GESTÃO FINANCEIRA II

PROBLEM SET 1: Solutions

Chapters 1, 2, 3, 4 and 5

Revision of Fundamental Concepts

(FROM BERK AND DEMARZO'S "CORPORATE FINANCE")

LICENCIATURA – UNDERGRADUATE COURSE

2014-2015

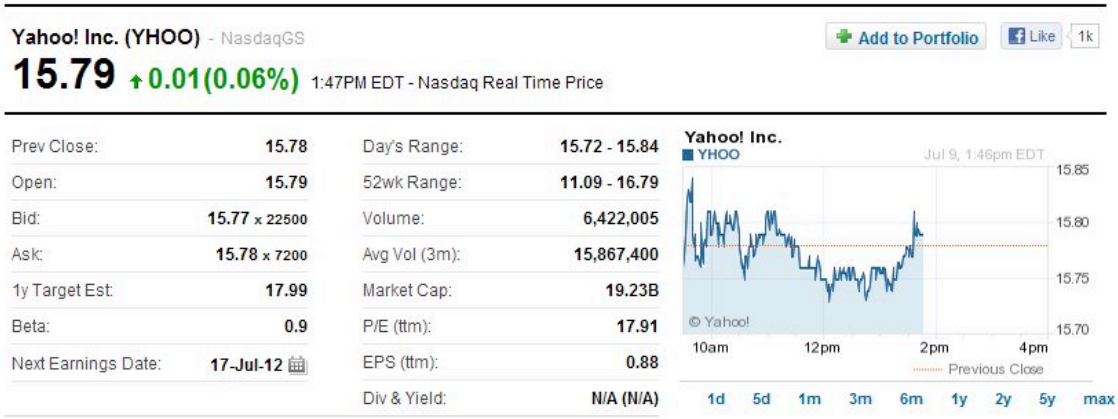
LISBOA SCHOOL OF ECONOMICS & MANAGEMENT

Chapter 1
The Corporation

1-14. **What is the difference between a public and a private corporation?** The shares of a public corporation are traded on an exchange (or "over the counter" in an electronic trading system) while the shares of a private corporation are not traded on a public exchange.

1-15. **Explain why the bid-ask spread is a transaction cost.** Investors always buy at the ask and sell at the bid. Since ask prices always exceed bid prices, investors "lose" this difference. It is one of the costs of transacting. Since the market makers take the other side of the trade, they make this difference.

1-16. **The following quote on Yahoo! Stock appeared on February 11, 2009, on Yahoo! Finance:**



If you wanted to buy Yahoo!, what price would you pay? How much would you receive if you wanted to sell Yahoo!? You would buy at $15.78 and sell for $15.77.

Chapter 2
Introduction to Financial Statement Analysis: IFRS

2-3. Find the most recent financial statements for Starbucks' corporation (SBUX) using the following sources:

a. From the company's Web site www.starbucks.com (*Hint* : Search for "investor relations.")

b. From the SEC Web site www.sec.gov. (*Hint* : Search for company filings in the EDGAR database.)

***c.* From the Yahoo! Finance Web site http://finance.yahoo.com.**

d. From at least one other source. (*Hint* : Enter "SBUX 10K" at www.google.com.)

Each method will help find the same SEC filings. Yahoo! Finance also provides some analysis such as charts and key statistics.

2-8. In early 2009, General Electric (GE) had a book value of equity of $105 billion, 10.5 billion shares outstanding, and a market price of $10.80 per share. GE also had cash of $48 billion, and total debt of $524 billion. Three years later, in early 2012, GE had a book value of equity of $116 billion, 10.6 billion shares outstanding with a market price of $17 per share, cash of $84 billion, and total debt of $410 billion. Over this period, what was the change in GE's:

a. market capitalization?

2009 Market Capitalization: 10.5 billion shares × $10.80/share = $113.4 billion. 2012 Market Capitalization: 10.6 billion shares × $17/share = $180.2. The change over the period is $180.2 – $113.4 = $66.8 billion.

b. market-to-book ratio?

2009 Market-to-Book $= \frac{113.4}{105} = 1.08$. 2012 Market-to-Book $= \frac{180.2}{116} = 1.55$. The change over the period is: 1.55 – 1.08 = 0.47.

c. enterprise value?

2009 Enterprise Value = $113.4 – 48 + 524 = $589.4 billion. 2012 Enterprise Value = $180.2 – 84 + 410 = $506.2 billion. The change over the period is: $506.2 – $589.4 = –$83.2 billion.

Chapter 3
Financial Decision Making and the Law of One Price

3-12. Suppose Bank One offers a risk-free interest rate of 5.5% on both savings and loans, and Bank Enn offers a risk-free interest rate of 6% on both savings and loans.

a. What arbitrage opportunity is available? Take a loan from Bank One at 5.5% and save the money in Bank Enn at 6%.

b. Which bank would experience a surge in the demand for loans? Which bank would receive a surge in deposits? Bank One would experience a surge in the demand for loans, while Bank Enn would receive a surge in deposits.

c. What would you expect to happen to the interest rates the two banks are offering? Bank One would increase the interest rate, and/or Bank Enn would decrease its rate.

3-13. Throughout the 1990s, interest rates in Japan were lower than interest rates in the United States. As a result, many Japanese investors were tempted to borrow in Japan and invest the proceeds in the United States. Explain why this strategy does not represent an arbitrage opportunity.

There is exchange rate risk. Engaging in such transactions may incur a loss if the value of the dollar falls relative to the yen. Because a profit is not guaranteed, this strategy is not an arbitrage opportunity.

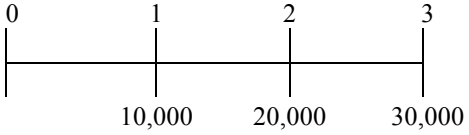
Chapter 4
The Time Value of Money

4-8. Your daughter is currently eight years old. You anticipate that she will be going to college in 10 years. You would like to have $100,000 in a savings account to fund her education at that time. If the account promises to pay a fixed interest rate of 3% per year, how much money do you need to put into the account today to ensure that you will have $100,000 in 10 years?

$$\text{PV}=\frac{100,000}{1.03^{10}} = 74,409.39$$

4-12. You have just received a windfall from an investment you made in a friend's business. He will be paying you $10,000 at the end of this year, $20,000 at the end of the following year, and $30,000 at the end of the year after that (three years from today). The interest rate is 3.5% per year.

a. What is the present value of your windfall?

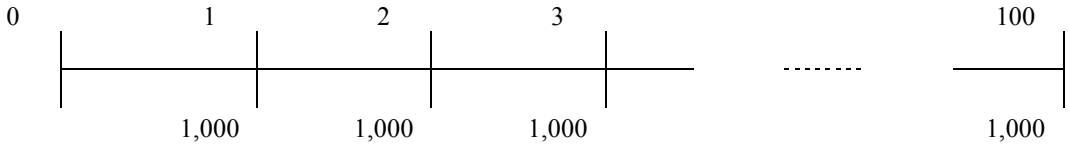


$$\text{PV} = \frac{10,000}{1.035} + \frac{20,000}{1.035^2} + \frac{30,000}{1.035^3}$$
$$= 9,662 + 18,670 + 27,058 = 55,390$$

b. What is the future value of your windfall in three years (on the date of the last payment)?

$$\text{FV} = 55,390 \times 1.035^3$$
$$= 61,412$$

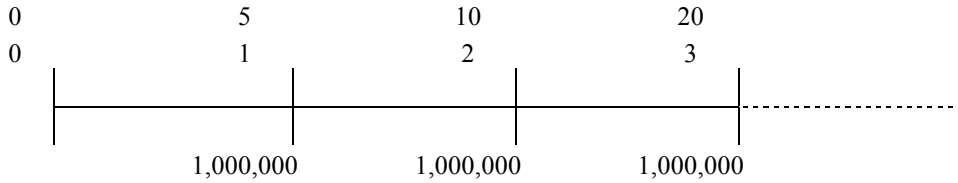
4-19. What is the present value of $1000 paid at the end of each of the next 100 years if the interest rate is 7% per year?



The cash flows are a 100 year annuity, so by the annuity formula:

$$\text{PV} = \frac{1,000}{0.07}\left(1 - \frac{1}{1.07^{100}}\right) = 14,269.25.$$

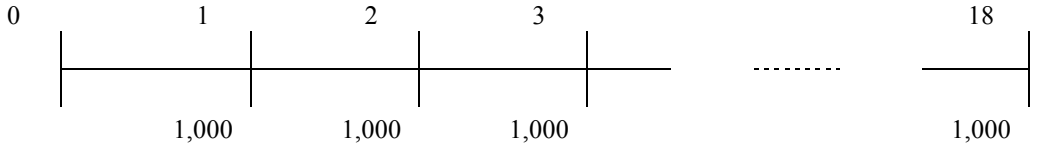
4-20. You are head of the Schwartz Family Endowment for the Arts. You have decided to fund an arts school in the San Francisco Bay area in perpetuity. Every five years, you will give the school $1 million. The first payment will occur five years from today. If the interest rate is 8% per year, what is the present value of your gift?



First we need the 5-year interest rate. If the annual interest rate is 8% per year and you invest $1 for 5 years you will have, $(1.08)^5 = 1.4693\,2808$. So the 5 year interest rate is 46.93%. The cash flows are a perpetuity, so:

$$\text{PV} = \frac{1,000,000}{0.46932808} = 2,130,833.$$

4-23. Your grandmother has been putting $1000 into a savings account on every birthday since your first (that is, when you turned 1). The account pays an interest rate of 3%. How much money will be in the account on your 18th birthday immediately after your grandmother makes the deposit on that birthday?



We first calculate the present value of the deposits at date 0. The deposits are an 18-year annuity:

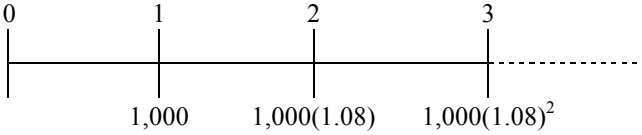
$$\text{PV} = \frac{1,000}{0.03}\left(1 - \frac{1}{1.03^{18}}\right) = 13,753.51$$

Now, we calculate the future value of this amount:

$$\text{FV} = 13,753.51(1.03)^{18} = 23,414.43$$

4-24. A rich relative has bequeathed you a growing perpetuity. The first payment will occur in a year and will be $1000. Each year after that, you will receive a payment on the anniversary of the last payment that is 8% larger than the last payment. This pattern of payments will go on forever. If the interest rate is 12% per year,

a. What is today's value of the bequest?



Using the formula for the PV of a growing perpetuity gives:

$$\text{PV} = \left(\frac{1,000}{0.12 - 0.08}\right) = 25,000.$$

b. What is the value of the bequest immediately after the first payment is made?

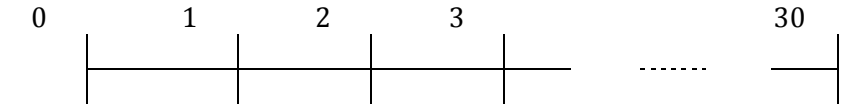
Using the formula for the PV of a growing perpetuity gives:

$$\text{PV} = \frac{1,000(1.08)}{0.12 - 0.08} = 27,000.$$

4-37. (includes 4.36) You are thinking of purchasing a house. The house costs $350,000. You have $50,000 in cash that you can use as a down payment on the house, but you need to borrow the rest of the purchase price. The bank is offering a 30-year mortgage that requires annual payments and has an interest rate of 7% per year.

a. What will your annual payment be if you sign up for this mortgage?

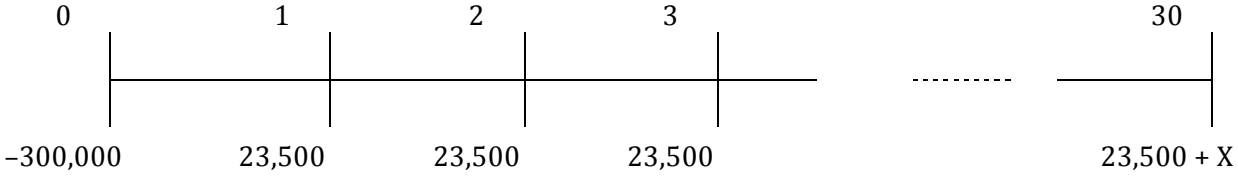
Timeline: (From the perspective of the bank)



$$C = \frac{300,000}{\frac{1}{0.07}\left(1 - \frac{1}{1.07^{30}}\right)} = \$24,176$$

b. You can afford to pay only $23,500 per year. The bank agrees to allow you to pay this amount each year, yet still borrow $300,000. At the end of the mortgage (in 30 years), you must make a *balloon* payment; that is, you must repay the remaining balance on the mortgage. How much will this balloon payment be?

Timeline: (where X is the balloon payment.)



The present value of the loan payments must be equal to the amount borrowed:

$$300,000 = \frac{23,500}{0.07}\left(1 - \frac{1}{1.07^{30}}\right) + \frac{X}{(1.07)^{30}}.$$

Solving for X:

$$X = \left[300,000 - \frac{23,500}{0.07}\left(1 - \frac{1}{1.07^{30}}\right)\right](1.07)^{30} = \$63,848$$

Chapter 5
Interest Rates

5-6. Your bank account pays interest with an EAR of 5%. What is the APR quote for this account based on semiannual compounding? What is the APR with monthly compounding?

Using the formula for converting from an EAR to an APR quote

$$\left(1+\frac{\text{APR}}{\text{k}}\right)^{\text{k}} = 1.05$$

Solving for the APR

$$\text{APR} = \left(\left(1.05\right)^{\frac{1}{\text{k}}} - 1\right)\text{k}$$

With annual payments k = 1, so APR = 5%
With semiannual payments k = 2, so APR = 4.939%
With monthly payments k = 12, so APR = 4.889%

5-26. If the rate of inflation is 5%, what nominal interest rate is necessary for you to earn a 3% real interest rate on your investment?

$1+\text{r}_\text{r} = \dfrac{1+\text{r}}{1+\text{i}}$ implies $1+\text{r} = (1+\text{r}_\text{r})(1+\text{i}) = (1.03)(1.05) = 1.0815$.

Therefore, a nominal rate of 8.15% is required.

5-30. Suppose the term structure of risk-free interest rates is as shown below:

Term	1 year	2 years	3 years	5 years	7 years	10 years	20 years
Rate (EAR, %)	1.99	2.41	2.74	3.32	3.76	4.13	4.93

What is the present value of an investment that pays $100 at the end of each of years 1, 2, and 3? If you wanted to value this investment correctly using the annuity formula, which discount rate should you use?

PV = 100 / 1.0199 + 100 / 1.0241^2 + 100 / 1.0274^3 =$285.61.

To determine the single discount rate that would compute the value correctly, we solve the following for r:

PV = 285.61 = 100/(1 + r) + 100 / $(1 + r)^2$ + 100/$(1 + r)^3$ = $285.61.

This is just an IRR calculation. Using trial and error or the annuity calculator, r = 2.50%. Note that this rate is between the 1, 2, and 3-yr rates given.