

UNIVERSITY OF ROCHESTER
William E. Simon Graduate School of Business Administration

FIN 411
Investments

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OLD EXAM QUESTIONS

I. Statistical Properties of Stock Returns

1. Why are estimates of serial correlations in the rates of return to common stock of practical and theoretical interest? Specifically, what would be implied if estimates of serial correlations were large in absolute value and their differences from zero were "statistically significant"?
2. "The random walk hypothesis says that stock prices vary randomly around their long-run averages. However, we know that there are noticeable patterns in stock prices, sometimes referred to as 'Bull' and 'Bear' markets, so the random walk hypothesis can't be true". *Evaluate* this statement.
3. In your first job after graduating from the Simon Graduate School of Business Administration, you are working as a financial analyst for a large money management firm (e.g., Batterymarch Financial Management Corp.). Your first assignment is to help your firm reduce its costs of trading.
 - (a) Often your firm decides to rebalance its portfolio, which requires it to sell large blocks of stock -- often through secondary distributions. Based on your knowledge from FIN 411, what are the costs of selling large blocks of stock through secondary distributions? Can you think of any ways that your firm can reduce these costs?
 - (b) Your firm owns a wide variety of securities in its portfolio. One of the other employees of your firm (a "quant") has calculated the first order autocorrelation coefficient for all of the stocks in your portfolio. Some of these estimates are positive (generally for large, well-known stocks), while some are negative (generally for small, less well-known stocks). Your colleague has suggested the following rule to be used by the stock traders in deciding which stocks to sell on a given day, and which stocks to hold onto for at least one more day: if yesterday's return was positive and the autocorrelation is negative, *or* if yesterday's return was negative and the autocorrelation is positive, sell at the opening of trading, because the stock price is likely to continue falling today. Of course, he only recommends this strategy for stocks that are on the "sell list" (i.e., the decision to sell them has already been made, it is only a question of when they will be sold). What do you think of his suggestion? Is there any evidence you know about that would support his results?
4. Briefly explain why French, Schwert and Stambaugh (FSS) think that expected stock market returns should be higher when expected volatility is higher. Is the behavior of the last two weeks, when volatility has been high and returns have been very low, evidence against the FSS hypothesis? Why or why not? At this point in time, what would you predict for the stock market for the next 12 months based on the FSS results?
5. Briefly explain why French, Schwert and Stambaugh think that *expected* stock market returns should be higher when *expected* volatility is higher. Also, explain two reasons why *unexpected* volatility is associated with negative *unexpected* returns.

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6. There has been a lot of concern lately about stock market volatility. In the period after the October 1987 stock market crash, the standard deviation of daily returns to the Standard & Poor's 500 portfolio rose from about 4 percent per month (pre-crash) to 20 percent per month (post-crash). Even though this was a dramatic event, it was typical of previous experience. French, Schwert and Stambaugh show that there is a negative correlation between unexpected changes in volatility and unexpected changes in stock prices (i.e., unexpected returns). Briefly describe two reasons why this relation might exist.

7. The following comment was made by that eminent contributing editor to the *Wall Street Journal* (and noted "neo-conservative") Irving Kristol at a talk at the University of Rochester:

"Efficient markets? Nonsense! I know at least a dozen people who have made a fortune in the stock market".

Comment.

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1. Many "trading rules" have been and continue to be proposed. *List and briefly explain* at least three sources of potential bias in estimates of the rate of return to be expected from using a given trading rule and/or in estimates of how much better one would do using the trading rule rather than a "naive" rule such as "buy and hold".

2. If the "strong" form of the efficient markets hypothesis is false, is the "semi-strong" form of the hypothesis necessarily false as well? *Explain*.

3. Two trading strategies are defined below. In an "efficient" market, the expected percentage gain over one year from strategy A should be bigger than the expected gain from strategy B over the same period. *Why?*

a) At the beginning of the year buy 100 shares of AT&T and hold these shares to the end of the year. Reinvest any cash dividends in additional AT&T shares which should also be held to the end of the year.

b) At the beginning of the year buy 100 shares of AT&T. Reinvest any dividends received. If the price per share falls at least 5% from the most recent high, sell all shares and put the money in a savings account. If the price per share then rises at least 5% above the most recent low, liquidate the savings account and repurchase AT&T shares. Continue this process to the end of the year.

4. *Explain* the role played by the "market model" in studies of the reaction of stock prices of various "events" (e.g., stock splits, earnings announcements, mergers, etc.). (You should not try to explain the entire methodology of event studies. The question here is primarily "Why use the market model? Why not just look at unadjusted rates of return?")

5. In the study of stock splits by Fama, *et. al.*, what specific evidence is offered in support of the "semi-strong" form of the efficient markets hypothesis? (Many issues other than efficient markets

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per se are examined in this study. If you try to tell me everything about the study I will probably conclude that you do not know which empirical results pertain to which issues).

6. Evidence shows that: (a) there is a statistically significant correlation between analysts' estimates of earnings changes and the subsequent actual changes, and (b) there is also a significant correlation between earnings changes and stock price changes. Does it then follow that (c) analysts' earnings forecasts must be useful in predicting stock price changes? *Explain.*
7. Using a methodology similar to Fama, Fisher, Jensen and Roll, Largay and West find that, "on average", increases in margin requirements are preceded by a sequence of abnormally large increases in stock prices and followed by a sequence of "normal" changes in stock prices. This proves that increases in margin requirements have the desired effect of stopping price increases that are "unhealthy" or "unjustified by underlying economic factors". True or False? Why?
8. "Given that the risks are the same, it is obviously better to buy the securities of firms with good prospects for long-run earnings growth than it is to buy those of stable or declining firms". *Comment.*
10. Interest rates will be higher next year, so it pays to borrow now". *Comment.*
11. Evaluate the following statement:

"The North Clinton area of Rochester is currently an excellent source of real estate investment bargains. Apartment buildings and private dwellings are selling for about half the price of housing producing comparable monthly rents in other parts of the city. Thus, by buying North Clinton property, the investor can get high current cash return on his investment and also be fairly certain of capital gains as the market value of property in this area increases toward that of comparable property in other parts of the city".
12. It is common belief among many Wall Street analysts that the price/earnings (P/E) ratio can be used to select stocks with abnormal performance. To investigate this "conventional wisdom" a recent study classified all NYSE stock into 4 categories based on their P/E ratios. The high P/E portfolio experienced significantly higher returns than the market (as measured by the equal weighted market index of all NYSE securities) and the low P/E portfolio experienced significantly lower returns than the market. The authors of the study interpret this as strong evidence of market inefficiency.
 - (a) Can you give a different interpretation of these results?
 - (b) Suppose that abnormal performance had been computed for each portfolio by subtracting the historical average return to that portfolio from the actual return and the results were the same. What interpretation would you give to these results? (Be sure to discuss the implications of using historical average returns to compute abnormal returns versus using the market return).
 - (c) How would you test this "conventional wisdom" regarding P/E ratios?
13. Consider the following filter rule discussed in a *Times Union* article on Monday, May 30, 1983:

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Ashland won't reveal its market timing methods, but there's a simple method in Venita Van Caspel's *The Power of Money Dynamics*. When the Federal Reserve discount rate rises twice in a row, she sells stocks. She buys stocks if the rate drops two times running.

If this rule outperformed a buy-and-hold strategy net of transaction costs, it would be clear evidence of market inefficiency. Comment.

14. Many people believe that accounting earnings are an important indicator of the value of common stock. Two general types of trading rules have been proposed: (a) buy stocks with either high (or low) P/E ratios; or (b) buy stocks whose earnings have recently grown faster than expected (by either security analysts or relative to past earnings growth). Describe how you would test these two trading rules. Suppose that the results of your test show that you could earn reliable profits from these rules, do you think that you are truly "beating the market?" *Why or why not?*

15. Below is an excerpt from an article in the 10/19/81 issue of *Business Week*. Evaluate this evidence of market inefficiency. Can you offer any alternative explanations of these findings?

In a study published in a recent issue of the bank's *Economic Review*, Throop compared the predictions of a panel of experts regarding the Treasury bill rate two quarters ahead with predictions he drew from an "auto-regressive" forecasting equation based on the behavior of the market itself. If the market were efficient, he notes, any information contained in the experts' forecasts would already be reflected in the prices of the securities, and no one could profit by following the professionals' advice. On the other hand, "If the market is inefficient, a group of investors could improve their returns by altering the maturity of their investments in light of superior interest rate forecasts".

The upshot of Throop's study, which covers the period from the first quarter of 1970 through the third quarter of 1979, is that the analysts' predictions were consistently more accurate than were the market predictions by an average of 14 basis points. And that reflects enough market inefficiency to "have allowed an investor to trade on the information contained in the analysts' forecast".

16. Below is a brief abstract of a paper by W. Brainard, J. Shoven, and L. Weiss titled "The Financial Valuation of the Return to Capital". The paper was presented in Boston at a meeting of economists on financing U.S. capital formation.

The study by Brainard, Shoven, and Weiss analyzes recent declines in the market value of corporations relative to their intrinsic value. The authors conclude that this decline is due to a fall in the market valuation of steady earnings flows, not to increasing risk premiums or high debt-equity ratios. They suggest that for a given amount of actual earnings, firms can boost their market valuations by using accounting procedures that raise reported earnings.

Do you agree or disagree with the authors' conclusions regarding the relationship between earnings and stock prices? Why? (Be sure to be precise in explaining your point of view citing evidence that you think is appropriate.)

17. The following quote is from *A Random Walk Down Wall Street* by Burton G. Malkiel (the Dean at Yale's School of Organization and Management).

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"A random walk is one in which future steps or directions cannot be predicted on the basis of past actions. When the term is applied to the stock market, it means that short-run changes in stock prices cannot be predicted. Investment advisory services, earnings predictions, and complicated chart patterns are useless. On Wall Street, the term "random walk" is an obscenity. It is an epithet coined by the academic world and hurled insultingly at the professional soothsayers. Taken to its logical extreme, it means that a blindfolded monkey throwing darts at a newspaper's financial pages could select a portfolio that would do just as well as one carefully selected by the experts". (Malkiel (1981), p.18).

Evaluate these remarks based on your understanding of random walks and market efficiency.

18. The following is an excerpt from an article in *The Chartered Accountant in Australia* (May, 1980).

Perhaps the ultimate in absurdity arising from the application of the EMF is the development of the so called index mutual fund - a fund designed to have a portfolio completely in line with that of the market index so that results would be identical with that achieved by the index. Instead of moving out of this market when it is vulnerable to decline from high relative prices this approach involves staying in the market on the basis that the results will be no worse than the result of the market index. That is comparable to an alcoholic deciding not to give up alcohol but to drink precisely the same amount as the average alcoholic so that he will incur the average amount of liver damage and shorten his life by the average amount.

(Note: EMF stands for "efficient market fallacy"). Evaluate this argument by discussing the role played by the indexed mutual fund (indexed to the market portfolio) in (i) modern portfolio theory (ii) the theory of efficient markets, and (iii) the Sharpe-Lintner capital asset pricing model. (Be precise in your discussion. I do not want a long diatribe on each of these topics but only those aspects that relate to the role played by these indexed funds).

19. It is often said that "every test of market efficiency is a joint test of efficiency and a model of equilibrium expected returns." Explain what this statement means, and give at least one example each where a test probably rejects this joint hypothesis: (1) because of a poor model of expected returns, and (2) because of market inefficiency.

20. Explain the concept of "sample selection bias" as it pertains to studies of asset market efficiency. Give at least one specific example of a result that could be caused by selection bias where an alternative interpretation of the data (that ignored the possibility of selection bias) could lead to poor managerial decisions.

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21. In his paper "Stock Returns and the Weekend Effect," Ken French finds that the return to the Standard & Poor's composite portfolio from the close of trading on Friday to the close of trading on Monday was negative, on average, for 20 of the 25 years from 1953-77. This result is highly statistically significant (a t-statistic of about -7.), although the magnitude of the effect is small (about -.17 percent per weekend).

(a) Does this result imply that the stock market is inefficient? Why or why not?

(b) If you were the manager of a large open-end mutual fund or pension fund, where there were continual inflows and outflows of cash into your portfolio, how would you use French's results, if at all, to improve your investment performance?

22. Given Mikkelson and Partch's evidence on the effects of secondary distributions, suppose that you were managing the University of Rochester endowment portfolio and you wished to sell a large block of stock because you were trying to change the risk characteristics of the portfolio. How would you consummate the sale so as to maximize the value received by the University?

23. Briefly explain what the 'buy-and-hold' policy is, why it is used in studies of efficient markets, and what model of 'equilibrium expected returns' is implied by this policy.

24. Much of the press coverage of the substantial drop in stock prices during the last few weeks has stressed the role of: (1) the U.S. budget and trade deficits; (2) panic selling by large institutional investors; and (3) sharp drops in the prices of foreign securities. Based on the theories and evidence discussed in FIN 411, analyze the following questions:

(a) Is the budget/trade deficit story consistent with the concept of efficient markets? If so, why? If not, why not?

(b) Is the story about panic selling consistent with the efficient markets hypothesis?

(c) Are you aware of any evidence that is consistent with the 'panic selling' hypothesis? (Be as specific as you can). Based on this evidence, what would you predict would happen if the S.E.C. suspended trading for a day? For a week? How does this match up with the fact that the Hong Kong stock market index fell by 33 percent after being closed for all of the week after 'Black Monday'?

(d) Is the evidence that prices of stocks dropped in markets around the world at the same time as U.S. markets support for, or refutation of, the efficient markets hypothesis? Why, or why not?

25. There has been much publicity recently concerning the desire of many students and faculty members (and many people not associated with the University) to have the University of Rochester divest its investments in stocks of companies that do business of any kind in South Africa. One argument that has been made in favor of divestment is that future unrest in South Africa resulting from the gradual decline of apartheid will reduce the profitability of operations within that country. Thus, divestment is not only 'morally correct', but it is a positive net present value investment policy. Evaluate this position from the perspective of the Vice President of Finance at the UR. For the purpose of this question, ignore any costs of under-diversification.

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26. During 1987, the price/earnings (P/E) ratio for the Standard & Poor's composite index rose from about 16 to over 23. At the same time, annual long-term government bond yields rose from about 9 to 9.75 percent. Some people believe that these facts should have given ample warning of the recent sharp fall in stock prices. Evaluate these facts from the perspective of the efficient markets hypothesis (i.e., is there a rational explanation for how the P/E ratio and the government bond yield could both rise so much simultaneously?)

27. Suppose that a friend of yours has gone into the business of giving investment advice. He uses a variety of methods, including fundamental analysis of macroeconomic conditions, analysis of company-specific information gleaned from interviews with corporate officers, and data screening techniques that focus on firms with low market-to-book value ratios (i.e., the ratio of the market price times shares outstanding of the stock divided by the accounting book value of equity.)

(a) Based on your knowledge from FIN 411, which of these techniques is most likely to earn "abnormal" returns? Why?

(b) Briefly describe how you would assess whether your friend had been successful in picking undervalued securities. Be as specific as possible. Based on this analysis, how long do you think you would have to wait to decide whether to let your friend make investment decisions for you?

28. Some of the largest one day returns to individual stocks occur when a tender offer or merger announcement is made (the average one day return for target firms is over 20 percent!) Accordingly, many security analysts have devoted resources to the problem of predicting which firms are likely to be the targets of takeover fights (e.g., local guru Charles LaLoggia runs advertisements on CNN saying that he can successfully predict takeover targets, and hence earn abnormal returns). Given your knowledge of the theory and evidence concerning the efficient markets hypothesis, answer the following questions (***HINT***: if you are taking FIN 415, do *not* answer this question based on the papers you read for that course; restrict your answer to the papers and books that have been assigned in FIN 411):

(a) If you are an avid reader of the *Wall Street Journal*, when is the best time to invest in takeover stocks? At the time the first offer is made? At the time when a second bidder enters the battle (if one does)? At the time when the firms agree to consummate the transaction (if they do so)? Defend your answers with reference to evidence wherever possible.

(b) Suppose you bought Mr. LaLoggia's newsletter, and suppose that he *is* able to predict takeover targets better than by throwing darts at the *WSJ*. Is it likely that you could earn abnormal returns by buying the stocks he predicts will be taken over? Why or why not?

(c) Some arbitrageurs ('Arbs') have made a lot of money over the last decade by trading in stocks involved in takeover fights. Are these people earning abnormal returns? (Hint: Ivan Boesky was one of the most famous of these Arbs).

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29. The recent U.S. presidential campaign has drawn attention to the importance of the economy for the outcome of political elections. It is often asserted that Republicans (and incumbents) benefit if the economy is doing well at the time of the election. Current public opinion polls seem to support this argument since George Bush now seems to have a wide lead over his Democratic challenger, Michael Dukakis.

A recent study of presidential elections from 1860 through 1984 shows that Republicans are more likely to win the White House when the stock market performs well during the year leading up to the election. Average returns to a broad stock market portfolio are 4.5 percent per year higher when Republicans win than when Democrats win.

(a) Does this mean that Michael Dukakis should blame the stock market if he loses to George Bush next Tuesday? Why, or why not? (*Hint: focus on interpreting the 'recent study', not on the characteristics of the current candidates.*)

(b) Is there a trading rule that you could use to make money on the stock market? (E.g., if you are confident that the Republicans are going to win a year in advance, buy stocks; if you are confident that the Democrats are going to win, sell stocks.)

30. A member of the Simon School Executive Advisory Committee, Mr. Andrew Carter, recently said, "The efficient markets hypothesis must be false, because I know many people who have made a lot of money investing in the stock and bond markets." Is this evidence against the efficient markets hypothesis? Why or why not? How would you design an experiment that could use evidence on investors' performance to judge efficient markets?

31. There are many types of 'seasonality' that have been documented in security returns. For example, Ken French finds that returns are lower over weekends (Friday close to Monday close) than for other trading days; Don Keim finds that average returns to small firms' stocks are very high during the first two weeks in January; Robert Ariel finds that the average return to many stock portfolios is higher during the first two weeks of the month than the last half of the month; etc. Is this evidence inconsistent with the efficient markets hypothesis? Why or why not? If you were a large investor with a well-diversified portfolio and relatively low transaction costs, how, if at all, would you try to profit from these 'seasonal' effects?

32. The *Wall Street Journal* usually contains several stories about tender offers, leveraged buyouts (LBOs), or recapitalizations that cause the stock price of the affected company to jump from 20 to 50 percent in one or two days. The recent RJR-Nabisco LBO is one example. Usually, these events involve an offer to buy all of the target company's stock at a large premium (more than the initial increase in the stock price), and the offer period lasts from 3 to 5 weeks.

(a) Is the large one day increase in stock price an indication that the stock market is inefficient?

(b) Why would the initial stock price change increase **less** than the offer made by the bidding firm? Is this evidence of market inefficiency?

(c) Do you think the risk of the stock will be higher or lower than its usual level during the period of the offer? *Why, or why not?*

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(d) If there are options traded on the stock of the target firm, what do you think will happen to the prices of these options? In particular, will the implied variance of stock returns go up, or go down during the offer period? *Why, or why not?*

33. In FIN 402 you were taught that firms should undertake all positive net present value ($NPV > 0$) projects to maximize the value of the firm. In FIN 411 you were taught that capital markets are generally semi-strong form efficient. This means that there are no $NPV > 0$ investments in stocks or bonds that your company could make. *Do you agree, or disagree? Why?*

34.

(a) Briefly explain why the efficient markets hypothesis *does not* generally imply that speculative asset (e.g., stock & bond) prices follow a random walk. *[Hint: give an example of some asset whose price doesn't follow a random walk, yet you think that market is probably efficient.]*

(b) Briefly explain why the random walk model for speculative asset prices *does not* generally imply that the market for that asset is efficient. *[Hint: think of a hypothetical example where an asset price follows a random walk, but that market is inefficient.]*

(c) Briefly explain what is meant by the expression "tests of market efficiency are always tests of a joint hypothesis."

35. A friend from the corporate treasurer's office knows that you are attending the Executive Development Program at the University of Rochester. Your company is considering borrowing money (issuing debt) to finance its expansion plans. The treasurer wants to know what is going to happen to interest rates: Should you borrow now, or wait until interest rates come down in the future? Based on the evidence and analysis you learned in your Investments course, what advice would you give your friend? *Be as specific as possible in describing what you know about the behavior of interest rates.*

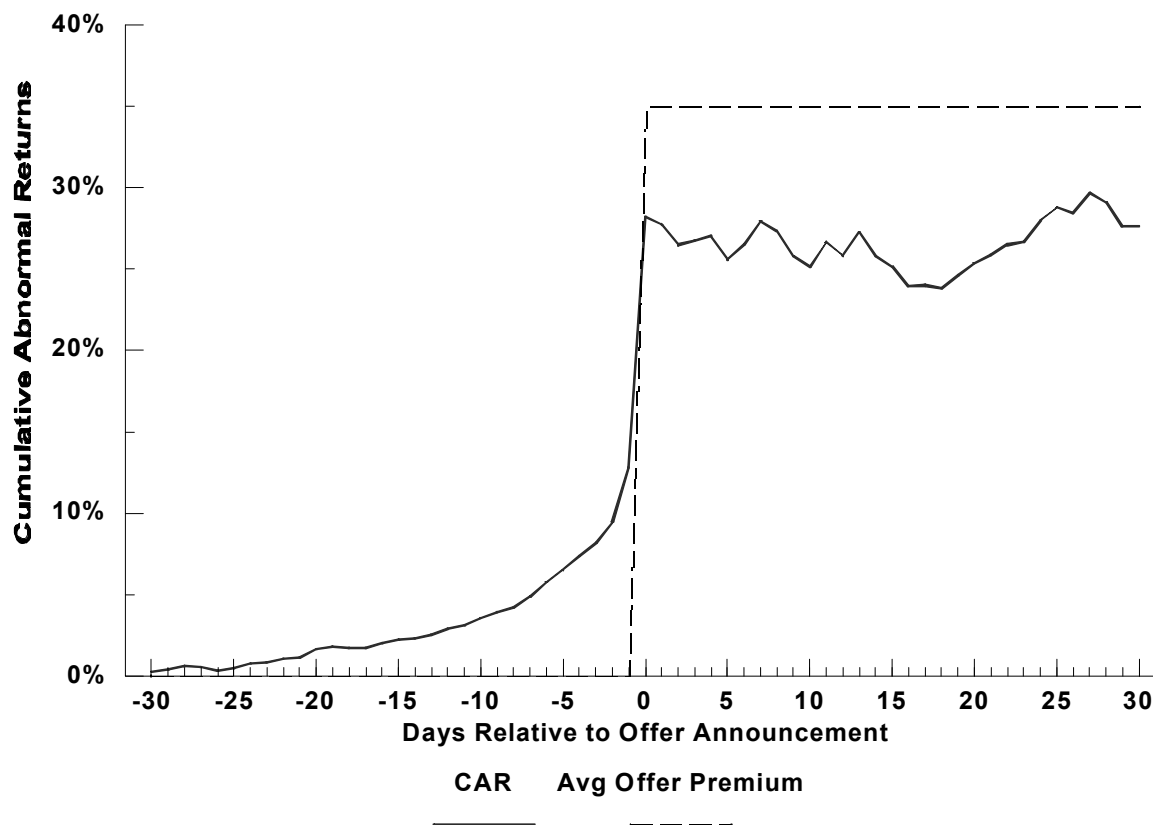
36. A recent paper published in the *Journal of Financial Economics* studies the stock price behavior of firms that are targets in hostile takeovers. The average premium offered (relative to the price on the day before the announcement) is 35 percent, and the stock price rises by about 25 percent on the day the tender offer is announced (i.e., the abnormal return is .25). The cumulative abnormal return (CAR) for the previous 5 days is about 5 percent, and there is no particular movement in the CAR over the next 30 trading days (see the plot below).

(a) Can you explain why the stock price rises by less than the amount of the tender offer on average?

(b) Can you explain why the stock price rises by 5 percent in the trading week before the announcement?

(c) What evidence, if any, does this study provide to show that the stock market is either efficient or inefficient? What additional evidence would you like to have to help you judge the efficiency of the stock price reaction to tender offer announcements?

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37. The Dow Jones Industrial Average closed at about 2950 yesterday. As you can see from the copy of the article from the March 8, 1991 *Wall Street Journal*, many traders think that 3,000 is a 'resistance level.'

- Explain how you would test the hypothesis that the Dow Jones Index has a resistance level at 3,000.
- Suppose that 3,000 was a resistance level. How would you create a trading rule to take advantage of this type of market inefficiency? Be as explicit as possible.

38. Below is a chart from the February 26, 1991, *Wall Street Journal*, showing the path of the Dow Jones Industrial Average and of the proportion of investment newsletters that are giving 'Bullish (optimistic)' or 'Bearish (pessimistic)' advice for the last nine months (*omitted*).

- Based on this chart, does it look like the investment newsletters have been doing a good job of forecasting future stock market price movements? *Why, or why not?*
- Are you surprised to see such a strong relation between published investment advice and stock price behavior reported in the *Wall Street Journal*? *Why, or why not?*
- How would you test whether there was information content in the recommendations of newsletters?

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39. Below is an ad from the February 8, 1991, *Wall Street Journal*, for Computrac's 'candle chart' (*omitted*). This company, which is owned by Dow-Jones, sells computer software that helps people perform technical analysis of stock price movements. The ad highlights such interesting patterns as the "Dark Cloud (a bearish reversal!)," the "Engulfing Pattern (also a bearish reversal)," the "Piercing Line (a bullish reversal)," and the "Upside Tasuki (a bullish continuation)."

(a) What evidence, if any, are you aware of that would lead you to be skeptical of the ability of Computrac's technical analysis system to accurately predict future stock price movements?

(b) If you were given a copy of this software, how would you evaluate the profitability of using it for trading stocks?

(c) French and Roll (1986, *JFE*) show that daily stock returns are slightly negatively autocorrelated at lags 2-10. They also show that small firms' stock returns are negatively autocorrelated at lag 1. Explain at least one reason why this might occur. Does this reflect the kind of profit opportunity that the Computrac program is trying to identify? *Why or why not?*

40. Below is a table from the March 13, 1991, *Wall Street Journal*, showing the largest purchases and sales of stock by insiders filed with the S.E.C. in the previous week (*omitted*). Relate these data to the *JFE* paper by Seyhun.

(a) Is now a good time to buy the stock of Richton? Or Tandy? *Why or why not?* Be as specific as possible.

(b) Is now a good time to be selling Circus Circus? Or Amgen? Or Fuqua Industries? *Why or why not?* Be specific.

(c) Is it surprising that most of the stocks in the "Buyers" list are listed Over-the-counter (O), while most of the stocks in the "Sellers" list are listed on the New York Stock Exchange (N)? *Why or why not?*

41. Gregg Jarrell taught you that consumers are generally willing to pay less per unit when increasing supplies of the good are made available in the market (demand curves slope downward.) Based on this logic, it is common to believe that an investor who decides to sell a large block of stock must be willing to offer a discount to entice other investors to purchase this increased volume.

(a) What are the implications of this hypothesis for the behavior of stock prices associated with secondary distributions of stock? Describe the evidence in the Mikkelson and Partch *JFE* paper that either supports or refutes this hypothesis. Be specific.

(b) Explain the tradeoffs faced by an investor who is considering whether to register a secondary distribution. Who would want to register, and who wouldn't. Explain how the stock price would react differently around the distribution date for registered and unregistered offerings.

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42. The story below from the February 13, 1991, *Wall Street Journal*, describes recent sales of Microsoft and Apple Computer stock, including blocks of 350,000 shares by Bill Gates (Microsoft) and 100,000 shares by John Sculley (Apple.) Based on your knowledge of financial theory and *evidence*, how will the stock market react to the news of this selling? Be specific about the reaction to both the Gates and Sculley sales.

43. "Cigarette manufacturers, such as Phillip Morris and RJR Nabisco, are in a dying industry. The proportion of the population that smokes continues to decline, the risk of litigation expenses from customers is rising, and many institutional investors (notably the Harvard University endowment) have decided not to invest in such socially irresponsible companies. With all of these negatives facing this industry, investments in these stocks are not recommended. Instead, we recommend investments in industries with high future growth rates, such as biotechnology or cellular telephone stocks." *Evaluate this (fictitious) statement from an investment advisor.*

44. As long-term interest rates have fallen in recent months, a rash of homeowners have gone to banks to refinance their homes. A frequently heard rule-of-thumb is that you should do this if current fixed rate mortgages are more than 1.5% below your existing mortgage loan rate (and you plan on owning your house for at least 5 more years). This rule of thumb trades off the transactions costs of getting a new loan versus the lower interest cost of the new loan.

A few years ago, after long-term interest rates had fallen, the University of Rochester decided to repurchase and retire some of its high coupon bonds in exchange for lower coupon bonds with larger face value. The argument used for that transaction was that future interest payments would be lower, even though the face value of the bonds was higher.

- (a) Discuss the similarities and differences between these two types of refinancings from the perspective of an efficient bond market. In particular, is either or both of these trades a positive net present value ($NPV > 0$) project? *Why, or why not?*
 - (b) If you were refinancing your mortgage today, and you had a choice between 30 year mortgages with a fixed rate of 8.625% or a mortgage with an adjustable rate equal to 1.9% plus the 1-year Treasury bill yield (currently 4.6%), adjusted annually, how would you choose? Assume that transactions costs are the same. What kind of factors do you think would be important in your analysis? What kind of factors do you think would **not** be important in your analysis? [*Hint: make an argument for choosing the highest NPV mortgage given your personal circumstances, and explain briefly what they are.*]
45. On the prior page is a copy of the *Wall Street Journal's* latest report on insider trading (March 11, 1992). Based on this information, which of these companies are likely to have had unexpected price increases (or decreases) in recent weeks? Based on your knowledge of the evidence from FIN 411, would you buy or sell any of these stocks at this time? [*Hint: the logic you use in explaining your analysis will determine your grade, not the specific company or companies you choose to illustrate your answer.*]

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46. Suppose you were an uninformed investor with a block of about 4% of the outstanding shares in a particular company. For non-information reasons you have decided to sell this stock (e.g., the University of Rochester has decided to reduce the proportion of "small cap" stocks in its endowment). [Hint: in answering this question, refer to the evidence in the Mikkelson & Partch paper.]

- (a) Would you use a secondary distribution to sell this block of stock? *Why, or why not?*
- (b) If you decided to use a secondary distribution, would you register it? *Why, or why not?*

47. Briefly explain why stock volatility is higher during trading periods than in non-trading periods. What evidence do French & Roll use to document this conclusion? What does this imply about the efficient markets hypothesis? What do you think will happen to stock volatility if markets start to stay open 24 hours per day as has been proposed recently?

48. "The recent news about the career moves of Christopher Steffen raises significant questions about the efficiency of the stock market. For example, on December 23, 1992 the *Wall Street Journal* reported that Mr. Steffen was resigning as CFO, and Honeywell's stock fell by about \$1.375 (4.1%). On January 11, 1993, when it was announced that he had been hired as its new CFO, Kodak's stock price rose \$3.50 (7.8%). On February 25, 1993, after Mr. Steffen met with security analysts to discuss Kodak's restructuring plans, the stock price rose \$ 2.75 (5.5%). But, when it was announced that he had resigned, Kodak's stock price fell \$ 7.00 (13.4%) at the delayed opening of trading on April 28, 1993. Finally, based on (unfounded) rumors that Mr. Steffen might be hired as its new CFO, IBM's stock price rose \$ 1.125 (2.3%). It is ridiculous to think that one man could be so important to these companies -- it is clear that Wall Street over-reacts to news about Christopher Steffen."

- (a) Evaluate the statement by a (*fictitious*) executive-search firm consultant. Suppose this statement was true, what strategy could you use to profit from this inefficiency?
- (b) If the stock market is (semi-strong form) efficient, how would you use the facts listed above in helping Mr. Steffen negotiate for compensation in his next job?
- (c) Assuming that Mr. Steffen hires you as his agent, what stock price reaction would you expect to see when you announce his next employment (and the terms you negotiated)?
Why?

49. A recent study of presidential elections from 1860 through 1992 shows that Republicans are more likely to win the White House when the stock market performs well during the year leading up to the election. Average returns to a broad stock market portfolio are 4.5 percent per year higher when Republicans win than when Democrats win.

- (a) Does this mean that George Bush should blame the stock market because Clinton won in 1992? *Why, or why not?* (Hint: focus on interpreting the "recent study," not on the characteristics of the recent candidates.)
- (b) Is there a trading rule that you could use to make money on the stock market? (e.g., if you are confident that the Republicans are going to win a year in advance, buy stocks; if you are confident that the Democrats are going to win, sell stocks.) *Why, or why not?*

II. Efficient Capital Markets

50. The story below from the August 7, 1992 *Wall Street Journal* describes how Bill Gates sold 1.25 million shares of Microsoft in late July. Based on the information in this story, do you think that Gates' sale of about \$92 million worth of stock portends bad news for Microsoft in the future? *Why or why not?*

51. "The news about the restructuring at Kodak caused the stock price to rise \$1.375 to \$46.125 (3.1%) on May 3, 1994. By comparison, Kodak's stock price fell by 10.3% on January 22, 1988 when Kodak made its successful bid to purchase Sterling Drug. Since the news that Kodak is selling Sterling-Winthrop and reducing debt effectively reverses its January 1988 decision, investing in Kodak now should be a good decision. Eventually, the price will rise at least another 7.2% when the sale of Sterling and the debt reduction are completed." Evaluate this (*fictitious*) statement by a (*fictitious*) local investment advisor. [*Hint: can you give other interpretations to the smaller reaction to the spin-off story than the takeover story?*]

52. The story below from the March 14, 1994 *Wall Street Journal* argues that since investment advisors and individual investors are "bearish", the market must be poised for a rally (on the premise that most people are wrong?). The measures of investor sentiment are based on survey responses. This model worked in November 1993, according to the accompanying graph. The article also points to the level of cash held by professional money managers and the volume of put option trading as useful measures of future stock price movements.

- (a) Based on the evidence discussed in FIN 411, do you think that these measures are likely to be helpful in predicting the future movement of stock prices? *Why, or why not?*
- (b) How would you design a test that would give you reliable evidence of whether these rules will be useful in the future? *Be as specific as possible.*

53. The story below from the March 14, 1994 *Wall Street Journal* describes how Dart Financial Corp. sold short 3.21 million shares of Salomon Inc. in early March. This reduced their net holdings of Salomon stock. At the same time, Warren Buffett (through Berkshire Hathaway) bought 5.5 million shares of Salomon stock. Buffett now holds 19.04% of Salomon's stock, while Dart was Salomon's second largest shareholder (6.6% before the short-sale). Based on the evidence discussed in FIN 411, how should the market react to Dart's sale? How should the market react to Buffett's purchase? Is it surprising that Dart didn't call Buffett and ask him to purchase their shares?

54. Mikkelson and Partch find that secondary distributions are an expensive way for people to sell large blocks of stock. First, investment banking fees average about 6% of the value of the block of stock. Plus, the stock price drops by 2-3.5% when the sale is announced.

- (a) Does this substantial discount prove that demand curves for common stocks slope downward (i.e., that investors must accept a large discount if they want to sell a large block of stock)? *Why, or why not?* [*Hint: what would you expect would happen to the stock price after the block has been sold?*]
- (b) If you owned a large block of stock in a publicly traded company (if only you were so lucky to have this "problem"), under what circumstances would you use a secondary distribution to sell your stock?
- (c) If you were selling your stock through a secondary distribution, under what circumstances might you voluntarily choose to register your sale with the S.E.C.?

II. Efficient Capital Markets

55. Suppose that after graduating from the Executive Development Program you have been assigned to the staff of the Chief Financial Officer. He has risen through the company in a variety of positions, but he has never had formal training in finance (e.g., like you are getting now). He is used to being in charge of a "profit-center", where his compensation is linked to the profitability of the particular product lines under his supervision. He wants to run the corporate treasury as a profit center, investing the firm's working capital, pension assets, and other financial assets in stocks, bonds, options, futures, or any other type of security that is likely to earn abnormal returns. He calls you into his office to ask your advice (because he wants to earn a return on the tuition investment the firm has made in you). What do you tell him? Where should he look to find profitable investments?

56. The article from the October 6, 1993 *Wall Street Journal*, reproduced on the next page, describes active selling by Xerox insiders during mid-1993, despite company rules that limit the amount of selling insiders can do. The article attributes the bad news expected at Xerox to the adverse effects of the "strong dollar" (i.e., the value in dollars of Xerox products sold in foreign markets falls as the dollar rises in value relative to foreign currencies).

- (a) After reading this article, would you want to buy or sell Xerox stock? *Why, or why not?*
- (b) Why might Xerox (or any other company) want to restrict the ability of insiders to sell (or buy) its stock?

57. The graph below from a recent research paper shows the cumulative average abnormal returns to the stocks of target companies from 126 trading days (about ½ year) before the first announcement of a takeover bid to 253 days (about a year) after the first bid.

- (a) Can you explain why the cumulative abnormal returns for the target firms that are taken over continue to rise after the first bid announcement?
- (b) Can you explain why the cumulative abnormal returns for the target firms that are not taken over fall back to 0 after a year has passed without a successful takeover?
- (c) Can you explain why the cumulative abnormal returns for the target firms rise before the first bid announcement?
- (d) Is this graph a test of market efficiency? *Why or why not?*
- (e) If you were the CEO of a firm that had just received a takeover bid (e.g., Chrysler), and you thought that you could use antitakeover devices such as state laws or poison pills to defeat the offer, would you do so? *Why or why not?*

II. Efficient Capital Markets

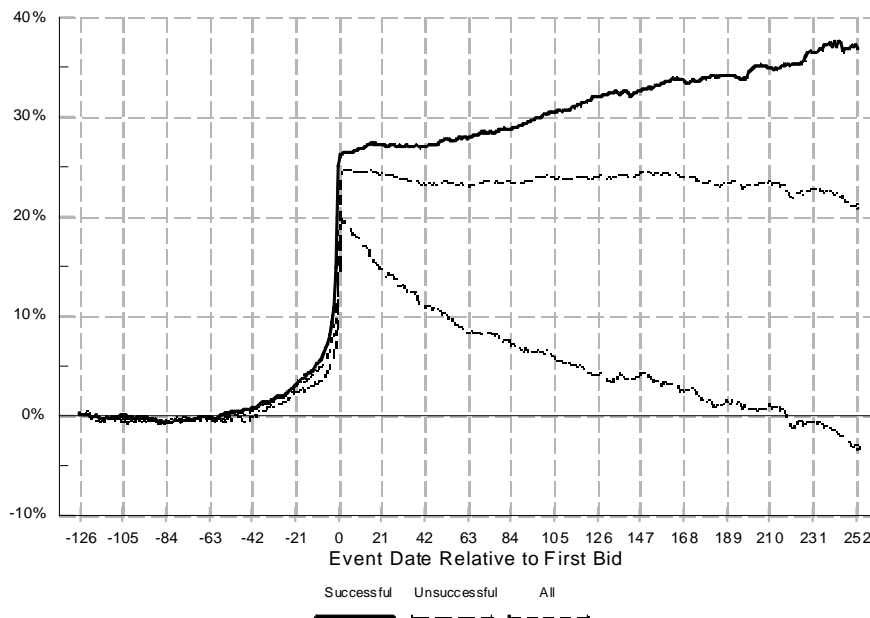


Fig. 1. Cumulative average abnormal returns to target firms' stocks from trading day -126 to +253 relative to the first bid. All NYSE and Amex-listed target firms in the period 1975-91. Market model parameters used to define abnormal returns are estimated using the CRSP value-weighted portfolio for days -379 to -127. The 1,401 target firms that were successfully taken over are shown with a solid line. The 414 target firms that were not taken over within the next year are shown with a dashed line. The full sample of 1,815 successful or unsuccessful firms is shown with a dotted line.

III. Bond Markets & Interest Rates

1. (a) In the Fama and Schwert article, "Asset returns and inflation," they find a negative relation between the unexpected inflation rate and the returns to long-term default-free government bonds. Give a brief explanation of why this result occurs.

(b) Fama and Schwert also find that returns to bonds, real estate, and human capital are positively related to expected inflation, but that stock returns are negatively related to expected inflation over the 1953-71 sample period. What implications does this have for the capital asset pricing model (the security market line), if any?

2. Fama has studied the behavior of Treasury bill yields (the returns from buying a discount security and holding it to maturity) and found that the autocorrelations of "real" returns (the Treasury bill yield minus the CPI inflation rate over the holding period) are close to zero, even though the autocorrelations of the nominal returns (in units of dollars) are close 1.

(a) Explain how this result can be interpreted as a test of market efficiency.

(b) Explain how this result can be used to help predict inflation in the future. For example, the 12 month Treasury bill yield from 12/1/86 to 11/27/87 is about 5.8 percent; what is your best guess about the value of the inflation rate for the next 12 months?

III. Bond Markets & Interest Rates

3. Fama and Schwert, in their paper "Asset Returns and Inflation," describe (1) a negative correlation between returns to stocks and CPI inflation, and (2) a positive correlation between returns to Treasury bills and CPI inflation. They also describe (3) a negative correlation of both stock returns and long-term bond returns with changes in short-term interest rates.

(a) Give a brief explanation for these three sets of results, including an explanation of why some of these results seem puzzling to economists.

(b) Suppose I told you that the next President of the U.S. will be a Democrat, and that the average inflation rate from 1988-92 will be 10% per year. What would you predict about the reaction to this news today (i.e., what would happen to stock and bond prices?) What would you predict for the returns to these assets during the 1988-92 period?

4. Given the prolonged economic expansion during the Reagan administration, and the low unemployment rates in many sections of the U.S., many economists are predicting higher inflation rates during the Bush administration. Also, some economists fear that the Fed will increase money growth rates to feed the expansion.

(a) If this forecast is accurate, what would you expect short-term interest rates (Treasury bill yields) to do over the next 4 to 8 years? *Why?*

(b) Given your forecast for interest rates, what would you expect the **current** term structure of interest rates to look like (i.e., the yield to maturity on bills and bonds from 1 month to 8 years to maturity?) *Why?*

(c) Given your forecast for interest rates, do you think that the next 4-8 years would be a good time to invest in long-term bonds? *Why, or why not?*

(d) Given your forecast for interest rates, do you think that the next 4-8 years would be a good time to invest in common stocks? *Why, or why not?*

5. In the Fama and Schwert article, "Asset Returns and Inflation," they find a negative relation between the unexpected inflation rate and the returns to long-term default-free government bonds. Give a brief explanation of why this result occurs.

6. If the current annual yield on a one-year Treasury bill is 5.2% and the yields on two, three and four-year Treasury strips are 5.9%, 6.4% and 6.6%, what do you think will happen to the level of one-year interest rates over the next three years? ***[You do not have to perform the calculation -- just describe how you would perform the calculation, and roughly where interest rates are likely to go in the future, given the current shape of the term structure.]***

7. The article below from the June 2, 1993 *Wall Street Journal* describes the proposal by the Congressional Budget Office (CBO) to have the U.S. Treasury issue government bonds that are indexed to the inflation rate.

(a) Why would investors want to purchase such securities?

(b) Why would the Treasury be reluctant to issue such securities?

III. Bond Markets & Interest Rates

8. There has been much recent discussion of the possibility that inflation might again become a serious concern to U.S. investors. President Clinton has appointed Princeton economist Alan Blinder (who is on his Council of Economic Advisors) to become the Vice-Chairman of the Federal Reserve, and Blinder is known to think that inflation is not a serious problem (compared with the level of unemployment).

- (a) What effect do these fears of inflation have on bond prices and interest rates? *Why?* [Hint: relate your answer to the evidence discussed in the course.]
- (b) Based on this concern, what would you predict the returns will be on intermediate and long-term government bonds over the next few years? *Why?*

IV. Option Pricing

1. "Writing call options on securities you already own is a great way to improve investment performance. First, you receive the proceeds from selling the option immediately. Second, if the exercise price is above the current stock price, you get the capital gain from S to X before the option would be exercised. In other words, the proceeds from the call provide a cushion if the price of the stock drops and gravy if it rises!". Comment.

2. Consider the following closing call option and common stock prices for General Motors Class E common stock as of June 5, 1985:

Exercise				Common
<u>Price</u>	<u>June</u>	<u>September</u>	<u>December</u>	<u>Stock</u>
70	7 1/2	no option	no option	77 5/8
75	3 3/4	6 1/2	no option	77 5/8
80	1	3 3/4	6	77 5/8

The riskless rate is 7% per annum.

- a) How could you use common stock prices to estimate the variance rate of General Motors Class E stock returns? How could you use option prices to estimate the variance rate?
 - b) How would you go about finding profit opportunities with these data?
 - c) Are there any apparent profit opportunities in these prices? If so, how would you try to reap these profits?
3. Suppose that you are interested in trying to make money by trading in puts or calls.
- (a) Describe some crude screens that you might use to look for profit opportunities by scanning the options quotes in the *Wall Street Journal*.
 - (b) Explain how you might use put and call option prices on a given stock with a given maturity date to estimate the volatility of the underlying stock return? What would

IV. Option Pricing

it mean if different call options implied different variance rates? What would it mean if call options and put options implied different variance rates? (*Discuss a specific example in each case; e.g., put implied variances are lower than call variances.*)

(c) Explain the logic of put-call parity.

4. On the following page is an article from the April 17, 1992 *Wall Street Journal*, titled "Webber's High-Risk 'Turbo' Warrants Promise Big Rewards If Long-Term Rates Fall."

(a) Based on the description of these warrants in this articles, how would you evaluate whether they were priced "fairly"? *Be explicit about all of the factors you would need to take into account.*

(b) How might you use these securities to adjust the risk of some asset you currently hold? *Give an explicit example of what you would do -- e.g., buy vs. sell? How many? etc.*

5. Suppose that you had reliable inside information about an upcoming announcement by a corporation that has listed stock and bonds, and put and call options traded on the stock (e.g., by Kodak), but you only a limited amount of money available to invest. [*For the purposes of this question, assume that it is not illegal to trade based on this inside information.*]

(a) What kind of security would you buy (or sell) to get the most benefit from *favorable* information? *Why?*

(b) What kind of security would you buy (or sell) to get the most benefit from *unfavorable* information? *Why?*

(c) What kind of security would you buy (or sell) to get the most benefit from information which is likely to be important, but you are unsure of whether the stock price will rise or fall when it is announced? *Why?*

IV. Option Pricing

6. Suppose that you were interested in trading put and call options on the Standard & Poor's 500 portfolio and you had access to historical daily returns to the S&P portfolio and to a spreadsheet that would calculate the value of the put and call options from the Black-Scholes model.

(a) What would you conclude if historical estimates of stock return volatility were significantly lower than the values implied by current market prices of S&P put and call options? Which estimate of volatility do you think would provide a better forecast of volatility over the life of the option? *Why?*

(b) What are some factors that are *not* reflected in the Black-Scholes model that might cause market prices to differ from model prices?

(c) Suppose that the implied volatility estimates from put options were systematically higher than from call options with the same exercise price and expiration date. How would you interpret such a result? Does this represent a profit opportunity? If so, describe how you would trade to take advantage of this opportunity.

7. Recently, there has been a lot of attention paid to losses suffered by a variety of corporations who were trading "derivative" securities related to interest rate movements (e.g., Proctor & Gamble). The Government Accounting Office (GAO) has recommended a substantial increase in the regulation of "over-the-counter" derivative securities contracts (although they don't propose regulating other types of business contracts). Proponents of options and futures contracts argue that they are useful in managing the risks people and companies face in the process of doing everyday business (i.e., hedging). Briefly give examples of types of firms or individuals who might use the following types of futures or options contracts for hedging. Also, give examples of investors who would probably be "speculating" (or "gambling") if you found them trading in these contracts.

- (a) Futures contracts on silver
- (b) Futures contracts on wheat
- (c) Futures contracts on cattle
- (d) Futures contracts on Treasury bonds
- (e) Futures contracts on Treasury bills
- (f) Futures contracts on a foreign currency (e.g., £ or ¥)
- (g) Futures contracts on the Standard & Poor's 500
- (h) Put options on Eastman Kodak stock
- (I) Call options on Bausch & Lomb stock
- (j) Put options on the Standard & Poor's 500
- (k) Call options on the Standard & Poor's 500

IV. Option Pricing

8. Suppose that you were interested in trading put and call options on the Standard & Poor's 500 portfolio and you had access to historical daily returns to the S&P portfolio and to a spreadsheet that would calculate the value of the put and call options from the Black-Scholes model.

(a) What would you conclude if historical estimates of stock return volatility were significantly higher than the values implied by current market prices of S&P put and call options? Which estimate of volatility do you think would provide a better forecast of volatility over the life of the option? *Why?*

(b) What are some factors that are *not* reflected in the Black-Scholes model that might cause market prices to differ from model prices?

(c) Suppose that the implied volatility estimates from put options were systematically lower than from call options with the same exercise price and expiration date. How would you interpret such a result? Does this represent a profit opportunity? If so, describe how you would trade to take advantage of this opportunity.

9. A large part of George Fisher's compensation when he came to Kodak as CEO involved slightly out-of-the-money stock options in Kodak stock. He received options for 750,000 shares of Kodak stock at an exercise price of about \$58 and an expiration date ten years into the future at a time when the stock price was about \$55.

(a) One view of this arrangement is that it was costless to Kodak shareholders since the options would only become valuable if Kodak's stock price rose above \$58. Do you agree with that assessment? *Why or why not?*

(b) Suppose you had to estimate the value of the option package (e.g., to include in Kodak's annual report to shareholders). How would you determine the value of Fisher's options? *Be as specific as possible.*

(c) The usual motivation for giving high-level executives stock options as an important part of their compensation is that it aligns their incentives with those of the shareholders (i.e., they worry about making the stock price go up). From the perspective of portfolio theory, do these stock options cause any problems for Mr. Fisher? *What are they?*

(d) Given that Mr. Fisher is forced to hold a large position in Kodak stock (through his option compensation), how do you think he might adjust his view of the risks facing Kodak when evaluating capital budgeting projects? Is this different from the approach that Ross Watts talked to you about in FIN 402? *Why or why not?*

V. Futures Pricing

1. Suppose your personal portfolio is comprised of investments in a mutual fund of equities, a mutual fund of money market securities (i.e., treasury bills, C.D.'s, banker's acceptances, etc.) and a mutual fund of municipal bonds whose income is tax-exempt. What differences, if any would it make which of these funds you held directly or through your IRA (individual Retirement Account with contributions and accruals being tax-deferred)? For simplicity assume you have equal dollar amount invested in each fund.

2. Recently, a number of investment bankers have been selling a product called "portfolio insurance", which uses put and call options or futures contracts on portfolios of stocks (e.g. the S&P 500 index) to hedge the risk of a large portfolio of stocks. For example, if your company's pension fund was invested in a broad portfolio of stocks, like the S&P 500, you could assure a minimum level of return to the portfolio over the next year by buying put options that expire at the end of the measurement interval.

(a) Briefly, explain how you could use calls, puts, or futures contracts to reduce the risk of the stock portfolio?

(b) If you could guarantee that your pension account would not lose money, but that it had a large chance of making money if the stock market went up, wouldn't everybody want to do this?

(c) If portfolio insurance is such a good thing, then how come everyone hasn't signed up for it? (i.e., what are the costs and benefits of such a strategy? what alternatives are available to pension fund managers?)

3. (a) Given what has happened in the stock market since the beginning of the quarter (e.g., 'Black Monday'), what do you think has happened to the prices of put and call options on stocks? Why?

(b) What do you think has happened to the spread between the 'spot' level of the S&P 500 index and the 12 month futures price of the S&P 500 contract? Why?

(c) Under what circumstances, if any, would you expect to see the futures price for the S&P 500 contract well below the current level of the index (e.g., a 5% discount)? How would you trade if you observed such a spread? Be as specific as possible.

4. Suppose that the stock market crashed on Friday June 1, 1990, with the Standard & Poor's 500 index falling over 8 percent in one day. This is not as bad as the October 19, 1987 crash, but it is worse than "Friday the 13th," in October 1989.

(a) What would you predict for the behavior of stock returns in the near and distant future (e.g., in the next few weeks and the next year or two)? *Why?*

(b) What would you predict for the behavior of stock return volatility in the near and distant future (e.g., in the next few weeks and the next year or two)? *Why?*

(c) What do you think has happened to the prices of put and call options on stocks? *Why?*

(d) Under what circumstances, if any, would you expect to see the futures price for the S&P 500 contract well below the current level of the index (e.g., a 5% discount)? How would you trade if you observed such a spread? *Be as specific as possible.*

V. Futures Pricing

5. Current short-term Treasury bill yields are about 6% and the current dividend yield on the Standard & Poor's composite portfolio is about 3.5%. The closing level of the S&P 500 index yesterday was 390. Based on these yields, what would you expect the price of a one year futures contract on the S&P 500 to be? (*I am not particularly interested in a number -- what I really want is either a formula or a description of how you would calculate your own estimate using, for example, a spreadsheet.*)

6. On the following page is an article from the April 14, 1992 *Wall Street Journal* titled "Flood in Chicago Waters Down Trading on Wall Street." This article notes that the volatility of intraday movements in the Dow Jones Index was much smaller after futures trading was halted in Chicago due to the flood. Trading volume on the New York Stock Exchange was also low on Friday.

(a) Based on this "experiment," do you think that financial futures trading has a destabilizing effect on the prices of stocks and bonds?

(b) Futures trading did not resume completely until the middle of the next week (April 20). Do you think that stock price volatility and volume remained unusually low throughout this period? *Why or why not? [Hint: relate your answer to the evidence from the French & Roll paper.]*

7. "The recent growth of markets in financial futures contracts provides a wonderful source of information about how people think stock and bond prices will move in the future. For example, if the futures price of the S&P 500 futures contract is much below the current level of the index, this implies mass pessimism about the returns to stocks. On the other hand, if the S&P futures price is way above the current level of the index, the market must expect a Bull Market." Evaluate this statement. (***Hint: Is the S&P 500 futures price useful in forecasting stock prices? Why or why not?***)

VI. Portfolio Selection - Diversification And Efficient Portfolios

1. If all of the individual assets available to a risk averse investor has identical expected rates of return, there would be no reason for the investor to strictly prefer any one portfolio over another. True or False? *Explain.*

2. "If you can borrow, the most efficient way to obtain a higher expected rate of return on your portfolio may not be to shift funds from stocks with low expected returns to stocks with high expected returns." *Explain.*

3. Graph the portfolio opportunity set when there are only two risky assets:

$$E(R_a) = .01, E(R_b) = .03, \sigma(R_a) = .10, \sigma(R_b) = .10 \text{ and } \text{cov}(R_a, R_b) = -.0005.$$

(a) Label the efficient set.

(b) What is the maximum amount that a risk averse expected utility maximizing investor would invest in asset b?

(c) What is the most that this same individual would invest in asset a?

(d) Could this situation exist in equilibrium (where all investors see the same opportunity set)? If not, what would you expect to happen?

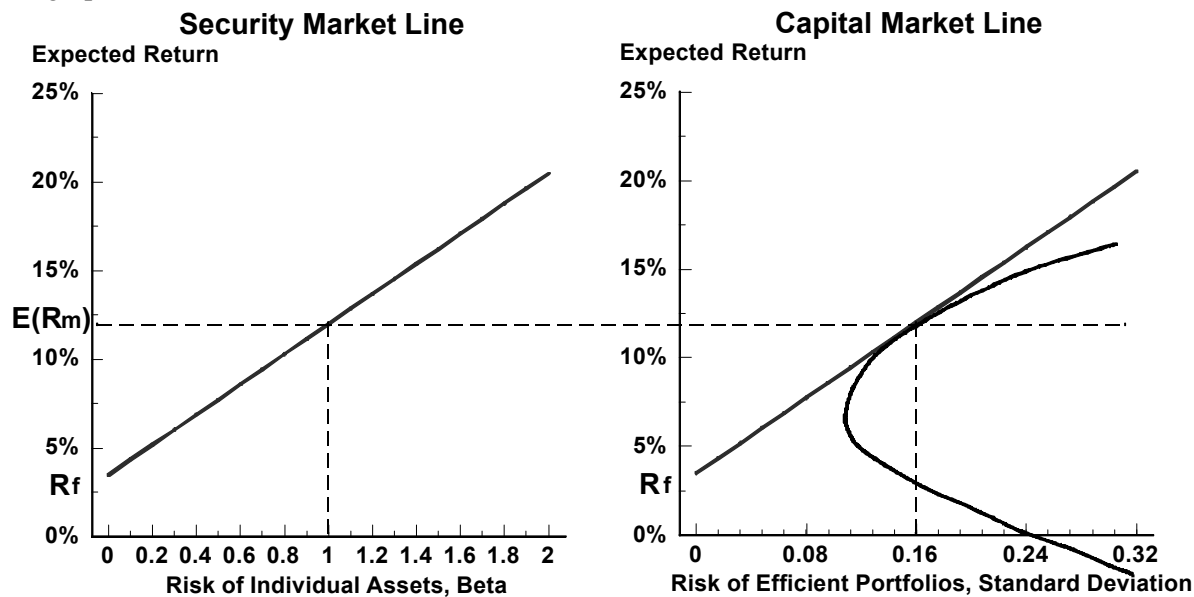
(e) Suppose $\text{cov}(R_a, R_b) = .01$. How would you answer questions (a) - (d)?

4. Since a firm is only a collection of assets whose returns are uncertain, the investment decision of firms is similar to the portfolio selection problem of individuals, and portfolio theory should be the basis for capital budgeting procedures. Comment.

5. As part of your compensation, your employer (Xerak Corp.) contributes to a stock purchase savings plan that equals about 10 percent of your after-tax income per year. The shares of Xerak stock that are purchased through this plan are held in a trust account -- you cannot sell them or borrow against them until you leave the firm (e.g., by retirement.) Given this investment in Xerak stock that is not marketable for many years in the future, how would you change your strategy for savings/investment in other types of securities compared with your twin brother/sister who earns the same taxable income working at the University of Rochester, but who does not have the Xerak savings plan?

VII. The Capital Asset Pricing Model: Theory, Tests And Extensions

1. Explain the relation between diversification and systematic risk, β_i , [$\beta_i = \text{cov}(R_{it}, R_{mt}) / \sigma^2(R_{mt})$]. In terms of correlations between asset returns, when is diversification most effective? When is it least effective?
2. Suppose IBM, GM, and ATT have beta of .5, 1.0, and 1.5 respectively. Plot these securities on the graphs below.



3. A close friend of yours purchased a lottery ticket yesterday but now owing to an unpredicted crisis, is in desperate need of cash. He offers to sell the ticket to you. You know the payoff and the probability of winning. All of your considerable fortune is invested in a highly diversified portfolio. How would you determine an appropriate price for the ticket using the capital asset pricing model?
4. Since investors are risk averse, it would seem that the expected returns should be greater for stocks with larger standard deviations. Nevertheless, we often observe stocks with very low average rates of return and large standard deviations and *vice versa*. This observation is inconsistent with the assumption of risk aversion and with the idea that the market is in "equilibrium" (i.e., all assets are held). Evaluate this argument.
5. In a world where the capital asset pricing model holds, can two assets with the same beta have different expected returns? Can actual realized returns differ?

VII. The Capital Asset Pricing Model: Theory, Tests And Extensions

6. In Michael Jensen's study of mutual fund performance, he estimated the "risk premium" form of the market model,

$$(R_{it} - R_{ft}) = \alpha_i + \beta_i (R_{mt} - R_{ft}) + \epsilon_{it},$$

for 115 mutual funds from 1945-64. He found that the estimates of α_i were not significantly different from 0 in most cases (on average they were negative). In the Black, Jensen and Scholes (BJS) study of the capital asset pricing model, they also estimated the risk premium market model. BJS found that, for portfolios of stocks that were selected to have different levels of risk (β_i), the estimates of α_i were systematically related to the estimates of β_i ; low β_i portfolios had positive α_i 's, and high β_i portfolios had negative α_i 's.

(a) Is the Jensen mutual fund article a test of market efficiency, or is it a test of the CAPM? Why?

(b) Explain why the coefficient α_i might be interpreted as a measure of abnormal performance in evaluating the abilities of different money managers.

(c) Based on the results of the BJS article, do you think that there would be a systematic relation between the estimates of β_i and the estimates of α_i in Jensen's mutual fund article? Why?

7. Recently, several papers have studied the "small firm effect" (i.e., small firm portfolios earn higher returns than predicted by the CAPM) and the "P/E ratio effect" (i.e., low P/E stocks earn higher returns than predicted by the CAPM).

(a) Are these tests of market efficiency, or are they tests of the capital asset pricing model? Explain the rationale for your answer.

(b) Suppose that you were managing money for a pension fund client, and you were going to be compensated according to "risk-adjusted performance" (i.e., $\alpha_i = R_{it} - R_{ft} - \beta_i [R_{mt} - R_{ft}]$). How, if at all, would you use the evidence on the small firm effect to improve your performance?

8. A friend who plays the stock market wants to see whether you have learned anything useful in the Investments course. She says that she has been buying the stocks of companies that are targets in cash tender offers for the past five years. She has often earned large positive returns when the target company is successfully taken over, but she also has had some big losses when the takeover attempts failed. She wants to see whether her realized returns from this activity are large enough to compensate for the large risks she bore from holding these takeover stocks.

(a) How would you estimate the risk of the takeover stocks she bought? Is your friend correct in thinking that these are very risky investments? *Why, or why not?*

(b) Your friend is now interested in buying put and call options on the stocks that are takeover candidates. Briefly explain what is likely to happen to the prices of put and call options when a tender offer is announced.

9. Suppose that you had been hired to provide testimony on behalf of a regulated public utility regarding the cost of equity capital for the firm. You are asked to use the capital asset pricing model

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(CAPM). Based on your knowledge of the empirical evidence on the CAPM, briefly describe some alternative methods you might consider to obtain as large an estimate of the 'cost of capital' as possible. (Note: a higher 'cost of capital' leads to higher allowed profits; also, most regulated utilities have betas below 1.)

10. Amihud and Mendelson argue that liquidity is an important determinant of the demand for assets.
- (a) Explain why security prices would be higher and expected rates of return lower if the cost of illiquidity could be reduced for an asset.
 - (b) Briefly summarize the evidence Amihud and Mendelson produce to support this hypothesis?
 - (c) What implications, if any, does the Amihud and Mendelson analysis have for portfolio theory (i.e., the way that different investors choose optimal portfolios of assets?) [*Hint: can you think of specific types of investors or investment accounts that would be more or less suitable for illiquid assets?*]
 - (d) How does it affect corporate finance (e.g., the types of securities that firms choose to sell to finance their activities?) [*Hint: what can a firm do to make its securities more liquid?*]
11. On the following page is an article from the April 16, 1992 *Wall Street Journal* titled "Three Measures Indicate Stocks Are Fully Priced." [P/E, dividend yield, and market/book ratios]. Based on this evidence, **and anything you have learned in FIN 411**, would you change the asset allocation mix among the various assets in your portfolio? If so, how would you do it? Explain your reasoning.
12. The current one year Treasury bill yield is 3.5% and the Ibbotson-Sinquefeld estimate of the average difference in returns to common stocks and Treasury bills is 8.4% (quoted in *Brealey & Myers*). Your job is to compare rates-of-return with costs-of-capital for various divisions of your large corporation as a function of the characteristics of the projects that are being considered.

Six projects have arrived on your desk with the following estimates of rate-of-return and your estimate of (beta) risk:

<u>Project</u>	<u>Rate of Return</u>	<u>Beta</u>	Decision:
			<u>Accept/Reject</u>
A	7.8%	0.5	
B	6.8%	0.5	
C	13%	1.0	
D	11%	1.0	
E	17%	1.5	
F	16%	1.5	

Based on what you have learned in FIN 411, which of these decisions is questionable? Explain how you would make a decision in these questionable cases.

13. The article below from the June 1, 1993 *Wall Street Journal* describes the decision by Liquidity Fund Investment Corp. to quit acting as a marketmaker for illiquid limited partnership interests because

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new regulations by the NASD have limited the transaction charges they can impose on buyers and sellers. What do you think will happen to the prices of limited partnership interests due to the NASD restriction that maximum transaction charges can be no more than 5%? *Why?*

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1. Explain and illustrate how "market timing" in the management of a portfolio affects its performance. Under what circumstances, if any, will timing increase the reward-to-variability (mean excess return divided by standard deviation) and/or reward-to-volatility (mean excess return divided by beta) ratio of the portfolio?

2. Suppose you were offered the choice of purchasing into a mutual fund, of say 20 randomly selected stocks, where the expected return on that portfolio was 10% and the standard deviation was 20%, or purchasing an equivalent dollar amount of ACME Chemical stock that has the same expected return and standard deviation. Which purchase would you make and *why?*

3. Evaluate the performance of XYZ Mutual Fund based on the following information:

Average monthly return, 1.5% per month

Standard deviation of monthly returns, 4.5% per month

Average monthly return on Standard & Poor's 500 index, 1.2% per month

Standard deviation of monthly returns on Standard & Poor's Index, 3.0% per month

Average return on one-month Treasury Bills, 0.5% per month

What else would you like to know in order to complete your analysis? (Be specific). How would you judge whether these results are significant?

4. You have now graduated from the M.B.A. program and you are working in your first job as a financial analyst. Your boss (who is smart, but does not have an M.B.A.) decides to ask your advice on several financial topics. How are you going to answer his question?

"I read in the newspaper that the average return to the S&P 500 was lower than the average return on one month Treasury Bills from 1973 to 1981. Should I get out of stocks and put my money into something like a money market account since returns to stocks are lower than money market returns?"

5. Many universities and public employee pension funds have decided to "divest" the stocks of companies that do business in South Africa from their portfolios.

(a) Will the stocks of the affected companies be 'depressed' over the next few years as these divestment programs are implemented?

(b) Is there an opportunity for "contrarian" investors to profit by buying the stocks of companies that operate in South Africa?

(c) Should the managers of these companies consider withdrawing from South African operations because of the selling pressure on their stocks?

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(d) Briefly, explain why "public spirited" institutions, such as universities and public employee pension funds, are at the forefront of the divestment movement.

6. In your first job as a financial analyst at Xerak you are assigned to help estimate the 'cost-of-capital' for some potential takeovers. Xerak's stock price is \$55 and its beta coefficient relative to the S&P 500 portfolio of stocks, β_i , is 1.0. The average return to Xerak stock has been about 16 percent per year. The term structure of interest rates is flat at about 8 percent per year, and the estimated risk premium for the S&P portfolio is 8 percent per year. Xerak is an all equity firm, and all of these projects would be financed with equity.

The first project under consideration involves building hamburger stands (Pepsico is considering selling us its Burger King subsidiary). The β_i for McDonald's stock is estimated to be .5. Xerak's staff estimates that we can earn 12.5 percent per year if we buy the Burger King subsidiary at the price being sought by Pepsico.

The second project under consideration involves genetic engineering (we are considering a takeover of Genentech, a manufacturer of pharmaceutical products from 'gene-splicing' techniques.) Genentech's β_i is estimated to be 1.5, and Xerak's staff estimates that we can earn 19.5 percent per year on this investment if we pay a 30 percent premium over the current market price of Genentech's stock (our estimate of the premium necessary to induce Genentech shareholders to tender all of their shares.)

Use your knowledge of the theory and evidence concerning the capital asset pricing model (CAPM) to answer the following questions:

(a) Should Xerak worry about buying a company that earns a lower rate of return than Xerak (i.e., Burger King)? *Why, or why not?*

(b) Would you recommend that Xerak undertake either or both of these projects? *Why, or why not?*

(c) Genentech is a 'small' firm. The market value of its equity would place it in the smallest 10 percent of NYSE listed stocks. Based on the evidence of the 'small firm effect,' do you think that the cost-of-capital for buying Genentech should be higher? *Why, or why not?*

7. Your boss has been put in charge of selecting money managers for the company's pension fund. She will also be responsible for monitoring their performance. Since she knows you have just finished your Investments course, she asks you for help in designing a performance evaluation scheme.

(a) She knows that most money managers compare their results with the S&P 500 portfolio. *What are the advantages and disadvantages of this benchmark?*

(b) She knows that many money managers think they can identify individual stocks or groups of stocks that will "out-perform" the market. She has also heard of the "alpha coefficient." *Explain what alpha (α) is, how it measures abnormal performance, and what some of its limitations are.*

(c) She knows that some money managers think they can identify time periods when the stock market will not perform well. She wants to know how she can measure the ability of such market timers. *Be as specific as possible.*

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8. An article from the May 24, 1990 *Wall Street Journal* describes the recent decision of Harvard University to divest itself of the stocks of corporations in the tobacco industry.

- (a) Briefly explain what impact such a decision will have on the tobacco companies. *Be as specific as possible about what effects, if any, this move will have.*
- (b) Briefly explain what effects this decision will have on Harvard University. *Be specific.*
- (c) Why is Harvard at the forefront of this movement on the "social responsibility" of investors *(as opposed to the Kodak pension plan, for example)*?

9. Shortly after graduating from the Executive Development Program, you have been transferred to the job of monitoring the performance of the money managers who manage the pension accounts for your company. All of these managers invest in common stocks. In the past, your company has compared managers' performance with the percent change in the Standard & Poor's 500 index.

- (a) Briefly explain some of the major problems in using the S&P 500 as the benchmark for portfolio performance.
- (b) One suggestion that has been made by another employee in your firm is to use the Capital Asset Pricing Model as a basis for calculating risk-adjusted portfolio performance. Explain how you would use the Sharpe-Lintner CAPM to measure the security selection ability of money managers. Explain how you would measure market timing ability.
- (c) Given your knowledge of the *evidence* on tests of the CAPM, briefly summarize the disadvantages of using the Sharpe-Lintner CAPM as a basis for rewarding superior portfolio performance (i.e., if you were a money manager, how would you form portfolios that have a high likelihood of achieving 'superior' performance, without having private information?)

10. Suppose that you were put in charge of selecting mutual funds that your firm's employees could choose as part of their 401(k) retirement program. Your goal is to select money managers that represent a variety of investment styles, and which seem to have had good performance in the past.

- (a) Describe how you might test for "stock selectivity" ability. [*Hint: what is the implied model of "normal" returns that you are using?*]
- (b) Describe how you might test for "market timing" ability. [*Hint: what is the implied model of "normal" returns that you are using?*]
- (c) Suppose that you noticed that several "value" managers (i.e., based on fundamental data, such as earnings, etc., they try to pick stock whose prices are "too low") seemed to perform well in the tests you performed in parts (a) and (b). Can you think of another interpretation of your results? How might you test whether these money managers could "pick winners"? [*Hint: what other method might you use to benchmark the performance of these managers?*]
- (d) Suppose that you noticed that several "growth managers" (i.e., based on projected earnings growth, etc., they try to pick stocks whose prices are "too low") seemed to perform well in the tests you performed in parts (a) and (b). Can you think of another interpretation of your

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results? How might you test whether these money managers could "pick winners"? [*Hint: what other method might you use to benchmark the performance of these managers?*]

11. As part of the 401K plan at your work, you have many choices of open-end mutual funds to select as part of your tax-sheltered retirement savings plan. You have been given the following regression output (from TSP) showing the performance of six funds that are available to you for investing: (1) Fidelity's Magellan Fund [FMAG], (2) Fidelity's Capital & Income Fund [FCI], (3) Fidelity's Select Health Care Fund [FSH], (4) the Dimension Fund Advisors U.S. 9-10 Small Company Fund [DFA], (5) the 44 Wall Street Fund [W44], and (6) the Vanguard International Growth Stock Fund [VINTG]. All fund returns are monthly percent returns net of the one month Treasury bill yield, and the regressors (independent variables) are the CRSP value-weighted return to NYSE and Amex-listed stocks (net of the Tbill yield) [MKT], and the market return if it is positive, or zero if it is negative [AMKT]. Based on this regression output, and what you have learned in the course,

- (a) How do you interpret the regressions where MKT is the only independent variable? [*Hint: Is there evidence of abnormal performance? How well diversified are these mutual fund portfolios?*]
- (b) What model of equilibrium expected returns is being used as a benchmark in judging the performance of these funds? **Explain**
- (c) Do any of these funds seem to show "market timing" ability? **Explain**. Does this make sense for these funds? [*Hint: is that what this fund claims to be doing?*]
- (d) Given the evidence on the validity of the CAPM, are there any of these funds where you might expect to see "abnormal performance", even though the mutual fund managers might not have superior stock selection ability? **Why?**
- (e) There is some evidence that the performance in the 1988-92 subperiod is different than for the overall 1983-92 period. Why might this happen? Is this relevant to your evaluation of these funds as potential investment vehicles? **Why?**
- (f) This method of evaluating mutual fund performance is likely to be more useful for some types of mutual funds than for others. Among this set of funds, for which is this problem likely to largest? **Why?** Are any of the estimates of unusual abnormal performance likely to be explained by this methodological problem?

12. There has been much interest lately in global capital markets. More and more pension plans and individual investors are making investments in stocks or mutual funds representing foreign equity markets. To see how the US market relates to the rest of the world, I have estimated the following regression equations using **Eviews**, where US is the difference between the monthly return to the CRSP value-weighted portfolio of NYSE and Amex-listed stocks and the return to a one-month Treasury bill. WORLD is the difference between the monthly return to the Morgan-Stanley World portfolio (which is value-weighted and covers all of the major stock markets in the world) and the return to a one-month Treasury bill.

- (a) How has the risk of the US as part of the WORLD portfolio changed over the 1976-92 period? Does this make any sense to you? [*Hint: explain both your interpretation of the regression output and its meaning in the context of portfolio theory.*]

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(b) Based on these results, do you think it would be wise to hold at least some of your assets in the form of foreign equities? *Why or why not? Be as explicit as possible.*

(c) Has the US stock market out- or under-performed the rest of the WORLD in any of these periods? *Why or why not? Be as explicit as possible.*

13. Warren Buffett, the CEO and major shareholder in Berkshire Hathaway is often cited as evidence that the stock market cannot be efficient (after all, how could he be worth billions of dollars from investing in listed stocks if there were not many profit opportunities out there?) The *Eviews* output below shows regressions of the monthly returns to Berkshire Hathaway stock minus the Treasury bill yield (WB) against the return to the CRSP value-weighted portfolio of NYSE and Amex-listed stocks minus the Treasury bill yield (RP) for 1984-93, 1984-88, and 1989-93.

(a) Based on this evidence, does it look like Mr. Buffett has indeed outperformed the market? *Why or why not?*

(b) What model of equilibrium expected returns is being used as a benchmark in judging the performance of these funds? *Explain*

(c) How well diversified is the Berkshire Hathaway portfolio?

(d) Has Mr. Buffett followed a consistent policy in selecting the riskiness of the stocks in his portfolio?

(e) The *Eviews* output below shows the regressions of WB against RP and a variable that is equal to RP when RP is positive, which is zero otherwise, ($DRP = RP$, if $RP > 0$; $DRP = 0$, if $RP < 0$) for 1984-93. Does it look like Mr. Buffett has any "market timing" ability? *Explain.*