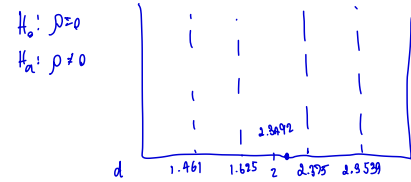


a. 1. Mutual fund #4 2. Mutual fund#6 3. Mutual fund#8

b. 1. Mutual fund #4 2. Mutual fund#6 3. Mutual fund#5

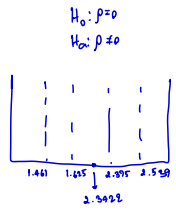
c. 1. Mutual fund #5 2. Mutual fund#17 3. Mutual fund#3

d. 1. From Durbin-Watson test, mutual fund #1 does ^{not} exist Autocorrelation (d-static = 2.349188).



2. We can see that the Mutual fund#1 exist multicollinearity problem from F-test that is significant (P-value = 0.000) but some t-test are insignificant, and from mean VIF=6.11.

3. In this case, FF ^{also doesn't has} Autocorrelation (d-static = 2.3422) ^{but has} and Multicollinearity (Mean VIF = 7.81 and significant F-test but not all t-test), so we use adjusted R-squared to compare between FF and Carhart model, since they are nested model. From the regression results, Adj R-squared of Carhart model (0.8135) is higher than FF model (0.8119). Hence, Carhart model should be employed in this case.



4. Sign and meaning of the estimated coefficients.

-Positive rrmf, on average, if the excess return of mutual fund #1 increases, the market risk premium will increase.

-Negative smb, on average, if the excess return of mutual fund #1 increases, the size of premium will decrease.

-Negative hml, on average, if the excess return of mutual fund #1 increases, the value premium will decrease.

-Negative wml, on average, if the excess return of mutual fund #1 increases, the momentum premium will decrease.

5. Overall test. $H_0: \beta_1 = 0, \beta_2 = 0, \beta_3 = 0, \beta_4 = 0$ $H_a: otherwise.$

- F(4, 115), Prob > F = 0.000. This model is overall significant.

6. Coefficient of determination.

-R-squared = 0.8198. The variation in r1 can be explained by independent variable about 82%

7. Individual test.

$H_0: \beta_0 = 0$ $H_a: \beta_0 \neq 0$
 $P > |t| = 0.331 > 0.025$
 H_0 is not rejected at 5% level of significant.

$H_0: \beta_1 = 0$ $H_a: \beta_1 \neq 0$
 $P > |t| = 0.000 < 0.025$
 H_0 is rejected at 5% level of significant.
 rrmf is statistically significant.

$H_0: \beta_2 = 0$ $H_a: \beta_2 \neq 0$
 $P > |t| = 0.049 > 0.025$
 H_0 is not rejected at 5% level of significant.
 smb is not statistically significant.

$H_0: \beta_3 = 0$ $H_a: \beta_3 \neq 0$
 $P > |t| = 0.049 > 0.025$
 H_0 is not rejected at 5% level of significant.
 hml is not statistically significant.

$H_0: \beta_4 = 0$ $H_a: \beta_4 \neq 0$
 $P > |t| = 0.159 > 0.025$
 H_0 is not rejected at 5% level of significant.
 wml is not statistically significant.

e.) Since the return on mutual funds should be positive, the FF model is more appropriate than Carhart model. Dropping variables from the model can cause specification error, hence CAPM shouldn't be appropriate.