Lecture 7: In-class exercise

1. An investment in net working capital arises whenever (1) inventory is purchased, (2) cash is kept in the project as a buffer against unexpected expenditures, and (3) credit sales are made, generating accounts receivable rather than cash. (The investment in net working capital is reduced by credit purchases, which generate accounts payables.) This investment in net working capital represents a cash outflow, because cash generated elsewhere in the firm is tied up in the project.

   To see how the investment in net working capital is built from its component parts, let's the managers predict sales to be US$100,000 and operating costs to be US$50,000. If both the sales and costs were cash transactions, the firm would receive US$50,000. Somehow additional information reveals that the managers:

   1. Forecast that US$9,000 of the sales will be on credit, implying that cash receipts will be only US$91,000. The accounts receivables of US$9,000 will be collected in the next year.
   2. Believe that they can defer payment of US$3,000 of the US$50,000 of costs, implying that cash disbursements will be only US$47,000. This US$3,000 accounts payable will be paid in the next year.
   3. Decide that the inventory of US$2,500 should be left on hand to avoid stockouts – running out of inventory.
   4. Decide that cash of US$1,500 should be earmarked for the project to avoid running out of cash.

   Thus, net working capital of the year is:

   Because US$10,000 of cash generated elsewhere in the firm must be used to offset this requirement for net working capital. Managers correctly view the investment in net working capital as a cash outflow of the project. As the project grows over time, needs for net working capital increase.

   Changes in net working capital from year to year represent further cash flows in the following years.

   Since US$10,000 net working capital, for the following year, managers can forecast net working capital for the following year assuming at US$16,320. Changes in net working capital for the following year are US$6,320, again pulling cash US$6,320 from elsewhere in the firm. [1]

[1] Ross, Stephen A., Randolph W. Westerfield, Jeffrey F. Jaffe, and Bradford D. Jordan, Core Principles and Applications of Corporate Finance, 3th edition, 2010.

2. **Example: Expansion project**

Regency Integrated Chips (RIC)'s research and development department has developed a small computer designed to control home appliances. Once programmed, the computer will automatically control the heating and air-conditioning systems, security system, hot water heater, and even small appliances such as a coffee maker. This project has now reached the stage where a decision must be made on whether to go forward with production.

RIC's marketing vice-president believes that annual sales would be 20,000 units if the units were priced at 3,000 baht each. RIC expects no growth in sales, and it believes that the unit price will rise by 2 percent each year. The engineering department has reported that the project will require additional manufacturing space, and RIC currently has an option to purchase an existing building, at a cost of 12 million baht, which would meet this need. The building would be bought and paid for on 31st December 2004, and for depreciation purposes it would fall into MACRS 39-year class.

The necessary equipment would be purchased and installed in late 2004, and it would also be paid for an 31st December 2004. The equipment would fall into the MACRS 5-year class, and it would cost 8 million baht, including transportation and installation. Moreover, the project would also require an initial investment of $6 million in net operating working capital, which is also be made on 31st December 2004. Then, each subsequent years, required NOWC equal to 10 percent of the upcoming year's sales.

The project's estimated economic life is your years. At the end of that time, the building is expected to have a market value of 7.5 million baht, whereas the equipment would have a market value of 2 million baht.

The production department has estimated that variable manufacturing costs would be 2,100 baht per unit, and that fixed overhead costs, excluding depreciation, would be 8 million baht per year. They expect variable costs to rise by 2 percent per year, and fixed costs to rise by 1 percent per year. Depreciation expenses would be determined in accordance with MACRS rates.

RIC's tax rate is 40 percent; its cost of capital is 12 percent; and, for capital budgeting purposes, the company's policy is to assume that operating cash flows occur at the end of each year. Because the plant would begin operations on 1st January 2005, the first operating cash flows would occur on 31st December 2005.

Several other points should be noted: (1) RIC is a relatively large corporation, which sales of more than 4,000 million baht, and it takes on many investments each year. Thus, if the computer control project does not work out, it will not bankrupt the company – management can afford to take a chance on the computer project. (2) If the project is accepted, the company will be contractually obligated to operate it for its full four-year life. Management must make this commitment to its component suppliers. (3) Returns on this project would be positively correlated with returns on RIC's other projects and also

with the stock market – the project should do well if other parts of the firm and the general economy are strong.

Assume that you have been assigned to conduct the capital budgeting analysis. For now, assume that the project has the same risk as an average project, and use the corporate weighted average cost of capital, 12 percent.[2]

Depreciation Schedule

	Years			
	1	**2**	**3**	**4**
Building Depreciation Rate	1.30%	2.60%	2.60%	2.60%
Building Depreciation				
Ending Book Value				
Equipment Depreciation Rate	20.00%	32.00%	19.20%	11.52%
Equipment Depreciation				
Ending Book Value				

Net Salvage Values in 2008

	Building	Equipment	Total
Estimated Market Value in 2008			
Book Value in 2008			
Expected Gain or Loss			
Taxes paid of tax credit			
Net cash flow from salvage			

Key output and appraisal of the proposed project

Net Present Value (at 12%)	
Internal rate of return	
Modified internal rate of return	
Profitability index	
Discounted payback period	
Payback period	

[2] Chatuporn Tangkathach, Cash flow and capital budgeting, 2006.

Projected Net Cash Flows

(Time line of annual cash flows)	Years 0	1	2	3	4
Investment Outlays: Long-Term Assets					
Building					
Equipment					
Operating Cash Flows over the Project's Life					
Units sold					
Sales Price per unit					
Variable costs per unit					
Sales revenue					
Variable costs					
Fixed Operating costs					
Depreciation (building)					
Depreciation (equipment)					
Operating income before taxes (EBIT)					
Taxes on operating income (40%)					
Net Operating Profit After Taxes (NOPAT)					
Add back: Depreciation (building)					
Depreciation (equipment)					
Cash Flows Due to Net Operating Working Capital					
Net Operating Working Capital					
Cash flow due to investment in NOWC					
Salvage Cash Flows: Long-Term Assets					
Total Salvage cash flows					
Net Cash Flow					