Acct Case 7

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Summary:
Expected Return for ETH with CAPM:12.7%
Multiple R-squared with CAPM : 0.1005
Expected Return for ETH with FF:10.1%
Multiple R-squared with FF: 0.201

Assumption:
Observations used: (2016-09-30 - 2017-09-29)
Risk-free rate: 10-year bond interest rate at 2017-09-29 = 2.33%

```
eth = read.csv("eth2.csv")
eth$date = as.Date(as.character(eth$date), format = "%Y%m%d")
market_rf = read.csv("F-F_Research_Data_Factors_daily.CSV",skip = 4)
market_rf$X = as.Date(as.character(market_rf$X),format = "%Y%m%d")
market_rf = market_rf[-nrow(market_rf),]
rownames(eth) = eth$date
rownames(market_rf) = market_rf$X
eth$date = NULL
market_rf$X = NULL
eth = eth[rownames(eth) >= "2016-09-30" & rownames(eth) <= "2017-09-29",]
market_rf = market_rf/100
mean_mkt_rf = mean(market_rf$Mkt.RF)
mean_smb = mean(market_rf$SMB)
mean_hml = mean(market_rf$HML)
market_rf = market_rf[rownames(market_rf) >= "2016-09-30" & rownames(market_rf) <= "2017-09-29",]

risk_free = 2.33 / 252 /100
return_premium = as.numeric(levels(eth$RET))[eth$RET] - market_rf$RF
```

```
## Warning: NAs introduced by coercion
```

```
capm = lm(return_premium ~ market_rf$Mkt.RF)
summary(capm)
```

```
##
## Call:
## lm(formula = return_premium ~ market_rf$Mkt.RF)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.122802 -0.009445  0.001279  0.009729  0.054239
##
## Coefficients:
##                    Estimate Std. Error t value Pr(>|t|)
## (Intercept)      -0.0005379  0.0012666  -0.425    0.671
## market_rf$Mkt.RF  1.3088210  0.2476223   5.286 2.73e-07 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
## Residual standard error: 0.01989 on 250 degrees of freedom
## Multiple R-squared:  0.1005, Adjusted R-squared:  0.09692
## F-statistic: 27.94 on 1 and 250 DF,  p-value: 2.731e-07
```

```
risk_free = 2.33 / 252 /100
capm_return = capm$coefficients[2] * mean_mkt_rf + risk_free
annual_capm = (1 + capm_return) ^ 252 - 1
factor_3 = lm(return_premium ~ market_rf$Mkt.RF + market_rf$SMB + market_rf$HML)
summary(factor_3)
```

```
##
## Call:
## lm(formula = return_premium ~ market_rf$Mkt.RF + market_rf$SMB +
##     market_rf$HML)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.116113 -0.007453  0.000237  0.009166  0.060251
##
## Coefficients:
##                    Estimate Std. Error t value Pr(>|t|)
## (Intercept)      -0.0001305  0.0012014  -0.109   0.9136
## market_rf$Mkt.RF  0.6022339  0.2663150   2.261   0.0246 *
## market_rf$SMB     1.4085829  0.2622096   5.372 1.79e-07 ***
## market_rf$HML     0.2447653  0.2212986   1.106   0.2698
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.01882 on 248 degrees of freedom
## Multiple R-squared:  0.201,  Adjusted R-squared:  0.1914
## F-statistic:  20.8 on 3 and 248 DF,  p-value: 4.698e-12
```

```
factor_3_return = factor_3$coefficients[2] * mean_mkt_rf + factor_3$coefficients[3] * mean_smb + factor
annual_3_factor = (1 + factor_3_return) ^ 252 - 1

cat("Expected Return for ETH with CAPM is ", annual_capm,"\n")
```

```
## Expected Return for ETH with CAPM is  0.1266934
```

```
cat("Expected Return for ETH with FF is ", annual_3_factor)
```

```
## Expected Return for ETH with FF is  0.1010088
```