

Fall 2008

FINA 522: EQUITY INVESTMENT ANALYSIS

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Meeting Time:

FINA522 L1 (Friday 19:00-22:20): HKUST Business Central

FINA522 L1 (Saturday 09:00-12:20): Room 2465

Class Duration/Dates:

Friday evening class- 5th September to 17th October 2008

Saturday morning class – 6th September 18th October, 2008

Common Exam:

Scheduled Final Exam Sunday 2nd November 2008

1. COURSE DESCRIPTION

The course covers the complete investment process from constructing investment objectives and policies to broad class asset allocation, monitoring, and performance measurement and attribution. Practical issues relating to investment style, active and passive management and stock market inefficiency will be discussed. Advanced techniques in portfolio construction involving the of the Black-Litterman model, single index and multi-factor models are studied.

2. READING MATERIALS

(a) Textbook/Reference book:

Reilly, F. and K. Brown, *Investment Analysis and Portfolio Management*, Eight Edition+, South-Western Publishing, 2006+. This text is widely regarded as a standard reference by practitioners in the investments industry. It offers good coverage of most topics without requiring a strong mathematical background. Many of the end-of-chapter problems are from CFA exams given in prior years.

(b) Lecture notes, which are posted as PDF files on the course web site. These should be downloaded prior to class.

(c) Selected articles posted on the web (some may also be available via www.ssrn.com). These articles are strictly optional, although some of them will be discussed in the lecture. Even though they are not required, I strongly recommend that you read them if you are potentially interested in getting into the portfolio management

3. WORKLOAD

(a) Final Exam: 50 marks

The final exam will be 2-hours and will be open book. There will be 2 parts to the exam: (a) will comprise 20 multiple choice questions (60 minutes) comprising short calculations; (b) will be a choice of 2 from 7 short essay questions (60 minutes) based upon the supplementary readings covered in class (one for each of the 7 topics). More information on these 7 questions will be provided at the end of the course but they will be based on the discussion in class of each of the 7 topics. It is recommended that you research further around a given topic of interest prior to attending the exam.

(b) Group Project: 40 marks

Stock Portfolio (details below). A stock portfolio project will be conducted on a group basis. Students will have to form groups of a maximum of 5 students. It is preferred – but not mandatory- to form a group from your class mates in the specific Saturday or Wednesday class that you attend. Please register the group with, the teaching assistant for the course.

Identify a favourite publicly listed stock that is not listed in Hong Kong or China and where you have access to good historical information (see finance.yahoo.com for example). You will need to benchmark this stock to a market index and a smaller portfolio of similar industry stocks (maximum of 10 stocks in the portfolio).

You will be required to write a report on the following aspects of the company

a. The life-cycle stage of your company, its past growth and future prospects (10 marks). This could be in the form of a SWOT analysis- see example.

- b. Calculate the risk (standard deviation and beta) of your company compared to the chosen index and the small portfolio. (10 marks)
- c. Value your company and compare this valuation to its current share price (10 marks).
- d. Explain how you could hedge the share price using options and other exchange traded products. You will also be required to demonstrate the effectiveness of the proposed hedge over the previous 6-month period (10 marks).

Your main reference for this question will be Reilly and Brown, Chapter 15. The Yahoo Finance website will also be of great help for this question and note that you can get historical price data from this site and also from Reuters. Note that access to Reuters is available via the Library website.

A **5-minute** presentation on your company will be made in the last week of class (week 7)

(Word limit: 1500; Marks: 40)

(c) Attendance Requirement and Class Participation: 10 marks.

I will distribute the attendance sign-up form during the class, starting the 2nd week. You should attend at least 70% of the classes (cannot miss more than 2 classes). To minimize the disruption to other students, you are expected to come on time (no more than 15 minutes late). Furthermore, you are expected to participate and contribute to the discussion in the class.

(d) Final Grade

The final grade will be computed based on the following scores:

- Final Exam: 50 points
- Group Work: Stock portfolio project 40 points
- Class attendance/participation 10 points
- Total 100 points**

4. COURSE OUTLINE

Pre-requisite(s): Investment analysis

Topic 1 Fundamental analysis of common stocks, review of equity valuation models and macroeconomic analysis (RB 1, 2, 10, 11, 12)

Class Discussion:

Overnight events in the stock, exchange and bond markets.

See the article: Preparing a security analysis report:

http://www.blackwellpublishing.com/poitras/Prep_a_SAR.pdf

Topic 2 Company and industry analysis, stock selection models, price multiples, technical analysis, style investing (RB 13, 14, 15, 16)

Class Discussion:

Overnight events in the stock, exchange and bond markets.

Discussion of Bank of China valuation.

Discussion of P/E Stock Estimation: APPENDIX 1.

Discussion of “Technical Indicators” APPENDIX 2.

Topic 3 Index funds and active funds, benchmarking, market inefficiency and anomalies, behavioural finance (RB 5, 6)

Discussion of LG versus SK Group Corporate

Articles for class discussion:

- (1) Renneboog, Luc and Szilagyi, Peter G., "How Relevant is Dividend Policy Under Low Shareholder Protection?" (August 2006). ECGI - Finance Working Paper No. 128/2006 Available at SSRN: <http://ssrn.com/abstract=925190>
- (2) Batten, Jonathan A., Ellis, Craig and Fetherston, Thomas A., "Return Anomalies on the Nikkei: Are they Statistical Illusions?" (February 28, 2003). Available at SSRN: <http://ssrn.com/abstract=396680> or DOI: 10.2139/ssrn.396680

Topic 4 Investment management companies, types of investment companies, open-end funds, close-end funds, management fees and hedge funds (RB 3, 4)

Articles for class discussion:

- (3) Renneboog, Luc and Szilagyi, Peter G., "Corporate Restructuring and Bondholder Wealth" (March 2006). ECGI - Finance Working Paper No. 124/2006 Available at SSRN: <http://ssrn.com/abstract=899072>
- (4) Agarwal, Vikas and Naik, Narayan Y., "On Taking the 'Alternative' Route: Risks, Rewards, Style and Performance Persistence of Hedge Funds" (February 1999). Available at SSRN: <http://ssrn.com/abstract=150388> or DOI: 10.2139/ssrn.150388

Topic 5 Evaluation of portfolio performance: performance measures, market timing, information ratio, and performance attribution (RB 18, 20, 25, 26).

Discussion of Morgan Stanley: Secret Sauce II: Share Buybacks

Discussion of Newsweek Article of ADRs

Articles for class discussion:

- (5) Russ Wermers (December 2005) Performance Evaluation with Portfolio Holdings Information: see http://www.rhsmith.umd.edu/faculty/rwermers/ftpsite/FAME/portfolio_holdings.pdf#
- (6) Hall, John H. and Brummer, L.M., "The Relationship Between the Market Value of a Company and Internal Performance Measurements". Available at SSRN: <http://ssrn.com/abstract=141189> or DOI: 10.2139/ssrn.141189

Topic 6 Advanced issues and techniques in equity allocation: multi-factor models, Black-Litterman model, equity risk premium, international and bond risks (RB 8, 9)

Discussion of Black-Scholes Option Model (Excel example)

Movie: "The Midas Formula (Discussion of Long Term Capital Management)"

Articles for class discussion:

- (7) Batten, Jonathan A., Fetherston, Thomas A. and Hoontrakul, Pongsak, "Factors Affecting the Yields of Emerging Market Issuers in International Bond Markets: Evidence from Thailand" (Jun 14, 2001). Available at SSRN: <http://ssrn.com/abstract=292920> or DOI: 10.2139/ssrn.292920 (note chapters 18, 19 RB for a discussion on the valuation of bonds)
- (8) Claus, James J. and Thomas, Jacob K. Kandathil, "The Equity Risk Premium is Lower Than You Think It Is: Empirical Estimates From a New Approach" (May 1999). Available at SSRN: <http://ssrn.com/abstract=165335> or DOI: 10.2139/ssrn.165335

Note **Appendix 3**: Calculating the Equity Risk Premium

Topic 7 Using derivatives in equity portfolio management: hedging with derivatives, synthetic strategies, and equity-linked products (RB 21, 22, 23, 24)

Articles for class discussion:

(9) Richards, Anthony J., "Idiosyncratic Risk: An Empirical Analysis, with Implications for the Risk of Relative-Value Trading Strategies" (November 1999). IMF Working Paper No. 99/148 Available at SSRN: <http://ssrn.com/abstract=194568> or DOI: 10.2139/ssrn.194568

(10) Geczy, Christopher Charles, Minton, Bernadette A. and Schrand, Catherine M., "Choices Among Alternative Risk Management Strategies: Evidence from the Natural Gas Industry" (November 1999). Available at SSRN: <http://ssrn.com/abstract=191890> or DOI: 10.2139/ssrn.191890

Group Presentation of Projects

APPENDIX 1: Estimating the P/E Ratio for a Stock

There are two types of events that affect the price/earnings ratio of a stock. For simplicity, we shall refer to these as simply *macro factors* and *micro factors*.

Macro Factors

Let us first consider movement in the overall market itself. As all stocks move up and down in price, the price/earnings ratio of the market itself changes as well. If investors become more aggressive and are willing to pay more of a premium for stocks, the market P/E ratio tends to increase. If investors become more cautious (and avoid stocks), the market P/E ratio tends to fall. In general, the P/E ratio for the overall market (as measured by the S&P 500 Index) has tended to range between the extremes of 8-9 on the low side and 23-25 on the high side. The average for the past sixty years is approximately 15. We will use the term *macro factors* to refer to those events that cause a change in the market P/E ratio.

To a large extent, macro factors correspond to those events that we usually think of as “*systematic risks*.” Anything that can change the appeal of common stock investment can be a macro factor. Thus, there are hundreds of different events that can affect the P/E of the market. Fortunately, most of these will affect earnings in some way so they are somewhat easy to understand. Typical macro factors include the following:

1. Tax legislation -- An increase in taxes will decrease the earnings of companies, so the tax bill makes stocks less attractive. Therefore, passage of the tax bill would tend to depress prices and, in the short-term, price/earnings ratios as well.
2. Fluctuations in the economy -- As a recession become increasingly likely, prices of stocks fall as money flows out of common stock investment into safer investments such as C.D.s and money market mutual funds.
3. Changes in interest rates -- If interest rates were to fall, the earnings of companies would rise. Simultaneously, alternative investments such as short-term interest-bearing investments (money market mutual funds, passbook savings accounts, short-term C.D.s) become less attractive. Money flows from these accounts into common stocks, forcing a rise in the market P/E ratios (in the short-term).

Macro factors are responsible for the fluctuation of the market's P/E between roughly 8 and 23. When the market P/E nears the upper end of this range, stocks are very popular, the economic outlook is probably rather rosy, and interest rates are probably relatively low. The market tends to “bottom out” near periods of deep recessions and dismal economic prospects.

In evaluating the market's P/E, we need to question how much investor optimism is built into the market's multiple (or P/E). For example, if the market P/E (which can be found in *Barron's*) is 22 and you see increasing signs of weakness in the economy, you would expect the market P/E to fall in the future. Professional investors frequently “follow the crowd” and push P/E ratios to unreasonable levels. Remember: the greatest opportunities to you, as an investor, lie in those occasions where you disagree with the prevailing opinion. On those occasions, you must have the courage to back up your convictions and be willing to risk your money on your belief.

Micro Factors

Micro factors are those events that affect only an individual company. Again, the factors are usually related to the earnings of the company and roughly correspond to the “*unsystematic risks*” of a firm. Typical micro events would be:

1. Increasing the firm’s market share by consolidating the firm’s position. As competitors weaken or drop out of the industry entirely, the winner’s market share increases and the profit margin is typically increased as the pressure of competition abates.
2. Gaining valuable patents that will increase the future earnings of the company.
3. Loss of a key management figure, such as a Chief Executive Officer or a leader in the research and development arena.

The Relative P/E Ratio

The relative P/E ratio is defined as a stock’s P/E ratio divided by the market’s P/E ratio. The relative P/E, then, is simply a way of showing how much of a discount or a premium the stock sells to the market.

Some stocks, often because of the industry in which they are located, sell at a discount to the market. In other words, they have a relative P/E of less than 1.0. Growth-oriented stocks will usually sell at a premium to the market, i.e., have a relative P/E greater than 1.0.

Estimating the P/E Ratio For A Stock

Although making the forecasts involved is not an easy process, the steps involved are very simple and straight-forward:

1. Estimate the future P/E ratio for the market, based on the macro factors.
2. Estimate the future relative P/E ratio for the stock, based on the micro factors.
3. Multiply #1 by #2, i.e., the market P/E ratio times the stock’s relative P/E ratio.

Step #1 involves making forecasts about likely changes in the market’s current P/E ratio. It involves looking out a year in the future and asking: What changes can I expect to happen during that time? What affect will these changes have on the attractiveness of common stock and therefore on the market P/E ratio? Construction of scenarios, as described earlier, is particularly valuable in this process.

Step #2 requires us to learn as much about the company as possible. In particular, we have to find out as much as we can about the future product development and expansion of the company. In particular, an analysis of the business risk, financial risk, and market risk discussed earlier is quite valuable. We must then translate this knowledge into a forecast about probable changes in the stock’s relative P/E ratio.

Step #3 allows us to determine the expected P/E ratio for the stock in a straight-forward manner. Let us take a look at a short example.

Shenandoah's P/E Ratio

Let's assume for the moment that the market P/E ratio is currently 16 and the P/E ratio for Shenandoah, Inc. is 20. Therefore, Shenandoah's **relative P/E ratio** is 20/16 or 1.25.

In looking at the macro factors, we believe that economy is still subject to a lot of risks. Consumer spending is relatively weak, the federal deficit continues to increase, and inflation has begun to creep up. Based on these and other factors, we believe that a market P/E is not justified and, in fact, a P/E that is slightly lower than its historical average of 14 is justified (since future growth is expected to be less than its historical average). Based upon this belief, we believe that a value of 12 to 13 is more appropriate. Since we believe that there is a reasonable chance of going back into a recession, we choose the lower number of 12 as our estimate of a fair P/E ratio one year from now.

In considering the micro factors, we look in Value Line Investment Survey and see that, for the past ten years, Shenandoah has traded at an average relative P/E of 1.50. In fact, it rarely has gotten below 1.3 during those ten years. Upon a close examination of the company's prospects, we see several things that we like: (1) the company's cash flow is very strong, (2) the management is progressing rapidly with some promising developments in California, Florida, and overseas, and (3) the company appears to be correcting some problems which have plagued it for several years. Based on this view, we believe that the company could easily return to its historical P/E of 1.50 or higher in the future. We choose 1.50 as the likely relative P/E ratio one year from now.

If Shenandoah maintained its current relative P/E of 1.25, the drop in the market P/E would cause a drop in Shenandoah's P/E from its current value of 20 to a value of 15 (i.e., 1.25 times 12). However, because of the micro factors, Shenandoah's relative P/E should increase to 1.5, giving an expected P/E one year from now of 18 (i.e., 1.5 times 12).

Overall, Shenandoah's P/E is pulled down more by the market drop (macro factors) than the rise caused by the company's improvement (micro factors). The net result is a drop from its current P/E level of 20 to a new level one year from now of 18. (Note that the expected price of Shenandoah's stock one year from now would be the expected P/E of 18 times the expected earnings per share at the end of one year.)

SUMMARY OF CALCULATIONS

	<u>Now</u>	<u>One Year From Now</u>
S&P 500 P/E Ratio	16	12
<u>x Shenandoah's Relative P/E</u>	<u>1.25</u>	<u>1.50</u>
Shenandoah's P/E	20	18

APPENDIX 2: TECHNICAL INDICATORS

Note: The first six (1-6) of these indicators are examples of CONTRARY OPINION indicators.

1. Advisory Services Index

$$\text{Advisory Services Index} = \frac{\text{Number of bullish advisory services}}{\text{Total number of advisory services}}$$

Investors pay a great deal of money for the investment advisory newsletters, etc. It is reasonable to assume that the investors will act on the recommendations of these advisory services. When all available money has been invested, there remains no money for new buy orders, thus the market must fall.

USE: High value of the ratio: SELL
 Low value of the ratio: BUY

2. Odd-Lot Balance Ratio

$$\text{Odd - Lot Balance Ratio} = \frac{\text{Daily Odd - Lot Sales}}{\text{Daily Odd - Lot Purchases}}$$

The odd-lot balance index is a 5-day (or 5-week) moving average of the odd-lot balance ratio. By using the index, you smooth out the large fluctuations in the ratio.

USE: Low value of the ratio: SELL
 High value of the ratio: BUY

3. Odd-Lot Short Sales Ratio

$$\text{Odd - Lot Short Sales Ratio} = \frac{\text{Odd - Lot Short Sales}}{\text{Odd - Lot Sales}}$$

The odd-lot short sales index is a 5-day (or 5-week) moving average of the odd-lot short sales ratio.

The small investor is notorious for being a horrendous short seller. His (or her) timing is almost always wrong. When the odd-lotter is selling short heavily (believing that stocks will soon fall in price), you want to be buying.

USE: High values of the ratio: BUY
 Low values of the ratio: SELL

4. Speculation Index

$$\text{Speculation Index} = \frac{\text{Volume on the AMEX}}{\text{Volume on the NYSE}}$$

A bull market must have speculation to exist. In this case, speculation is measured by the activity in the lesser quality stocks (found on the American Stock Exchange). Excessive amounts of speculation lead to market downturns; very little speculation is found at market bottoms.

USE: High values of the ratio: excessive speculation, SELL
Low values of the ratio: very little speculation, BUY
(Note: the buy signal does not seem to be as valid as the sell signal.)

5. Option Activity Ratio

$$\text{Option Activity Ratio} = \frac{\text{Total Puts} + \text{Total Calls}}{\text{Total NYSE Volume}}$$

This ratio is also an indicator of speculation. Use a 10-week moving average in conjunction with this ratio.

USE: Both moving average and ratio are high: SELL
Both moving average and ratio are low: BUY

6. Put/Call Ratio

$$\text{Put / Call Ratio} = \frac{\text{Weekly Puts}}{\text{Weekly Calls}}$$

Option players tend to be wrong more often than they are right. The put call ratio is a 4-week moving average of weekly puts divided by weekly calls. Buyers of puts tend to be bearish; buyers of calls are bullish.

USE: High values of the ratio: BUY
Low values of the ratio: SELL

7. Specialist's Short Sales Index

$$\text{Specialist ' s Short Sales Index} = \frac{\text{Specialist ' s Short Sales}}{\text{Total Short Sales}}$$

The specialist is one of the most informed persons in the market. Therefore, it pays to be on the specialist's side.

USE: Low values of the index: BUY
High values of the index: SELL

8. Monthly Short Interest Ratio

$$\text{Monthly Short Interest Ratio} = \frac{\text{Total monthly short interest}}{\text{Average daily trading volume}}$$

Short interest refers to the number of shares of stock that have been sold short. When stock is sold short, there is a commitment to repurchase the shares in the future. When the short interest is quite large, there is a "platform" or future built-in demand for the stock which should be bullish for future price moves.

USE: Low values of the ratio: SELL
High values of the ratio: BUY

9. Relative Strength Index

$$\text{Relative Strength Index} = \frac{\text{Closing price of stock}}{\text{Closing price of market index}} \times 100$$

The relative strength index is designed to identify those stocks that outperform the market averages.

USE: When this index is increasing, the stock is performing better than the average stock (as represented by the market index). (A declining index means that the stock is performing worse than the market.) When the stock is (1) going up faster than the market, or (2) going down less than the market, the value of the relative strength index will increase.

Examples of How a Technician Views Market Movements

Plurality

1. When the number of stocks declining outnumbers the number of stocks advancing together with a rise in the Dow-Jones Industrial Average, then the market is on the verge of a decline.
2. When the number of advances outnumbers declines together with a fall in the Dow-Jones Industrial Average, then the market is on the verge of an advance.

Leadership

3. If the quality of market leadership deteriorates on an upswing in the Dow-Jones Industrial Average, then it is pretty reliable evidence that a near-term decline is in the making.
4. If the quality of market leadership deteriorates on an upswing in the Dow-Jones Industrial Average, then it is pretty reliable evidence that a near-term decline is in the making.

Genuine Moves

5. If the advance in the Dow-Jones Industrial Average is not genuine (a less than commensurate dip made by the Standard & Poor 500 Stock Index), then the rise is suspect.
6. If the decline in the Dow-Jones Industrial Average is not genuine (a less than commensurate dip made by the Standard & Poor 500 Stock Index), then the decline is suspect and the next move may be an upward one in the Dow-Jones Industrial Average.
7. If the Dow-Jones Industrial Average declines and is matched by an equal or greater decline in the Standard & Poor 500 Stock Index, then the decline is likely to continue.
8. If the advance in the Dow-Jones Industrial Average is genuine (matched by an equal or greater gain in the Standard & Poor 500 Stock Index), then the advance is likely to continue.

Dullness

9. When dullness prevails following a previous advance, that is bearish.
10. When dullness prevails following a previous decline, that is bullish.

Sudden Shifts

11. Five or six consecutive daily advances or more in the Dow-Jones Industrial Average heighten the probability of a quick downside reversal.
12. Five or six consecutive daily declines in the Dow-Jones Industrial Average heighten the probability of a quick upside reversal.

Light Volume

13. A rise on light volume lacks conviction, especially if the quality of market leadership is poor.
14. A rise on light volume is not necessarily bearish if the quality of market leadership is good on the upswing.
15. A decline on light volume is not necessarily bullish if the quality of market leadership is high on the decline.
16. A decline on light volume is especially bullish if the quality of market leadership deteriorates on the decline.

Heavy Volume

17. A rise on heavy volume with a deteriorating quality of market leadership indicates that a reaction is near.
18. A rise on heavy volume with a good quality of market leadership indicates that the advance can continue.

Reversals

19. When the Dow-Jones Industrial Average runs up to a new rally top followed by a failure to hold the gains of the day, the market direction is about to turn down.
20. When the Dow-Jones Industrial Average sinks to a new low on an intermediate decline and closes well above the lows of the day, the market direction is near-term bullish.

The 3-Day Rule

21. There are seldom ever more than three consecutive sharp daily declines. Either the fourth day sees a reduced rate of decline or a sharp rebound.
22. There are seldom ever more than three consecutive sharp daily advances. Either the fourth day sees a reduced rate of climb or a sharp decline.

Churning

23. After the market declines sharply for a few days and follows this with a small net change in the Dow-Jones Industrial Average on heavy volume, this churning action is the normal prelude to an important bullish reversal.
24. After the market has been rising for a few days and follows this with a small net change in the Dow-Jones Industrial Average on heavy volume, this churning action is the normal prelude to an important bearish reversal.

News Reflections

25. When the market disregards bearish news, that is a bullish indication.
26. When the market turns a deaf ear on bullish news, that is a bearish indication.

Closing Strength

27. In the absence of overnight news, a strong closing in the market usually spills over with further strength seen the next day.
28. In the absence of overnight news, a weak closing in the market usually spills over with further weakness seen the next day.

Odd Lot Buying

29. A trend toward decreased odd lot buying on balance is a bullish indication for the market.
30. A trend toward increased odd lot buying on balance is a bearish indication for the market.

Rebounds and Declines

31. Technical rebounds are much more likely to follow sharp declines rather than periods of simple erosion.
32. Technical declines are much more likely to follow sharp advances rather than periods of slow gradual rise.

Highs and Lows

33. A trend of expanding new daily highs is bullish.
34. A trend of expanding new daily lows is bearish.

Calculating The Equity Risk Premium
by David Harper, CFA, FRM

In this article, we take a deeper look at the assumptions and validity of the risk premium by looking at the calculation process in action with actual data. Recall the three steps of calculating the risk premium: (1) estimate the expected return on stocks, (2) estimate the expected return on safe bonds and (3) subtract the difference to get the equity risk premium. (For background reading, see [The Equity Risk Premium - Part 1.](#))

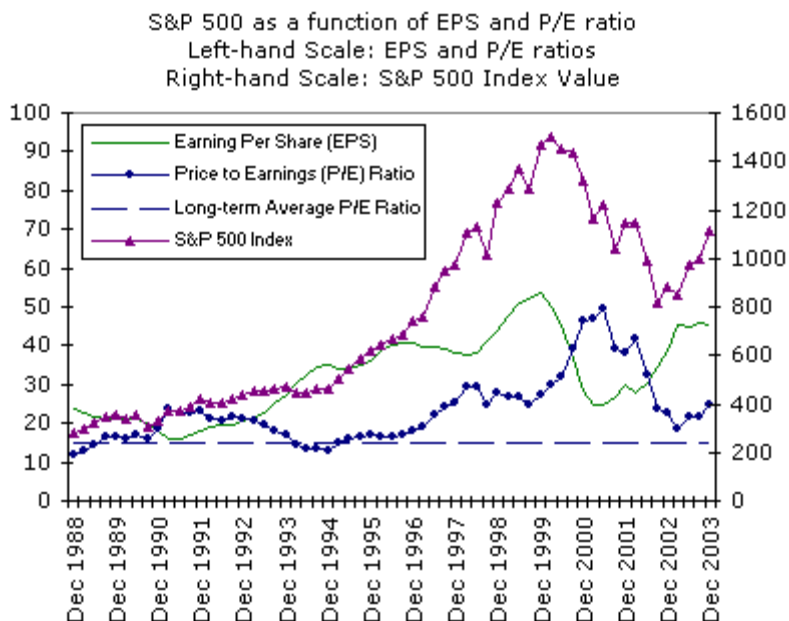
Step One: Estimate the Expected Total Return on Stocks

Estimating future stock returns is the most difficult (if not impossible) step. Here are the two methods of forecasting long-term stock returns:

<i>Earnings-based Approach</i>	<i>Dividend-based Approach</i>
$k = \frac{E}{P}$	$k = \frac{D}{P} + g$
Where k = the expected return (%), E = Earnings Per Share, and P = stock price	Where k = the expected return (%), D = Dividends per share, P = stock price, and g = growth in dividends
<i>Important: both models assume that current valuation levels are correct</i>	

Plugging into the Earnings Model

The earnings-based model says that the expected return is equal to the [earnings yield](#). Consider the 15-year history of the [S&P 500](#) Index, ending on December 31, 2003:



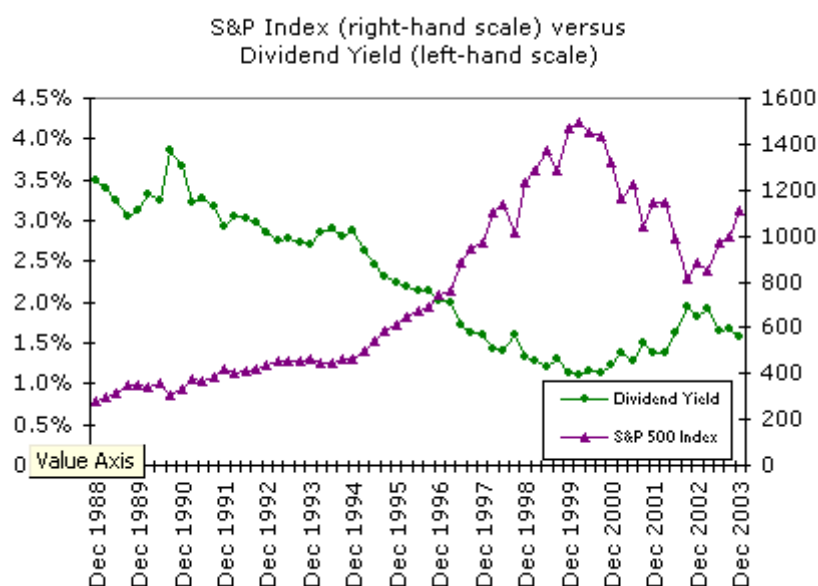
In the above graph, we split the S&P 500 index (violet line) into two pieces: [earnings per share](#) (green line) and the [P/E](#) multiple (blue solid line). At every point, you can multiply EPS by the P/E multiple to get the index value. For example, on the last day of Dec 2003, the S&P index reached 1112. At that time, the EPS of the combined companies was \$45.20 and the P/E multiple therefore was 24.6x ($\$45.20 \times 24.6 = 1112$).

As the index finished the year with a P/E of almost 25, the earnings yield was 4% ($1 \div 25 = 4\%$). According to the earnings-based approach, the expected real return - before [inflation](#) - was therefore 4%. The underlying intuitive idea is 'mean reversion': the theory that P/E multiples cannot get too high or too low before they revert back to some natural middle ground. Consequently, a high P/E implies lower future returns and a low P/E implies higher future returns.

Graphically, we can also see why some academics warn that next decade's equity returns cannot keep pace with the double-digit returns of the 1990s. Consider the 10-year period from 1988 to 1998, omitting the acute [bubble](#) at the end of the decade. EPS grew at an annualized rate of 6.4%, but the S&P index grew a whopping 16%! The difference arose from so-called 'multiple expansion': an increase in the P/E multiple from about 12 to 28x. Academic skeptics use simple logic. If you start from a base P/E multiple of about 25x at the end of 2003, you can only realize aggressive long-term returns that outpace earnings growth with further expansion of the P/E multiple.

Plugging into the Dividend Model

The dividend model says that expected return equals [dividend yield](#) plus growth in dividends (all in a percentage). Here is the dividend yield on the S&P 500 from 1988 to 2003:



The index ended 2003 with a dividend yield of 1.56%. We only need to add a long-term forecast of growth in the markets' dividends per share. One way to do this is to assume that dividend growth will track with economic growth. And we have several economic measures to choose from, including [gross national product](#), per capita [GDP](#) and per capita gross national product.

Let's take real GDP which has been consistent over the long run at 3-4%. To use this measure for estimating future equity returns, we need to acknowledge a realistic relationship between it and dividend growth. It is a big leap to assume that 4% real GDP growth will translate into 4% growth in dividends per share. Dividend growth has rarely, if ever, kept pace with GDP growth and there are two good reasons why.

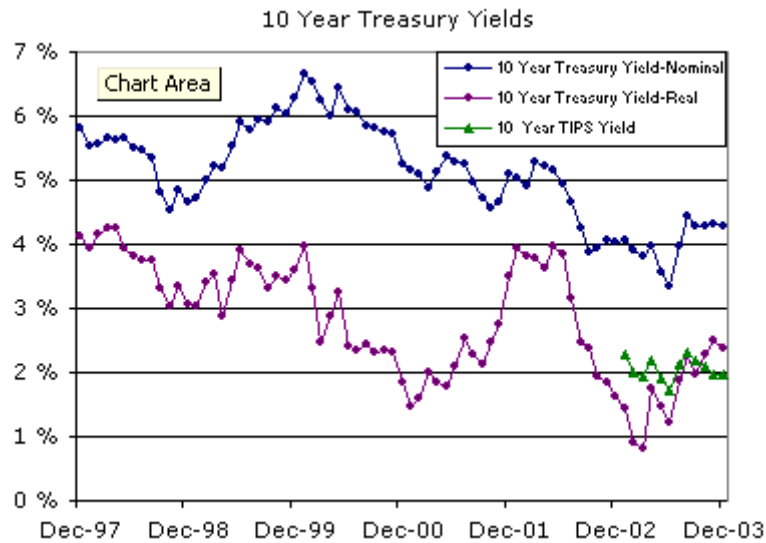
First, private entrepreneurs create a disproportionate share of economic growth; the public markets often do not participate in the economy's most rapid growth. Second, the dividend yield approach is concerned with per share growth, and there is 'leakage' because companies dilute their share base by issuing [stock options](#) (while it is true that stock [buybacks](#) have an offsetting effect, they rarely compensate for stock option [dilution](#). Publicly traded companies are remarkably consistent 'net diluters').

History tells us that real GDP growth of 4% translates, at best, into roughly 2% growth in real dividends per share, or 3% if we are really optimistic. If we add our growth forecast to the dividend yield at the end of 2003, we get about 3.5% to 4.5% (1.56% + 2 to 3% = 3.5% to 4.5%). We happen to match the 4% predicted by the earnings model, and both numbers are expressed in real terms, before inflation.

Step Two: Estimate the Expected 'Risk-Free' Rate

The nearest thing to a safe long-term investment is the [Treasury Inflation Protected Security](#) (TIPS). Because the [coupon](#) payments and principal are adjusted semi-annually for inflation, the TIPS yield is already a real yield. TIPS are not truly risk-

free ; if interest rates move up or down, their price moves, respectively, down or up. However, if you hold a TIPS bond to maturity, you can lock in a real rate of return.



In the above chart, we compare the nominal 10-year Treasury yield (blue line) to its equivalent real yield (violet). The real yield simply deducts inflation. The short green line is important. It is the 10-year TIPS yield during the year 2002. We expect the inflation-adjusted yield on the regular 10-year Treasury (violet) to track closely with the 10-year TIPS (green). At the end of 2003, they were close enough. The 10-year TIPS yield was just shy of 2%, and the real yield on the Treasury was about 2.3%. Therefore, the 2% real yield becomes our best guess at future real returns on a safe bond investment.

Step Three: Subtract the Estimated Bond Return from the Estimated Stock Return

When we subtract our forecast of bond returns from stock returns, we get an estimated equity risk premium of +1.5% to +2.5%:

Step	Estimated Long-term Return
1. Real stock returns	3.5% to 4.5%
2. Subtract real bond returns	minus 2.0%
3. Estimated equity risk premium	= +1.5 to 2.5%

All Sorts of Assumptions

The model attempts a forecast and therefore requires assumptions - enough for some experts to reject the model entirely. However, some assumptions are safer than others. If you reject the model and its outcome, it is important to understand exactly where and why you disagree with it. There are three kinds of assumptions, ranging from safe to dubious.

First, the model does assume that the entire stock market will outperform risk-free securities over the long term. But we could say this is a safe assumption because it allows for the varying returns of different [sectors](#) and the short-term vagaries of the market. Take the calendar year 2003, during which the S&P 500 jumped 26% while experiencing a modest decline in the P/E multiple.

No equity risk premium model would have predicted such a jump, but this jump does not invalidate the model. It was caused largely by phenomena that cannot be sustained over the long haul: a 17% increase in the combined forward EPS (i.e. EPS estimates for four future quarters) and an almost unbelievable 60%-plus increase in trailing EPS (according to S&P, from \$27.60 to \$45.20).

Second, the model requires that real growth in dividends per share - or EPS, for that matter - be limited to very low single-digit growth rates in the long run. This assumption seems secure but is reasonably debated. On the one hand, any serious study of historical returns (like those by Robert Arnott, Peter Bernstein or Jeremy Siegel) proves the sad fact that such growth rarely gets above 2% for a sustained period.

On the other hand, optimists allow for the possibility that technology could unleash a discontinuous leap in productivity that could lead to higher growth rates; who knows, maybe the [new economy](#) is just around the bend. But even if this happens, the benefits will surely accrue to selected sectors of the market rather than all stocks. Also, it is plausible that publicly traded companies could reverse their historical conduct, executing more share buybacks, granting fewer stock options and reversing the eroding effects of dilution.

Finally, the model's dubious assumption is that current valuation levels are approximately correct. We've assumed that, at the end of 2003, the P/E multiple of 25x and the price-to-dividend yield of 65x (1 ÷ 1.5% dividend yield) are going to hold going forward. Clearly, this is just a guess! If we could predict valuation changes, the full form of the equity risk premium model would read as follows:

Equity Risk Premium	In English
$k_{S-B} = \frac{D}{P} + g - R_f + (\Delta S - \Delta B)$	Equity Risk Premium = Dividend yield (D/P) + Growth in dividend per share (g) - Long-term real bond yield (R_f) + (change in stock valuations over/above change in bond valuations)
Where k_{S-B} = Equity risk premium (stock - bond return) D/P = Dividend yield g = Growth in dividends/share R_f = "Safe" bond yield ΔS = Change in stock valuations (P/E or P/D) ΔB = Change in bond valuations	

Conclusion

The equity risk premium is a long-term prediction of how much the stock market will outperform safe bonds. The premium is calculated as the difference between the

estimated real return on stocks and the estimated real return on safe bonds, and the model makes a key assumption that current valuation multiples are roughly correct. When the dividend yield on stocks is close enough to the TIPS yield (at the end of 2003, they were less than 50 basis points apart), the subtraction conveniently reduces the premium to a single number: the long-term growth rate of dividends paid per share.