

### Assignment 1

From the given data set, estimate the following models:

Capital Asset Pricing Model (CAPM)

$$\text{CAPM: } r_{jt} = \alpha_j + \beta_{j1}r_{mt} + \varepsilon_{jt} \quad (1)$$

Fama & French three-factor Model (FF)

$$\text{Fama & French: } r_{jt} = \alpha_j + \beta_{j1}r_{mt} + \beta_{j2}r_{smbt} + \beta_{j3}r_{hmlt} + \varepsilon_{jt} \quad (2)$$

Where:

- $r_{jt}$  = excess return on portfolio  $j$  at time  $t$  and
- $r_{mt}$  = excess return on market portfolio at time  $t$  – representing market risk premium.
- $r_{smbt}$  = return on a small-stock portfolio minus the return on a large-stock portfolio (Small Minus Big) at time  $t$  – representing size premium.
- $r_{hmlt}$  = return on a value-stock portfolio minus the return on a growth-stock portfolio (High Minus Low) at time  $t$  – representing value premium.

- (1) Determine whether there exists significant Jensen Alpha.
- (2) Determine whether portfolio  $j$  has the same risk as the market.
- (3) Determine whether there exists significant size premium.
- (4) Determine whether there exists significant growth (value) premium.
- (5) Compare CAPM and FF models and determine which model is the most appropriated model. why?

To study calendar effect (January effects) from the data set, estimate the following models:

$$r_{jt} = \alpha_j + \gamma_j D_{1t} + \beta_{j1}r_{mt} + \beta_{j2}r_{smbt} + \beta_{j3}r_{hmlt} + \varepsilon_{jt} \quad (3)$$

where:  $D_{1t} = 1$  on January and  $= 0$  otherwise.

- (6) Determine whether there exist significant January effects.
- (7) Make interpretation of estimated result of model (3) (including (1) sign, (2) overall test, (3) R-square, and (4) individual test).
- (8) Perform Chow-test whether January and other month share the same structure of the Fama-French model (2).