Supplemental Information

Class Policies and Term Project

Web Site

Be sure to visit the web site: www.vandenberg.info. This site has a variety of things to help you grasp the class material. There are links to supplemental material, text problem solutions, and the text authors' web site. It also contains information about other general class policies including, privacy, prerequisites, grade point requirements, incompletes, WU grades etc. It also contains tutorials and solutions to homework problems which are available after we cover the problems in class.

Recording Policy

At all times, for a variety of reasons, including the fact that everyone is entitled to a certain level of privacy, the use of recording devices, such as, but not limited to, cameras of any type (including cell phones, which should be off during class), video or voice recorders etcetera, during class is *prohibited*.

Exam Calculator Policy

The calculator must have less than 256 kb of addressable memory. Which means it must be a financial calculator, not a computer. Therefore a *single* standard financial calculator is allowed.

You are not allowed to use "crib" sheets during the exam, the form of the crib sheet does not matter so no written or electronic crib sheets. Thus you are not allowed to program into your calculator anything that could be used during the exam, this includes, but not limited to, formulas, equations, notes etc. You are allowed to use any pre-programmed functions built into the calculator, e.g. Financial functions, log functions etc.

Classroom Calculator

I will be using a screen representation of a financial calculator. If you wish you can obtain this file from my web site. It is available in several spreadsheet formats. Choose the one you want, probably Excel (Calfinx.exe). The instructions for installing it are on the web site. If you are asked for either a user name or password on the web site use the following (available in class):

User name: _____
Password: _____

Both of these are case sensitive. Note for the solution to text problems you will need specific passwords which will be available after we go over the problems in class.

The remaining part of this handout will probably not be needed until you start the project. But you are free to start at any time and you need to choose your company by February 20. But waiting a little while is probably a good idea. It is better early in the class to spend your time reading and doing the other assignments.

The Term Project Part I

By Tuesday, February 20, select your firm for the term project and obtain the *closing* stock price on this date. Remember the selection criterion and the data requirements. You can choose any public firm that you wish as long as its stock ticker symbol starts with the same letter as your first or last name. One other requirement is that you cannot reuse firms you have used or are using in your other classes. There are also a few firms that I use as examples that you may not use: Kellogg, Starbucks, Best Buy, or Johnson and Johnson. Do not choose, financial service firms such as, banks, insurance companies, brokerage firms etc. These firms do not fit with the discussion in the text since they are financial institutions. Any firm that meets the basic requirements will work. All you are really doing is getting data and then applying some analysis to it. The data itself does not matter. There are no good or bad firms for this project. It also not your job to find "good results," whatever that my mean. It does not matter whether the stock price goes up or down; whether the firm makes money or loses money; whether the dividend is zero or some positive number; or whether the ratios are good or bad. Your job is to find the data and do the required analysis and comment on the results.

As you collect this data think about what is going on. Each day investors evaluate the information set about the company and its environment and adjusts the price to reflect this information. So the stock price at any moment reflects all that is known and all that is anticipated about this particular company and its value, the investor forecast the expected cash flows from her investment and this results in a stock price.

Capital market pricing affect us all in some way, sometimes indirectly and frequently directly. As figure 1 shows the price depends on the present value of the future cash flows.

$$P = \sum_{t=0}^{\infty} \frac{E(D_t)}{(1 + R)^t}$$

Figure 1

This pricing process sets discount rates, in the above formula Re (the ex post incarnation of these are called HPR's). This is the rate of return that we can expect to earn on this investment. The same process set rates of interest in other markets and that ultimately determines the rate of interest we pay on loans, and rates we earn on deposits. These rates also affect the prices we pay for many other products and services. For most of you it will also determine how much you must save in order to be able to retire. Thus I hope you will come away from this exercise with an appreciation for the pricing process in free markets.

By Wednesday, Feb 21 send an Email to *fin323@rohan.sdsu.edu* (please do not use this address for any other messages use *pieter.vandenberg@sdsu.edu* instead). Please format the *subject line* as follows (separate each item with a comma):

lastname,firstname,tickersymbol,closingprice

So for example, if your name is John Garcia and you chose JNJ (Johnson and Johnson), and the stock price on Tuesday February 20 was $65.70 (I have no idea what the stock price will actually be on Tuesday February 20 or any future date so these are all fictitious prices.) Then your *subject line* would look like this:

Garcia,John,JNJ,65.70

Notice there are no $ signs and no blanks. Be sure to separate each item with a comma as shown above. You can leave the body of the email blank, no one will read it. If you do not format the subject field correctly your effort may not count.

Starting the next week you will also need to check if the stock received a dividend. The important date is the ex-dividend date, since that is the date the dividend no longer will trade with the stock. Starting the next week report dividend received (if any) during the week (i.e. the stock went ex dividend during the week), the stock price, and then compute your weekly holding period return (HPR) and add both of these to the subject line. For example if the following Tuesday the stock was $66.40 and the dividend during week was $0.375. (If no dividend was paid then the dividend is $0.00.) Then: $1+HPR = (66.40 + .375)/65.70 = 1.01636$ (for this purpose use 5 decimal places). Also report the geometric average return to date, which for the first period is same as the HPR.

The $(1+HPR)$ is essentially the fundamental equation of finance solved this way:

$$P_0 = (P_1 + DIV)/(1+HPR)^n$$
$$(1+HPR)^n = (P_1 + DIV)/P_0$$

since in most of the case "n" will be one the equation is:

$$(1+HPR)^1 = (P_1 + DIV)/P_0$$

Please format the *subject line* as follows:

lastname,firstname,tickersymbol,closingprice,dividend,(1+HPR),geometricmean

For this example it would be:

Garcia,John,JNJ,65.70,.375,1.01636,0.01636

Suppose no dividend were paid the next week (as is likely) and stock price was 65.25. The HPR would be $(65.25+0)/66.40 = 0.98268$. And geometric average to date would be $(1.01636*0.98268)^{.5}-1=-0.00062$. Then the subject line would look like this:

Garcia,John,JNJ,65.70,0,0.98268,-0.00062

Continue this exercise through the week of April 23. We will skip the week of March 26, but be sure to adjust the HPR for this during the week of April 2. You might want to develop a little spreadsheet such as Figure 2. (Example data, not actual.)

As part of you final report on the company include the Value of the

Figure 2

	A	B	C	D	E	F
1	Ticker:	JNJ				
2	Date:	Stock Price	Dividend	1+HPR	HPR	Geometric Average
3	2/20/2007	65.70	0.000			
4	2/27/2007	66.40	0.375	1.01636	0.01636	0.01636
5	3/6/2007	65.25	0.000	0.98268	-0.01732	-0.00062
6	3/13/2007					
7	3/20/2007					
8	3/27/2007	No Price				
9	4/3/2007					
10	4/10/2007					
11	4/17/2007					
12	4/24/2007					

Equity (VE) of this firm on 4/24/2007. For the number of shares use the last Balance Sheet's number of shares outstanding. Remember that this value would reflect the total present value all of the expected cash flows to the equity holder as of that date.

You will receive an email from me each week with my results for JNJ. (Remember the stock prices I used above are purely fictitious since I don't know what the actual will be.) I will send the first one the week before yours is due, with actual stock price for JNJ. So if you want to see if you are getting what you are supposed to be getting you might also want to look up the stock price for JNJ each Tuesday and compute the above values for JNJ and see how that compares with my Emailed results to you. If you are not getting the same answers than something is wrong. (It might be my mistake or it might be yours, so work it out carefully and find the error.)

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The Term Project Part II

I recommend that you start on this part of the project after the first exam. While it will probably not take long to complete the project there are things that may take some time to complete. Leaving some elapse time between your efforts increases the quality of the learning experience and avoids the problems associated with the "critical need detectors," always kick in when you fail to plan and try to accomplish the task at the last minute. The critical need is detected and something fails, and prevents you from accomplishing the task. You also need time to think.

In addition to meeting the general requirements for the firm you will need 10 years of historical data so make sure that the firm you choose has the necessary data. Do not assume that it is bound to be available, if the firm was not a public firm it is unlikely to be available, this is particularly true for the stock price, but is also likely to be true for other financial data. Consider that some firms will already have data for fiscal 2007 and others for fiscal 2006. It is likely that by April firms with fiscal years ending in January through early March should have reported their fiscal year results for 2007 and remaining firms should have data for fiscal 2006 available.

Collection of data/information is an important part of the process and you need to allow time for its completion. Last minutes searches are frequently fruitless. By now, after at least 15 years of formal education, all of you should have developed a sound research methodology. Hint, real research does not start with the word "Google" or any other internet search engine. Why? The problem with the internet is that there is no "editor" to hold responsible for the material. Any pea brained 12 year old chimp can put up a web page, which should tell you to be extremely cautious about material you find there. Your only protection in using material from this source is in knowing what the data/information should look like, if it is reliable. You have to have an appreciation for the field by having looked at reliable information sources before you venture out in the internet mine field. You should be able to use your existing research skills to obtain the data/information. I will not tell you where or how to find the data/information, this basic research methodology is prerequisite to the course. The information is available in a variety of places and sources. It may be necessary to chain two sources together to get data for the required time period. I will give you one more hint, when you are looking for information on a college campus you go to one of the largest (usually) buildings and start there (ours has a dome in front of it).

As part of the analysis process you will need to enter the data into a spreadsheet. You can use the spreadsheet to put the data into a presentation format that looks professional. You will need to graph the data using the spreadsheet graphing tool (hand drawn graphs are not acceptable, nor are handwritten papers). Finally you will need to produce a well written report that meets the requirements listed below. You will of course need to integrate the output from the spreadsheet into the report.

To print the statements use the page setup options in Excel or other spreadsheet you are using. All have similar options. In this case choose landscape, and choose to fit the output to 1 page tall and 1 page wide. Also set the margins to about .5 inch. You can find these options on the File menu, page setup.
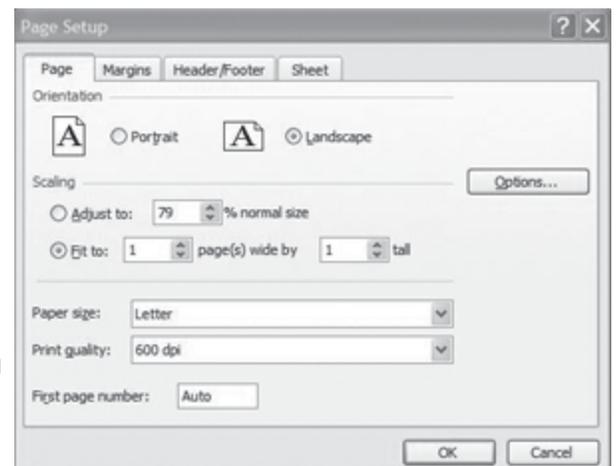

Figure 3

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The Data

The term project requires that you apply some of the things you will learn to a firm. As such you will need to choose a firm that meets the requirements listed and then collect, at minimum, the following information:

1. The last ten years (1997 through 2006 or later) of financial information including the Balance Sheet and Income Statement. While not required you might also want to obtain the Cash Flow Statements since in some cases it is the best place to find depreciation expenses.

2. Collect the last nine years (1998 - 2006) of the end of the calendar year close common stock price, along with dividends (if any) paid during the year. This will give you eight holding period returns.

3. A brief description of the firm's business and activities, in your words. Don't just copy the company's public statements.

4. Attach the appropriate bibliographical information.

The Calculations and Graphs

Enter this data into a spreadsheet in a standard format. This format should not contain more than about 25 or so lines for the Balance Sheet and about 15 or so lines for the Income Statement. So you should create, simple readable, summary forms, of the financial statement, *not* just a dump of any data you find. You should have one sheet with 10 years of Balance Sheet information and one sheet with 10 years of Income Statements. Print (landscape) one page containing the Balance Sheets and one page containing the Income Statements. (See **Figure 3**)

1. Then compute the ratios in Table 3.5 (page 60) for each year of data. (You will have 10 years of ratios. Print one page containing the ratios. For the first year of data please supply documentation of the calculation of the ratio by giving the data for the numerator and the denominator for each of the required ratios.

2. Graph, over time, the ratios from each of the five (I, II, III, IV, V) categories in table 3.5 (total of 5 graphs). You may scale the data or use dual axis to achieve your results.

3. Using the market data for common stock calculate the "Holding Period Return" (See pages 7 and 8 of this handout) for each of the last 8 years and the 8 year Internal Rate of Return on a hypothetical initial investment of $1000 in the stock.

The Analysis

Within the scope of the data you collected comment on the performance of this company. You may choose any format you find useful to accomplish this. Be sure to keep your reader in mind. Think about convincing the reader that you have a good "solution" and that reader can readily determine that from reading the report. So organize it.

Grading

In grading the project I will assign a score between 0 and 4. Most individuals will receive a two (2) which means that you have, in general, done the project completely and competently. If you have some problems with your solution you will receive a one (1). If you turn in an assignment that is essentially a piece of paper, but does not complete the project you will receive a zero, meaning the project does not count.

Score	Grade	Without Part I
1	75	65
2	85	75
3	95	85
4	100	90

If you make an obvious effort to complete the assignment it is unlikely that you will receive a zero. A three can be earned by doing a particularly good job. This could be an innovative approach to the solution, and/or an extra effort in the quality of presentation or explanation. A four (4) is reserved for a rare event. Every once in a while someone does an extraordinary presentation. The numbers can be converted to a percentage by the scale given in the box above, on the right.

What do you do about stock dividends and stock splits?

What is stock dividend (as opposed to a cash dividend)?

You are given additional shares, usually stated as some fraction of a share for every share you own. So a 5% stock dividend means you will get 5% more shares. So if you own 20 shares you will get one more share, a 100 share you would get 5 more. This gives you more shares but now the value of the firm (VF) is spread over more shares. So if the VF = Old number of shares times price was equal to $25,000 = 1000 shares * $25.00 then the new value of firm is still $25,000 but this is now spread over 5% more shares. The new price would be $23.8095.

Stock Dividend	5.00%	**Stock Dividend**	
Share outstanding	1000		
Market Price	$25.00		
VF	$25,000.00 =$$25.00*1000		
Additional Shares Issued	50		
New Share outstanding	1050		
New Market Price	$23.8095238 =$25,000.00/1,050		

Let's say you owned 100 shares before the stock dividend.

Old Position:		New Position	
Shares	100	Shares	105
Prices	$25.00	New Price	$23.8095238
Portfolio Value	$2,500.00	Portfolio Value	$2,500.00

So when you are all done you own more share, but each one is worth less and your over-all position is the same.

What's a stock split?

You could just call it a big stock dividend. A 2 for 1 split means that firm has just offered a 100% stock dividend, but this is usually called a split. (There is a technical difference from a cash dividend, when a stock splits the dividend per share also splits and thus is reduced to half, but in the case of a stock dividend the cash dividend is usually not lowered.) Notice what this would do to your rate of return if you were not careful.

100% Stock Dividend or a 2 for 1 split means shares increase by:	100.00%	**Stock Split**	
Share outstanding	1000		
Market Price	$25.00		
VF	$25,000.00		
Additional Shares Issued	1000		
New Share outstanding	2000		
New Market Price	$12.5000000 =$25,000.00/2,000		

So when you are all done you own more share, but each one is worth less and your over-all position is the same.

Old Position:		New Position	
Shares	100	Shares	200
Prices	$25.00	New Share Price	$12.5000000
Portfolio Value	$2,500.00	Portfolio Value	$2,500.00

One day you look in WSJ and find the stock is selling for $25, the next day (after the split) it is selling for $12.50. It looks like your HPR is: -50% {$12.50/$25.00 -1}. A really bad day. But you realize that you own 2 shares for every one before so the correct HPR = 0% {(2*$12.50)/$25 -1}. Since this could happen more than once over a time period most suppliers of historical stock prices provide an adjusted close price. This means they have adjusted the prices so that they are comparable.

	WSJ Price	Adjusted Historical Price
Day 0	$25.00	$12.50
Day 1	$12.50	$12.50

Example: Starbucks Adjusted close prices

Here are the prices of Starbucks shares for the 1st trading week in December. In this case the supplier, Yahoo has adjusted the closing price

Date	Open	High	Low	Close	Volume	Adj Close*
6-Dec-06	36.95	36.97	36.48	36.86	5,032,000	36.86
5-Dec-06	36.66	37.14	36.51	36.84	10,746,800	36.84
4-Dec-06	35.35	35.99	35.25	35.75	6,636,900	35.75
1-Dec-06	35.25	35.55	34.90	35.20	5,922,400	35.20

Notice that the Close and the Adj Close* are the same, there were no splits during this time period. Below is a continuation of this data going back to earliest available. Notice the difference in Close and Adj Close*. Using the difference it tells you that if you bought one share in July of 92 you would now own about 32.04225 (36.86/.71) shares (actually 32 shares, there have been 5 two for one splits, difference is attributable to rounding).

Date	Open	High	Low	Close	Volume	Adj Close*
2-Jul-92	23.00	23.00	22.25	22.75	7,155,200	0.71
1-Jul-92	22.50	23.00	21.75	22.75	9,270,400	0.71

The historical stock price of Starbucks (Source: Yahoo)

Figure 5 Starbucks Adjusted Close Prices

Circles are 2 for 1 splits dates

Why do firms split their stock?

Finance does not have a good answer for this. It appears that it makes no sense. Certainly Warren Buffet, VRP {that's a Very Rich Person} does not believe in stock splits, one share of Berkshire Hathaway-A sells (End of 2006) for about $113,000 a share.

Does stock splits create value for shareholders?

The answer appears to be no.

Are stocks that split a better investment?

The answer appears to be no. Don't get the cart before the horse. Successful firms may well split their stock as Starbucks has done, but the evidence is that Starbucks would have been successful even if it had not split its stock. So the split is not the cause of the success. A reasonable forecast is that Starbucks shares would be selling for about $1180 today (Dec, 2006) if they had not split. And the historical rate of return would have been exactly the same.

Computing Rates of Returns on stocks

Assume that five years ago you invested $1000 in some shares of stock, the stock costs $9.25 a share (the dividends and share prices for the next five years are given below). Notice in this case you end up with a partial share. Can you buy fractional shares? Not in stocks in general. But there is no reason why conceptually you could not do so. So in a case like this it works just fine. Mutual funds regularly sell fractional shares since they accept regular fixed dollar deposits from investors (IRA, 401k, 403b or some other saving plan) every month, they need to sell fractional shares.

Assume today is period 5 and you are looking back 5 years
Five years ago:

Invest	$1,000.00
Buys you:	= 1000/$9.25 = 108.108 Shares

Alternative 1 No Dividend Reinvestment

Alternative 2 Dividend Reinvestment
Very Common and is conceptually similar to interest compounding in a saving account

	End of Period	Dividends/ Share	Stock Price	Number of Shares--no additional investment	Cash Dividends Received	Buy additional shares with dividends — New	Buy additional shares with dividends — Total	Dividends (used to Buy Stock) — Dividends	Actual Cash Dividends Received
Initial Invest date	0		$9.25	108.108			108.108		
	1	$1.00	$11.00	108.108	$108.11	9.828	117.936	$108.11	$0.00
	2	$0.00	$13.00	108.108	$0.00	0.000	117.936	$0.00	$0.00
	3	$1.25	$9.00	108.108	$135.14	16.380	134.316	$147.42	$0.00
	4	$1.40	$13.00	108.108	$151.35	14.465	148.781	$188.04	$0.00
Today	5	$1.10	$14.00	108.108	$118.92	11.690	160.471	$163.66	$0.00

Start reading at Page 291 and 311

HPR = Div Yield + Capital Gain

EOP is end of period

No Dividend Reinvestment				Dividend Reinvestment			
Period	Value EOP	Cash Dividend	1+HPR	Period	Value EOP	Cash Dividend	1+HPR
0	$1,000.00			0	$1,000.00		
1	$1,189.19	$108.11	1.2973	1	$1,297.30	0	1.2973
2	$1,405.41	$0.00	1.1818	2	$1,533.17	0	1.1818
3	$972.97	$135.14	0.7885	3	$1,208.85	0	0.7885
4	$1,405.41	$151.35	1.6000	4	$1,934.15	0	1.6000
5	$1,513.51	$118.92	1.1615	5	$2,246.59	0	1.1615
Arithmetic Average of HPR -1			20.58%	Notice that both of these produce the same values for the average returns			20.58%
Geometric Average of HPR -1			17.57%				17.57%

We can also calculate the source of the return by calculating the Dividend Yield (dividends over price) and Capital Gain Yield (change in price over price). In both cases I have computed them in (1+ yield) form. This makes computing the means convenient. We know that we could also calculate the return from the following equation. Notice that it works whether we keep the dividends or reinvest in new shares. If you reinvest then the dividends (Div1...5) would all be zero.

Period	1 + Dividend Yield	1 + Capital Yield	Total Yield 1 + HPR
0			
1	1.1081	1.1892	1.2973
2	1.0000	1.1818	1.1818
3	1.0962	0.6923	0.7885
4	1.1556	1.4444	1.6000
5	1.0846	1.0769	1.1615
Arithmetic Average -1	8.89%	11.69%	20.58%
Geometric Average -1	8.77%	8.64%	17.57%

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$$Price = \frac{Div1}{(1+r)^1} + \frac{Div2}{(1+r)^2} + \frac{Div3}{(1+r)^3} + \frac{Div4}{(1+r)^4} + \frac{Div5}{(1+r)^5} + \frac{Price5}{(1+r)^5}$$

Alternative 1   Keep the cash dividends (in order to earn the IRR over the 5 year period you must reinvest in something earning 17.06%)

End of period	0	1	2	3	4	5
Dividends		$108.11	$0.00	$135.14	$151.35	$118.92
Stock Purchase	-$1,000.00					
Stock Sale						$1,513.51
Cash flow	-$1,000.00	$108.11	$0.00	$135.14	$151.35	$1,632.43
IRR =	17.06%					

The rate of return here depends in part on what you do with the dividends. If you do not re-invest the dividend at the IRR over the time period the return will be less. In this case you must re-invest the dividends to earn 17.06 percent . Whether this return is equal to the Geometric return computed below depends on the stock's performance and dividend pattern. In some cases reinvesting in addtional shares will mean a higher IRR and in other cases it will mean a lower IRR. Notice in this case re-investing in stock produces a slightly higher IRR.

Alternative 2   Reinvest the dividend in new shares

End of period	0	1	2	3	4	5
Dividends		$0.00	$0.00	$0.00	$0.00	$0.00
Stock Purchase	-$1,000.00					
Stock Sale						$2,246.59
Cash flow	-$1,000.00	$0.00	$0.00	$0.00	$0.00	$2,246.59
IRR =	17.57%					

This is exactly the same as geometric return above and will always be that way since it is essentially doing exactly the same thing.

One Final Observation:
If you do not reinvest the dividends (alternative 1) then you will not achieve the rate of return:

Example   Initial Investment   -$1,000.00
Keep the dividends in a cookie jar* (Year 5 Total) $513.51
Sell: Ending Stock Value $1,513.51
Sum Stock value + cookie jar $2,027.03

$1,000.00   = $2,027.03/(1+ r)^5
Solve for r: 15.18%
Significantly less than the other options above

* Your cookie jar does not pay interest