

Problem Set

PROBLEM SET: Performance (2)

Exercise 1.

A study of mutual fund management performance found that some funds earned rates of return greater than that of a broadly based market index and some earned less. The authors of the study concluded that some funds are able to "beat the market" with astute security selection while others seem to know less than the proverbial dart flying at the *Wall Street Journal*.

1. Are the authors justified in their conclusion? What might account for observed differences between rates of return? What additional information would you need to have before concluding that the high-return funds were actually better managed than the low-return funds?
2. Discuss how data on mutual fund performance can be used to test the efficient market hypothesis. For what form of the hypothesis is this data relevant?

Exercise 2.

You are given the following set of excess returns (return in excess of the risk free rate)

	Portfolio p	Market m
\bar{r}	35%	28%
β	1.2	1
σ	42%	30%

1. Calculate the Sharpe, Treynor and Jensen performance measures.

Exercise 3.

Sharpe [4]

1. What is the Sharpe Ratio?
2. How is it calculated?
3. Consider the following two investment opportunities

Investment:	A	B
Expected return	10%	12.5%
Standard Deviation	12.5%	15%
Sharpe Ratio	0.8	0.83

If this is your only investment opportunity, and you had to choose between these two assets, which asset would you choose?

Exercise 4.

You are given the historical percentage excess returns (returns in excess of the risk free rate) for 2 portfolios, P, Q and a benchmark M .

time	$r_P - r_f$	$r_Q - r_f$	$r_M - r_f$	
1	3.58	2.81	2.2	0
2	-4.91	-1.15	-8.41	
3	6.51	2.53	3.27	
4	11.13	37.09	14.41	
5	8.78	12.88	7.71	
6	9.38	39.08	14.36	
7	-3.66	-8.84	-6.15	
8	5.56	0.83	2.74	
9	-7.72	0.85	-15.27	
10	7.76	12.09	6.49	
11	-4.01	-5.68	-3.13	
12	0.78	-1.77	1.41	

1. Calculate the Sharpe ratio and plot the three portfolios in a diagram.
2. Calculate the Treynor ratio and plot the three portfolios in a diagram.
3. Calculate the Jensen alpha.
4. Calculate the Appraisal ratio.
5. Calculate the M^2 measure relative to the benchmark portfolio M .

Exercise 5.

Given the following data:

	P	m
Average return	35%	28%
Beta	1.2	1
Standard Deviation	42%	30%
Nonsystematic risk ($\sigma(e)$)	18%	0

The T-bill rate during the period was 6%.

1. Calculate the M^2 measure for the portfolio P .

Exercise 6.

Sharpe [4]

1. What is the Sharpe Ratio?
2. How is it calculated?
3. Consider the following two investment opportunities

Investment:	A	B
Expected return	10%	12.5%
Standard Deviation	12.5%	15%
Sharpe Ratio	0.8	0.83

If this is your only investment opportunity, and you had to choose between these two assets, which asset would you choose?

Exercise 7.

[1]

The comparison universe is _____.

- A) a concept found only in astronomy
- B) the set of all mutual funds in the world
- C) the set of all mutual funds in the U. S.
- D) a set of mutual funds with similar risk characteristics to your mutual fund
- E) none of the above

Exercise 8.

[3]

Suppose two portfolios have the same average return, the same standard deviation of returns, but portfolio A has a higher beta than portfolio B. According to the Sharpe measure, the performance of portfolio A _____.

- A) is better than the performance of portfolio B
- B) is the same as the performance of portfolio B
- C) is poorer than the performance of portfolio B
- D) cannot be measured as there is no data on the alpha of the portfolio
- E) none of the above is true.

Exercise 9.

[5]

Suppose the risk-free return is 4%. The beta of a managed portfolio is 1.2, the alpha is 1%, and the average return is 14%. Based on Jensen's measure of portfolio performance, you would calculate the return on the market portfolio as

- A) 11.5%
- B) 14%
- C) 15%
- D) 16%
- E) none of the above

Exercise 10.

[3]

You want to evaluate three mutual funds using the Sharpe measure for performance evaluation. The risk-free return during the sample period is 6%. The average returns, standard deviations and betas for the three funds are given below, as is the data for the S&P 500 index.

	Average Return	Standard. Deviation	Beta	
Fund A	24%	30%	1.5	
Fund B	12%	10%	0.5	
Fund C	22%	20%	1.0	
S&P 500	18%	16%	1.0	

The fund with the highest Sharpe measure is _____.

- A) Fund A
- B) Fund B
- C) Fund C
- D) Funds A and B are tied for highest

E) Funds A and C are tied for highest

Exercise 11.

[3]

You want to evaluate three mutual funds using the Sharpe measure for performance evaluation. The risk-free return during the sample period is 4%. The average returns, standard deviations and betas for the three funds are given below, as is the data for the S&P 500 index.

	<u>Average Return</u>	<u>Standard. Deviation</u>	<u>Beta</u>	
Fund A	18%	38%	1.6	
Fund B	15%	27%	1.3	
Fund C	11%	24%	1.0	
S&P 500	10%	22%	1.0	

The fund with the highest Sharpe measure is _____.

- A) Fund A
- B) Fund B
- C) Fund C
- D) Funds A and B are tied for highest
- E) Funds A and C are tied for highest

Exercise 12.

[3]

You want to evaluate three mutual funds using the Sharpe measure for performance evaluation. The risk-free return during the sample period is 5%. The average returns, standard deviations and betas for the three funds are given below, as is the data for the S&P 500 index.

	<u>Average Return</u>	<u>Standard. Deviation</u>	<u>Beta</u>	
Fund A	23%	30%	1.3	
Fund B	20%	19%	1.2	
Fund C	19%	17%	1.1	
S&P 500	18%	15%	1.0	

The investment with the highest Sharpe measure is _____.

- A) Fund A
- B) Fund B
- C) Fund C
- D) the index
- E) Funds A and C are tied for highest