Final Exam Spring 2003

Name: _____   Result: _____
                                                       Total: 40 points: ____40

Instructions: This test has 35 questions. You can use a calculator and a "cheat sheet". Each question may have multiple parts that are related. Answer all questions on the test. Use the blank, reverse pages if necessary. Please make every effort to write your solutions in a neat and legible manner - it enhances your chance of partial credit in case of error! The test is three (3) hours long and is out of 40 points. Use bullet points for the "discuss-questions" and briefly explain the bullet points … don't write novels or books, the TA and I seriously appreciate it !

Good Luck !

1. (1 p) Three years ago you purchased a bond for $974.69. The bond had three years to maturity, a coupon rate of 8%, paid annually, and a face value of $1,000. Each year you reinvested all coupon interest at the prevailing reinvestment rate shown in the table below. Today is the bond's maturity date. What is your realized compound yield on the bond?

    Time Prevailing   Reinvestment Rate

    0 (purchase date) 6.0%
    1   7.2%
    2   9.4%
    3 (maturity date) 8.2%

    A)   6.43%
    B)   7.96%
    C)   8.23%
    D)   8.97%
    E)   9.13%

    Ans: D

2. (1 p) Consider a 5-year bond with a 10% coupon that has a present yield to maturity of 8%. If interest rates remain constant, one year from now the price of this bond will be _____.
    A)   higher
    B)   lower
    C)   the same

D)   cannot be determined

E) $1,000

Ans: B

3.   (0.5 p) A bond will sell at a discount when _____.

A)   the coupon rate is greater than the current yield and the current yield is greater than yield to maturity

B)   the coupon rate is greater than yield to maturity

C)   the coupon rate is less than the current yield and the current yield is greater than the yield to maturity

D)   the coupon rate is less than the current yield and the current yield is less than yield to maturity

E)   none of the above are true.

Ans: D

4.   (1 p) You purchased an annual interest coupon bond one year ago with 6 years remaining to maturity at the time of purchase. The coupon interest rate is 10% and par value is $1,000. At the time you purchased the bond, the yield to maturity was 8%. If you sold the bond after receiving the first interest payment and the bond's yield to maturity had changed to 7%, your annual total rate of return on holding the bond for that year would have been _____.

A)   7.00%

B)   8.00%

C)   9.95%

D)   11.95%

E)   none of the above

Ans: D

5.   (0.5 p) Which of the following combinations will result in a sharply increasing yield curve?

A)   increasing expected short rates and increasing liquidity premiums

B)   decreasing expected short rates and increasing liquidity premiums

C)   increasing expected short rates and decreasing liquidity premiums

D)   increasing expected short rates and constant liquidity premiums

E)   constant expected short rates and increasing liquidity premiums

Ans: A

6. (1 p) Given the yield on a 3 year zero-coupon bond is 7.2% and the spot rates of 6.1% for year 1 and 6.9% for year 2, what must be the forward rate in year 3?
   A) 7.2%
   B) 8.6%
   C) 6.1%
   D) 6.9%
   E) none of the above.

   Ans: B

7. (1 p) If the rates don't change, e.g. 2 yr becomes 1 yr, what should the purchase price of a 2-year zero coupon bond be if it is purchased at the beginning of year 2 and has face value of $1,000?

   Year 1-Year Forward Rate
   1   5.8%
   2   6.4%
   3   7.1%
   4   7.3%
   5   7.4%

   A) $877.54
   B) $888.33
   C) $883.32
   D) $893.36
   E) $871.80

   Ans: A

8. (0.5 p) The concepts of spot and forward rates are most closely associated with which one of the following explanations of the term structure of interest rates.
   A) Segmented Market theory
   B) Expectations Hypothesis
   C) Preferred Habitat Hypothesis
   D) Liquidity Premium theory
   E) None of the above

   Ans: B

9. (2 p) Answer the following questions that relate to bonds.
   - A 2-year zero-coupon bond is selling for $890.00. What is the yield to maturity of this bond?

- The price of a 1-year zero coupon bond is $931.97. What is the yield to maturity of this bond?
- Calculate the forward rate for the second year.
- How can you construct a synthetic one-year forward loan of $ 1'000 (you are agreeing now to loan in one year)? State the strategy and show the corresponding cash flows. Assume that you can purchase and sell fractional portions of bonds. Show all calculations and discuss the meaning of the transactions.

Ans: Calculations are shown in the table below.
- Calculations for YTM of the 2-year zero: N=2, PV=-890.00, PMT=0, FV=1000, i_2=6.0.
- Calculations for YTM of the 1-year zero: N=1, PV=-931.97, PMT=0, FV=1000, i_1=7.3.
- Calculations for f_2 : $(1.06)^2/(1.073) - 1 = .047157502$, f2 = 4.7157502%
- As shown by the calculations below, you purchase enough 2-year zeros to offset the cost of the 1-year zero. At time 1 the 1-year zero matures and you get $1,000. At time 2 the 2-year zeros mature and you have to pay 1.047157502 * $1,000 = $1,047.16. You are effectively borrowing $1,000 a year from now and paying $1,047.16 a year from then. The rate on this forward loan is $1,047.16/$1,000 - 1 = .04716$, which equals the forward rate for the second year (f_2).

Strategy	Cash Flow
Buy a 1-year zero-coupon bond	-$931.97
Sell 1.047157502 2-year zeros	$890.00 * 1.047157502 = $931.97
Net Cash Flow	$0.00

10. (0.5 p) Identify the bond that has the longest duration (no calculations necessary).
    A) 20-year maturity with an 8% coupon.
    B) 20-year maturity with a 12% coupon.
    C) 15-year maturity with a 0% coupon.
    D) 10-year maturity with a 15% coupon.
    E) 12-year maturity with a 12% coupon.

    Ans: C

11. (1 p) Given a stock index with a value of $1,000, an anticipated dividend of $30 and a risk-free rate of 6%, what should be the value of one futures contract on the index?
    A) $943.40
    B) $970.00
    C) $913.40
    D) $915.09
    E) $1000.00

    Ans: C
    [this question has been cancelled as answer is rationally not obvious]

12. (1 p) You purchased a Treasury bond futures contract on the Chicago Board of Trade (CBOT) at a futures price of 96.10. What would your profit (loss) be at maturity if the futures price increased by 2 points?
    A) $2,000 loss
    B) $20 loss
    C) $20 profit
    D) $2,000 profit
    E) None of the above.

    Ans: D

13. (0.5 p) Which one of the following statements regarding "basis" is not true?
    A) the basis is the difference between the futures price and the spot price.
    B) the basis risk is borne by the hedger.
    C) a short hedger suffers losses when the basis decreases.
    D) the basis increases when the futures price increases by more than the spot price.
    E) none of the above.

    Ans: C

14. (1 p) Suppose that the risk-free rates in the United States and in the United Kingdom are 4% and 6%, respectively. The spot exchange rate between the dollar and the pound is $1.60/BP. What should the futures price of the pound for a one-year contract be to prevent arbitrage opportunities, ignoring transactions costs.
    A) $1.60/BP
    B) $1.70/BP
    C) $1.66/Bp
    D) $1.63/BP
    E) $1.57/BP

    Ans: E

15. (0.5 p) Credit risk in the swap market
    A) is extensive.
    B) is limited to the difference between the values of the fixed rate and floating rate obligations.
    C) is equal to the total value of the payments that the floating rate payer was obligated to make.
    D) a and c.
    E) none of the above.

Ans: B

16. (0.5 p) An interest rate floor
   A)   pays the holder in any period that the reference interest rate falls below some limit.
   B)   Is analogous to a sequence of options with the same strike and different maturities.
   C)   is part of a collar.
   D)   both a and b are true.
   E)   all of the above.

   Ans: E

16. (0.5 p) The Jensen portfolio evaluation measure
   A)   is a measure of return per unit of risk, as measured by standard deviation.
   B)   is an absolute measure of return over and above that predicted by the CAPM.
   C)   is a measure of return per unit of risk, as measured by beta.
   D)   a and b.
   E)   b and c.

   Ans: B

17. (1.5 p) The following data are available relating to the performance of Diamond Stock Fund and the market portfolio:

	Fund	Market
Average Return	18%	14%
Standard Deviation of Returns	30%	22%
Beta	1.4	1.0
Residual standard deviation		

   The risk-free return during the sample period was 6%.

   Calculate the M2 measure for the Diamond Fund.

   A)   4.0%
   B)   20.0%
   C)   2.86%
   D)   0.8%
   E)   40.0%

   Ans: D

18. (0.5 p) The M2 measure was developed by
    A) Merton and Miller.
    B) Miller and Miller.
    C) Modigliani and Miller.
    D) Modigliani and Modigliani.
    E) the M&M Mars Company.

    Ans: D

19. (2 p) In a particular year, Wiseguys Mutual Fund earned a return of 15% by making the following investments in the following asset classes

	Weight	Return
Bonds	10%	6%
Stocks	90%	16%

    The return on a benchmark portfolio was 10%, calculated as follows:

	Weight	Return
Bonds (Lehman Brothers Index)	50%	5%
Stocks (S&P 500 Index)	50%	15%

    The contribution of asset allocation across markets to the total excess return was
    A) 1%
    B) 3%
    C) 4%
    D) 5%
    E) none of the above

    Ans: C

20. (0.5 p) The beta of an active portfolio is 1.20. The standard deviation of the returns on the market index is 20%. The nonsystematic variance of the active portfolio is 1%. The standard deviation of the returns on the active portfolio is _____.
    A) 3.84%
    B) 5.84%
    C) 19.60%
    D) 24.17%
    E) 26.0%

    Ans: E

21. (1 p) Discuss marking to market and margin accounts in the futures market.

Ans: When opening an account, the trader establishes a margin account. The margin deposit may be cash or near cash, such as T-bills. Both sides of the contract must post margin. The initial margin is between 5 and 15% of the total value of the contract. The more volatile the asset, the higher the margin requirement. The clearinghouse recognizes profits and losses at the end of each trading day; this daily settlement is marking to market, thus proceeds accrue to the trader's account immediately; maturity date does not govern the realization of profits or losses.

22. (1.5 p) In an increasingly globalized investment environment, comparability problems become even greater. Discuss some of the problems for the investor who wishes to have an internationally diversified portfolio.

Ans: Firms in other countries are not required to prepare financial statement according to U. S. generally accepted accounting principles. Accounting practices in other countries vary from those of the U. S. In some countries, accounting standards may be very lax or virtually nonexistent. Some of the major differences are: reserve practices, many countries allow more discretion in setting aside reserves for future contingencies than is typical in the U. S.; depreciation practices, in the U. S., firms often use accelerated depreciation for tax purposes, and straight line depreciation for accounting purposes, while most other countries do not allow such dual accounts, and finally, the treatment of intangibles varies considerably across countries.
Finally, the problem of obtaining financial information may be considerable for some international investments, varying currency exchange rates present additional complications, translation of statements into English is another complication; potential government expropriation of assets and political unrest may be problems in some countries. In general, for the individual investor, investing in global or international mutual funds is a less risky way to add diversification to the portfolio than is attempting to value individual international securities.

23. (1 p) Discuss rate anticipation swaps as a bond portfolio management strategy.

Ans: Rate anticipation swap is an active bond portfolio management strategy, based on predicting future interest rates. If a portfolio manager believes that interest rates will decline, the manager will swap into bonds of greater duration. Conversely, if the portfolio manager believes that interest rates will increase, the portfolio manager will swap into bonds of shorter duration. This strategy is an active one, resulting in high transactions costs, and the success of this strategy is predicated on the bond portfolio manager's ability to predict correctly interest rate changes consistently over time (a difficult task, indeed).

24. (1.5 p) Discuss contingent immunization. Is this form of bond portfolio management strategy an active, passive, or combination of both, strategy?

Ans: Contingent immunization is portfolio management technique where the portfolio owner is willing to accept an average annual return over a period of time that is lower than that currently available. The portfolio manager may actively manage the portfolio until (if) the portfolio declines in value to the point that the portfolio must be immunized in order to earn the minimum average required return. Thus, the portfolio will be immunized contingent upon reaching that level. If that level is not reached, the portfolio will not be immunized, and the average annual returns will be greater than those required. Thus, this strategy is considered to be a combination active/passive bond portfolio management strategy.

25. (1.5 p) Although the expectations of increases in future interest rates can result in an upward sloping yield curve; an upward sloping yield curve does not in and of itself imply the expectations of higher future interest rates. Explain.

Ans: The effects of possible liquidity premiums confound any simple attempt to extract expectation from the term structure. That is, the upward sloping yield curve may be due to expectations of interest rate increases, or due to the requirement of a liquidity premium, or both. The liquidity premium could more than offset expectations of decreased interest rates, and an upward sloping yield would result.

26. (1.5 p) Discuss the three theories of the term structure of interest rates. Include in your discussion the differences in the theories, and the advantages/disadvantages of each.

Ans: The expectations hypothesis is the most commonly accepted theory of term structure. The theory states that the forward rate equals the market consensus expectation of future short-term rates. Thus, yield to maturity is determined solely by current and expected future one-period interest rates. An upward sloping, or normal, yield curve would indicate that investors anticipate an increase in interest rates. An inverted, or downward sloping, yield curve would indicate an expectation of decreased interest rates. A horizontal yield curve would indicate an expectation of no interest rate changes.
The liquidity preference theory of term structure maintains that short-term investors dominate the market; thus, in general, the forward rate exceeds the expected short-term rate. In other words, investors prefer to be liquid to illiquid, all else equal, and will demand a liquidity premium in order to go long term. Thus, liquidity preference readily explains the upward sloping, or normal, yield curve. However, liquidity preference does not readily explain other yield curve shapes.
Market segmentation and preferred habitat theories indicate that the markets for different maturity debt instruments are segmented. Market segmentation maintains that the rates for the different maturities are determined by the intersection of the supply and demand curves for the different maturity instruments. Market segmentation readily explains all shapes of yield curves. However, market segmentation is not observed in the real world. Investors and issuers will leave their preferred maturity habitats if yields are attractive enough on other maturities.

27. (2 p) Discuss the M2 measure of performance by answering the following questions. Why is M2 better than the Sharpe measure? What measure of risk does M2 use? How do you construct a managed portfolio, P, to use in computing the M2 measure? What is the formula for M2 ? Draw a graph that shows how M2 would be measured. Be sure to label the axes and all relevant points.

Ans: The Sharpe measure indicates whether a portfolio underperformed the market index, but the difference between the market's Sharpe measure and the portfolio's Sharpe measure is difficult to interpret. M2 uses the same measure of risk as the Sharpe measure – variation in total return, calculated as the standard deviation. For managed portfolio P an adjusted portfolio P* is formed by combining P with borrowing or lending at the risk-free rate to the point where P* has the same volatility as a market index (M). Then since M and P have the same standard deviation they can be directly compared using the M2 measure. M2 = rP* - rM. If P* outperforms M the measure will be positive, which means the CAL on which P* lies will have a steeper slope than the CML on which M lies. M2 is the distance between the CAL and the CML.
The graph should look like the one in Figure 24.2 on page 814.

28. (1.5 p) Discuss some of the factors that might be included in a multifactor model of security returns in an international application of arbitrage pricing theory (APT).

Ans: Some of the factors that might be considered in a multifactor international APT model are:
(A) A world stock index
(B) A national (domestic) stock index
(C) Industrial/sector indexes
(D) Currency movements.
Studies have indicated that domestic factors appear to be the dominant influence on stock returns. However, there is clear evidence of a world market factor during the market crash of October 1987.

29. (1.5 p) Why are many bonds callable? What is the disadvantage to the investor of a callable bond? What does the investor receive in exchange for a bond being callable? How are bond valuation calculations affected if bonds are callable?

Ans: Many bonds are callable to give the issuer the option of calling the bond in and refunding (reissuing) the bond if interest rates decline. Bonds issued in a high interest rate environment will have the call feature. Interest rates must decline enough to offset the cost of floating a new issue. The disadvantage to the investor is that the investor will not receive that long stream of constant income that the bondholder would have received with a noncallable bond. In return, the yields on callable bonds are usually slightly higher than

the yields on noncallable bonds of equivalent risk. When the bond is called, the investor receives the call price (an amount greater than par value). The bond valuation calculation should include the call price rather than the par value as the final amount received; also, only the cash flows until the first call should be discounted. The result is that the investor should be looking at yield to first call, not yield to maturity, for callable bonds.

30. (1.5 p) Discuss some of the accounting comparability problems involved in international investing.

Ans: Some of the major accounting comparability problems in international investing are:
(A) Depreciation. The U. S. allows firms to use different depreciation methods for financial reporting and tax purposes. The use of dual statements is uncommon in other countries.
(B) Reserves. U. S. standards generally allow lower discretionary reserves for possible losses, resulting in higher reported earnings than other countries.
(C) Consolidation. Accounting practices in some countries do not call for all subsidiaries to be consolidated in the corporation's income statement.
(D) Taxes. Taxes may be reported as either paid or accrued.
(E) P/E ratios. There may different practices for calculating the number of shares used to calculate the P/E ratios. For example, firms may use end-of-year shares, year-average shares, or beginning-of-year shares.

31. (1.5 p) Discuss performance evaluation of international portfolio managers in terms of potential sources of abnormal returns.

Ans: The following factors may be measured to determine the performance of an international portfolio manager.
(A) Currency selection: a benchmark might be the weighted average of the currency appreciation of the currencies represented in the EAFE portfolio.
(B) Country selection measures the contribution to performance attributable to investing in the better-performing stock markets of the world. Country selection can be measured as the weighted average of the equity index returns of each country using as weights the share of the manager's portfolio in each country.
(C) Stock selection ability may be measured as the weighted average of equity returns in excess of the equity index in each country.
(D) Cash/bond selection may be measured as the excess return derived from weighting bonds and bills differently from some benchmark weights.

32. (2 p) Aunt Gunda holds her portfolio 100% in U.S. securities. She tells you that she believes foreign investing can be extremely hazardous to her portfolio. She's not sure about the details, but has "heard some things". Discuss this idea with Aunt Gunda by

listing three objections you have heard from your clients who have similar fears. Explain each of the objections is subject to faulty reasoning.

Ans: A few of the factors students may mention are
- Client: "The U.S. markets have done extremely well in the past few years, so I should stay 100% invested in them." Your Reply: You can explain that there are other times when foreign markets have beat the U.S. substantially in performance. You can't tell easily beforehand what markets will do the best. It is important to consider that there are many times when countries' markets move in different directions and you can buffer your risk to some extent by investing globally.
- Client: "You should keep your money at home." Your Reply: Don't confuse familiarity with good portfolio management. Even though there is a lot of information available on U.S. companies, it can be difficult to use the information to make good forecasts. Most professional managers aren't even good at this.
- Client: "There's too much currency risk." Your Reply: It is true that there may be times when both a security's value in its own currency and the currency exchange rate may lead to poor returns. But the opposite is also true. And there are cases when security price movements and currency movements will have opposite impacts on your portfolio's return. This may have a smoothing effect on your portfolio.
- Client: "Invest with the best." Your Reply: Even if U.S. markets have been the best performers in recent periods there is no guarantee that things will stay that way. If you diversify internationally you will benefit when other markets take the lead.

33. (1.5 p) Define and discuss the Sharpe, Treynor, and Jensen measures of portfolio performance evaluation, and the situations in which each measure is the most appropriate measure.

Ans: Sharpe's measure, $(r_P - r_f)/s_P$, is a relative measure of the average portfolio return in excess of the average risk-free return over a period time per unit of risk, as measured by the standard deviation of the returns of the portfolio over that time period.
Treynor's measure, $(r_P - r_f)/b_P$, is a relative measure of the average portfolio return in excess of the average risk-free return over a period of time per unit of risk, as measured by the beta of the portfolio over that time period.

Jensen's measure, $a_P = r_P - [r_f + b_P(r_M - r_f)]$, is a measure of absolute return (average return on the portfolio over a period of time) over and above that predicted by the CAPM.

As the risk measure in the Sharpe measure of portfolio performance evaluation is total risk, this measure is appropriate for portfolio performance evaluation if the portfolio being evaluated represents the investor's complete portfolio of assets.

As the risk measure in the Treynor measure of portfolio performance evaluation is beta, or systematic risk, this measure is the appropriate portfolio performance evaluation measure if the portfolio being evaluated is only a small part of a large investment portfolio. This

measure is also appropriate for evaluation of managers of "subportfolios" of large funds, such as large pension plans.

As the Jensen measure, or Jensen's alpha, measures the return of a portfolio relative to that predicted by the CAPM, this measure is appropriate for the evaluation of managers of "subportfolios" of large funds. However, the Treynor measure is an even better measure for such a scenario.

34. (1 p) Explain why mean-variance analysis is inadequate for valuing market timing.

Ans: The mean-variance approach relies on those two statistics to determine whether a portfolio earned an appropriate return relative to other portfolios. But when dealing with a perfect market timer the standard deviation is not relevant. The perfect timer will move in and out of the market as appropriate to earn the most favorable rate of return. Even when the market is riskier, as measured by standard deviation, it will be appropriate to be in the market if the returns are suitable. The other factor that is involved is skewness. A perfect market timer works with portfolios that are not normally distributed, but are skewed to the right. The skewness parameter is not incorporated into mean-variance analysis.

35. (1 p) What is an Exchange-traded fund? Give two examples of specific ETFs. What are some advantages they have over ordinary open-end mutual funds? What are some disadvantages?

Ans: ETFs allow investors to trade index portfolios. Some examples are spiders (SPDR), which track the S&P500 index, diamonds (DIA), which track the Dow Jones Industrial Average, and qubes (QQQ), which track the Nasdaq 100 index. Other examples are listed in Table 4-3, page 117. (It is anticipated that there may soon be ETFs that track actively managed funds as well ad the current ones that track indexes.)

Advantages -
1. ETFs may be bought and sold during the trading day at prices that reflect the current value of the underlying index. This is different from ordinary open-end mutual funds, which are bought or sold only at the end of the day NAV.
2. ETFs can be sold short.
3. ETFs can be purchased on margin.
4. ETFs may have tax advantages. Managers are not forced to sell securities from a portfolio to meet redemption demands, as they would be with open-end funds. Small investors simply sell their ETF shares to other traders without affecting the composition of the underlying portfolio. Institutional investors who want to sell their shares receive shares of stock in the underlying portfolio.
5. ETFs may be cheaper to buy than mutual funds because they are purchased from brokers. The fund doesn't have to incur the costs of marketing itself, so the investor incurs lower management fees.

Disadvantages -

1. ETF prices can differ from NAV by small amounts because of the way they trade. This can lead to arbitrage opportunities for large traders.

2. ETFs must be purchased from brokers for a fee. This makes them more expensive than mutual funds that can be purchased at NAV.