A Case Study of American Chemical Corporation

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Introduction

American Chemical Corporation was one of the largest diversified chemical companies in the United States. In this case study, we try to calculate the incremental cash flows and other financial parameters relating to the acquisition of its Collinsville plant by the Dixon Corporation.

Cost of Capital

Keeping in mind the fact that Dixon had not been a part of the Sodium Chlorate business, we decided to use the average asset beta for the industry as the proxy for the unlevered beta for the Dixon corporation. For this, we performed the calculations shown in Figure 1.

	ACC	PW	KM	IMC	GP	BC	SC
Equity	0.61	0.69	0.83	0.68	0.71	0.85	0.79
Debt	0.39	0.31	0.17	0.32	0.29	0.15	0.21
Tax rate	48.70%	48.70%	48.70%	48.70%	48.70%	48.70%	48.70%
ßE	1.2	1.33	1.06	0.81	1.5	1.1	1.2
ßD	0	0	0	0	0	0	0
ßU	0.90059055	1.07813	0.95797	0.65076	1.23722	1.00754	1.05427

Figure 1: Comparable Firms

We get the average asset beta for the comparable firms:

$$\beta(U) = 0.9837824$$

Now considering the capital structure of Dixon Corporation we find the equity beta from this unlevered beta using the formula:

$$\beta(E) = (1 + (1 - \tau_C) * D/E) * \beta(U)$$

The Debt/Value is 0.35, therefore the Debt/Equity ratio = 0.35/0.65 and the tax rate is 48.60%.

$$\beta(E) = 1.25924$$

Using the calculated levered beta, a EMRP of 5% and a Risk free return rate of 9.5%

$$r_E = r_f + \beta(r_M - r_f)$$

$$r_E = 9.5 + 5 * 1.25924 = 15.7962\%$$

Using the equity cost of capital and the debt cost of capital (r(D) = 11.25%), we calculate the WACC as follows:

$$r_{WACC} = E/V * (r_E) + D/V * (r_D) * (1 - \tau(c))$$

$$r_{WACC} = 12.315\%$$

NPV without the Laminate Technology

	Expected 12/31 1979	For the Years Ended December 31, 1980	1981	1982	1983	1984
Revenues						
Sales (tons)		32,000	35,000	38,000	38,000	38,000
Average price/ton		$415	$480	$520	$562	$606
Sales ($000)		$13,280	$16,800	$19,760	$21,356	$23,028
Manufacturing Costs						
Variable: -Power		$6,304	$7,735	$9,386	$10,526	$11,780
-Graphite		645	791	875	940	992
-Salt and other		1,285	1,621	1,753	1,836	1,956
Total variable		$8,234	$10,147	$12,014	$13,302	$14,728
Fixed: -Labor		$1,180	$1,297	$1,427	$1,580	$1,738
-Maintenance		256	277	299	322	354
-Other		1,154	1,148	1,179	1,113	1,153
Total fixed		$2,590	$2,722	$2,905	$3,015	$3,245
Total Manufacturing Costs		$10,824	$12,869	$14,919	$16,317	$17,973
Other Charges						
Selling		$112	$125	$138	$152	$168
R&D		451	478	508	543	591
(Revenues-Cash Expenses)		$1,893	$3,328	$4,195	$4,344	$4,296
Depreciation		$1,060	$1,110	$1,160	$1,210	$1,270
Cash flow from operations		1493.16	2263.36	2738.2	2839.68	2843.52
CURRENT ASSETS						
Accounts receivable	$1,622	$1,328	$1,680	$1,976	$2,136	$2,303
Inventories	651	598	756	889	961	1,036
CURRENT LIABILITIES						
Accounts payable	873	730	924	1,087	1,175	1,267
Working capital	$1,400	$1,196	$1,512	$1,778	$1,922	$2,072
Change inWorking capital		$204	$316	$266	$144	$150
Capital Expenditure	10600					
Total cash flow	-10600	$1,289	$2,579	$3,004	$2,984	$2,994
Discounted cash flow	-10600	1147	2044	2121	1876	1676
NPV=	-1736					

Figure 2: NPV without Lamentation

In the table above the following formulas were used:

i) Cash flow from operations = (Revenues - Cash Expenses) * (1 - t(c)) + Depreciation * t(c)
ii) Working Capital = Accounts receivable + Inventories - Accounts Payable
iii) Total cash flow = Cash flow from Operations - CapEx - Change in Working Capital
iv) R(WACC) was used to discount future cash flows to present value

$$NPV = -10600 + \frac{1289}{(1+12.315\%)} + \frac{2579}{(1+12.315\%)^2} + \frac{3004}{(1+12.315\%)^3} + \frac{2984}{(1+12.315\%)^4} + \frac{2994}{(1+12.315\%)^5}$$

$$NPV = -1,736,000$$

NPV of the Laminate Technology

For the laminate technology we assume the following:

i) The power costs cut by 17.50% (avg of 15-20% mentioned in the case study)
ii) The graphite costs cut to 0 from 1981, as the research completes in an year.
iii) The added CapEx of 2.25 million is deducted at the start of the 1981
iv) All the formulas used above still apply.

	Expected 12/31 1979	For the Years Ended December 31, 1980	1981	1982	1983	1984
Revenues						
Sales (tons)		32,000	35,000	38,000	38,000	38,000
Average price/ton		$415	$480	$520	$562	$606
Sales ($000)		$13,280	$16,800	$19,760	$21,356	$23,028
Manufacturing Costs						
Variable: -Power		$6,304	$6,381	$7,743	$8,683	$9,718
-Graphite		645	0	0	0	0
-Salt and other		1,285	1,621	1,753	1,836	1,956
Total variable		$8,234	$8,002	$9,496	$10,519	$11,674
Fixed: -Labor		$1,180	$1,297	$1,427	$1,580	$1,738
-Maintenance		256	277	299	322	354
-Other		1,154	1,148	1,179	1,113	1,153
Total fixed		$2,590	$2,722	$2,905	$3,015	$3,245
Total Manufacturing Costs		$10,824	$10,724	$12,401	$13,534	$14,919
Other Charges						
Selling		$112	$125	$138	$152	$168
R&D		451	478	508	543	591
(Revenues-Cash Expenses)		$1,893	$5,473	$6,713	$7,127	$7,350
Depreciation		$1,060	$1,110	$1,160	$1,210	$1,270
Cash flow from operations		1493.16	3378.76	4047.56	4286.84	4431.6
CURRENT ASSETS						
Accounts receivable	$1,622	$1,328	$1,680	$1,976	$2,136	$2,303
Inventories	651	598	756	889	961	1,036
CURRENT LIABILITIES						
Accounts payable	873	730	924	1,087	1,175	1,267
Working capital	$1,400	$1,196	$1,512	$1,778	$1,922	$2,072
Change in Working capital		$204	$316	$266	$144	$150
Capital Expenditure	-10600	-2250				
Total cash flow	-10600	$961	$3,695	$4,314	$4,431	$4,582
Discounted cash flow	-10600	-842	3240	3783	3885	4018
NPV=	3484					

Figure 3: NPV with Lamentation

$$NPV = 3,484,000$$

Should this acquisition be approved

The Dixon Corporation should not proceed with the acquisition of the Collinsville plant without the lamentation technology included as the NPV of the project is a negative 1.736 million dollars. This will reduce the firm's value and the amount payable to the investors. The reason behind such a negative NPV is credited to the increasing power costs which dominate all other costs. The Power costs are expected to increase at a rate of 12% while the sale increase at a lesser 8%. Also the industry's overcapacity has pushed the margins down for the short run.

But in case of a sale agreement wherein American agrees to make the laminated electrodes technology available to Dixon and keeps it informed concerning the development of the research which is expected to be deployed in plants by March 1980, then the NPV of such a project turns out to be positive. The calculated NPV is a positive 3.484 million dollars. This positive return on investment can be attributed to the fact that the laminated electrode technology reduces power costs by a 17.5% and also drives away the Graphite costs. Even after an added 2.25 million dollar installation cost, the technology churns out a positive return and it is in the favour of the Dixon Corporation to approve the acquisition.