

KEY

FINC 512 – Spring 2013 – Final Exam – You must show all your work on the problems to receive credit.
Also, remember to be complete in your responses to any essays.

Consider the following scenario analysis:

State	Probability	PG	ARK
Boom	29%	27.3%	68.4%
Bust	20%	-19.6%	-70.1%
Normal	51%	5.1%	8.2%

Calculate the covariance between PG and ARK.

$$E(R)_{PG} = .29(.273) + .20(-.196) + .51(.051) = 6.6\%$$

$$E(R)_{ARK} = .29(.684) + .20(-.701) + .51(.082) = 10\%$$

$$\begin{aligned} \sigma_{PG}^2 &= (.273 - .066)^2 \cdot .29 = .01243 \\ &+ (-.196 - .066)^2 \cdot .20 = -.01373 \\ &+ (.051 - .066)^2 \cdot .51 = .00011 \\ &= .02677 \end{aligned}$$

$$\begin{aligned} \sigma_{ARK}^2 &= (.684 - .10)^2 \cdot .29 = .09891 \\ &+ (-.701 - .10)^2 \cdot .20 = .12832 \\ &+ (.082 - .10)^2 \cdot .51 = .00017 \\ &= .22739 \end{aligned}$$

$$\sigma_{PG} = \sqrt{.02677} = 16.21\%$$

$$\sigma_{ARK} = \sqrt{.22739} = 47.69\%$$

State	Pr	PG der	ARK der	Product	Weighted Product
Bo	29%	20.70	58.40	1209.42	350.62
Bst	20%	-26.20	-80.10	2098.41	419.68
Normal	51%	8.2	-1.80	2.69	1.37

$$\boxed{771.7}$$

→ covariance

$$\rho = \frac{92.25}{(21.22)(17.31)} = 0.25 \quad \text{if } \rho = 1 \dots \sigma_P = \frac{60}{95}(21.22) + \frac{35}{95}(17.31) = 19.78\%$$

Consider the following scenario analysis:

State	Probability	KKD	TGT
Great	12%	49.4%	-5%
Above Average	34%	11%	27.3%
Average	30%	-3.9%	19.9%
Awful	24%	-22.5%	-14.4%

The covariance between KKD and TGT is 92.25. What is the correlation coefficient between KKD and TGT? Also, if you have a \$95,000 portfolio and you invest \$60,000 into KKD and the rest into TGT, then what is your diversification benefit?

$$E(R)_{KKD} = .12(.494) + .34(.11) + .30(-.039) + .24(-.225) = 3.1\%$$

$$E(R)_{TGT} = .12(-.05) + .34(.273) + .30(.199) + .24(-.144) = 11.24\%$$

$$\sigma_{KKD}^2 = (.494 - .031)^2 \cdot .12 = .02572$$

$$(-.11 - .031)^2 \cdot .34 = .00212$$

$$(-.039 - .031)^2 \cdot .30 = .00147$$

$$(-.225 - .031)^2 \cdot .24 = .01573$$

$$.04505 \quad \sigma = 21.22\%$$

$$\sigma_{TGT}^2 = (-.05 - .112)^2 \cdot .12 = .00315$$

$$(.273 - .112)^2 \cdot .34 = .00882$$

$$(.199 - .112)^2 \cdot .30 = .00227$$

$$(-.144 - .112)^2 \cdot .24 = .01572$$

$$.02996$$

Suppose the market portfolio has a risk premium of 7%, a standard deviation of 27%, and a return of 11.2%. How would an investor's coefficient of risk aversion change if everything remained the same, but the standard deviation increased to 30%? How would you explain this result?

Use risk aversion formula presented in class

$$E(R)_P - R_F = \frac{1}{2} A \sigma_P^2$$

$$.07 = \frac{1}{2} A (-.27)^2$$

$$.07 = .0365 A \quad A = 1.92$$

$$.07 = \frac{1}{2} A (.30)^2$$

$$.07 = .045 A \quad A = 1.56$$

investor is taking $\uparrow$ risk for same return
= less risk averse

KEY

Please explain how VaR is helpful in the investment analysis and portfolio construction process.

VaR = worst-case scenario analysis

i.e. 5% VaR = portfolio return is expected to be at this return or lower only 5% of the time.

∴ very useful for a risk averse investor to control extreme downside risk.

Compute the duration for a 3 year bond that pays a 7% semiannual coupon and currently carries a YTM of 5.34%.

Time	CF	PV	Weight	Weighted Time
0.5	35	$= 35 / 1.0267 = 34.09$	.0326	.0163
1	35	$= 35 / (1.0267)^2 = 33.20$	.0318	.0318
1.5	35	$= 35 / (1.0267)^3 = 32.34$	.0309	.0464
2	35	$= 35 / (1.0267)^4 = 31.50$	.0301	.0603
2.5	35	$= 35 / (1.0267)^5 = 30.68$	.0293	.0734
3	1035	$= 1035 / (1.0267)^6 = 883.65$	.8452	2.5357

If interest rates were to suddenly fall by 20bp, then how much would the price of the bond from the previous bond change?

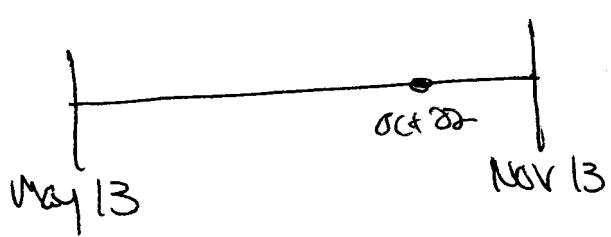
2.7643

$$\Delta P = - \left(\frac{2.76}{1.0534} \right) (-0.0020) (1045.46) = \$5.48$$

there are $\frac{22}{184}$ days left = 1196 until maturity

Today is October 22 and a bond investor currently holds a bond that is set to mature on November 13 of this year. This bond pays a 4.25% semiannual coupon and its yield to maturity is 4.77%. If this bond investor sold her bond today, then how much would she receive for that sale?

$+ 18.71$
 $= \$1018.40$



PV ? = 999.69
 FV 1000
 I 4.77/2
 PMT 21.25
 N 1196

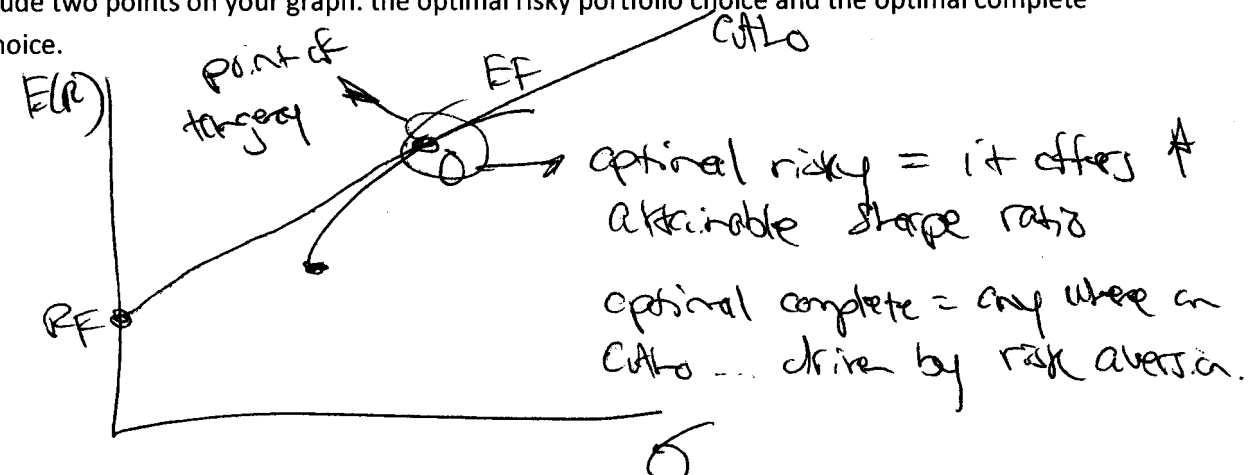
May = 18 Sept = 30
 Jun = 30 Oct = 31
 Jul = 31 Nov = 13
 Aug = 31

184d

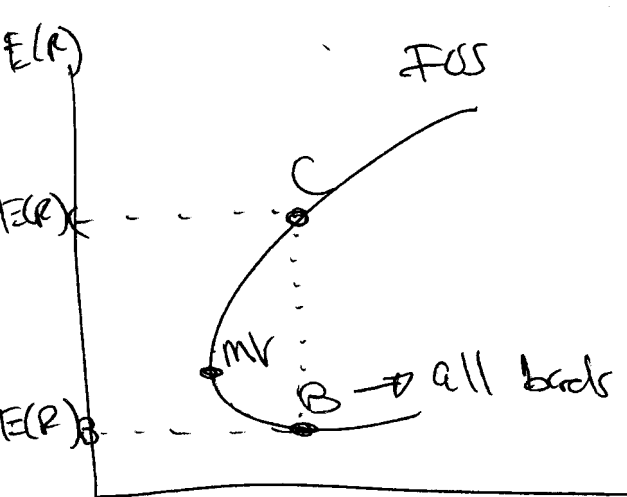
held for
 18 + 30 + 31 + 31 + 30 + 22 = 162d.

$\frac{162d}{184d} = .8804 \rightarrow \times 21.25$ Accrued
 $= \$18.71$ Int.

Please graphically show the relationship between the efficient frontier and the best possible CAL. Be sure to include two points on your graph: the optimal risky portfolio choice and the optimal complete portfolio choice.



Why does the investment opportunity set suggest that an all bond portfolio is dominated?



All bonds is inferior to both MV (lower risk + higher return) & C (same risk + higher return)
 risk reduction & ↑ returns happens when you move away from 100% B b/c of b/n stocks/bonds is $ret^4 + 1$
 $\therefore$ some D.B + $E(R)_S > E(R)_B$

Please explain what it means if the stock market is "semi-strong form efficient." What does this say about all of the financial experts and analysts we see on TV all the time? According to what you read, please explain three of the 'anomalies' to this level of efficiency.

SSF = cannot earn AR from any publicly available information

∴ Outside of diversification / basic understanding of investments, financial media is not too useful
= they will not help you "beat" the stock mkt

Multiple Choice Questions

1. What is the minimum tick movement in the gold market?
A. \$0.01
☒ B. \$0.10
C. \$0.25
D. \$1.00
2. How many barrels of oil are in each contract?
A. 100
B. 500
☒ C. 1,000
D. 5,000
3. Bonds rated _____ or better by Standard and Poor's are considered investment grade.
A. AA
☒ B. BBB
C. BB
D. CCC
4. As a result of bond convexity an increase in a bond's price when yield to maturity falls is _____ the price decrease resulting from an increase in yield of equal magnitude.
☒ A. greater than

- B. equivalent to
C. smaller than
D. The answer is indeterminate.
5. All other things equal, a bond's duration is _____.
A. higher when the coupon rate is higher
B. lower when the coupon rate is higher
C. the same when the coupon rate is higher
D. indeterminate when the coupon rate is high
6. A bond currently has a price of \$1,050. The yield on the bond is 6.00%. If the yield increases 25 basis points, the price of the bond will go down to \$1,030. The duration of this bond is _____ years.
A. 7.46
B. 8.08
C. 9.02
D. 10.11
7. Asset A has an expected return of 15% and a reward-to-variability ratio of .4. Asset B has an expected return of 20% and a reward-to-variability ratio of .3. A risk-averse investor would prefer a portfolio using the risk-free asset and _____.
A. asset A
B. asset B
C. no risky asset
D. can't tell from the data given
8. Diversification is most effective when security returns are _____.
A. high
B. negatively correlated
C. positively correlated
D. uncorrelated
9. You put half of your money in a stock portfolio that has an expected return of 14% and a standard deviation of 24%. You put the rest of your money in a risky bond portfolio that has an expected return of 6% and a standard deviation of 12%. The stock and bond portfolio have a correlation 0.55. The standard deviation of the resulting portfolio will be _____.
A. more than 18% but less than 24%
B. equal to 18%
C. more than 12% but less than 18%
D. equal to 12%
10. The geometric average of -12%, 20% and 25% is _____.
A. 8.42%
B. 11.00%
C. 9.70%
D. 18.88%
11. The return on the risky portfolio is 15%. The risk-free rate as well as the investor's borrowing rate is 3%. The standard deviation of return on the risky portfolio is 32%. If the standard

$$D = - \frac{1}{1+y} \Delta P$$

$$-20 = - \frac{1}{1.06} (-0.025)(1050)$$

$$\sigma_p^2 = \left[(.5)(.24) \right]^2 + \left[(.5)(.12) \right]^2 + 2(.5)(.5)(.24)(.12)(.55)$$

$$= .0144 + .0036 + .0079 = .0259$$

$$\sigma = 16.11\%$$

$$(.88)(1.2)(1.25) = (1.09)^3$$

deviation on the complete portfolio is 25%, the expected return on the complete portfolio is _____.

A. 6.00%

B. 8.74 %

☒ C. 12.38%

D. 16.25%

$$\sigma_C = y\sigma_P + (1-y)\sigma_{RF} \quad E(R)_C = (.7813)(.15) + (.2187)(.03)$$

~~Sc~~

$$.25 = y \cdot .32 \quad \therefore y = .7813\%$$

$$= .1172 + .0066$$

12. Even risk averse investors would prefer which of the following to be large and positive...

A. standard deviation

☒ B. skew

C. kurtosis

D. a risk averse investor would not want any of these to be large and positive

13. Random price movements indicate _____.

A. irrational markets

B. that prices cannot equal fundamental values

C. that technical analysis to uncover trends can be quite useful

☒ D. that markets are functioning efficiently

14. Evidence suggests that there may be _____ momentum and _____ mean reversion patterns in stock price behavior.

A. short-run, short-run

B. long-run, long-run

C. long-run, short-run

☒ D. short-run, long run

15. Most people would readily agree that the stock market is not _____.

A. weak form efficient

B. semi-strong form efficient

☒ C. strong form efficient

D. efficient at all