

# 15.414 - Recitation II

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## Topics in Today's Recitation:

*I.* From Accounting Data to PV Analysis: Guidelines and Reasoning.

*II.* Turbo Widgets: An Example.

*III.* Practice Problem Requests.

## I. From Accounting Data to PV Analysis.

- **PV Analysis:** *Only* interested in cashflows and discounting. We'll focus on the cashflows for now.

- ★ Problem: Getting these cashflows is a challenge...

1. Requires information to be gathered at many levels of the firm and several divisions.
2. Gathered information is usually presented in the format of accounting data. Accounting profits are *not* the same as cashflows!

- ★ Why are they different? Main reason is that accountants recognize profits when they are *promised* which usually is before they are actually *realized*.

- ★ Need to make *adjustments* to get cashflows.

## I. Continued...

- **Obtaining Cashflows:** Methodology (with some details left out)...

↪ Start with accounting data, namely the *income statement* and the *balance sheet*.

★ **STEP ONE:** From the income statement, get a measure of *earnings before taxes and depreciation* (EBTD), also called operating profits.

↪ **EBTD:** Simplification of EBITDA (I've left out some details)...

↪ We choose not to include depreciation in this figure (i.e. use EBTD instead of EBT) only out of convenience, though one could also argue that it is intuitive because depreciation isn't a cashflow. In any case, we could perform this step by computing EBT here while using depreciation (instead of the depreciation tax shield) in step two (same answer obtains).

## I. Continued...

★ **STEP TWO**: Compute the *depreciation tax shield* (DTS).

↪ **DTS**: Amount of depreciation booked during the year times the tax rate.

$$DTS = Depreciation \times (1 - tax). \quad (1)$$

↪ Why? Though not a cashflow, depreciation represents the accounting treatment of capital expenditures on profits. As a result, since accounting profits are used to compute tax liability, depreciation reduces this tax burden (i.e. increases cashflows).

## I. Continued...

★ **STEP THREE:** Find the *capital expenditure, maintenance, and asset sales* (CAPX) figures from investment data (e.g. can back this out from the balance sheet).

↔ We include this because CAPX is a cash-flow, but it wasn't accounted for in steps one and two.

★ **STEP FOUR:** Calculate *net working capital* (NWC) and keep track of changes in this measure.

↔ More on this starting next slide...

★ **STEP FIVE:** Now we put it all together. You can think of steps two to four as being adjustments that change accounting profits (roughly computed in step one) into actual cashflows via the formula:

$$CF = EBT D \times (1 - tax) + DTS + CAPX - \Delta NWC. \quad (2)$$

## I. Continued...

- Let's describe the discrepancies (between accounting profits and cashflows) addressed by the use of the NWC in steps 4 and 5.

- ★ Discrepancy # 1: Sales and COGS are recognized even if revenue from the sale hasn't been received yet or some costs of production haven't been paid.

↔ Recognizing these cashflows early (as in the case of unreceived revenues) or late (unpaid bills) is misleading given that there is a time value of money. All else equal, we all prefer paying late and receiving early, right?

- ★ Discrepancy # 2: Expenses incurred towards gathering inventory are not recognized until the items are actually sold.

↔ Again, the expense inevitably occurs before the sale. Not recognizing this cost at the right time overstates profits because it neglects the time-value of money.

## I. Continued...

○ **Extreme Example:** Future sales and COGS may be booked by a supplier once long-term contracts between it and another downstream firm are signed even if much of the ensuing production hasn't begun.

● Discrepancies #1 and #2 are addressed via the *Net Working Capital adjustment...*

★ **Net Working Capital:** Defined as...

$$NWC = CA - CL \quad (3)$$

$$= AR + INV - AP \quad (4)$$

where *INV* is entered at cost (not at value).

★ Why do we enter inventory at cost? Why does this adjustment address discrepancies #1 and #2? Reducing operating income by the change in NWC yields cashflows that correctly account for timing of payments.

## I. Continued...

- Other Issues:...

1. **Sunk costs:** Not relevant. Don't mistake sunk costs with fixed costs, they're very different.
2. **Opportunity costs:** Take into account not only cash costs, but also value creation that is forgone when undertaking the project.
3. **Inflation:** Treat consistently.
4. **Average vs. Marginal cost:** ...
5. **Project interaction and Real options:** ...

## II. Turbo Widgets.

- See Lewellen handout.

★ **Some Comments:** Regarding the treatment of warehouse space for inventory in cashflow calculations. Different assumptions could be made...

**1. You rent the space:** This is a cost and as a result it reduces your a cashflow (through EBTD).

**2. You own the space, but could rent it to someone else:** This is an opportunity cost and it should be considered in your PV analysis.

**3. You own the space, but cannot rent it to someone else:** There is direct cost or opportunity cost. This shouldn't affect your cashflows.

↔ This is the assumption made in Lewellen's lecture notes.

### **III. Practice Problem Requests.**

★ **Chapter 6, Question 8:** An example of a make or buy decision...

### **III. Continued...**

★ **Chapter 6, Question 11:** Manufacture high-protein hog feed?

- Summarize on blackboard.