Problem Set 8 Solutions

Econ 136, Fall 2009

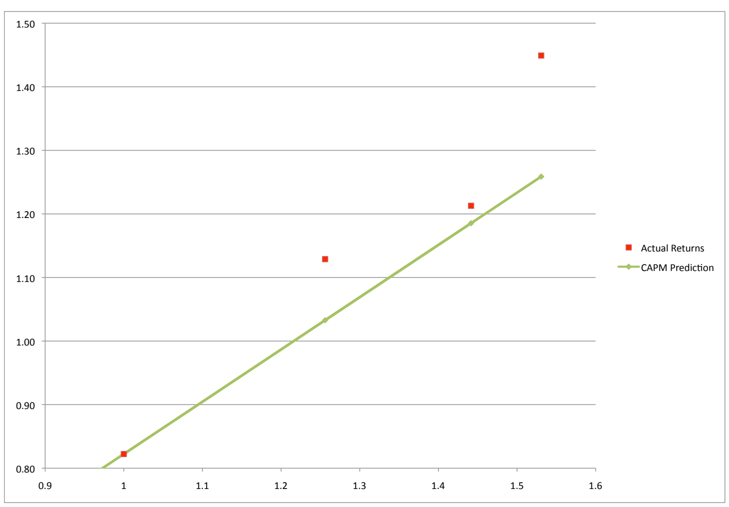
A note about grading:
5: no major or minor errors
4: no more than a few minor errors
3: a major or many minor errors
2: multiple major errors
1: multiple major errors and portions left blank
0: blank or never turned in.

1 CAPM Test

Parts (a) to (e):

	Small		Big		
	Low	High	Low	High	Market
a) mean excess ret	1.13	1.45	0.78	1.21	0.82
b) beta	1.2559704	1.5307014	0.9269296	1.4415309	1
c) alpha	0.0960846	0.1903928	0.0158963	0.0274191	0
d) CAPM pred. excess ret	1.0327894	1.2587018	0.7622179	1.1853765	0.8223039
e) Actual-Predicted	0.09608	0.19039	0.01590	0.02742	0.00000

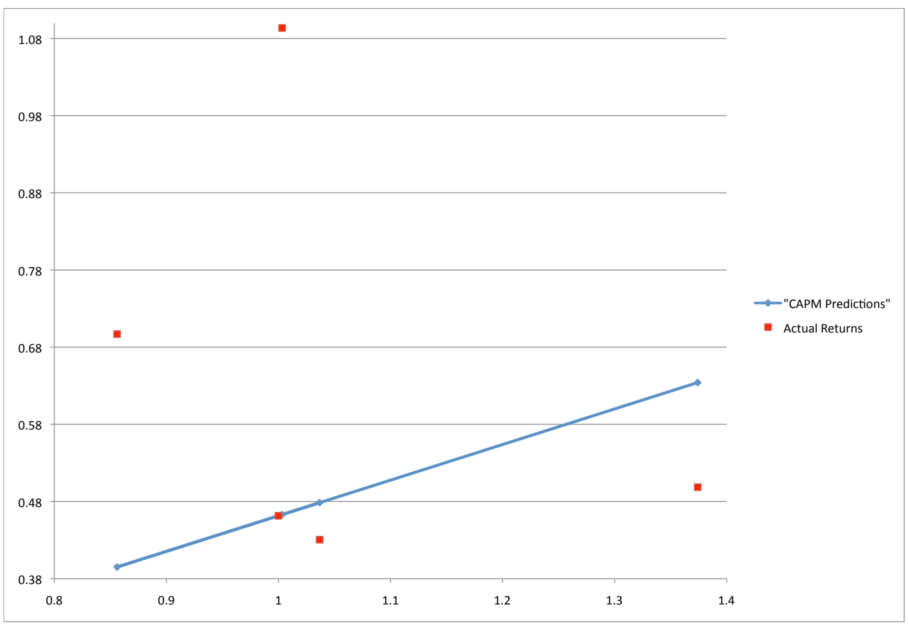
f) CAPM works fairly well for the five test portfolios considered here during the period before 1964.



g) CAPM fails in the data for the more recent period since 1964. This is consistent with what we discussed in class about the value and size effects. Intriguingly, the CAPM equation was discovered around 1963.

The small size -high B/M i.e. the small-value portfolio has the highest alpha (0.63).

CAPM test 1/1964-12/2004					
	Small		Big		
	Low	High	Low	High	Market
mean excess ret	0.50	1.09	0.43	0.70	0.46
beta	1.3741662	1.0032614	1.0367847	0.8560517	1
alpha	-0.135577	0.6306102	-0.04797	0.3018785	0
CAPM pred. excess ret	0.6341553	0.4629888	0.4784593	0.3950539	0.4614837
Actual-Predicted	-0.13558	0.63061	-0.04797	0.30188	0.00000



2 Derivatives

a) Use spot-futures parity: $F_0^T = S_0(1 + \text{cost of carry})^T$ where cost of carry = storage cost + foregone interest - income from holding.

$$\text{Cost of carry} = 0 + .03 - 0 = .03$$
$$\text{Forward price for delivery 1 year from today} = F_0^1 = 12(1 + .03)^1 = \$12.36$$
$$\text{Forward price for delivery 6 months from today} = F_0^{\frac{1}{2}} = 12(1 + .03)^{\frac{1}{2}} = \$12.18$$
$$\text{Forward price for delivery today} = F_0^0 = 12(1 + .03)^0 = \$12.00$$

b) The forward price for 1 share of ABC and the forward price for 1 share of XYZ should be equal. Spot-futures parity says that each forward price should equal $14 * (1 + R_f)$, where R_f is the three month risk-free rate. Given the spot price, volatility of the underlying assets price does not affect its futures price because this pricing relationship holds by a no-arbitrage condition that does not involve any risk.

3 Using Derivatives

a) You could sell a one-year forward for the stocks. This would require no payment today. You would get the price of the stock today plus accrued interest for selling the stock a year from now.

b) You could buy a put that is due one year from today. In that case, you spend money today to buy the put. But, if the market falls, there is a minimum amount you would be getting a year from now. However, if the price of the stocks rise, you would get the upside.