

Homework 6

Solution

- The following table summarizes the results:

	\hat{m}	$se(\hat{m})$	β	CAPM m
MKT-RF	0.48%	0.19%		
SMB	0.23%	0.14%	0.22	0.11%
HML	0.44%	0.12%	-0.27	-0.13%
MOM	0.84%	0.17%	-0.06	-0.03%

where \hat{m} is the average return, and the error of the estimate of the mean return, \hat{m} is given by

$$SE(\hat{m}) = \frac{\sigma(R_i)}{\sqrt{T}}$$

The column β gives each returns beta. The column CAPM m gives the return implied by the CAPM: $\beta\hat{m}^M$ based on the average market return. We see that the actual average returns for SMB, HML, and MOM are much higher than the CAPM tells us they should be. In other words, they generate “alpha”.

- Looking at estimates of \hat{m} across subsamples

	1960	1970	1980	1990	2000
MKT-RF	0.47%	0.11%	0.68%	1.02%	0.06%
SMB	0.68%	0.30%	0.01%	-0.09%	0.43%
HML	0.33%	0.67%	0.50%	-0.11%	0.86%
MOM	0.86%	0.83%	0.75%	1.12%	0.57%

it is not obvious that the size effect has disappeared in the 2000s.

- To see if the returns are statistically significant, we compute the t-stat as the mean divided by the standard error: $\sqrt{T} \frac{\hat{m}}{\hat{\sigma}}$ for each return. The following table gives those results. Remember, “significant” depends on the level of confidence you want, but generally let’s say they are significant if the t-stat is bigger than 1.9.

	1960	1970	1980	1990	2000
Mkt	1.30	0.24	1.52	2.85	0.14
SMB	2.27	0.95	0.06	-0.32	0.97
HML	1.58	2.68	1.96	-0.43	2.22
MOM	2.99	2.40	2.30	3.81	0.94