

1. **Due April 7 (T) 12:00pm.** No late submission will be accepted.
2. Total scores: 100 points. You can discuss the assignment with your classmates but you need to do the assignment on your own hands and write down your own explanations. Otherwise, you learn little from this assignment.
3. In this assignment, you will learn more about EXCEL functions and how to use spreadsheet to master the first-hand macroeconomic and financial data and interpret them. The instruction of the assignment is based on MS Office Excel 2007 edition.
4. Go to the course website to download the Excel file assignment2.xls to your personal disk. Open the file and type your name in Cell C1 of "I. Time Value" Tab. And answer questions in blue cells and boxes.
5. After finishing your homework, turn in your assignment **electronically** via D2L.
  - (1) From the *Course Home* page, on the *Navigation* bar, click **DROPBOX**  
The *Folder List* dialog box appears.
  - (2) Click "Assignment 2" folder. The *Drop Off Files* dialog box appears.
  - (3) In the *File* text box, select the file: (a) Click **BROWSE...** The *Choose file* dialog box appears. (b) Using the *Look in* pull-down list, locate and select the file. (c) Click **OPEN**.
6. **Double Check** View all the files that have been submitted to me in the your *Dropbox*.
  - (1) From the *Course Home* page, on the *Navigation* bar, click **DROPBOX**  
The *Folder List* dialog box appears.
  - (2) Click **HISTORY**. The *Dropbox Dropoff History* dialog box appears. A list of submitted files appears in each folder.
7. Finally you will have to submit one Excel file named assignment2.xls including the following 7 tabs.
  - Time Value. (36 points)
  - Stock Markets. (24 points)
  - Four Charts: SP500, Fastenal, GM, and Return Series. (20 points)
  - Reading Summary. (20 points)
8. Feel free to stop by my office if you have any questions.

# I. Time Value of Money

## 1. Future Value

In Chapter 13, we learned about the Future Value and Present Value. For instance, in Handout 9 example on page 6,

[Ex 1] You have \$1000 now, interest rate for your investment is 7%, after 5 years you will get:  $1000(1+0.07)^5 = 1403 \rightarrow 1,000$  today is worth 1,403 in 5 years.

We can do this easily using Excel. Go to the course website and download the **assignment2.xls** to see the example (on **Cell D5**) and then answer the following questions using Excel.

Q 1.1 How much will an investor have in 5 years, if \$1000 is invested today at an annual interest rate of 9%? Using the same method as in Ex 1, type the formula and get the answer in **Cell D10**.

Q 1.2 How much will an investor have in 20 years, if \$1000 is invested today at an annual interest rate of 7%? Using the same method as in Ex 1, type the inputs in Cell B15 to B17 and type the formula and get the answer in Cell D15.

Q 1.3 Briefly explain the findings (the difference between Ex 1, Q1.1 and Q1.2 about the impact of interest rate and compounded year on the future value) in Q 1.3. Box.

## 2. Present Value

Again see the example in Handout 9 page 6 and check how we can calculate this using Excel (see D21) and then answer the following questions using Excel.

[Ex2] Suppose the interest rate is 8%, in order to get \$1000 after 6 years, how much money you need to invest now?

$1000 / (1+0.08)^6 = 630 \rightarrow 630$  today is worth 1,000 in 6 years

Q 2.1 A car salesperson gives you four alternative ways to pay for your car. The first is to pay \$18,000 today. The second is to pay \$19,000 one year from today. The third is to pay \$20,300 two years from today. The fourth is to pay \$21,500 three years from today. If the interest rate is 6 percent, which payment option has the lowest present value and which has the highest? (actually this is the practice question Q8 on page 9 in Handout 9).

Q 2.2 Your Aunt gives you \$100 today and promises to pay you another \$100 four year from today. What is the present value of these payments if the interest rate is 4 percent? (This is similar to the practice question Q6 on page 8 in Handout 9).

## 3. Bond Value

A 5-year bond with face value \$1000 will give you \$60 coupon every year. If the current market interest rate is 5%, the reasonable price of the bond will be \$1043.29. See

assignment2.xls [Ex 3] by using Excel function “NPV”. Using the Excel to answer the following questions.

Note: You should click “?” (Excel Help) on the top right corner of toolbar → And type “NPV function” in the Search box to see the explanation of this function.

Q 3.1 What will be this bond’s reasonable price if the market interest rate goes up to 7%?

Q 3.2 What will be this bond’s reasonable price if the market interest rate goes down to 3%?

Q 3.3 What will be the price for a 10-year bond with face value \$1000 which gives you \$50 coupon every year under the market interest rate 8%?

#### 4. Investment Project

[Ex 4.1] Suppose you are the CEO in IBM, you are planning an investment project, which will give the company cash inflow as follows: \$200 in two years, \$300 in three years, \$400 in four years, and \$500 in five years. If the market interest rate is 5%, the present value of this investment project will be \$1161 (see cell D72). In other words, the cost for this project should be \$1161 **at most!**

[Ex 4.2] The other way to see this project is: if we spend \$1161 right now (year 0) to implement the above project, what will be the return for this project? The answer is 5%. Since the return of the project is equal to the market interest rate (the borrowing cost), this is so call **Break-Even Point**. In Excel, we use “IRR” function to calculation the return of an investment project in order to compare to the borrowing cost/market interest rate. You should use Excel Help to find the explanation for IRR function.

Q 4.1 Suppose the above IBM project cost \$1000 and the future benefit are the same as above, what is this project’s return? Will you do this project?

Q 4.2 If the market interest rate goes up from 5% to 10%, will you still do this project? Why or why not?

Q 4.3 According to the Census survey, the college degree will give graduates \$23,000 extra pay a year. (*If you don’t believe it, read this [article!](#)*) Suppose it will cost you \$30,000 a year for four years (from year 0 to year 3) in attending college and you will get a job and work for 50 years (from year 4 to year 53) after graduation. Calculate the return for this human capital investment.

Q 4.4 Does the above calculation include all the cost for college? (Hint: opportunity cost) What cost do we miss, if any? What will happen to your human capital investment return if we include this cost?

Q 4.5 If the extra nominal pay: \$23,000 increase over time, meaning that the gap between college graduate and high school graduate widen, what will happen to your human capital investment return?

*Note: The implication of this question is as follows.*

*Don’t ever think about dropping out college!!! Hang in there whatsoever!*

## II. Stocks Market

Go to <http://finance.yahoo.com> (Course website has this link) and download monthly three stock market data over the period December 1990 to December 2008. Make sure to reorder the data so that time runs forward. Do your analysis on the monthly adjusted closing price data (which have been adjusted for dividends and stock splits).

Guidelines:

- In Yahoo Finance page, enter “^GSPC” in the symbol(s) box and click “GET QUOTES.”
- Click “Historical Prices” below the Quotes.
- Choose the Start Date: Dec 1, 1990 and End Date: Dec 1, 2008 and check Monthly data.
- Click **Get Prices**.
- Scroll down click **Download to Spreadsheet** and click “Save” into your disk as sp500.csv.
- Read the data from the file.
- Delete Column B to F: Open, High, Low, Close, and Volume.
- To let time run forward, highlight Column A and click “Sort & Filter” on the toolbar and click “Sort Oldest to Newest” A → Z. Sort Warning will pop up. Choose “Expand the selection” and click “Sort”. Take a look and make sure the data begins from 3-Dec-90. Save it.
- Import Data to assignment2.xls. Go to the assignment2.xls file and click “II Stock Markets” Tab. Click Cell A1 and then click Data on the toolbar → Import External Data → Import Data. And then look for your sp500.csv file and choose and open it.
- The Text Import Wizard will pop up. Click Next >. → And then In Delimiters area check Comma. → Click Next >. → Click Finish. → Click OK. You are supposed to import the data into Column A and B. [If you don’t like this method, you could simply do the copy and paste from file to file.
- Change the name “Adj Close” into “sp500” in cell B1. Delete “Date” in Cell A1 to make following plotting easier.
- Go to Yahoo Finance again to collect the same period of stock prices for Fastenal (stock ticker “fast”) and GM (just ”gm”), sort the data and import them to Column C and Column D, respectively. Name C1 as “fast” and D1 as “gm”.

1. Make time plots of the monthly price data over the period for sp500, fast, and gm. Put informative titles and labels on the graph. Place these three graphs in separate tabs from the data. Name the tab “sp500”, “fast”, and “gm”, respectively.

Hints: For example, for sp500, highlight column A, B and click Insert → Chart → Line on the toolbar. After chart popping up, right click the chart. And then choose Move Chart → New sheet: → OK.

2. Make a time plot of the return of S&P 500, fast, and gm over the period. Calculate the

**annualized** rate of return for three series from Column B, C, D to Column E, F, and G. And then use the date series (column A) and these three return series to draw one chart. Name it “returns” and save it in a separate tab.

If you forgot how to do it, go back to check Assignment 1 guideline. It will be the same way as calculating GDP growth rate or CPI inflation rate.

$$\text{monthly stock return} = R_t = \frac{P_t - P_{t-1}}{P_{t-1}}$$

$$\text{monthly annualized stock return} = 12 * \left( \frac{P_t - P_{t-1}}{P_{t-1}} \right) \text{ because there are 12 months a year!}$$

3. If you invested \$1,000 to buy S&P 500 index fund at the end of December 1990 and hold it until the end of December 2008, your financial investment value will become \$4,230. [How to get this number? Check the formula in Cell J5]. Use the same way to show the investment values for Fastenal and GM in Dec 2008 if you have had invested \$1000 on them in Dec 1990.
4. Use the “average” and “stdev” functions to calculate the mean and standard deviations of stock return series of sp500, fast, and gm from Cell J6 to L7.

Q 5. 1. Which of them (sp500, fast, or gm) gives you the highest investment return from 1990 through 2008?

Q 5. 2. Compare these returns to the human capital return in Q 4.3, what implication could you get?

Q 5. 3. Compare the numbers you got about the mean and S.D. of these three series, what implication could you get? [Hint: risk premium and diversification]

### III. Essay

Read the President Obama’s message in his 2010 budget proposal as follows,

[http://www.whitehouse.gov/omb/assets/fy2010\\_new\\_era/President's\\_Message1.pdf](http://www.whitehouse.gov/omb/assets/fy2010_new_era/President's_Message1.pdf)

Briefly express your opinion on President’s message in the Essay tab. For example, you can talk about the future impact of this message; if you agree with President, you can mention why you agree; or if you disagree with President, you can describe why you don’t agree with him.