Econ 156
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Final Examination Answers

1. The Efficient Market Hypothesis is that one cannot consistently realize above-average risk-adjusted returns because all available information is already taken into account by investors and consequently already reflected in the market price. It could still be the case that, because of their differing interpretations of available information, investors disagree about whether a stock is too cheap or too expensive at the current market price. While the current market price represents a balance between bulls and bears, there are inevitably bulls who are buying the stock from bears who are selling.

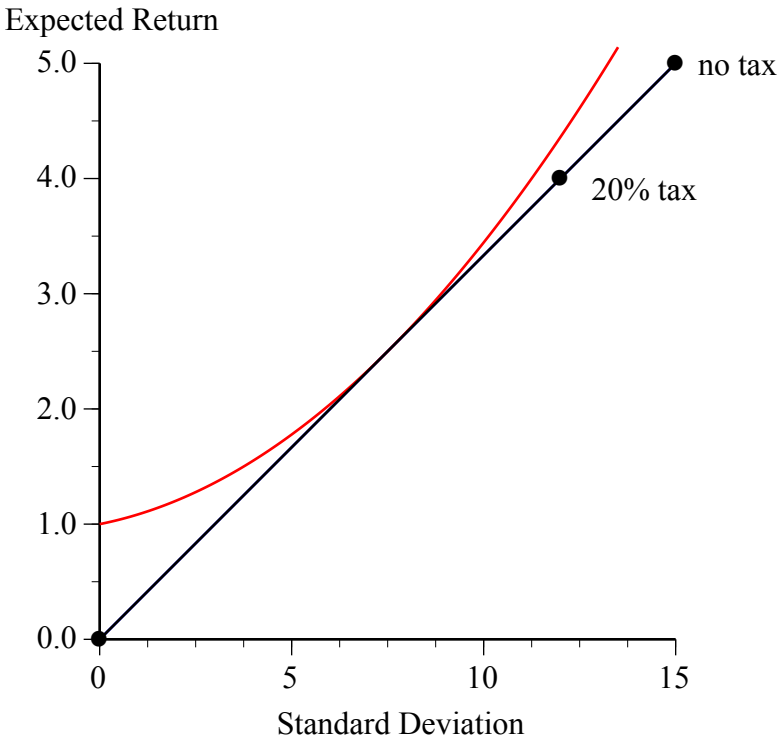
2. a. Duration gauges a bond's sensitivity to interest rate changes. Specifically, the percentage decline in a bond's price that accompanies a one-percentage-point increase in interest rates is approximately equal to the bond's duration.
   b. substantial interest rate declines.

3. a. The fall in long-term interest rates increased bond prices and also had a positive effect on stock prices, which was more than offset by the collapsing economy. So, bond prices went up, while stock prices went down.
   b. Short-term rates fell to near zero as the Fed tried to keep the Great Recession from turning into the Great Depression. The term structure is now strongly upward sloping because investors expect the economy to improve and the Fed to allow short-term interest rates to rise to keep inflation in check (and/or increased inflationary pressures will push short-term rates up.

4. I don't like gold because it has no cash flow. Here is what Buffett said in a 1998 speech at Harvard University: "It [gold] gets dug out of the ground in Africa, or someplace. Then we melt it down, dig another hole, bury it again and pay people to stand around guarding it. It has no utility. Anyone watching from Mars would be scratching their head."

5. a. 0%
   b. (20%)(0.5) + (-10%)(0.5) = 5%
   c. (0%)(0.5) + (5%)(0.5) = 2.5%
   d. 0%
   e. The variance is $(20\% - 5\%)^2(0.5) + (-10\% - 5\%)^2(0.5) = 15\%^2$. The standard deviation is 15%.
   f. (0%)(0.5) + (15%)(0.5) = 7.5%

6. The return on the first asset continues to have an expected value of 0% and a standard deviation of 0%. The return on the second asset now has an expected value of 4% and a standard deviation of 12%. The opportunity locus shrinks toward the origin. If the investor had a tangency before with a 50-50 division, the investor will continue to have a tangency at an expected return of 2.5% and a standard deviation of 7.5%, with a larger fraction of the portfolio invested in the risky asset (62.5% instead of 50%).



7. [August 31, 2010 Annual Report of the Templeton Emerging Markets Income Fund] Their answer "their risk of loss is limited to the premiums paid for the option."

8. a. Idiosyncratic risks are risks specific to an investment that can be diversified away, for example, whether a technology company's patent infringement lawsuit will be successful, or whether a pharmaceutical company's drug application will be approved by the FDA.
   b. If most of the investments' risks are idiosyncratic, a well-diversified portfolio might have little overall risk. Or perhaps this manager feels that the fund can analyze idiosyncratic uncertainties better than macroeconomic uncertainties like interest rates and the overall economic outlook.

9. a. Because a bank that needs Australian dollars cannot borrow from other Australian banks, we can expect that it has to pay a premium in order to borrow from other institutions that have surplus Australian dollars. On November 19, 2010, the Australian overnight LIBOR rate was 4.75% and the U.S. overnight LIBOR rate was 0.23%.
   b. An Australian bank could borrow or lend U.S. dollars and then use a currency swap to convert this loan into effectively an AUD loan. For example, an Australian bank could borrow $100 million in the U.S. LIBOR market and then enter into a currency swap in which it agrees to pay Australian dollars in return for being paid enough U.S. dollars to repay its LIBOR loan.

10. The Capital Asset Pricing Model assumes that investors are using mean-variance analysis and gauging risk by the standard deviation of their portfolio return. The insight provided by CAPM is that a well-diversified portfolio will eliminate idiosyncratic risk, leaving only systematic risk—which is measured by beta coefficients.

11. a. If the stock price rises, then the owner of the convertible bonds will get stock that is more valuable than the price they paid to the company (or the value of the company's bonds that are extinguished by the conversion), thereby hurting the existing shareholders.

b. To protect existing shareholders against the dilution if the price of Swiss Re stock rises, they should buy calls, which become increasingly valuable as the stock price rises (and this is, in fact, what they did.)

12. The table:

year	assets at the beginning of year ($)	profits during year ($)	dividends paid at end of year ($)
1	100	30	0
2	130	39	0
3	169	16.9	16.9
4	169	16.9	16.9

b. The value of the firm is the dividends discounted by the stockholders' 10% required return:

$$P = \frac{16.9}{1.10^3} + \frac{16.9}{1.10^4} + \ldots = \frac{1}{1.10^2}\left(\frac{16.9}{1.10^1} + \frac{16.9}{1.10^2} + \ldots\right) = \frac{1}{1.10^2}\left(\frac{16.9}{0.10}\right) = 139.67$$

13. Not surprisingly, it gives the same answer as the dividend-discount model:

$$V = 100 + \frac{30 - 0.10(100)}{1.10^1} + \frac{39 - 0.10(130)}{1.10^2} + \frac{16.9 - 0.10(169)}{1.10^3} + \frac{16.9 - 0.10(169)}{1.10^4} + \ldots$$
$$= 100 + \frac{20}{1.10^1} + \frac{26}{1.10^2} = 139.67$$

14. A drop in interest rates will increase the current market value of the assets, but for horizons beyond 8 years, the reduced earnings on the reinvested cash flow will more than offset the increased market value—causing the portfolios value at the end of 40 years to be lower than it would have been if interest had not declined.

15. According to CAPM, zero-beta stocks have an expected return equal to the return on the safe asset

16. Let's call the stock on the left A and the stock on the right B.
    a. Looking at the heights of the data, B had the higher average return.
    b. Looking at the dispersion in the heights of the data, B had the higher standard deviation.
    c. Looking at the slope of a line fit to the data, B had the higher beta coefficient.
    d. Looking at how close the points are to a line fit to the data, B had the higher R-squared.

17. [James R. Hagerty, "For These Mortgages, Downside Comes Later," The Wall Street Journal, October 5, 2004]

a. $X = \left(\frac{0.04}{12}\right)\$350{,}000$

b. $$\$350{,}000 = \sum_{t=1}^{20(12)} \frac{X}{(1+0.04/12)^t} = \frac{X}{R/12}\left(1 - \frac{1}{(1+0.04/12)^{20(12)}}\right) \Rightarrow X = \frac{\$350{,}000\left(\frac{0.04}{12}\right)}{\left(1 - \frac{1}{(1+0.04/12)^{20(12)}}\right)}$$

c. $$\$350{,}000 = \sum_{t=1}^{30(12)} \frac{X}{(1+0.04/12)^t} = \frac{X}{R/12}\left(1 - \frac{1}{(1+0.04/12)^{30(12)}}\right) \Rightarrow X = \frac{\$350{,}000\left(\frac{0.04}{12}\right)}{\left(1 - \frac{1}{(1+0.04/12)^{30(12)}}\right)}$$

(a) is smaller than (c) because (a) is interest only and (c) includes principal repayments; (b) is larger than (c) because the loan is amortized over 20 rather than 30 years. The relevant question is whether one wants to pay off a 4% loan, or use money borrowed at 4% to make investments. If one can make more than 4% and the client expected their income to be high enough 10 years from now to make the higher mortgage payments, I would advise taking the interest-only loan.

18. The Markowitz Frontier describes opportunities not preferences. It is not true that, "Investments above the curve have too much risk." Investments above the curve are not possible, as the curve gives those portfolios that have the maximum expected return for any given level of risk.

19. The total value is initially (10 million)($20) = $200 million. The company receives $10 million from the CEO and spends $20 million repurchasing shares. Its total assets drop to $190 million and its value per share falls to ($190 million)/(10 million) = $19.

20. 1,407,550 pennies divided by 34 years is $413.98 per year. The future value is

$$F = \$413.98(1.10^{33}) + \$413.98(1.10^{32}) + \ldots + \$413.98 = \$101{,}622.44$$

Alternatively, the present value is

$$F = \frac{\$413.98}{1.10^{1}} + \frac{\$413.98}{1.10^{2}} + \ldots + \frac{\$413.98}{1.10^{34}} = \$3{,}977.76$$

The future value is $\$3{,}977.76(1.10^{34}) = \$101{,}622.44$.