

Assignment 1

Due 25/8/2020

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).

$$r_{jt} = \alpha_j + \beta_{j1}r_{mt} + \beta_{j2}r_{smbt} + \beta_{j3}r_{hmlt} + \gamma_j D_{1t} + \beta_{j1} D_{1t} r_{mt} + \beta_{j2} D_{1t} r_{smbt} + \beta_{j3} D_{1t} r_{hmlt} + \varepsilon_{jt} \quad (4)$$

- (8) Perform Chow-test (using Intercept and Slope Dummy) whether January and other month share the same structure of the Fama-French model (Model (2) vs Model (4)).