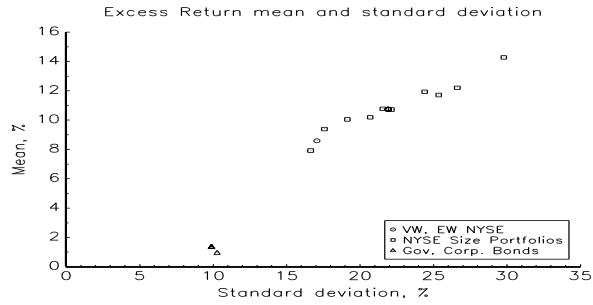


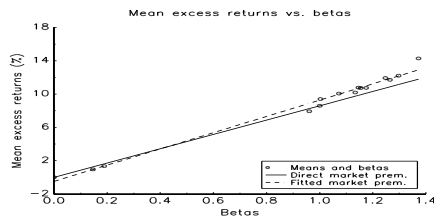
Fama-French

1. CAPM, example 1, size

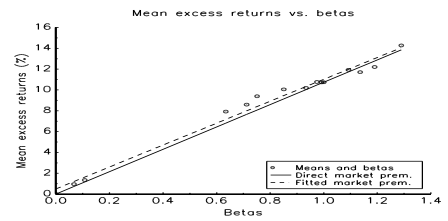
(a) Expected returns



(b) Betas



VW market



EW market

2. Discount rates update

3. CAPM Example 2: industry portfolios

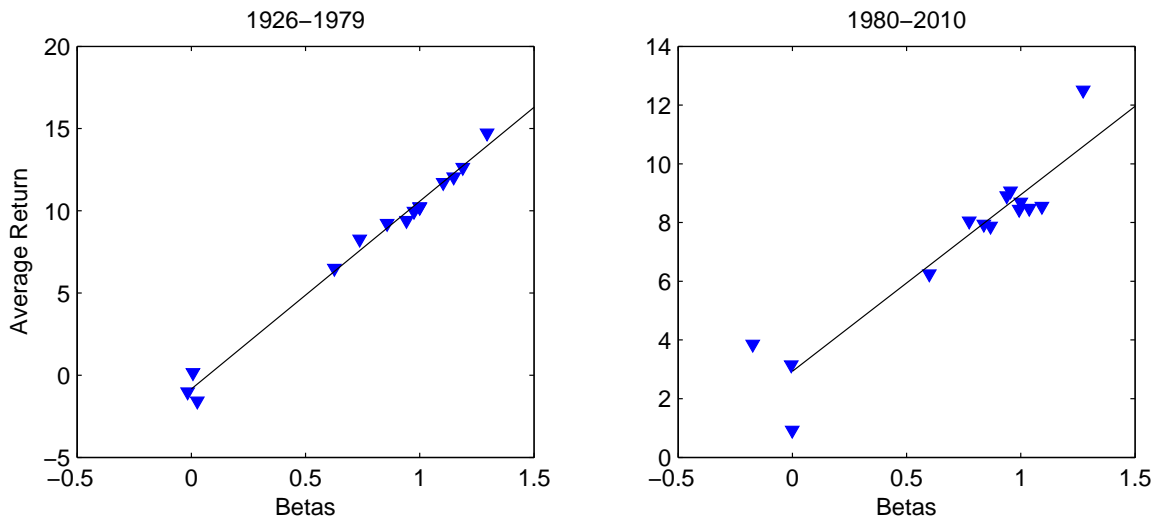
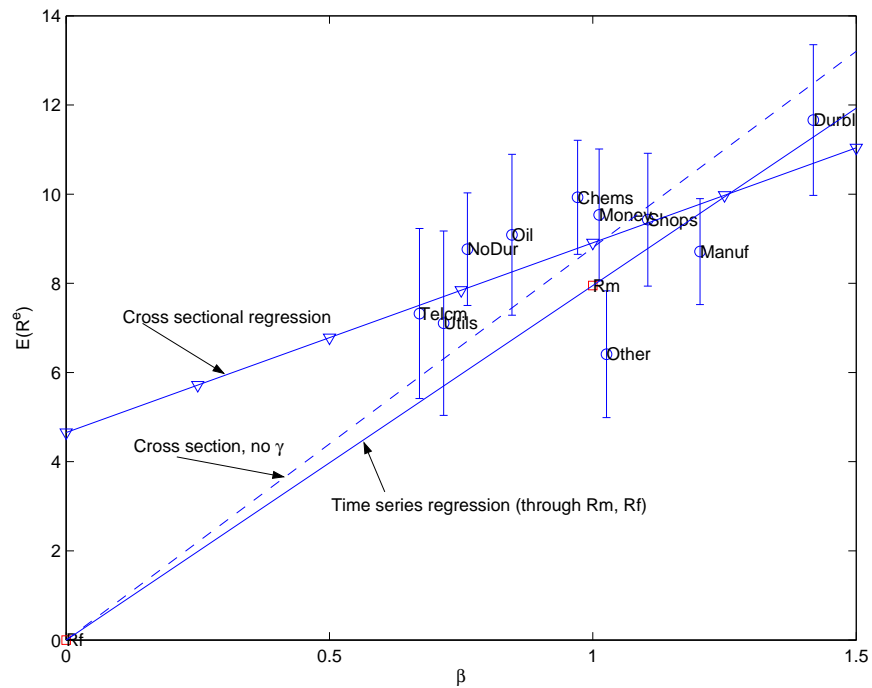
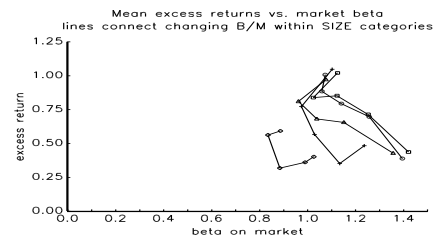
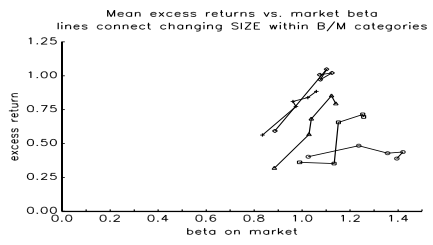
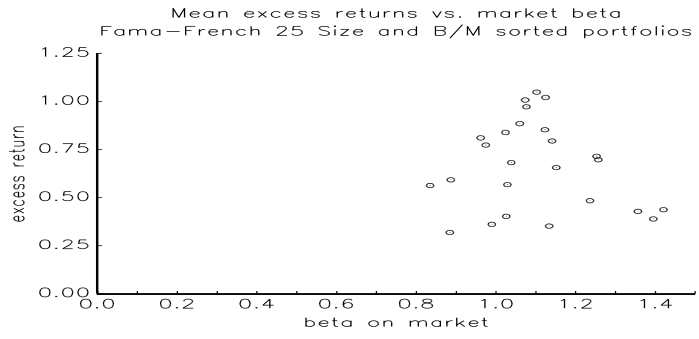


Figure 2: CAPM on Fama-French size portfolios, and , 10 and 30 year government bonds, monthly data 1926-2009. The diagonal line is the fit of a cross-sectional regression.

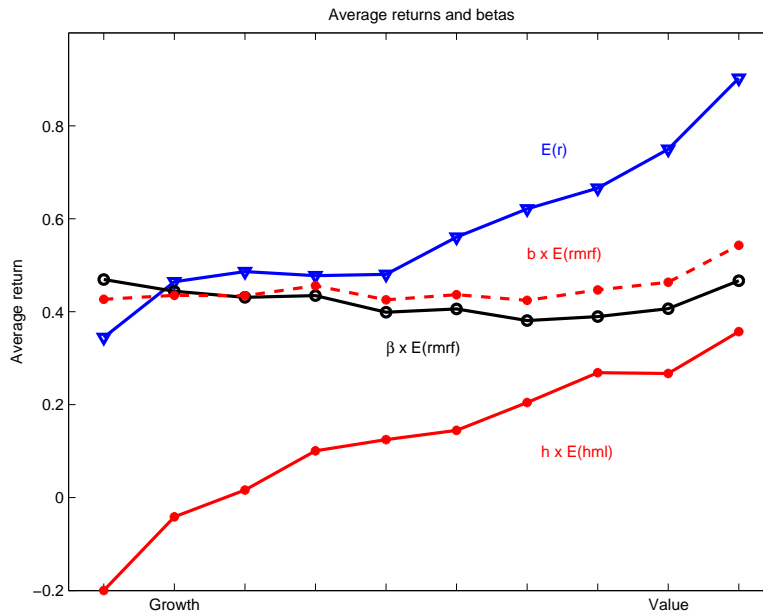


4. FF: What about *book/market* sorted portfolios?

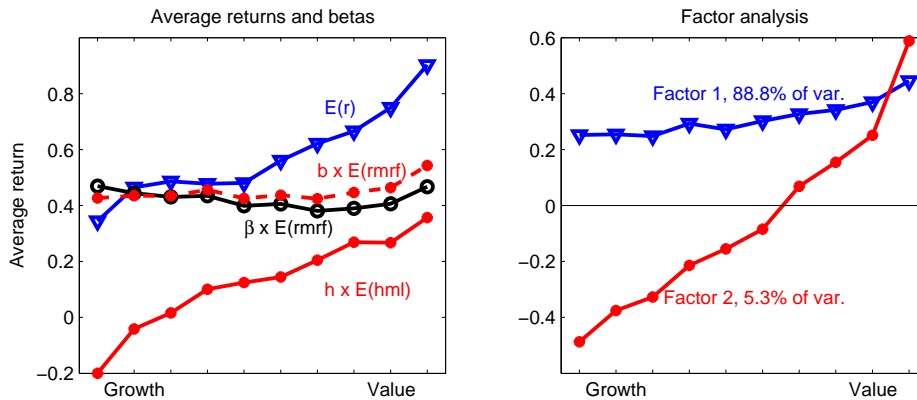
(a) Facts: There is a big spread in average returns. But market beta is a disaster.



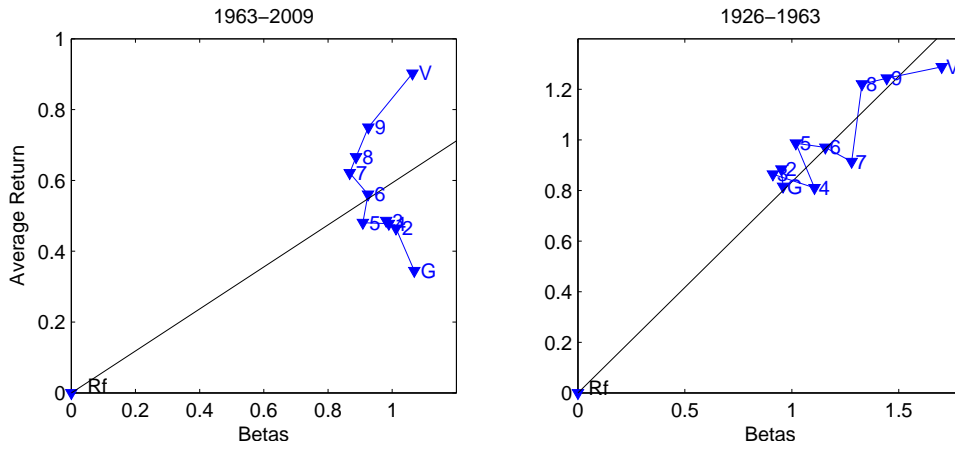
5. Discount rates graphs



Average returns and betas for Fama - French 10 B/M sorted portfolios. Monthly data 1963-2010.



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



Value effect before and after 1963. Average returns on Fama - French 10 portfolios sorted by book/market equity vs. CAPM betas. Monthly data. Source: Ken French's website.

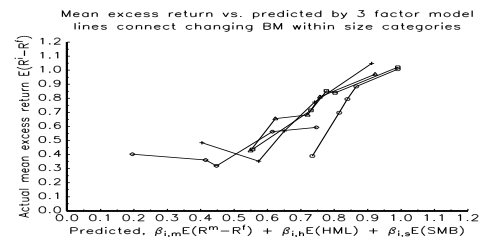
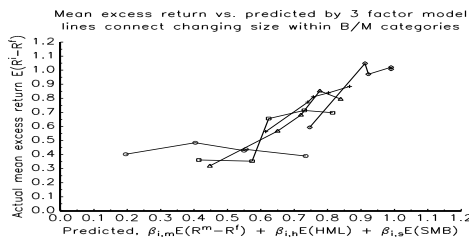
6. Fama-French solution:

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

$$R_t^{ei} = \alpha_i + b_i R_t^{em} + s_i SMB_t + h_i HML_t + \varepsilon_t^i; t = 1, 2 \dots T \text{ for each } i = 1, 2 \dots N.$$

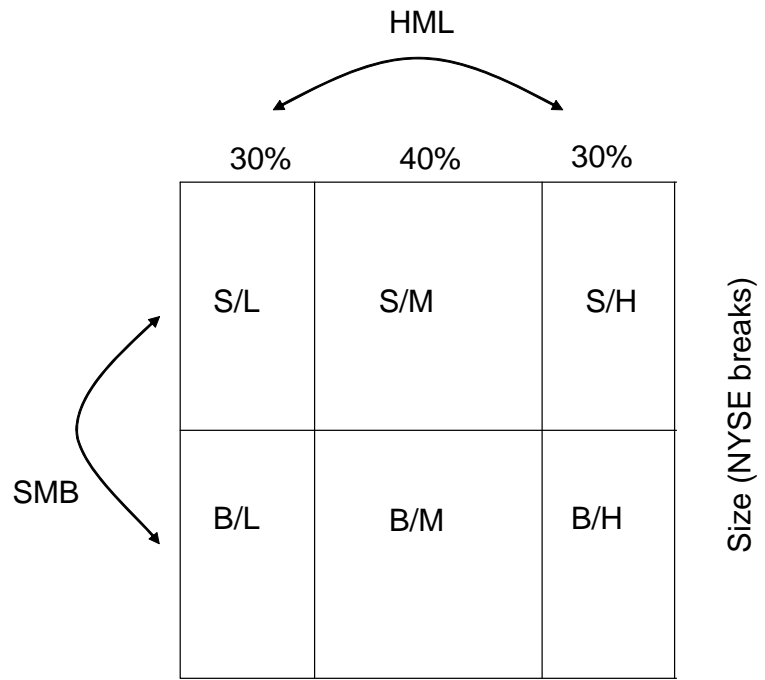
- (b) Look across stocks

$$E(R^{ei}) = \alpha_i + b_i E(R^{em}) + s_i E(SMB) + h_i E(HML)$$



7. Fama-French paper: See Table 1

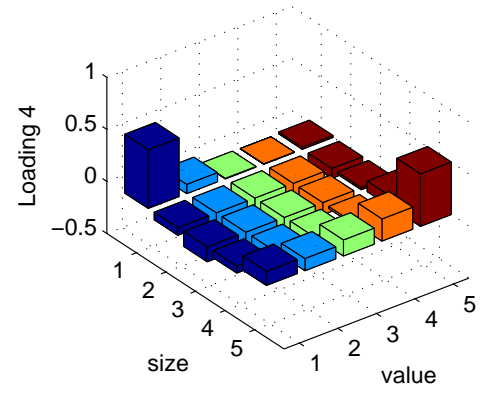
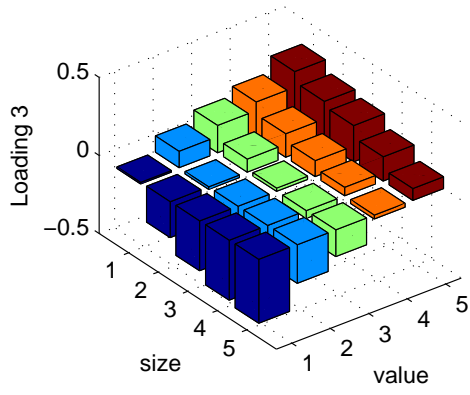
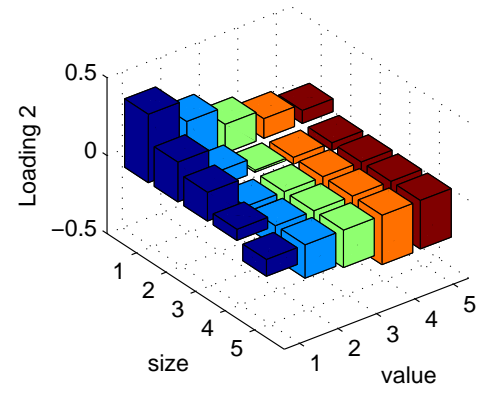
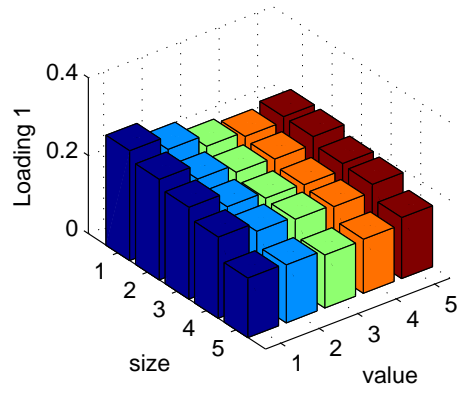
- (a) FF factors



Book/market (NYSE breaks)

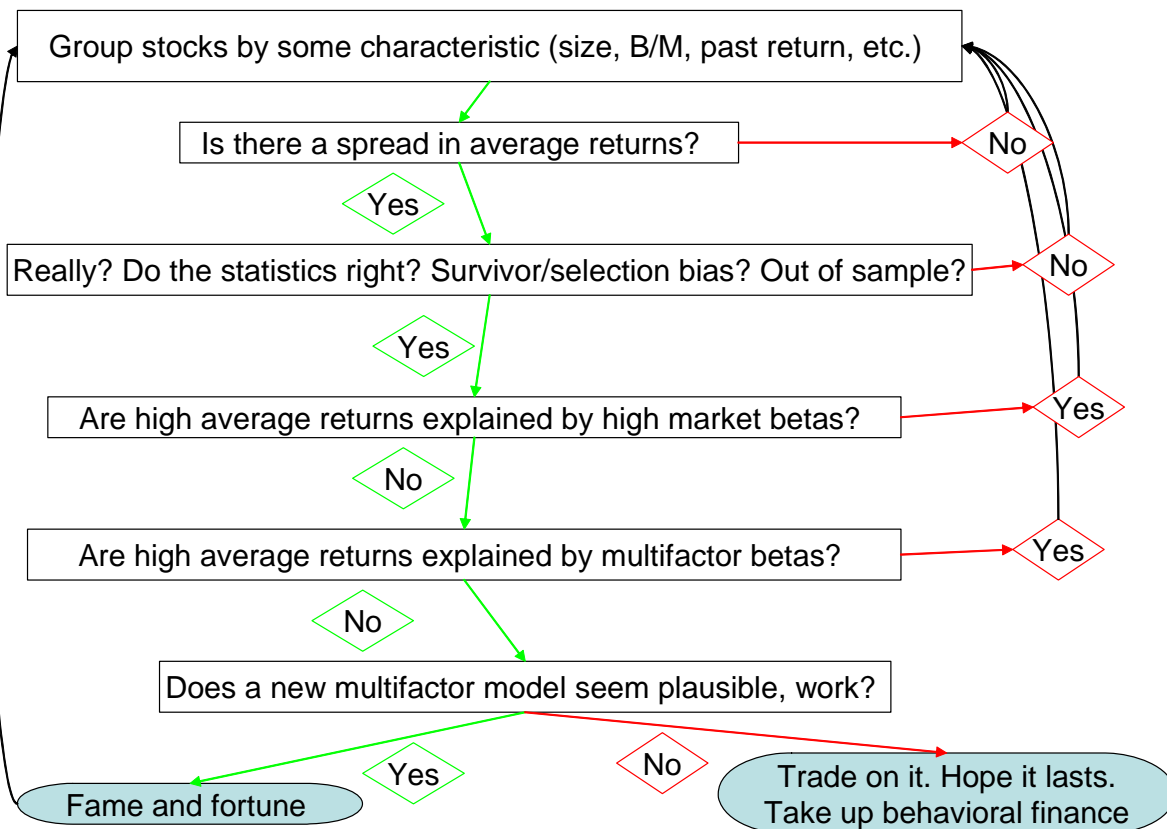
$$HML = (S/H + B/H)/2 - (S/L+B/L)/2$$

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



8.

Empirical Asset Pricing Flowchart



9.

