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Assignment 1

a.) mutual fund 4, 6, 8

b.) mutual fund 4, 6, 8

c. mutual fund 5, 17, 3

d.) DB test for Carhart-four factors mutual fund 1

H_0 ; $\rho = 0$, H_a ; $\rho \neq 0$

d-statistic (5, 120) = 2.744188

at 5% level with n: 120, k: 4, d_L: 1.679, d_u: 1.788

∴ H_0 rejected, Auto correlation existed in mutual fund 1

Overall test is significant at 5% but for individual test was insignificant for 3 variables which is a sign of multicolinearity.

DB test for FF mutual fund 1

H_0 ; $\rho = 0$, H_a ; $\rho \neq 0$

d. statistic (4, 120): 2.742202

at 5% level with n: 120, k: 3, d_L: 1.689, d_u: 1.774

∴ H_0 rejected, Auto correlation existed

Overall test is significant at 5% but for individual test was insignificant for 2 variables which is a sign of multicolinearity.

Both model consist of Autocorrelation and multicolinearity, but for Carhart-four factor have higher adjusted R^2, therefore it should be used in this case.

positive rmrf on average, if the excess return of mutual fund 1 increases, the market risk premium increase

negative smb on average, if the excess return of mutual fund 1 increases, the size of premium decrease

negative hml on average, if the excess return of mutual fund 1 increases, the value premium decrease

negative wml on average, if the excess return of mutual fund 1 increases, the momentum premium decrease

Overall test

$F(4, 115) = 190.81$ H_0 ; $\beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$, H_a otherwise

H_0 is rejected $\beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq 0$

The variation of r_{jt} was explained by independent variable by 81.44%.

Individual test (at 5% level of significant)

r_{mt} H_0 ; $\beta_1 = 0$

H_a ; $\beta_1 \neq 0$

$P > |t| = 0.00 < 0.025$

H_0 rejected at 5%

r_{mt} is statistically significant

r_{smbt} H_0 ; $\beta_2 = 0$

H_a ; $\beta_2 \neq 0$

$P > |t| = 0.047 > 0.025$

H_0 is not rejected at 5%.

r_{smbt} is insignificant

r_{hmlt} H_0 ; $\beta_3 = 0$

H_a ; $\beta_3 \neq 0$

$P > |t| = 0.045 > 0.025$

H_0 is not rejected

r_{hmlt} is insignificant

r_{wmlt} H_0 ; $\beta_4 = 0$

H_a ; $\beta_4 \neq 0$

$P > |t| = 0.157 > 0.025$

H_0 is not rejected

r_{wmlt} is insignificant

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e.) Based on a.), b.), c.) the most appropriated model would be FF. Mutual fund are meant to be relatively safe. Return should not be negative in most case like in Carhart model. And multicollinearity existed between rsmb and rhml. If both variables are drop from the model independent variable would be correlate with error term and thus would violates the assumption.