

15.415 Finance Theory

Lecture 21: Valuation III

Spring 1999

Overview of this Lecture

In this lecture we continue our study of Dixon's decision to purchase the Collinsville plant by American Chemical.

- Cash flows
- Net present value/Sensitivity analysis
- Strategic issues/Industry analysis
- Decision

Cash Flows

We first determine expected cash flows without the laminate technology.

- We are given pro forma financial statements from 1980 to 1984.
- Are these realistic?
- How do they compare with 1979?

Financial Statements 1980-1984

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Financial Statements 1980-1984

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1980-1984: Comments I

- Sales: Sales at 1980 drop to 32000. Sales then grow, and at 1982 they are 38000, i.e. their 1979 level. Sales do not grow any further. This makes sense since the capacity of the plant is 40000.
- Price: Price at 1980 is 415. It is roughly equal to the 1979 level (413) due to the increase in industry capacity. Price then grows at 16% for one year, and at around 8% for the remaining years.
- Power Costs: At 1980 they drop to 6304. This reflects the reduction in sales. Power costs then increase at around 22% for two years. The increase is partly due to an increase in sales and partly to an increase in unit costs. For the last two years power costs increase by around 12%. Since sales remain constant, the 12% reflects the increase in unit costs.

1980-1984: Comments II

- Graphite Costs: At 1980 they drop to 645. They then increase by around 22%, 11%, 8%, and 6%.
- Salt and Other: At 1980 they drop to 1285. They then increase by around 26%, 8%, 5%, and 7%.
- Fixed: At 1980 they slightly increase to 2590. They then increase by around 5%, 7%, 4%, and 8%.
- Selling: At 1980 it drops to 112, since Dixon's sales force already deals with the paper and pulp industry. It then increases by around 10% each year.
- R&D: It increases by around 6% for the first two years, and then 7%, and 9%.

1980-1984: Comments III

- Net Working Capital: It is around 4% of sales for 1979-1981 and then becomes around 5% of sales.
- Capital Expenditures: They are around 500 at the first two years and grow to 600 at the last two years.
- Depreciation: At 1980 it is 1060, i.e. 10% of end of 1979 NPPE. This is because Dixon depreciates the plant linearly over 10 years. Depreciation then increases because Dixon depreciates also the capital expenditures. Since CAPX is 500 and then 600, depreciation first increases by 50 (i.e. 10% of 500) and then by 60.

What Happens After 1984?

We need to produce pro forma financial statements after 1984.

- Since the physical life of the plant is 10 years, we need to go until 1989.
- We will use our analysis of the 1980-1984 financial statements.
- We also have to determine what Dixon does with the plant after 1989.

Financial Statements 1985-1989

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Computing Cash Flows

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The NPV

Assume that Dixon scraps the plant at the end of 1989. This is a reasonable assumption since there is a superior technology (metal electrodes).

- Dixon can write off the NPP&E. This is a tax saving of $0.48 \times 3310 = 1589$.
- It can get the NWC. This is 2072.
- Total cash flow is 3661. This gives a PV of 830.

The total NPV is

$$8915 + 830 - 12000 = -2255.$$

Therefore, Dixon should not buy the plant without the laminate technology.

Cash Flows With the Laminate

We will now evaluate the laminate technology. We will consider only incremental cash flows.

- The laminate technology reduces power costs by 17.5% on average
- It eliminates graphite costs
- It brings tax savings due to depreciation

The Laminate Technology

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The New NPV

If Dixon scraps the plant in 1989, it realizes a further 108 tax saving. This gives a PV of 24.

The NPV of the incremental cash flows due to the laminate is

$$4956 + 24 = 4980.$$

The total NPV is

$$-2255 + 4980 = 2725.$$

Therefore, Dixon should buy the plant with the laminate technology.

Which Discount Rate for Laminate?

- We discounted the incremental cost savings at the same rate we would have discounted incremental profits. However, cost savings are less risky than profits due to operating leverage.

- Example

	Year 1	Year 2
Revenues	100	90
Variable Costs	70	63
Fixed Costs	15	15
Profits	15	12

Revenues and variable costs decrease by 10%, while profits decrease by 20%. Fixed costs are analogous to debt.

- Suppose that variable costs are half as variable as profits. Then, we should use an unlevered beta of $1.04/2=0.52$, and a WACC of around 12%.
- The NPV of the incremental cash flows due to the laminate becomes 6467, and the total NPV becomes 4212.

Sensitivity Analysis

- We should check the sensitivity of our analysis to the assumptions we made in order to compute WACC and the cash flows.
- A questionable assumption is that prices will keep rising at 8%. This assumption is questionable since new plants are using metal electrodes, which eliminate graphite costs and reduce power costs by about 30%. The reduction in variable costs is likely to reduce prices.
- Let's assume that prices are lower by 10% each year. Then, the present value of cash flows is lower by 5399. This makes the plant a bad deal, even with the laminate technology.
- Getting precise forecasts of cash flows is very important.

The Big Picture

- The plant has positive NPV given our assumptions.
- However, Dixon has other choices. For instance, it can build a brand new plant with metal electrodes.
- Does the Collinsville plant fit better into Dixon's strategy of supplying the paper and pulp industry?
- The Collinsville plant is a cheap way to enter in the sodium chlorate business. If the business turns sour, Dixon can scrap the plant. If the business is attractive, Dixon can build a brand new plant.