Fama-French

1. CAPM, example 1, size
   (a) Expected returns

   ![Graph showing expected returns vs. standard deviation]

   (b) Betas

   ![Graph showing mean excess returns vs. betas]

   VW market

   EW market

2. Discount rates update

3. CAPM Example 2: industry portfolios
Figure 2: CAPM on Fama-French size portfolios, and 10 and 30 year government bonds, monthly data 1926-2009. The diagonal line is the fit of a cross-sectional regression.

4. FF: What about book/market sorted portfolios?

(a) Facts: There is a big spread in average returns. But market beta is a disaster.
5. Discount rates graphs

B/M sorted portfolios, monthly data 1963-2010. Left panel: Average returns, market beta × market premium, and two-factor betas times premiums. Right panel: eigenvectors of the largest two eigenvalues in the covariance matrix of excess returns.

6. Fama-French solution:

(a) Run time series regressions that include additional factors (portfolios of stocks) SMB, HML

\[ R_{it}^{ei} = \alpha_i + b_t R_{it}^{em} + s_i SMB_t + h_i HML_t + \varepsilon_{it}; \quad t = 1, 2 \ldots T \] for each \( i = 1, 2 \ldots N \).

(b) Look across stocks

\[ E(R_{it}^{ei}) = \alpha_i + b_i E(R_{it}^{em}) + s_i E(SMB) + h_i E(HML) \]

7. Fama-French paper: See Table 1

(a) FF factors
Book/market (NYSE breaks)

HML = (S/H + B/H)/2 – (S/L+B/L)/2

SMB = (S/L + S/M + S/H)/3 – (B/L+B/M+B/H)/3

Size (NYSE breaks)

30% 40% 30%

S/L S/M S/H

B/L B/M B/H

HML

SMB
8.
Group stocks by some characteristic (size, B/M, past return, etc.)

Is there a spread in average returns?

Yes

Really? Do the statistics right? Survivor/selection bias? Out of sample?

No

Are high average returns explained by high market betas?

Yes

No

Are high average returns explained by multifactor betas?

No

Yes

Does a new multifactor model seem plausible, work?

Yes

No

Trade on it. Hope it lasts. Take up behavioral finance

Fame and fortune

9.

E(R)

Log(Book/market)

Securities

Portfolio Mean

Better weights?

Portfolio

1 2 3 4 5