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**FROM EARNINGS TO CASH FLOWS**
**Problem 1**

a. Effective tax rate = 0.25! 12.5/50

After-tax operating income =	37.5			
	1	2	3	Terminal year
EBIT (1-t)	\$41.25	\$45.38	\$49.91	\$52.41
Reinvestment	\$16.50	\$18.15	\$19.97	\$20.96
FCFF	\$24.75	\$27.23	\$29.95	\$31.44
Terminal value			\$524.08	
Present Value	\$22.30	\$22.10	\$405.10	
Firm Value	\$449.49			

b. Marginal tax rate rate =

0.35

After-tax operating income =	32.5			
	1	2	3	Terminal year
EBIT (1-t)	\$35.75	\$39.33	\$43.26	\$45.42
Reinvestment	\$16.50	\$18.15	\$19.97	\$20.96
FCFF	\$19.25	\$21.18	\$23.29	\$24.46
Terminal value			\$407.62	
Present Value	\$17.34	\$17.19	\$315.08	
Firm Value	\$349.61			

b. Marginal tax rate rate =

0.25

After-tax operating income =	37.5			
	1	2	3	Terminal year
EBIT (1-t)	\$41.25	\$45.38	\$49.91	\$45.42
Reinvestment	\$16.50	\$18.15	\$19.97	\$20.96
FCFF	\$24.75	\$27.23	\$29.95	\$24.46
Terminal value			\$407.62	
Present Value	\$22.30	\$22.10	\$319.94	
Firm Value	\$364.34			

**Problem 2***R & D adjustment*

Year	R&D	Amortization	Remaining R&D
Current	\$50.00		\$50.00

## Dividend Discount Models 2

-1	\$40.00	\$13.33	\$26.67
-2	\$30.00	\$10.00	\$10.00
-3	\$20.00	\$6.67	\$0.00

Value of research asset \$86.67

Amortization = \$30.00

Adjusted Operating Income =  $80(1-.4) + 50 - 30 = \$68.00$

### *Free Cashflow to Firm*

Adjusted Operating Income = \$68.00

+ Depreciation & Amortization = \$50.00 ! Includes amortization of R&D

- Cap Ex = \$160.00 ! Includes R&D and acquisitions

Free Cash flow to Firm = -\$42.00

### **Problem 3**

PV of Operating Lease Commitments = \$310.49 ! PV of \$ 50 million at cost of debt for 8 years

Adjusted EBIT = \$78.63 ! =  $60 + .06 * 310.49$

EBIT (1-t) = \$ 78.63 (1-.4) = \$47.18

+ Depreciation 50

- Capital Expenditures 110! Includes two acquisitions

- Change in Non-cash Working capital -20! Only non-cash Working capital

FCFF \$7.18

Non-cash working capital change =  $(180-80)-(200-120) = -20$

I used the short cut for the adjusting operating leases. You could have added the entire operating lease expense back and subtracted out depreciation on the leased asset.

### **Problem 4**

a. Net working capital = 40928 !  $91524 - 50596$

b. Non-cash working capital = 57241 ! Net out cash and short term debt

c. As percent of revenues = 36.94%

### **Problem 5**

	1	2	3	4	5
Revenues	\$170,446	\$187,491	\$206,240	\$226,864	\$249,550
Working capital as % of revenue	36.94%	36.94%	36.94%	36.94%	36.94%
Change in working capital	\$5,724	\$6,297	\$6,926	\$7,619	\$8,381

	1	2	3	4	5
Revenues	\$170,446	\$187,491	\$206,240	\$226,864	\$249,550
Working capital as % of revenue	4.30%	4.30%	4.30%	4.30%	4.30%
Change in working capital	\$666	\$733	\$806	\$887	\$976

(I have assumed immediate convergence. If you assume gradual convergence, your ratio will change each year)

**Problem 6**

a. Next year's FCFF

Revenues	1100	
Working capital change	-5!	Assuming that working capital is -5% of revenue
EBIT (1-t)	80	
- Change in working capital	-5	
FCFF	85	

b. If we were forecasting cashflows for the next 10 years, we would use an industry average working capital percent or look at the firm's own history since it is unlikely (though not impossible) that working capital will continue to be a source rather than a use of cash.