FINC 430 TA Review Session 5 Capital Budgeting and Pro Formas Solutions

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Question 1 (7-6 in the Textbook)

FastTrack Bikes, Inc. is thinking of developing a new composite road bike. Development will take six years and the cost is \$200,000 per year. Once in production, the bike is expected to make \$300,000 per year for 10 years. Assume the cost of capital is 10%.

(a) Calculate the NPV of this investment opportunity, assuming all cash flows occur at the end of each year. Should the company make the investment?

(b) By how much must the cost of capital estimate deviate to change the decision? (Hint: Use Excel to calculate the IRR.)

(c) What is the NPV of the investment if the cost of capital is 14%?

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(a) Calculate the NPV of this investment opportunity, assuming all cash flows occur at the end of each year. Should the company make the investment?

Timeline:



I will solve part(a) using 4 different methods.

The NPV is the difference between the present value of two cash flows- an annuity of \$300,000 from years 7-16 and another annuity of \$200,000 from years 1-6

$$NPV = \frac{-200,000}{r} \left(1 - \frac{1}{(1+r)^6} \right) + \frac{1}{(1+r)^6} \frac{300,000}{r} \left(1 - \frac{1}{(1+r)^{10}} \right)$$
$$= \frac{-200,000}{0.1} \left(1 - \frac{1}{(1.1)^6} \right) + \frac{1}{(1.1)^6} \frac{300,000}{0.1} \left(1 - \frac{1}{(1.1)^{10}} \right)$$
$$= \$169,482$$

NPV > 0, so the company should take the project.

Variation of Method 1, but using the PV function in Excel instead of the growing annuity formula

The NPV is the difference between the present value of two cash flows- an annuity of \$300,000 from years 7-16 and another annuity of \$200,000 from years 1-6.

$$NPV = \frac{1}{(1.1)^6} PV(10\%, 10, -300000) - PV(10\%, 6, -200000)$$

= \$1,040,534 -\$871,052
= \$169.482

Let's now do an even cleverer split of the cash flows into three annuities **all starting at time 1**. (This eliminates the need to divide by $(1.1)^6$ to discount the \$300,000 annuity starting at time 6) The NPV is

The present value of an annuity of \$300,000 from years 1-16

- the present value of an annuity of \$300,000 from years 1-6
- the present value of an annuity of \$200,000 from years 1-6

Now use the PV function in Excel

NPV = PV(10%, 16, -300000) - PV(10%, 6, -300000) - PV(10%, 6, -200000)

= \$2,347,113- \$1,306,578 - \$ 871,052

= \$169,482

Alternatively, set up the cash flows in Excel. Then use the NPV function (not the PV function). I give the screenshot below.

Notice carefully the inputs to the NPV function. The first is the discount rate (input either as "0.1" or "10%"). The second is the sequence of cash flows.

NPV = \$169,482

		D7	• (-	<i>f</i> _x =N	PV(D6,B3	3:Q3)										
	А	В	С	D	E	F	G	Н	T	J	K	L	M	N	0	Р	Q
1																	
2		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
3		-200000	-200000	-200000	-200000	-200000	-200000	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000
4			1.1									1.1					
5																	
6			r	10%													
7			NPV	169482													
-					R.												

(b) By how much must the cost of capital estimate deviate to change the decision? (Hint: Use Excel to calculate the IRR.)

Setting the NPV = 0 and solving for r (using a spreadsheet) the answer is IRR = 12.66%.

So if the estimate is too low by 2.66%, the decision will change from accept to reject.

		D5	• (m	<i>f</i> _x =IR	R(B3:Q3)											
	A	В	С	D	E	F	G	Н	1	J	К	L	M	N	0	P	Q
1																	
2		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
3		-200000	-200000	-200000	-200000	-200000	-200000	300000	300000	300000	300000	300000	300000	300000	300000	300000	300000
4			i j		<u></u>			11								í	
5			IRR	12.66%													

(c) What is the NPV of the investment if the cost of capital is 14%?

This is similar to part (a). Now, r = 14% instead of 10%. We will solve this using method 1 from part (a), though you can use any of the four methods.

$$NPV = \frac{-200,000}{r} \left(1 - \frac{1}{(1+r)^6} \right) + \frac{1}{(1+r)^6} \frac{300,000}{r} \left(1 - \frac{1}{(1+r)^{10}} \right)$$
$$= \frac{-200,000}{0.14} \left(1 - \frac{1}{(1.14)^6} \right) + \frac{1}{(1.14)^6} \frac{300,000}{0.14} \left(1 - \frac{1}{(1.14)^{10}} \right)$$
$$= -\$64,816$$

Since we are discounting at a rate of 14% > IRR (which we calculated in part (b) to be 12.66%), it should be no surprise to see that the NPV is less than 0.

Question 2 (8-7 in the Textbook)

Castle View Games would like to invest in a division to develop software for video games. To evaluate this decision, the firm first attempts to project the working capital needs for this operation. Its chief financial officer has developed the following estimates (in millions of dollars):

	Year 1	Year 2	Year 3	Year 4	Year 5
Cash	6	12	15	15	15
Accounts receivable	21	22	24	24	24
Inventory	5	7	10	12	13
Accounts payable	18	22	24	25	30

Assuming that Castle View currently does not have any working capital invested in this division, calculate the cash flows associated with changes in working capital for the first five years of this investment. (End of question)

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
1 Cash		6	12	15	15	15
2 Accounts receivable		21	22	24	24	24
3 Inventory		5	7	10	12	13
4 Accounts payable		18	22	24	25	30
5 Net Working Capital (1+2+3-4)	0	14	19	25	26	22
6 Increase in NWC		14	5	6	1	-4

Question 3 (8-9 in the Textbook)

Elmdale Enterprises is deciding whether to expand its production facilities. Although long-term cash flows are difficult to estimate, management has projected the following cash flows for the first two years (in thousands of dollars):

	Year 1	Year 2
Revenues	125	160
Costs of goods sold and operating expenses other		
than depreciation	40	60
Depreciation	25	36
Increase in Net Working Capital	5	8
Capital Expenditures	30	40
Marginal corporate Tax rate	35%	35%

(a) What are the incremental earnings for this project for years 1 and 2?

(b) What are the free cash flows for this project for the first two years? (End of question)

(a)

		Year	1	2
Inc	remental Earnings Forecast (\$000s)			
1	Sales		125.0	160.0
2	Costs of good sold and operating expenses other than depreci	ation	(40.0)	(60.0)
3	Depreciation		(25.0)	(36.0)
4	EBIT		60.0	64.0
5	Income tax at 35%		(21.0)	(22.4)
6	Unlevered Net Income		39.0	41.6

(b)

Free	Cash Flow (\$000s)	1	2
7	Plus: Depreciation	25.0	36.0
8	Less:Capital Expenditures	(30.0)	(40.0)
9	Less: Increases in NWC	(5.0)	(8.0)
10	Free Cash Flow	29.0	29.6

Question 4 (8-10 in the Textbook)

You are a manager at Percolated Fiber, which is considering expanding its operations in synthetic fiber manufacturing. Your boss comes into your office, drops a consultant's report on your desk, and complains, "We owe these consultants \$1 million for this report, and I am not sure their analysis makes sense. Before we spend the \$25 million on new equipment needed for this project, look it over and give me your opinion." You open the report and find the following estimates (in thousands of dollars):

		Pro	oject Year		
	1	2		9	10
Sales revenue	30,000	30,000		30,000	30,000
 Cost of goods sold 	18,000	18,000		18,000	18,000
= Gross profit	12,000	12,000		12,000	12,000
 General, sales, and 					
administrative expenses	2,000	2,000		2,000	2,000
 Depreciation 	2,500	2,500		2,500	2,500
= Net operating income	7,500	7,500		7,500	7,500
– Income tax	2,625	2,625		2,625	2,625
= Net income	4,875	4,875		4,875	4,875

All of the estimates in the report seem correct. You note that the consultants used straight-line depreciation for the new equipment that will be purchased today (year 0), which is what the accounting department recommended. The report concludes that because the project will increase earnings by \$4.875 million per year for 10 years, the project is worth \$48.75 million. You think back to your halcyon days in finance class and realize there is more work to be done!

First, you note that the consultants have not factored in the fact that the project will require \$10 million in working capital upfront (year 0), which will be fully recovered in year 10. Next, you see they have attributed \$2 million of selling, general and administrative expenses to the project, but you know that \$1 million of this amount is overhead that will be incurred even if the project is not accepted. Finally, you know that accounting earnings are not the right thing to focus on!

(a) Given the available information, what are the free cash flows in years 0 through 10 that should be used to evaluate the proposed project?

(b) If the cost of capital for this project is 14%, what is your estimate of the value of the new project? (End of question)

(a) Free Cash Flows are:

	0	1	2	 9	10
= Net income		4,875	4,875	4,875	4,875
+ Overhead (after tax at 35%)		650	650	650	650
+ Depreciation		2,500	2,500	2,500	2,500
– Capex	25,000				
– Inc. in NWC	10,000				-10000
FCF	-35,000	8,025	8,025	 8,025	18,025

(b)
$$NPV = -35 + 8.025 \frac{1}{0.14} \left(1 - \frac{1}{1.14^9} \right) + \frac{18.025}{1.1.4^{10}} = 9.56$$

Question 5

You are the CFO of a manufacturing company and your job is to value a potential new project. The project details are as follows:

- Revenue is forecast to be \$350 million at t=1 and will grow year at a rate of 12% from t=1 to t=2 then 10% from t=2 to t=3, then 5% from t=3 to t=4, then level off at a rate of 4% thereafter.
- Total operating expenses (OPEXP), COGS and SG&A, are forecast to be 40% of revenue.
- Starting at t=0, inventories will be 75% of the following year's OPEXP.
- The firm pays for 60% of the inventories when they are purchased and 40% the year after.
- There are no accounts receivable.
- The project will have a life-span of five years after which it will be stopped.
- For the project to start they need money for capital expenditures (CAPEX) today, at t=0, of \$150 million.
- This CAPEX will be scraped for zero value at the end of the life of the project.
- CAPEX is depreciated across two years.
- The firm's tax rate is 20%.

(a) What are the free cash flows for years t=1 to 5?

(b) What is the IRR of the project?

(c) If the discount rate is 15%, what is the NPV of the project? Should your firm invest in the new project? (End of question)

See Excel file for the detailed solution. Here are the answers

	Net Op	erating Pro	ofits After T	āxes		
	0	1	2	3	4	5
OPREV		\$350	\$392	\$431	\$453	\$471
OPEXP		\$140.00	\$156.80	\$172.48	\$181.10	\$188.35
DEPR		\$75	\$75	\$0	\$0	\$0
EBIT		\$135	\$160	\$259	\$272	\$283
Taxes		\$27	\$32	\$52	\$54	\$57
NOPAT		\$108	\$128	\$207	\$217	\$226

	Long-Term	and Short	-Term Inves	stments		
	0	1	2	2	Л	5
CAPEX	\$150	1	Z	5	4	5
DEPR		\$75	\$75			
INV	\$105	\$118	\$129	\$136	\$141	\$0
AR	\$0	\$0	\$0	\$0	\$0	\$0
AP	\$42.00	\$47.04	\$51.74	\$54.33	\$56.50	\$0.00
NWC	\$63	\$71	\$78	\$81	\$85	\$0
Change in NWC	\$63	\$8	\$7	\$4	\$3	-\$85

		Free Cash	FIOWS			
	0	1	2	3	4	5
NOPAT	\$0	\$108	\$128	\$207	\$217	\$226
Depr	\$0	\$75	\$75	\$0	\$0	\$0
CAPEX	\$150					
Change in NWC	\$63	\$8	\$7	\$4	\$3	-\$85
FCF	-\$213	\$175	\$196	\$203	\$214	\$311
		IRR				
IRR	86.60%					
		Value of th	e Firm			
PV of FCF	-\$213	\$153	\$148	\$134	\$122	\$155
NPV	\$498					
Decision	Invest					

Question 6

You have conducted a pro-forma analysis over 3 years (t=1,2,3) of the target company for a potential merger and acquisition (M&A) transaction, resulting in the following table

Forecast Horizon t	1	2	3
Free Cash Flow (FCF in M)	50	100	105

After a careful analysis using the CAPM you have determined that the appropriate risk-adjusted discount rate for the free cash flows of this company is 10%. Starting with year 3, you expect the company to grow at a constant long-term rate of 3.5%. What is the fundamental value of this company today (year t=0)?

(End of question)

$$(Terminal \, Value)_{3} = \frac{FCF_{4}}{r-g} = \frac{(1+g)FCF_{3}}{r-g}$$
$$= \frac{(1+3.5\%) \times 105}{10\% - 3.5\%}$$
$$= 1,672 \, M$$

$$Value_{0} = \frac{FCF_{1}}{1+r} + \frac{FCF_{2}}{(1+r)^{2}} + \frac{FCF_{3}}{(1+r)^{3}} + \frac{TV_{3}}{(1+r)^{3}}$$
$$= \frac{50}{1.1} + \frac{100}{(1.1)^{2}} + \frac{105}{(1.1)^{3}} + \frac{1,672}{(1.1)^{3}}$$
$$= 1,463 M$$

Question 7

You work for a private equity firm and you are trying to decide if your company should purchase another company, PrivateCo, and if so, how should you pay for the acquisition.

Assume that the acquisition, if it takes place, will occur today, the last day of the year for which you have actual accounting data and the day that you have made the forecast for next year's accounting data.

You want to determine the fair market value for PrivateCo based on the following information you have about PrivateCo:

Accounting Data in Millions of \$	Current (Actual)	Next year (Forecast)
Sales	3,000	3,200
Costs (COGS and SG&A)	1,960	2,080
Depreciation	300	320
Inventories	840	880
PP&E	760	920

Additionally, you know or expect the following:

- You expect PrivateCo's free cash flows will reach a long-term growth rate of 3% the year after next (immediately following the one forecasted year).
- PrivateCo has no accounts receivable, accounts payable, or accrued expenses.
- PrivateCo has a tax rate of 30%.
- PrivateCo's current cost of capital is 22%.
- PrivateCo has no debt.
- Assume there are no tax loss carry forwards.
- Any free cash flow each year is distributed to shareholders, so there is never any "Cash" on the balance sheet.

(a) What is PrivateCo's pro forma income statement for next year?

(b) What is PrivateCo's pro forma balance sheet for next year?

(c) What is PrivateCo's pro forma free cash flow statement for next year?

(d) Using the discounted cash flow (DCF) valuation approach, what is PrivateCo's current value, assuming you acquire the company by raising new equity capital?

(End of question)

(a) Pro Forma Income Statement

Sales	3200	Given
Costs	2080	Given
Dep	320	Given
EBIT	800	Sales- Costs-Dep
Taxes	240	30% Of EBIT
NOPAT	560	EBIT - Taxes

(b) Balance Sheet

Assets		Liabilities	
Inventories	880	Debt	0
PP&E	920	Equity	1800

(Inventories, Debt and PP&E are given. Equity = Inventories + Debt - PP&E)

(c) Pro Forma Free Cash Flow Statement

NOPAT	560	From Income Statement
Dep	320	Given
Capex	480	Change in PP&E (920-760) + Depreciation (320)
Change in WC	40	Change in Inventories
FCF	360	NOPAT+ Dep-CAPEX- Change in WC

(d) Company Value

$$Value_0 = \frac{FCF_1}{r-g} = \frac{360}{22\% - 3\%} = 1894.74$$