Final Project Part 4

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library(wooldridge)  
library(stargazer)

##   
## Please cite as:

## Hlavac, Marek (2022). stargazer: Well-Formatted Regression and Summary Statistics Tables.

## R package version 5.2.3. https://CRAN.R-project.org/package=stargazer

library(car)

## Loading required package: carData

library(lmtest)

## Loading required package: zoo

##   
## Attaching package: 'zoo'

## The following objects are masked from 'package:base':  
##   
## as.Date, as.Date.numeric

# Part 4

## Regression Results

Model used for predictions:

reg6 <- lm(lsalary~ roe + ros + I(ros^2)+ sales+ I(sales^2) + pcroe + finance + indus + utility, wooldridge::ceosal1)  
stargazer(reg6, type = "text")

##   
## ===============================================  
## Dependent variable:   
## ---------------------------  
## lsalary   
## -----------------------------------------------  
## roe 0.008\*   
## (0.005)   
##   
## ros 0.002   
## (0.001)   
##   
## I(ros2) -0.00001\*\*\*   
## (0.00000)   
##   
## sales 0.00004\*\*\*   
## (0.00001)   
##   
## I(sales2) -0.000\*\*\*   
## (0.000)   
##   
## pcroe 0.0004   
## (0.0003)   
##   
## finance -0.062   
## (0.104)   
##   
## indus -0.231\*\*   
## (0.092)   
##   
## utility -0.520\*\*\*   
## (0.117)   
##   
## Constant 6.758\*\*\*   
## (0.136)   
##   
## -----------------------------------------------  
## Observations 209   
## R2 0.320   
## Adjusted R2 0.289   
## Residual Std. Error 0.477 (df = 199)   
## F Statistic 10.409\*\*\* (df = 9; 199)   
## ===============================================  
## Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Our equation for estimation is

Our and , with 199 degrees of freedom and 209 observations.

Our base for the industry category is consumer product.

#Intepreting Regression Results ((Coefficients, R2, adjusted-R2, F and t statistics, and etc)

**Coefficients**

, which means that when return on equity increases by 1 unit the CEO’s salary is predicted to increase by . (0.008\*1000 = 8)

, which means that when return on stock increases by 1 unit the CEO’s salary is predicted to increase by . (0.002\*1000 = 2)

, which means that when increases by 1 unit the CEO’s salary is predicted to decrease by . (0.00001\*1000 = 0.01)

, which means that when sales increases by 1 unit the CEO’s salary is predicted to increase by . (0.00004\*1000 = 0.04)

, which means that when increases by 1 unit the CEO’s salary is predicted to decrease by . (0.000\*1000 = 0.00)

, which means that when pcroe increases by 1 unit the CEO’s salary is predicted to increase by . (0.0004\*1000 = 0.40)

, which means that when the company is a financial firm, the CEO’s salary is predicted to decrease by relative to a consumer product firm which is our base variable. (0.062\*1000 = 62)

$\hat\beta\_8 = -0.231`$, which means that when the company is an industrial firm, the CEO’s salary is predicted to decrease by relative to a consumer product firm which is our base variable. (0.231\*1000 = 231)

, which means that when the company is a financial firm, the CEO’s salary is predicted to decrease by relative to a consumer product firm which is our base variable. (0.520\*1000 = 520)

**, Adjusted , and F-Statistics** which means that 32% of the variability within the data is explained by our regression equation, which isn’t super high. We interpret this to mean that there are other variables that reflect a large portion of the variability that we don’t have in the data.

which is lower because we have more variables and your adjusted is penalized by more variables. However the difference is very small compared to the normal

which shows the joint significance of the variables. At least one independent variable is related to Y, in our case CEO salary.

**Hypothesis Testing**

#Test the hypothesis that ROE has a higher impact than any other variable.   
linearHypothesis(reg6, c('roe-ros-I(ros^2)-sales-I(sales^2)-pcroe-finance-indus-utility=0'))

## Linear hypothesis test  
##   
## Hypothesis:  
## roe - ros - I(ros^2) - sales - I(sales^2) - pcroe - finance - indus - utility = 0  
##   
## Model 1: restricted model  
## Model 2: lsalary ~ roe + ros + I(ros^2) + sales + I(sales^2) + pcroe +   
## finance + indus + utility  
##   
## Res.Df RSS Df Sum of Sq F Pr(>F)   
## 1 200 47.683   
## 2 199 45.366 1 2.3175 10.166 0.001662 \*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

#Does roe have a greater impact on CEO salary than ros?  
linearHypothesis(reg6, c('roe-ros=0'))

## Linear hypothesis test  
##   
## Hypothesis:  
## roe - ros = 0  
##   
## Model 1: restricted model  
## Model 2: lsalary ~ roe + ros + I(ros^2) + sales + I(sales^2) + pcroe +   
## finance + indus + utility  
##   
## Res.Df RSS Df Sum of Sq F Pr(>F)  
## 1 200 45.789   
## 2 199 45.366 1 0.42347 1.8576 0.1744

#Test the hypothesis that industry has a large impact on the CEO's salary.  
linearHypothesis(reg6, c('finance=0','indus=0','utility=0'))

## Linear hypothesis test  
##   
## Hypothesis:  
## finance = 0  
## indus = 0  
## utility = 0  
##   
## Model 1: restricted model  
## Model 2: lsalary ~ roe + ros + I(ros^2) + sales + I(sales^2) + pcroe +   
## finance + indus + utility  
##   
## Res.Df RSS Df Sum of Sq F Pr(>F)   
## 1 202 51.136   
## 2 199 45.366 3 5.7698 8.4365 2.641e-05 \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

**Confidence Intervals**

confint(reg6, level = 1-.05)

## 2.5 % 97.5 %  
## (Intercept) 6.489910e+00 7.027051e+00  
## roe -6.774164e-04 1.761184e-02  
## ros -7.184324e-04 3.833114e-03  
## I(ros^2) -1.702512e-05 -2.498605e-06  
## sales 2.381459e-05 5.301067e-05  
## I(sales^2) -5.686398e-10 -1.817976e-10  
## pcroe -2.992826e-04 1.079621e-03  
## finance -2.675505e-01 1.435063e-01  
## indus -4.133863e-01 -4.934901e-02  
## utility -7.502533e-01 -2.894807e-01

Our confidence intervals at a 95% confidence level is shown in the table above for each variable.

**Test for Heteroskedasticity**

bptest(reg6)

##   
## studentized Breusch-Pagan test  
##   
## data: reg6  
## BP = 8.0542, df = 9, p-value = 0.5287

Our p-value is above 0.05 so we can say that there is not heteroskedasticity present.