Chapter 7

7-1
Income bonds do share some characteristics with preferred stock. The primary difference is that interest paid on income bonds is tax deductible while preferred dividends are not. Income bondholders also have prior claims on the assets, if the firm goes bankrupt. In calculating cost of capital, the primary difference will be that income bonds can be treated as debt (because they provide the tax advantage) and preferred stock cannot.

7-2
Commodity bonds are different from straight bonds because the interest payments on these bonds are not fixed but vary with the price of the commodity to which they are linked. There is more risk, therefore, to the holder of these bonds.
 It is different from equity since the cash flows are constrained. Even if the commodity's price does go up, the payments on the commodity bond will go up only by the defined amount, whereas equity investors have no upside limit. Commodity bondholders also have prior claims on the assets of the firm if the firm goes bankrupt.
 I would treat commodity bonds as debt, but recognize that it is also debt that creates less bankruptcy risk if the firm gets into trouble due to commodity price movements.

7-3
The first characteristic - a fixed dividend and a fixed life - is a characteristic of debt, as is the last one - no voting rights. The other two - no tax deductions and secondary claims on the assets - make it more like equity. In fact, this security looks a lot like preferred stock, and I would treat it as such.

7-4
Value of Straight Preferred Stock portion of Convertible = 6/.09 = $66.67 !
Preferred stock has perpetual life, and the coupons are set forever.
I am valuing the preferred stock portion, using the preferred dividend rate on straight preferred.
Value of Conversion Portion = $105 - $66.67 = $38.33

7-5
The convertible bond is a 10-year bond with a face value of $1000 and a coupon rate of 5%. If it yielded the same rate as the straight bond, i.e. 8%, its price would be equal to
$\frac{25}{.04}(1 - \frac{1}{1.04^{20}}) + \frac{1000}{1.04^{20}} = 796.15$, assuming semi-annual coupons. Hence, the equity component of the convertible can be estimated as 1100 - 796.15 = 303.85.

The total equity component of the firm's asset value = 50(1 m.) + 303.85(20000) = $56.077m.
The debt component = $25m. + 796.15(20000) = 40.923m.
Hence, the debt ratio = 40.923/(40.923 + 56.077) = 42.19%

7-6

Value of Equity = 50,000 * $100 + 100,000 * $90 = $14,000,000
Value of Debt = $5 million
Debt Ratio = 5/(5+14) = 26.32%
Since the debt was taken on recently, it is assumed that the book value of debt is equal to market value.

7-7
a. The cost of internal equity = 6.5 + 1.2(6) = 14.3%
b. The cost of external equity = (100/95)(14.3) = 15.0526%
(In effect, we get to keep only $95 out of every $100 raised, which raises the cost of equity)

7-8
a. If the current owners give up 30% of the firm, they will be left with (0.7)(120) = $84m. Otherwise, they have $80m. Hence, they are better off taking the venture capital, assuming that they cannot raise financing on better terms.
b. The breakeven percentage would be x, where x solves $120x = 80$, or $x = 2/3$; i.e. the owners should be willing to give up no more than 33% of the firm.
(I am assuming that the $120 million in new firm value is inclusive of the cash raised from the venture capitalist as well)

7-9
We assume that Office Helpers is choosing to go public instead of using venture capital. Furthermore, we assume that the market valuation of $120 will hold even with the IPO. Finally, let us assume that $20 million need to be raised. Now, if the target price is $10, which represents an under pricing of 20%, the true value of the shares would be 10/.8 = $12.5 per share. At this price, the firm would have to issue 20/10 or 2 million shares. Since the 2 million shares will represent a value of $25 million, the total number of shares outstanding would be 2(120/25) = 9.6 million shares. Of this, the existing shareholders would get 7.6 million shares, representing a value of (7.6/9.6)120 = $95m.; the public shareholders would get (2/9.6)120 = $25m. for which they would have paid 2(10) = $20m., or an undervaluation of 5/25 or 20%.

7-10
a. The exit value will be 50(15) = $750m.
b. The discounted terminal value is $750/1.35^4$ = $225.80m.
c. You would ask for at least 75/225.80 or 33% of the firm.
(I am computing the value, prior to the cash infusion. The owner will probably come back with a counter offering you 75/(225.80+75), which is the post money value)

7-11
a. The expected return using the CAPM is 6.5 + 1.1(6) = 13.1%
b. Venture capitalists typically have to invest a large portion of their portfolio in a single firm; hence there is a lot of diversifiable risk that they would have to hold.
There is a second concern that may not be reflected in betas and the expected return. A large number of young firms fail, and your expected return has to be increased to cover

this failure risk.

7-12

The loss to the existing shareholders is 50($18) = $900m.

The main people gaining from the under pricing are the investors that are able to buy the stock at the issue price and the investment bankers who get paid their underwriting fees, while bearing little risk.

7-13

I am in qualified agreement with this statement. It is true that IPOs are more difficult to value, partially because they tend to be younger firms and partially because you don't have an anchor of a market assessed value.

I would test it empirically by looking at the extent of underpricing for firms at different stages in the life cycle. If this statement is true, I would expect the underpricing to be greatest in younger, more difficult to value firms.

In a rational market, though, this should offer an opportunity for investors who can get into these stocks at the offering price.

7-14

a. Since you are a small firm, you should consider the reputation of the investment banker. A more reputable investment banker may be able to attract wary investors into the offering. If you are a high technology or biotechnology firm, where technical knowledge may be essential in the valuation process, you should pick an investment banker with some experience with similar issues.

b. If the issue is fairly priced, 40% of the firm (20/50). If the valuation was done, prior to the considering the cash infusion from the IPO, it would be lower (20/(50+20))

c. If the investment banker underprices the issue, you will have to sell
Value of Securities Sold = $20/.9 = $22.22
As % of Overall Firm Value = 22.22/50 = 44.44%

d. You would have to create roughly 2 million shares: ($50 million/2 million = $25). You would then need to issue about 800,000 shares to raise $20 million.

7-15

a.
Number of shares you would need to sell in rights offering = $100 mil/$25 = 4 million
Number of shares outstanding = 10 million; Number of rights = 10 million
You would need 5 rights to buy two shares.

b. Ex-rights price = (50*10+25*4)/14 = $42.86

c. Value per right = Pre-rights price - Ex-rights price = $50 - $42.86 = $7.14

d. If the price of the right were higher than $7.14, I would sell my rights at the higher

price and keep the difference as excess return. The stock price after the rights issue and the cash will yield me more than what I paid for the stock, which was $50.

7-16
a. Expected Stock Price = (1 million * $15 + 500,000 * $10)/1.5 million = $13.33

b. Price per Right = $15 - $13.33 = $1.67

c. No, because I will own more shares after the issue.

7-17
a. The current capital is $15(1 million shares) = $15million. Additional capital to be raised is $10(0.5 million shares) = $5 million. Hence, net income after the issue will be $1 million(20/15) = $1.33 million. Hence EPS would be 1.33/1.5 = 88.67 cents per share.
b. Earnings per share under this alternate scenario would be 1.33/1.33 = $1 per share
c. No, if I have availed myself of the rights issue; in this case, I would have more shares and the same proportional ownership of the firm. Even if I had sold the right, I would have been compensated for the lost value.

7-18
a. Annual tax savings from debt = $ 40 million * .09 * .35 = $1.26 million

b. PV of Savings assuming savings are permanent = $40 million * .35 = $14.00
(You can get there by dividing your annual tax savings, $1.26 million, by the pre-tax cost of debt of 9%)

c. PV of Savings assuming savings occur for 10 years = $1.26 (PVA,9%,10) = $8.09

d. PV of Savings will increase
If savings are permanent = 1.26/.07 = $18.00
If savings are for 10 years = $1.26 (PVA,7%,10) = $8.85
(I am assuming that your interest expenses are locked in. If you can refinance the debt at the lower rate, the answer will be different)

7-19
a. After-tax interest rate = 10% (1-.45) = 5.50%

b. If only half the interest is allowed = 10% (1-.225) = 7.75%

c. Yes. The tax savings will be much lower since the tax savings will not occur until three years from now. The after-tax interest rate will therefore be the same as the pre-tax rate (10%) for the first three years. Put another way, the tax savings from interest expenses will have to be discounted back three years.

7-20
a. Ignoring the net operating loss,

PV of Tax Savings = $5 billion (.36) = $1.8 billion

b. Yes. The net operating loss will mean that this tax savings will not occur for a while. For instance, if it will be 5 years before Westinghouse will have enough taxable income to claim the interest deduction, this $ 1.8 billion should be discounted back 5 years to arrive at the present value.

7-21
a. False. There may be non-discretionary capital expenditures/working capital needs that drain cash flows.

b. False. Depreciation may also be large and offset the cap ex.

c. Partially true. The commitment to pay dividends is a much weaker one than the one to pay interest expenses.

d. False. It is precisely when managers are not owners that they may need the discipline of debt.

e. False. Not necessarily. Mature, well run firms can have high free cash flows.

7-22
While there may be other motives behind acquisitions, the firm that would look most promising on the free cash flow hypothesis would be the firm with low growth, poor projects, low leverage and good earnings. It is in this firm that the discipline of borrowing money will have the greatest impact in terms of inducing managers to pick better investments.

7-23
a. Cost of Equity = 9% + 6% = 15%
Since it is an all-equity financed firm, the cost of capital is equal to the cost of equity.

b.

Value of Debt	Increase in Debt	Marginal Tax Benefits	Marginal Exp. Bankruptcy Cost
2500,000	2,500,000	1,000,000	0
5000,000	2,500,000	1,000,000	640,000
7500,000	2,500,000	1,000,000	1,000,000
8000,000	500,000	200,000	760,000
9000,000	1000,000	400,000	1,200,000
10,000,000	1000,000	400,000	600,000
12,500,000	2,500,000	1,000,000	1,400,000

Every marginal increment past $7.5 million has expected cost > expected tax benefits! Optimal debt is between $ 5 million and $ 7.5 million.

c. Value of Firm at Optimal Capital Structure = Current Firm Value + Sum of Marginal

Tax Benefits - Sum of marginal bankruptcy costs = $13,360,000

7-24

Depends on which version of the Miller Modigiliani world you devise. In the original version, with no bankruptcy costs and taxes, here is the answer:

a. In the Miller-Modigliani world with no taxes and default risk, the value of the firm will be $ 100 million no matter what the debt ratio.

b. The cost of capital will always be 11%.

c. With taxes, the value of the firm will increase as the debt is increased (because of the tax benefits of debt) and the cost of capital will go down (due to the interest tax savings again).

7-25
Of $1 paid to bondholders from corporate before-tax income, the bondholder gets (1-0.4) = 60 cents. Of the same dollar paid to equity holders, the equity holder gets (1-0.3)(1-0.2) = 56 cents. Hence debt does have a tax advantage.
If a firm with no debt and a market value of $100 million borrowed $50 million in this world, it would obtain a benefit of 1-0.56/0.6 = 1/16 of the amount issued, or 50/16 = $3.33 million. Hence the firm value would be 100 + 50 + 3 = $153 million.

7-26
The tax rate on equity would have to be t, where t solves (1-0.3)(1-t) = 1-0.4, i.e. 1-t = (1-0.4)/(1-0.3) = t = 14.286%

7-27
a. The past policy of not using debt can be justified by noting that returns on projects were high (increasing the need for flexibility) and that earnings in the future were likely to be volatile (because of the growth).

b. Given that returns on projects are declining, I would argue for a greater use for debt.

7-28
a. Financial flexibility is higher with low leverage in several ways: one, the firm can use retained earnings for whatever purposes it chooses: it is not forced to pay out funds as debt service. Also, with low leverage and high debt capacity, the firm can tap into this debt capacity if funds are urgently needed. Finally, there are likely to be fewer covenants to restrict the firm.
b. The tradeoff is flexibility versus the tax advantages of debt and the discipline enforced by debt on wayward managers.

7-29
a. An electric utility is regulated (reducing agency costs), has stable and predictable cash

flows (reducing bankruptcy needs), and knows its future investment needs with some precision (reducing the need for flexibility). All of these factors will increase its capacity to carry debt.

b. Yes. Both the regulation and the monopoly characteristics reduce the agency costs and bankruptcy costs, increasing debt capacity.