Klick
Corporate Finance
Problem Set #1
January 30, 2007

1. You win a bet for $10,000 against your friend on the Colts-Pats game. It turns out your friend doesn't actually have $10,000 but he promises to make regular monthly payments to you.
   a. If you agree to a payment period of 4 years and your cost of capital (i.e., the opportunity cost of your funds) is 8% annually, how much will your friend have to pay you every month to satisfy the debt?

      PV = 10,000
      I = 8/12=0.67
      N = 4*12=48
      FV = 0
      Press CPT PMT => -244.13

   b. If your friend says he can't manage that payment and wants to spread the debt over 6 years, what will the payment be?

      Same as above except, N = 6*12 = 72
      Press CPT PMT => -175.53

   c. If he promises to pay you $100 per month, how long will it take to pay off the debt?

      PV = 10,000
      I = 8/12 = 0.67
      PMT = -100
      FV=0
      Press CPT N => 166.03 Months or just under 14 years

   d. Your friend agrees to set up a perpetuity to pay off his debt. What annual payment do you require from this perpetuity?

      $$PV = \frac{PMT}{i} <=> 10,000 = \frac{PMT}{.08}$$
      $$\therefore PMT = 10,000 * .08$$
      $$=> PMT = \$800 \text{ per year}$$

2. You represent the wife in a divorce proceeding. The couple jointly owns an apartment building in Tallahassee that currently generates $100,000/year in rental income after expenses (including depreciation). Given the projected growth in Tallahassee, you expect that this amount is likely to grow at an annualized rate of

3%. For various reasons, the husband doesn't want to sell the building. Instead, he offers to pay a lump sum to buy the wife's interest (which is equal to one half of the asset).

a. If your client has a cost of capital of 9%, what buy out amount should you suggest?

The property is like a perpetuity so

$$PV = \frac{PMT}{i-g} = \frac{100,000}{.09-.03} = \frac{100,000}{.06} = 1,666,666.67$$

her share is half so => $833,333.33$

b. If the husband offers convincing evidence that growth is likely to be only 1% in the future, what buy out amount is reasonable?

$$PV = \frac{PMT}{i-g} = \frac{100,000}{.09-.01} = \frac{100,000}{.08} = 1,250,000.00$$

her share is half so => $625,000.00$

c. If the husband offers your client $500,000 after stating that he believes growth will be 1% per year, what discount rate is he implicitly applying to this asset's cash flows?

$$500,000 * 2 = 1,000,000 = PV$$

$$1,000,000 = \frac{100,000}{i-.01}$$

$$i-.01 = \frac{100,000}{1,000,000}$$

$$i-.01 = 0.10$$

$$i = 0.11$$

Corporate Finance
Problem Set #2
Klick
February 8, 2007

1. You represent Dale Tadlock, the Tallahassee hunter who put the now-famous duck "Perky" in his freezer after shooting it, not realizing it was not dead. Mr. Tadlock's wife discovered that Perky was alive after opening the freezer door and the duck "looked at her." Perky was rushed to the animal hospital where it was nursed back to health. Due to some damage to Perky's wings, it can never be released back into the wild. The animal rights group that agrees to take Perky under its care uses an obscure Florida law defining "negligence" in the hunting context as including instances where a hunter inflicts non-fatal wounds upon game if the game is not killed within one hour of the initial wounding to sue Mr. Tadlock to cover Perky's care costs.
    a. If it costs $50 per week to care for Perky, currently age 5, and ducks live 20 years on average, if Mr. Tadlock currently makes about 7 percent annually on his portfolio, what is the most he should be willing to settle this case (ignoring attorney fees, etc.)?

    PMT: 50
    I: 7/52
    N: 15*52
    FV: 0

    ➔ $24,136

    b. If instead of $50/week, experts suggest that the costs of caring for Perky will increase with Perky's age, such that it will cost $50/week to care for a duck in the age range 0-10 years, $75/week for a duck in the next 5 years of its life, and $100/week for a duck in the final 5 years of its life, what is the settlement that would make Mr. Tadlock indifferent between paying for the on-going care and making a lump sum payment now to cover his liability?

    Treat this as 3 different annuities and remember to discount annuities back to the present.

    Annuity #1:

    PMT: 50
    I: 7/52
    N: 5*52
    FV: 0

➔ PV $10,962.57

Annuity #2

PMT: 75
I: 7/52
N: 5*52
FV: 0
➔ PV $16,443.85

But note, this is the PV from the point of 5 years in the future so

FV: 16,443.85
I: 7/52
N: 5*52
PMT: 0
➔ PV: $11,590.51

Annuity #3

PMT: 100
I: 7/52
N: 5*52
FV: 0
➔ PV $21,925.13

But this if the PV from the point of 10 years in the future so

FV: 21,925.13
I: 7/52
N: 10*52
PMT: 0
➔ PV $10,892.83

So the present value of all of these expenditures is
$10,962.57 + $11,590.51 + $10,892.83 = $33,445.91

c. Mr. Tadlock's associate, Scott, offers to make the Perky problem "disappear" for a payment of $100 now but, if this conspiracy is discovered, under Florida law, Mr. Tadlock can be fined $25,000. The best estimate is that there is a 50% likelihood that the conspiracy would be discovered. Under the assumptions laid out in 1.a, what is the expected net present value of this "investment" proposed by Scott?

First, the cost of Scott's offer is

100 + 0.5*25,000 = $12,600

The benefit of the offer is that he avoids the PV calculated in 1.a

$24,136

So the net present value of the offer is

$24,136-$12,600 = $11,536.

Corporate Finance
Problem Set #3
Klick
March 21, 2007

Data on Share Prices:

Market Index	100	80	110	95	90	120	115	110	120	125
FSU	25	15	27	25	21	35	32	26	30	30

Note these are prices, not returns

1) Calculate FSU's Beta on the basis of these data

Beta is equal to $\beta = \frac{Cov_{FSU,Market}}{Var_{Market}} = \frac{\frac{1}{n}\sum_{t=1}^{n}\left(r_{FSU_t} - \overline{r_{FSU}}\right)\left(r_{Market_t} - \overline{r_{Market}}\right)}{\frac{1}{n}\sum_{t=1}^{n}\left(r_{Market_t} - \overline{r_{Market}}\right)^2}$

So first we need to calculate the returns for the given prices above

Market Index	100	80	110	95	90	120	115	110	120	125
return		(80-100)/100=	(110-80)/80	(95-110)/95	(90-95)/95	(120-90)/90	(115-120)/120	(110-115)/115	(120-110)/110	(125-120)/120
		-0.20	0.38	-0.14	-0.05	0.33	-0.04	-0.04	0.09	0.04
FSU	25	15	27	25	21	35	32	26	30	30
Return		(15-25)/25	(27-15)/15	(25-27)/27	(21-25)/25	(35-21)/21	(32-35)/35	(26-32)/32	(30-26)/26	(30-30)/30
		-0.40	0.80	-0.07	-0.16	0.67	-0.09	-0.19	0.15	0.00

We now need to calculate the mean return for FSU and the Market:

FSU mean: 0.71/9=.08
Market mean: 0.37/9=.04

For the covariance we have 1/9*()=
1/9*(.12+.24+.03+.02+.17+.01+.02+0+0)=.07

for the variance of the market return we have
1/9*(0.0576+0.1156+0.0324+0.0081+0.0841+0.0064+0.0064+0.0025+0)=
1/9*(0.31)=0.03

So for beta: .07/.03=2.3

2) Assume the risk free rate of return is 2% and the market rate of return is the average return for the market index given above; also use the variance for the returns from the market index data above. If the market index price on the next day is 120, what price is predicted for FSU on that day by the CAPM? Show all of your work.

Under the CAPM, the return is represented by:

$$r_{FSU_t} = r_{riskfree} + \beta_{FSU}\left(r_{Market_t} - r_{riskfree}\right)$$

so plugging in the given info and the beta calculated above (and calculating the market return as [120-125]/125):

$$r_{FSU_t} = .02 + 2.3*\left(-0.04 - .02\right) = .02 + 2.3*(-0.06) = .02 + \left(-0.138\right) = -0.12$$

so FSU is predicted to suffer a 12 percent loss, so the price is expected to be $26.40

Corporate Finance
Problem Set #4
Klick
April 3, 2007

1. A bond has the following characteristics:

   It has a face value of $1,000
   It pays 7.5% interest per year tax free
   It matures in 25 years

   a. Assuming a discount rate of 12% for this bond, what would you be willing to pay for it today?

   PMT: 75
   i/year: 12
   n: 25
   FV: 1000
   ➔ PV: $647.06

   b. Now assume that the payments are not tax free and your marginal tax rate is 30%. How much would you be willing to pay for it?

   PMT: 75*(1-.3)= 52.50
   i/year: 12
   n: 25
   FV: 1000
   ➔ PV: $470.59

   c. Assume you plan to sell the bond at the end of 5 years time and expect that you will be able to sell it to someone else who also uses a 12% discount rate to value the bond. What are you willing to pay for the bond today if its payments are tax free?

   Value your 5 years:

   PMT: 75
   i/year: 12
   n: 5
   FV: 0
   ➔ 270.36

   Now value what you'll get for it which is what the other guy will pay for it discounted back to the present so do it in 2 steps:

PMT: 75
i/year: 12
FV: 1000
n: 20
➔ guy willing to pay: 663.88

Discount this amount to the present
FV: 663.88
i/year: 12
n: 5
PMT: 0
➔ 376.7

So you're willing to pay the sum of your income stream plus the value you'll get when you sell

So you'd pay $647.06 (note that this is the same thing you got when you valued the buy and hold to maturity strategy; this is because you're expecting to sell to someone who has the same discount rate as you do).

d. Re-do 1.c assuming the tax treatment from 1.b.

For reasons like 1.c above, you'll get the same valuation as in 1.b. Go through the steps though to convince yourself that you come up with the same answers.

2. A bond has the following characteristics

It has a face value of $1,000
It pays 7.5% interest per year tax free
It matures in 10 years

Your discount rates for the various payments are as follows:

Year 1:	5%
Year 2:	8%
Year 3:	10%
Year 4:	11.5%
Year 5:	12%
Years 6-10:	12.5%

a. What are you willing to pay for the bond now?

Value each year's payment separately:

Year 1:

FV: 75
i/year: 5
n: 1
PMT: 0
➔ 71.43

Year 2:
All same except i/year: 8 and n: 2
➔ 64.30

Year 3:
All same except i/year: 10 and n: 3
➔ 56.35

Year 4:
All same except i/year: 11.5 and n: 4
➔ 48.52

Year 5:
All same except i/year: 12 and n: 5
➔ 42.56

Year 6-10 can be thought of as an annuity paying PMT 75 and FV 1000 with n: 5 and i/year: 12.5 but you have to remember to then discount it back to the present so:

Annuity value at beginning of year 5:
PMT: 75 FV: 1000 i/year: 12.5 n: 5
➔ 821.97

Now discount it: FV: 821.97 PMT: 0 i/year: 12.5 n: 5
➔ 456.13

Sum the individual payments and you get:

➔ $739.29
(note that this is more than you valued for 1.a; this is because that problem had a higher average discount rate than this one).

b. If the payments aren't tax deductible and your marginal tax rate is 30%, what are you willing to pay for the bond now?

Do as above but now use (1-.3)*75=52.50 as your yearly payment.
Year 1➔ 50 Year 2 ➔ 45.01 Year 3 ➔ 39.44 Year 4 ➔ 33.97 Year 5 ➔ 29.79
Annuity ➔ 741.86 discounted to present ➔ 411.68
Total Present Value ➔ 609.89