, and it creates an illusion of benefits from the merger.¹ Once again, it may be noticed that the price-earnings

ratio exchanged by the acquiring firm (SFC), $\text{Rs } 24.9 / \text{Rs } 3.32 = 7.50$ is less than its price-earnings ratio, and this resulted in higher EPS for the acquiring firm.

In case of Excel's acquisition by SFC, there is expected to be increase in Excel's capitalisation due to improvement in profit margin and operating efficiencies. We have seen earlier that if the exchange ratio is 0.734, the entire gain is transferred to the shareholders of Excel. Possibly, Excel's shares would remain 'under valued', if SFC does not acquire it. Can a negotiation take place so that the shareholders of SFC also gain from the increased wealth from merger? Let us assume economic gain ($\text{Rs } 1,060 - \text{Rs } 622.5 = \text{Rs } 437.5$ crore) and SER in terms of the current market value of two companies, i.e., 0.431. The effect is shown in Table 32.11.

Table 32.11: Impact of the Acquisition of Excel by SFC: SER 0.431

	SFC (before merger)	Excel	SFC (after merger)
1. Profit after tax (Rs in crore)	403.00	83.00	486.00
2. Number of shares (crore)	157.50	25.00	168.30
3. EPS (Rs)	2.56	3.32	2.89
4. Market value per share (Rs)	57.80	24.90	60.39
5. Price-earnings ratio (times)	22.50	7.50	21.40
6. Total market capitalisation (Rs in crore)	9,104.00	1,060.00	10,164.00

Notes:

- In line 2, SFC's number of shares after merger would be: $157.50 + (0.431 \times 25) = 168.30$ crore.
- In line 6, the value of Excel's share is taken as Rs 1,060 crore, which is based on its evaluation by SFC reflecting future growth and cost savings.
- Market value per share after merger would be: $\text{Rs } 10,164 / 168.30 = \text{Rs } 60.39$.

We may observe from Table 32.12 that the market value of SFC's share is expected to be higher (Rs 60.39) after merger as compared to the before-merger value (Rs 57.80). Shareholders of both Excel and SFC, as shown below, share the net increase in wealth:

(Rs in crore)

Gain to SFC's (the acquiring firm) shareholders:

$$(P_{ab} - P_a)N_a = (60.39 - 57.80) \times 157.50 \quad 409.00$$

Gain to Excel's (the acquired firm shareholders):

$$P_{ab} \times (\text{SER}) N_b - P_a \times N_b = 60.39 \times 10.78 - 24.90 \times 25 \quad 28.50$$

Total gain:

$$P_{ab} \times (N_a + (\text{SER}) N_b) - (P_a \times N_a + P_b \times N_b) = 60.39 (157.5 + 0.431 \times 25) - (57.8 \times 157.5 + 24.9 \times 25) \quad 437.50$$

Thus, the distribution of the merger gain between the shareholders of the acquiring and target companies can be calculated as follows:

1. Myers, S.C., A Framework for Evaluating Mergers, *Modern Developments in Financial Management*, S.C. Myers (ed.), Praeger, 1976. Also see Brealey and Myers, *op. cit.*, p. 825.

$$\begin{aligned} \text{Merger gain} &= \text{Gain to the acquiring company's} \\ &\quad \text{shareholders} + \text{Gain to the acquired} \\ &\quad \text{company's shareholders} \\ &= (P_{ab} - P_a) N_a + P_{ab} (N_a + \text{SER} (N_b)) - P_b \times N_b \quad (3) \end{aligned}$$

where P_{ab} is the price per share after merger, P_a before-merger share price of the acquiring company, P_b before-merger share price of the target company, N_a before-merger number of shares of the acquiring company, N_b before-merger number of shares of the target company and SER is the share exchange ratio. Using Equation (3), the merger gain for the shareholders of SFC and Excel in Illustration 32.2 can be computed as follows:

$$\begin{aligned} 1,060 - 622.50 &= (60.4 - 57.8) 157.5 \\ &\quad + [60.4 \times (24.9/57.8) (25) - 24.9 \times 25] \\ 437.50 &= 2.60 \times 157.5 + [60.4 \times (0.431) 25 - 24.9 \times 25] \\ &= 409.0 + 28.5 = \text{Rs } 437.50 \text{ crore} \end{aligned}$$

We may observe that the market value per share of the combined firm (P_{ab}) is higher than that of the acquiring or the acquired firm because of the operating economies and improved margin in the operation of the acquired firm. Thus the total gain is also equal to the fair value of Excel's shares (Rs 1,060 crore) minus the current market capitalization (Rs 622.5), i.e., Rs 437.50.

MERGER NEGOTIATIONS: SIGNIFICANCE OF P/E RATIO AND EPS ANALYSIS

In practice, investors attach a lot of importance to the earnings per share (EPS) and the price-earnings (P/E) ratio. The product of EPS and P/E ratio is the market price per share. In an efficient capital market, the market price of a share should be equal to the value arrived by the DCF technique. In reality, a number of factors may cause a divergence between these two values. Thus, in addition to the market price and the discount value of shares, the mergers and acquisitions decisions are also evaluated in terms of EPS, P/E ratio, book value etc. We have already discussed the impact of merger on these variables in the case of the merger of SFC and Excel (Illustration 32.2). In this section, we extend the discussion in a more formal manner in the context of the negotiations in terms of exchange of shares.

Share Exchange Ratio

In practice, in a number of deals, the current market values of the acquiring and the acquired firms are taken as the basis for exchange of shares. As discussed earlier, the share exchange ratio (SER) would be as follows:

$$\begin{aligned} \text{Share exchange ratio} &= \frac{\text{Share price of the acquired firm}}{\text{Share price of the acquiring firm}} \\ &= \frac{P_b}{P_a} \end{aligned}$$

The exchange ratio in terms of the market value of shares will keep the position of the shareholders in value terms unchanged after the merger since their proportionate wealth would remain at the pre-merger level. There is no incentive for

the shareholders of the acquired firm, and they would require a premium to be paid by the acquiring company. Could the acquiring company pay a premium and be better off in terms of the additional value of its shareholders? In the absence of net economic gain, the shareholders of the acquiring company would become worse-off unless the price-earnings ratio of the acquiring company remains the same as before the merger. For the shareholders of the acquiring firm to be better-off after the merger without any net economic gain either the price-earnings ratio will have to increase sufficiently higher or the share exchange ratio is low, the price-earnings ratio remaining the same. Let us consider an example.

Suppose Shyama Enterprise is considering the acquisition of Rama Enterprise. The following are the financial data of two companies:

	Shyama Enterprise	Rama Enterprise
Profit after tax (Rs)	40,000	8,000
Number of shares	10,000	4,000
EPS (Rs)	4	2
Market value per share (Rs)	60	15
Price earnings ratio (times)	15	7.5
Total market capitalisation (Rs)	600,000	60,000

Shyama Enterprise is thinking of acquiring Rama Enterprises through exchange of shares in proportion of the market value per share. If the price-earnings ratio is expected to be (a) pre-merger P/E ratio of Rama, i.e., 7.5, (b) pre-merger P/E ratio of Shyama, i.e., 15, (c) weighted average of pre-merger P/E ratio of Shyama and Rama, i.e., 13.75, what would be the impact on the wealth of shareholders after merger?

Since the basis of the exchange of shares is the market value per share of the acquiring (Shyama Enterprise) and the acquired (Rama Enterprise) firms, then Shyama would offer 0.25 of its shares to the shareholders of Rama:

$$\text{SER} = \frac{P_b}{P_a} = \frac{15}{60} = 0.25$$

In terms of the market value per share of the combined firm after the merger, the position of Rama's shareholders would remain the same; that is, their per-share value would be: Rs 60 $\times$ 0.25 = Rs 15. The total number of shares offered by Shyama (the acquiring firm) to Rama's (the acquired firm) shareholders would be:

$$\begin{aligned} \text{No. of shares exchanged} &= \text{SER} \times \text{Pre-merger number of} \\ &\quad \text{shares of the acquired firm} \\ &= (P_b / P_a) N_b = 0.25 \times 4,000 \\ &= 1,000 \end{aligned}$$

The total number of shares after the merger would be: $N_a + (\text{SER}) N_b = 10,000 + 1,000 = 11,000$. The combined earnings (PAT_c) after the merger would be: Rs 40,000 + Rs 8,000 = Rs 48,000 and EPS after the merger would be:

Post-merger combined EPS

$$\begin{aligned}
 &= \frac{\text{Post-merger combined PAT}}{\text{Post-merger combined shares}} \\
 &= \frac{\text{PAT}_a + \text{PAT}_b}{N_a + (\text{SER})N_b} \quad (4) \\
 &= \frac{40,000 + 8,000}{10,000 + (0.25) 4,000} \\
 &= \frac{48,000}{11,000} = \text{Rs } 4.36
 \end{aligned}$$

The earnings per share of Shyama (the acquiring firm) increased from Rs 4 to Rs 4.36, but for Rama's (the acquired firm) shareholders, it declined from Rs 2 to Rs 1.09; that is, Rs $4.36 \times 0.25 = \text{Rs } 1.09$.

Given the earnings per share after the merger, the post-merger market value per share would depend on the price-earnings ratio of the combined firm. How would P/E ratio affect the wealth of shareholders of the individual companies after the merger? Table 32.12 shows the impact.

Table 32.12: Rama and Shyama Enterprises: P/E Ratio and Effect on Value

P/E Ratio	EPS After Merger	Combined Firm's Market Value After Merger	Market value: Shyama		Market value: Rama	
			Before merger	After merger	Before merger	After merger
7.50	4.36	32.70	60.00	32.70	15.00	8.18
15.00	4.36	65.40	60.00	65.40	15.00	16.35
13.75	4.36	60.00	60.00	60.00	15.00	15.00

Notes:

- Shyama's share price after merger is equal to its EPS of Rs 4.36 times the P/E ratio.
- Rama's share price after merger is equal to its share of EPS, Rs 1.09 times P/E ratio.

Note that Rama's shareholders' value in terms of their shareholding in Shyama is: MV after merger $\times 0.25$. We can observe from Table 32.12 that the shareholders of both the acquiring and the acquired firms neither gain nor lose in value terms if post-merger P/E ratio is merely a weighted average of pre-merger P/E ratios of the individual firms. The post-merger weighted P/E ratio is calculated as follows:

Post-merger weighted P/E ratio:

(Pre-merger P/E ratio of the acquiring firm) $\times$ (Acquiring firm's pre-merger earnings $\times$ Post-merger combined earnings) + (Pre-merger P/E ratio of the acquired firm) $\times$ (Acquired firm's pre-merger earnings $\times$ Post-merger combined earnings)

$$P/E_w = (P/E_a)(\text{PAT}_a / \text{PAT}_c) + (P/E_b)(\text{PAT}_b / \text{PAT}_c) \quad (5)$$

Using Equation (5) in our example, we obtain:

$$\begin{aligned}
 &= (15)(40,000/48,000) + (7.5)(8,000/48,000) \\
 &= 12.5 + 1.25 = 13.75
 \end{aligned}$$

The acquiring company would lose in value if post-merger P/E ratio is less than the weighted P/E ratio. Any P/E ratio above the weighted P/E ratio would benefit both the acquiring as well as the acquired firms in value terms. An acquiring firm would always be able to improve its earnings per share after the merger whenever it acquires a company with a P/E ratio lower than its own P/E ratio. The higher EPS need not necessarily increase the share price. It is the quality of EPS rather than the quantity that would influence the price.

An acquiring firm would lose in value if its post-merger P/E ratio is less than the weighted P/E ratio. Shyama Enterprise would lose Rs 27.30 value per share if P/E ratio after merger was 7.5. Any P/E ratio above the weighted P/E ratio would benefit both the acquiring as well as the acquired firm in value terms. When the post-merger P/E ratio is 15, Shyama gains Rs 5.40 value per share and Rama Rs 1.35.

Why does Shyama Enterprise's EPS increase after merger? It increases because it has a current P/E ratio of 15, and it is required to exchange a lower P/E ratio:

$$P/E \text{ exchanged} = \frac{\text{SER} \times P_a}{\text{EPS}_b} = \frac{0.25 \times 60}{2} = 7.5 \quad (6)$$

Shyama Enterprise's EPS after merger would be exactly equal to its pre-merger EPS if P/E ratio paid is equal to its pre-merger P/E ratio of 15. In that case, given Rama's EPS of Rs 2, the price paid would be Rs 30 or a share exchange ratio of 0.5. Thus, Shyama Enterprise would issue $0.5 \times 4,000 = 2,000$ shares to Rama Enterprise. The acquiring firm's EPS after merger would be: Rs $48,000/12,000 = \text{Rs } 4$. It may be noticed that at this P/E ratio, Shyama's shareholders would have the same EPS as before the merger: $0.5 \times \text{Rs } 4 = \text{Rs } 2$. It can be shown that if the acquiring firm takes over another firm by exchanging a P/E ratio higher than its P/E ratio, its EPS will fall and that of the acquired firm would increase after the merger.¹

Let us assume in our illustration that Shyama exchanges a P/E ratio of 22.5 to acquire Rama. This implies a price of Rs 45 per share and a share exchange ratio of 0.75. The earnings per share after acquisition would be as follows:

$$\text{Post-merger EPS} = \frac{40,000 + 8,000}{10,000 + 0.75 \times 4,000} = \frac{48,000}{13,000} = \text{Rs } 3.69$$

Thus, the acquiring firm's EPS falls (from Rs 4 to Rs 3.69) and the acquired firm's EPS increases (from Rs 2 to Rs 3.69 $\times 0.75 = \text{Rs } 2.77$).

Earnings Growth

At share exchange ratio, based on the current market values, Shyama's (the acquiring firm) EPS falls. Should it acquire Rama? It can acquire Rama if its (Rama's) future earnings are expected to grow at a higher rate. After acquisition, Shyama's EPS would

increase faster than before since the future growth rate would be the weighted average of the growth rates of the merging firms.

Let us assume that Shyama's EPS is expected to grow at 6 per cent and Rama's at 15 per cent. The weighted EPS growth for Shyama would be:

$$g_w = 0.06 \times \frac{40,000}{48,000} + 0.15 \times \frac{8,000}{48,000} = 0.075 \text{ or } 7.5 \text{ per cent}$$

Thus, the formula for weighted growth in EPS can be expressed as follows:

Weighted Growth in EPS = Acquiring firm's growth $\times$ (Acquiring firm's pre-merger PAT/combined firm's PAT) + Acquired firm's growth $\times$ (Acquired firm's pre-merger PAT/combined firm's PAT)

$$g_w = g_a \times \frac{PAT_a}{PAT_c} + g_b \times \frac{PAT_b}{PAT_c} \quad (7)$$

where g_w is the weighted average growth rate after the merger, g_a and EPS_a are growth rate and earnings per share respectively of the acquiring firm before the merger, g_b and EPS_b are growth rate and the earnings per share of the acquired firm before the merger, EPS_c earnings per share of the combined firm after merger.

Table 32.13 shows the future EPS of Shyama with and without merger.

We can see from Table 32.13 and Figure 32.1 that without merger, Shyama's current EPS of Rs 4.00 would grow at 6 per cent per year and with merger the diluted EPS of Rs 3.69 would grow at 7.5 per cent (the weighted average growth rate). Shyama's EPS with merger would remain depressed until five years after merger. Its EPS, however, would start growing faster after five years.

Table 32.13: Shyama's EPS with and without Merger (Rs)

Year	Without Merger ($g = 6\%$)	With Merger ($g = 7.5\%$)
0	4.00	3.69
1	4.24	3.97
2	4.49	4.26
3	4.76	4.58
4	5.05	4.93
5	5.35	5.30
6	5.67	5.69
7	6.01	6.12
8	6.38	6.58
9	6.76	7.07
10	7.16	7.60
15	9.59	10.92
20	12.83	15.67

In fact, Shyama has a higher P/E ratio that is an indication of the investors' expectation of high future growth. Therefore, it is more likely that it would grow rapidly. Under such situation, it would not pay any premium to Rama. At a share exchange ratio of 0.25, Shyama's EPS after merger would be Rs 4.36. Assume that its earnings are expected to grow at 24 per cent and Rama's at 15

percent. How would Shyama's EPS behave with or without merger? This is shown in Table 32.14 and Figure 32.2. It may be observed that merger would help the acquiring company to grow rapidly (than without merger) for seven years after merger. After seven years, the position would reverse. Thus, the company would either acquire other companies with lower P/E ratios, or improve its operating efficiency and continue growing.

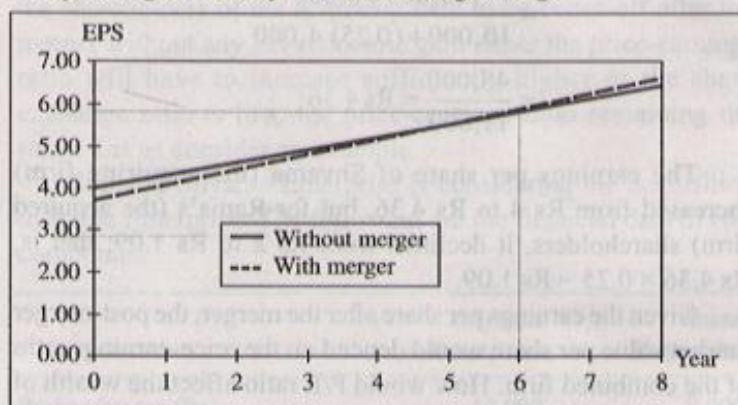


Figure 32.1: EPS with and without merger

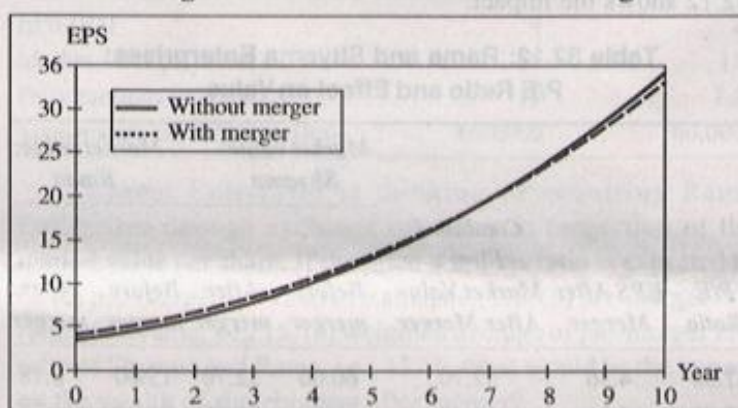


Figure 32.2: EPS with and without merger

Table 32.14: Shyama's EPS with and without Merger

Year	Without merger ($g = 24\%$)	With merger ($g = 22.5\%$)
0	4.00	4.36
1	4.96	5.34
2	6.15	6.54
3	7.63	8.01
4	9.46	9.82
5	11.73	12.03
6	14.54	14.73
7	18.03	18.05
8	22.36	22.11
9	27.72	27.08
10	34.37	33.18
15	100.78	91.52
20	295.46	252.47

It should be obvious from calculation in Tables 32.13 and 32.14 as well as from Figures 32.1 and 32.2 that the important factors influencing the earnings growth of the acquiring firm in future are:¹

1. Weston, J.F. and Copeland, T.E., *Managerial Finance*, Dryden, 1986, p. 918.