Assignment 1

Due date: 20/9/2016

Part I

From the given data set CAPM.dta, estimate the following models:

Capital Asset Pricing Model (CAPM)

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

Fama & French three-factor Model (FF)

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.

From Model (1):
(1) Determine whether there exists significant Jensen Alpha.
(2) Determine whether portfolio *j* has the same risk as the market.

From Model (1) & (2):
(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) Perform Chow-test whether January and other month share the same structure of the Fama-French model (2).

Part II

Simultaneous Equations Model
Leverage and Performance

From the data set Simultaneous.dta:

$$Leverage_t = \alpha_1 + \alpha_2 Performance_t + \alpha_3 Risk_t + \alpha_4 \ln Size_t + u_{1t} \quad (4)$$

$$Performance_t = \beta_1 + \beta_2 Leverage_t + \beta_3 MarketShare_t + \alpha_4 \ln Size_t + u_{2t} \quad (5)$$

Endogenous variables in this system include $Leverage_t$ and $Performance_t$
Exogenous variables in this system include $Risk_t$, $Marketshare_t$, and ln$Size_t$

1. State reduce form model of these system models.
2. Estimate reduce form model using OLS and prediction of the endogenous variables.
3. Estimate structural form using predicted endogenous variables as independent variables in the structural form model.
4. Estimate the structural form models using OLS and 2SLS and perform Hausman test whether endogeneity biased is significant.
5. Estimate the structural models of these system equations using OLS, 2SLS, 3SLS, and I3SLS. Concerning on the asymptotic property, which model is the most appropriated model? Why?