

Exercise 1

Use the data in `hprice1.RData` to estimate the model $\text{price} = \beta_0 + \beta_1 \text{sqrft} + \beta_2 \text{bdrms} + u$ where price is the house price measured in thousands of dollars.

- i) Write out the results in equation form.
$$\hat{Y} = -19.315 + 0.128 \text{sqrft} + 15.19 \text{bdrms}$$
- ii) What is the estimated increase in price for a house with one more bedroom, holding square footage constant?
According to the regression model, for an additional bedroom we can expect increase of 15.19 unit dollar in prices, however this relationship is insignificant.
- iii) What is the estimated increase in price for a house with an additional bedroom that is 140 square feet in size? Compare this to your answer in part (ii).
- iv) iv) What percentage of the variation in price is explained by square footage and number of bedrooms?

Coefficient of determination r^2 explains variations in the dependent variable, according to regression model variation in price explained by square footage and number of bedrooms is 0.25

- v) v) The first house in the sample has $\text{sqrft} = 2,438$ and $\text{bdrms} = 4$. Find the predicted selling price for this house from the OLS regression line.
1
320.3294
- vi) The actual selling price of the first house in the sample was \$300,000 (so $\text{price} = 300$). Find the residual for this house. Does it suggest that the buyer underpaid or overpaid for the house?
Residuals of the first house :
1
-54.6052490
- vii) vii) Now add the variable `colonial` to your model. Interpret its coefficient. Is it significant?

$$\hat{Y} = -19.315 + 0.128 \text{sqrft} + 15.19 \text{bdrms} + 13.078 \text{colonial}$$

According to regressing line with one unit increase in `colonial`, prices increase 13.07 units (dollars) coefficient of `colonial` is positive but insignificant.

R formula sheet.

```
getwd("C:/Users/sehri/Desktop/Econometrics HW/hprice1.RData")
require(data.table)
require(stargazer)
price <- data.table(data)
```

```

price.lm<-lm(price$price~price$sqrft+price$bdrms)
stargazer(price.lm, type = 'text')
price.lm<-lm(price$price~price$bdrms)
stargazer(price.lm, type = 'text')
df <- data.frame(sqrft =2438), (bdrms=4)
price.lm<-lm(price$price~price$bdrms)
stargazer(price.lm, type = 'text')
new <- data.frame(sqrft=2438), (bdrms = 4) = price.lm
predict(price.lm<-lm(price$price~price$bdrms))
resid(price.lm<-lm(price$price~price$sqrft+price$bdrms))
price12<-lm(price$price~price$sqrft+price$bdrms+price$colonial)
stargazer(price12,type = "text")
price12<-lm(price$price~price$sqrft+price$bdrms+price$colonial)
> stargazer(price12,type = "text")

```

Output

```

> price.lm<-lm(price$price~price$sqrft+price$bdrms)
> stargazer(price.lm, type = 'text')

```

```
=====
```

Dependent variable:

price

sqrft	0.128*** (0.014)
-------	---------------------

bdrms	15.198 (9.484)
-------	-------------------

Constant	-19.315 (31.047)
----------	---------------------

Observations	88
R2	0.632
Adjusted R2	0.623
Residual Std. Error	63.045 (df = 85)
F Statistic	72.964*** (df = 2; 85)

```
=====
```

Note: *p<0.1; **p<0.05; ***p<0.01

>

```
> predict(price.lm<-lm(price$price~price$bdrms))
```

1	2	3	4	5	6	7	8	9
320.3294	258.3048	258.3048	258.3048	320.3294	382.3539	258.3048	258.3048	258.3048
10	11	12	13	14	15	16	17	18
258.3048	320.3294	382.3539	258.3048	258.3048	258.3048	320.3294	320.3294	258.3048

19	20	21	22	23	24	25	26	27
258.3048	320.3294	258.3048	258.3048	258.3048	320.3294	258.3048	258.3048	258.3048
28	29	30	31	32	33	34	35	36
258.3048	506.4031	320.3294	320.3294	320.3294	258.3048	320.3294	320.3294	320.3294
37	38	39	40	41	42	43	44	45
320.3294	382.3539	320.3294	196.2802	258.3048	382.3539	320.3294	258.3048	382.3539
46	47	48	49	50	51	52	53	54
258.3048	258.3048	320.3294	258.3048	320.3294	258.3048	196.2802	258.3048	258.3048
55	56	57	58	59	60	61	62	63

Residuals

```
resid(price.lm<-lm(price$price~price$sqrft+price$bdrms))
```

1	2	3	4	5	6
-54.6052490	77.0868501	-11.7509302	-17.2552098	8.6335990	55.8857115
7	8	9	10	11	12
40.7427760	66.3973427	-47.2263609	-29.0240147	-56.5047555	-94.9769372
13	14	15	16	17	18
-54.7517871	-58.1799406	-58.2240955	-40.1255045	-58.3501888	30.8745857
19	20	21	22	23	24
64.9921974	32.8417859	-23.3169360	-29.0780880	-28.3547971	-113.9292845
25	26	27	28	29	30
35.7722799	0.5816644	-44.4183356	46.2337638	-62.8237274	45.0995644
31	32	33	34	35	36
-13.5079270	-69.8238072	15.3694000	-42.8003952	54.1730213	-70.0761982
37	38	39	40	41	42
-34.6773466	19.9915447	-70.5974950	31.4107589	6.2594412	229.0030242
43	44	45	46	47	48
-6.1681325	53.3216205	23.8198106	12.1589478	-68.7910074	-103.4301414
49	50	51	52	53	54

=====

Dependent variable:

price

sqrft 0.130***
(0.014)

bdrms 12.487
(10.024)

colonial 13.078
(15.436)

Constant -21.552
(31.210)

Observations	88
R2	0.635
Adjusted R2	0.622
Residual Std. Error	63.150 (df = 84)
F Statistic	48.720*** (df = 3; 84)

=====

Note: *p<0.1; **p<0.05; ***p<0.01

Exercise 2

The file ceosal2.RData contains data on 177 chief executive officers and can be used to examine the effects of firm performance on CEO salary.

i) Estimate a model relating annual salary to firm sales and market value. Make the model of the constant elasticity variety for both independent variables. Write the results out in equation form.

$$\hat{y} = 4.621 + 0.162 \ln \text{sales} + 0.107 \ln \text{mktval}$$

ii) Add profits to the model from part (i). Why can't this variable not be included in logarithmic form? Would you say that these firm performance variables explain most of the variation in CEO salaries?

$$\hat{y} = 4.621 + 0.162 \ln \text{sales} + 0.107 \ln \text{mktval} + 0.00004 \text{ profits}$$

Log transformations removes skewness of the data and make the data series normal. If profits are used in logarithmic form we can't capture the original impact of profits in the regression. Value of R2 is 0.299 in the regression model, which represent that these firm performance variable are not explain most of the variation in CEO salaries

iii) Interpret the coefficient of $\ln \text{mktval}$. Does it have a significant effect? Explain.

In the model (ii) the value of coefficient of $\ln \text{mktval}$ is 0.098 which explains that with one unit increase in marketvalue salary increase 0.098 units, the coefficient of $\ln \text{mktval}$ is insignificant.

iv) Interpret the coefficient of profits. Does it have a significant effect? Explain.

In the model (ii) the value of coefficient of profits is 0.00004 which explains that with one unit increase in profits of the company salary increase 0.00004 units, and the impact of profits on salary is insignificant

v) Add the variable ceoten and comten to the model in part (ii). What is the estimated percentage return for another year of CEO tenure, holding other factors fixed?

Results of the model iii shows that ceoten (coefficient is 0.017***) has positive and significant impact on salary. Results shows that percentage return to the salary of CEO is 1.7% for another year of CEO tenure .

vi) Interpret the coefficients on ceoten and comten. Are these explanatory variables statistically significant?

Coefficient value of ceoten is 0.017*** and coefficient value of , comten is -0.010*** which shows that ceoten has positive impact on salary of CEOs, however comten has negative impact on salary of CEO and both variables are significant at 1% level.

vii) What do you make of the fact that longer tenure with the company, holding the other factors fixed, is associated with a lower salary?

Generally longer tenured CEOs are paid more, as CEOs gain valuable experience and skills, so company may offer raise to retain their services. However, negative relationship between longer tenure with company and salary of CEO can be justified when company is facing loss in revenues or sales. Or negative relationship can be explained when there is general recession in the economy and companies are paying low to their employees, in this scenario CEOs are not likely to get pay raise or bonuses.

viii) Predict the salaries for all the CEOs in the sample.

x) Calculate the residuals.

resid(lm1)

1	2	3	4	5	6
-0.052253177	0.113442500	-0.262366037	-0.014915901	0.001661668	-0.127970573
7	8	9	10	11	12
0.524813787	0.328199926	-0.092980445	0.201776134	-0.041793200	-0.432860442
13	14	15	16	17	18
0.690562215	-0.458048770	0.197577157	-0.589802630	0.202848712	0.990103922
19	20	21	22	23	24
0.398722352	-0.067965982	-0.544412838	0.263789883	-0.055554701	-0.475717698
25	26	27	28	29	30
-0.336274487	-0.311373996	0.300762292	-0.535877393	0.071149615	-1.252481743
31	32	33	34	35	36
0.337774865	0.200360641	-0.637530717	0.229675333	-0.551764218	0.319963157
37	38	39	40	41	42
-0.258560289	-1.064680750	0.327841755	0.230037812	-0.049988884	0.137062374
43	44	45	46	47	48
0.214061658	0.093862164	0.683000842	-0.350426104	0.005517351	-0.237680777
49	50	51	52	53	54
-0.402003470	-0.326570202	-0.483968131	-0.627740660	0.253722107	0.281985584
55	56	57	58	59	60
0.610085443	0.306454926	0.129102347	0.089332151	0.238343605	0.742074446

61	62	63	64	65	66
0.100228697	0.540633739	-0.465035020	-0.179018812	-0.428574219	0.065305026
67	68	69	70	71	72
-0.025713723	-0.213044675	0.825222344	-0.106946066	0.393434481	0.112599789
73	74	75	76	77	78
0.160026780	1.570928590	-0.597817348	-0.515992216	0.465680030	-0.332450011
79	80	81	82	83	84
0.045198014	0.129819741	0.180307316	0.477271887	0.186748511	0.360798128
85	86	87	88	89	90
-0.368931303	-0.644431731	-0.546557621	0.236094421	0.514180816	-0.575027513
91	92	93	94	95	96
-0.261611577	-0.058266251	0.253807437	0.332766930	-0.556806426	-0.345580175
97	98	99	100	101	102
0.074117748	-0.394205844	0.008263151	0.554287065	0.403971810	-0.118238909
103	104	105	106	107	108
1.912096038	-0.314904468	-0.100638485	-0.044627291	-0.021853142	0.609953882
109	110	111	112	113	114
-0.236703413	0.547465584	0.020485749	0.446477085	-2.280602853	-0.250915755
115	116	117	118	119	120
-0.110603928	-0.231896532	0.575386310	-0.563338868	0.496036604	-0.302150226
121	122	123	124	125	126
0.040383084	-0.384318085	-0.480103436	0.394380402	0.291293397	-0.293458213
127	128	129	130	131	132
-0.320327557	-0.168168837	-0.258517244	1.179683347	-0.300630632	-0.092507994
133	134	135	136	137	138
-0.233773608	0.317561092	0.387419723	0.398238023	-0.607076518	0.189885025
139	140	141	142	143	144
0.065971982	-0.109232242	-0.911335219	0.374206034	0.325204617	0.298890813
145	146	147	148	149	150
-0.116361972	0.766000146	0.683196002	-0.002335861	0.222815857	0.617445614
151	152	153	154	155	156
-0.295847322	0.140034556	0.248359884	-0.023285675	0.323513386	-0.178640910
157	158	159	160	161	162
-0.108725257	-0.690844171	-0.418428496	0.719143584	0.663169670	-0.753916378
163	164	165	166	167	168
-0.012688735	0.457147891	0.553995098	-0.571293220	0.002370093	-0.143475038
169	170	171	172	173	174
-0.856704579	-0.156481859	-0.024872922	-0.890075176	-0.645911043	-1.152526470
175	176	177			
-0.304479791	1.501172017	-0.134350689			

R Formulas

```
require(data.table)
require(stargazer)
ceosal<-data.table(data)
nrow(ceosal)
```

```
colnames(ceosal)
head(ceosal)
summary(ceosal)
stargazer(ceosal, type = 'text')
lm1<- lm(lsalary ~ lsales + lmktval, data = ceosal)
stargazer(lm1, type = 'text')
R version 4.1.1 (2021-08-10) -- "Kick Things"
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'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.
```

[Workspace loaded from ~/.RData]

```
> load("C:/Users/sehri/Desktop/Econometrics HW/ceosal2.RData")
> require(data.table)
Loading required package: data.table
data.table 1.14.2 using 4 threads (see ?getDTthreads). Latest news: r-datatable.com
> require(stargazer)
Loading required package: stargazer
```

Please cite as:

Hlavac, Marek (2018). stargazer: Well-Formatted Regression and Summary Statistics Tables.
R package version 5.2.2. <https://CRAN.R-project.org/package=stargazer>

Output/ Appendix

```
R version 4.1.1 (2021-08-10) -- "Kick Things"
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'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

[workspace loaded from ~/.RData]

> load("C:/Users/sehri/Desktop/Econometrics HW/ceosal2.RData")
> require(data.table)
```

```

Loading required package: data.table
data.table 1.14.2 using 4 threads (see ?getDTthreads). Latest news: r-datatable.com
> require(stargazer)
Loading required package: stargazer

```

Please cite as:

Hlavac, Marek (2018). stargazer: well-Formatted Regression and Summary Statistics Tables.
R package version 5.2.2. <https://CRAN.R-project.org/package=stargazer>

```

> ceosal<-data.table(data)
> nrow(ceosal)
[1] 177
> colnames(ceosal)
[1] "salary" "age" "college" "grad" "comten" "ceoten" "sales"
[8] "profits" "mktval" "lsalary" "lsales" "lmktval" "lcomtensq" "lceotensq"
[15] "profmarg"
> head(ceosal)
Error in head(ceosal) : object 'cesal' not found
> head(ceosal)
   salary age college grad comten ceoten sales profits mktval lsalary lsales
1:  1161  49      1     1      9      2  6200    966  23200 7.057037 8.732305
2:   600  43      1     1     10     10   283    48   1100 6.396930 5.645447
3:   379  51      1     1      9      3   169    40   1100 5.937536 5.129899
4:   651  55      1     0     22     22  1100   -54  1000 6.478509 7.003066
5:   497  44      1     1      8      6   351    28   387 6.208590 5.860786
6:  1067  64      1     1      7      7 19000   614   3900 6.972606 9.852194
   lmktval lcomtensq lceotensq profmarg
1: 10.051908      81      4 15.580646
2:  7.003066     100     100 16.961130
3:  7.003066      81      9 23.668638
4:  6.907755     484     484 -4.909091
5:  5.958425      64      36  7.977208
6:  8.268732      49      49  3.231579
> summary(ceosal)
   salary      age      college      grad
Min.   :100.0   Min.   :33.00   Min.   :0.0000   Min.   :0.0000
1st Qu.: 471.0   1st Qu.:52.00   1st Qu.:1.0000   1st Qu.:0.0000
Median : 707.0   Median :57.00   Median :1.0000   Median :1.0000
Mean   : 865.9   Mean   :56.43   Mean   :0.9718   Mean   :0.5311
3rd Qu.:1119.0   3rd Qu.:62.00   3rd Qu.:1.0000   3rd Qu.:1.0000
Max.   :5299.0   Max.   :86.00   Max.   :1.0000   Max.   :1.0000
   comten    ceoten    sales    profits
Min.   : 2.0   Min.   : 0.000   Min.   : 29   Min.   : -463.0
1st Qu.:12.0   1st Qu.: 3.000   1st Qu.: 561   1st Qu.: 34.0
Median :23.0   Median : 6.000   Median : 1400   Median : 63.0
Mean   :22.5   Mean   : 7.955   Mean   : 3529   Mean   : 207.8
3rd Qu.:33.0   3rd Qu.:11.000   3rd Qu.: 3500   3rd Qu.: 208.0
Max.   :58.0   Max.   :37.000   Max.   :51300   Max.   :2700.0
   mktval    lsalary    lsales    lmktval
Min.   : 387   Min.   :4.605   Min.   :3.367   Min.   : 5.958
1st Qu.: 644   1st Qu.:6.155   1st Qu.: 6.330   1st Qu.: 6.468
Median :1200   Median :6.561   Median : 7.244   Median : 7.090
Mean   :3600   Mean   :6.583   Mean   : 7.231   Mean   : 7.399
3rd Qu.:3500   3rd Qu.:7.020   3rd Qu.: 8.161   3rd Qu.: 8.161
Max.   :45400   Max.   :8.575   Max.   :10.845   Max.   :10.723
   comtensq    ceotensq    profmarg
Min.   : 4.0   Min.   : 0.0   Min.   : -203.077
1st Qu.:144.0   1st Qu.: 9.0   1st Qu.: 4.231
Median :529.0   Median :36.0   Median : 6.834
Mean   :656.7   Mean   :114.1   Mean   : 6.420
3rd Qu.:1089.0   3rd Qu.:121.0   3rd Qu.:10.947
Max.   :3364.0   Max.   :1369.0   Max.   : 47.458
> stargazer(ceosal, type = 'text')

```

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
salary	177	865.864	587.589	100	471	1,119	5,299
age	177	56.429	8.422	33	52	62	86
college	177	0.972	0.166	0	1	1	1
grad	177	0.531	0.500	0	0	1	1
comten	177	22.503	12.295	2	12	33	58
ceoten	177	7.955	7.151	0	3	11	37
sales	177	3,529.463	6,088.654	29	561	3,500	51,300
profits	177	207.831	404.454	-463	34	208	2,700
mktval	177	3,600.316	6,442.276	387	644	3,500	45,400
lsalary	177	6.583	0.606	4.605	6.155	7.020	8.575
lsales	177	7.231	1.432	3.367	6.330	8.161	10.845
lmktval	177	7.399	1.133	5.958	6.468	8.161	10.723
comtensq	177	656.684	577.123	4	144	1,089	3,364
ceotensq	177	114.124	212.566	0	9	121	1,369
profmarg	177	6.420	17.861	-203.077	4.231	10.947	47.458

```

> lm1<- lm(lsalary ~ lsales + lmktval, data = ceosal)
> stargazer(lm1, type = 'text')

```

```

=====
Dependent variable:
-----
lsalary
-----

```


lsales	0.162*** (0.040)
lmktval	0.107** (0.050)
Constant	4.621*** (0.254)

```
-----
Observations      177
R2                0.299
Adjusted R2       0.291
Residual Std. Error 0.510 (df = 174)
F Statistic      37.129*** (df = 2; 174)
=====
```

```
Note: *p<0.1; **p<0.05; ***p<0.01
> lm2<- lm(lsalary ~ lsales + lmktval+ profits, data = ceosal)
> stargazer(lm2, type = 'text')
```

```
=====
Dependent variable:
-----
lsalary
-----
lsales      0.161***
            (0.040)
lmktval     0.098
            (0.064)
profits     0.00004
            (0.0002)
Constant    4.687***
            (0.380)
-----
```

```
-----
Observations      177
R2                0.299
Adjusted R2       0.287
Residual Std. Error 0.512 (df = 173)
F Statistic      24.636*** (df = 3; 173)
=====
```

```
Note: *p<0.1; **p<0.05; ***p<0.01
> lm3<- lm(lsalary ~ lsales + lmktval+ profits + ceoten + comten, data = ceosal)
> stargazer(lm3, type = 'text')
```

```
=====
Dependent variable:
-----
lsalary
-----
lsales      0.191***
            (0.040)
lmktval     0.077
            (0.062)
profits     0.0001
            (0.0001)
ceoten      0.017***
            (0.006)
comten      -0.010***
            (0.003)
Constant    4.697***
            (0.376)
-----
```

```
-----
Observations      177
R2                0.349
Adjusted R2       0.330
Residual Std. Error 0.496 (df = 171)
F Statistic      18.342*** (df = 5; 171)
=====
```

```
Note: *p<0.1; **p<0.05; ***p<0.01
> lm3<- lm(lsalary ~ lsales + lmktval+ profits + ceoten + comten, data = ceosal)
> stargazer(lm3, type = 'text')
```

```
=====
Dependent variable:
-----
lsalary
-----
lsales      0.191***
            (0.040)
lmktval     0.077
            (0.062)
-----
```

profits	0.0001 (0.0001)
ceoten	0.017*** (0.006)
comten	-0.010*** (0.003)
Constant	4.697*** (0.376)

Observations	177
R2	0.349
Adjusted R2	0.330
Residual Std. Error	0.496 (df = 171)
F Statistic	18.342*** (df = 5; 171)

Note: *p<0.1; **p<0.05; ***p<0.01

```
> predict(salary)
Error in predict(salary) : object 'salary' not found
> predict(salary, data=ceosal)
Error in predict(salary, data = ceosal) : object 'salary' not found
> pred<-predict(lm1,data.frame(salary))
Error in data.frame(salary) : object 'salary' not found
> pred<-predict(lm1<- lm(lsalary ~ lsales + lmktval, data = ceosal)
Error: unexpected symbol in "pred<-predict lm1"
> stargazer(lm1, type = 'text')
```

Dependent variable:	
lsalary	
lsales	0.162*** (0.040)
lmktval	0.107** (0.050)
Constant	4.621*** (0.254)

Observations	177
R2	0.299
Adjusted R2	0.291
Residual Std. Error	0.510 (df = 174)
F Statistic	37.129*** (df = 2; 174)

Note: *p<0.1; **p<0.05; ***p<0.01

```
> pred<-predict(lm1<- lm(lsalary ~ , data = ceosal)
Error: unexpected symbol in "pred<-predict lm1"
> stargazer(lm1, type = 'text')
```

Dependent variable:	
lsalary	
lsales	0.162*** (0.040)
lmktval	0.107** (0.050)
Constant	4.621*** (0.254)

Observations	177
R2	0.299
Adjusted R2	0.291
Residual Std. Error	0.510 (df = 174)
F Statistic	37.129*** (df = 2; 174)

Note: *p<0.1; **p<0.05; ***p<0.01

```
> View(ceosal)
> new.ceosal<-data.table(salary = 1161,600,397)
> my.pred <-predict(lm.1, newdata = new.ceosal)
Error in predict(lm.1, newdata = new.ceosal) : object 'lm.1' not found
> my.pred <-predict(lm1, newdata = new.ceosal)
Error in eval(predvars, data, env) : object 'lsales' not found
> my.pred <-predict(ceosal, newdata = new.ceosal)
Error in UseMethod("predict") :
  no applicable method for 'predict' applied to an object of class "c('data.table', 'data.frame')"
> residuals(ceosal)
NULL
> residuals(lm3<- lm(lsalary ~ lsales + lmktval+ profits + ceoten + comten, data = ceosal)
+ stargazer(lm3, type = 'text'))
```

```

Error: unexpected symbol in:
"residuals(lm3<- lm(lsalary ~ lsales + lmktval+ profits + ceoten + comten, data = ceosal)
+ stargazer"
> residuals(lm3<- lm(lsalary ~ lsales + lmktval+ profits + ceoten + comten, data = ceosal)
+ stargazer(lm3, type = 'text'))
Error: unexpected symbol in:
"residuals(lm3<- lm(lsalary ~ lsales + lmktval+ profits + ceoten + comten, data = ceosal)
+ stargazer"
> residuals(lm(lsalary ~ lsales + lmktval+ profits + ceoten + comten, data = ceosal)
+ stargazer(lm3, type = 'text'))
Error: unexpected symbol in:
"residuals(lm(lsalary ~ lsales + lmktval+ profits + ceoten + comten, data = ceosal)
+ stargazer"
> resid(lm1)
      1      2      3      4      5      6
-0.052253177 0.113442500 -0.262366037 -0.014915901 0.001661668 -0.127970573
      7      8      9     10     11     12
0.524813787 0.328199926 -0.092980445 0.201776134 -0.041793200 -0.432860442
     13     14     15     16     17     18
0.690562215 -0.458048770 0.197577157 -0.589802630 0.202848712 0.990103922
     19     20     21     22     23     24
0.398722352 -0.067965982 -0.544412838 0.263789883 -0.055554701 -0.475717698
     25     26     27     28     29     30
-0.336274487 -0.311373996 0.300762292 -0.535877393 0.071149615 -1.252481743
     31     32     33     34     35     36
0.337774865 0.200360641 -0.637530717 0.229675333 -0.551764218 0.319963157
     37     38     39     40     41     42
-0.258560289 -1.064680750 0.327841755 0.230037812 -0.049988884 0.137062374
     43     44     45     46     47     48
0.214061658 0.093862164 0.683000842 -0.350426104 0.005517351 -0.237680777
     49     50     51     52     53     54
-0.402003470 -0.326570202 -0.483968131 -0.627740660 0.253722107 0.281985584
     55     56     57     58     59     60
0.610085443 0.306454926 0.129102347 0.089332151 0.238343605 0.742074446
     61     62     63     64     65     66
0.100228697 0.540633739 -0.465035020 -0.179018812 -0.428574219 0.065305026
     67     68     69     70     71     72
-0.025713723 -0.213044675 0.825222344 -0.106946066 0.393434481 0.112599789
     73     74     75     76     77     78
0.160026780 1.570928590 -0.597817348 -0.515992216 0.465680030 -0.332450011
     79     80     81     82     83     84
0.045198014 0.129819741 0.180307316 0.477271887 0.186748511 0.360798128
     85     86     87     88     89     90
-0.368931303 -0.644431731 -0.546557621 0.236094421 0.514180816 -0.575027513
     91     92     93     94     95     96
-0.261611577 -0.058266251 0.253807437 0.332766930 -0.556806426 -0.345580175
     97     98     99    100    101    102
0.074117748 -0.394205844 0.008263151 0.554287065 0.403971810 -0.118238909
    103    104    105    106    107    108
1.912096038 -0.314904468 -0.100638485 -0.044627291 -0.021853142 0.609953882
    109    110    111    112    113    114
-0.236703413 0.547465584 0.020485749 0.446477085 -2.280602853 -0.250915755
    115    116    117    118    119    120
-0.110603928 -0.231896532 0.575386310 -0.563338868 0.496036604 -0.302150226
    121    122    123    124    125    126
0.040383084 -0.384318085 -0.480103436 0.394380402 0.291293397 -0.293458213
    127    128    129    130    131    132
-0.320327557 -0.168168837 -0.258517244 1.179683347 -0.300630632 -0.092507994
    133    134    135    136    137    138
-0.233773608 0.317561092 0.387419723 0.398238023 -0.607076518 0.189885025
    139    140    141    142    143    144
0.065971982 -0.109232242 -0.911335219 0.374206034 0.325204617 0.298890813
    145    146    147    148    149    150
-0.116361972 0.766000146 0.683196002 -0.002335861 0.222815857 0.617445614
    151    152    153    154    155    156
-0.295847322 0.140034556 0.248359884 -0.023285675 0.323513386 -0.178640910
    157    158    159    160    161    162
-0.108725257 -0.690844171 -0.418428496 0.719143584 0.663169670 -0.753916378
    163    164    165    166    167    168
-0.012688735 0.457147891 0.553995098 -0.571293220 0.002370093 -0.143475038
    169    170    171    172    173    174
-0.856704579 -0.156481859 -0.024872922 -0.890075176 -0.645911043 -1.152526470
    175    176    177
-0.304479791 1.501172017 -0.134350689
>
>
> cor(lmktval, profits, data = ceosal)
Error in cor(lmktval, profits, data = ceosal) :
  unused argument (data = ceosal)
> cor(profits, lmktval)
Error in is.data.frame(y) : object 'lmktval' not found
> View(data)
> head(ceosal)
  salary age college grad comten ceoten sales profits mktval lsalary lsales
1:  1161  49      1    1      9      2  6200    966  23200 7.057037 8.732305
2:   600  43      1    1     10     10   283    48   1100 6.396930 5.645447
3:   379  51      1    1      9      3   169    40   1100 5.937536 5.129899
4:   651  55      1    0     22     22  1100   -54   1000 6.478509 7.003066
5:   497  44      1    1      8      6   351    28    387 6.208590 5.860786
6:   1067 64      1    1      7     17 19000   614   3900 6.972606 9.852194
  lmktval comtensq ceotensq profmarg
1: 10.051908      81      4 15.580646

```

```

2: 7.003066      100      100 16.961130
3: 7.003066      81       9 23.668638
4: 6.907755     484      484 -4.909091
5: 5.958425      64       36 7.977208
6: 8.268732      49       49 3.231579
> ceosal[, c(profits, lmktval
+ ceosal[, c("profits", "lmktval")]
Error: unexpected symbol in:
"ceosal[, c(profits, lmktval
ceosal"
> ceosal[, c(profits, lmktval)]
[1] 966.000000 48.000000 40.000000 -54.000000 28.000000 614.000000
[7] 24.000000 191.000000 7.000000 230.000000 34.000000 8.000000
[13] 35.000000 234.000000 91.000000 24.000000 55.000000 115.000000
[19] 69.000000 69.000000 210.000000 81.000000 193.000000 13.000000
[25] 295.000000 25.000000 226.000000 28.000000 184.000000 483.000000
[31] 596.000000 108.000000 549.000000 338.000000 117.000000 562.000000
[37] 82.000000 28.000000 1200.000000 1400.000000 109.000000 -60.000000
[43] 182.000000 2700.000000 120.000000 57.000000 1300.000000 37.000000
[49] 34.000000 1900.000000 287.000000 -40.000000 17.000000 77.000000
[55] 55.000000 842.000000 23.000000 239.000000 40.000000 475.000000
[61] 34.000000 484.000000 308.000000 90.000000 106.000000 7.000000
[67] -55.000000 143.000000 21.000000 33.000000 149.000000 182.000000
[73] 11.000000 35.000000 46.000000 80.000000 1700.000000 57.000000
[79] 212.000000 23.000000 6.000000 56.000000 195.000000 142.000000
[85] 50.000000 6.000000 175.000000 423.000000 96.000000 79.000000
[91] -438.000000 308.000000 877.000000 665.000000 63.000000 40.000000
[97] 67.000000 20.000000 16.000000 131.000000 40.000000 54.000000
[103] 119.000000 36.000000 182.000000 1300.000000 1600.000000 30.000000
[109] 51.000000 130.000000 63.000000 36.000000 394.000000 -463.000000
[115] 65.000000 13.000000 8.000000 39.000000 51.000000 38.000000
[121] 140.000000 53.000000 69.000000 26.000000 135.000000 34.000000
[127] 1400.000000 75.000000 364.000000 27.000000 80.000000 87.000000
[133] 35.000000 18.000000 1700.000000 33.000000 56.000000 32.000000
[139] 145.000000 257.000000 60.000000 71.000000 222.000000 208.000000
[145] 229.000000 36.000000 -271.000000 40.000000 38.000000 37.000000
[151] 40.000000 30.000000 401.000000 478.000000 166.000000 17.000000
[157] 206.000000 280.000000 45.000000 52.000000 21.000000 210.000000
[163] 55.000000 92.000000 47.000000 326.000000 44.000000 -132.000000
[169] 386.000000 49.000000 56.000000 41.000000 43.000000 49.000000
[175] 28.000000 -80.000000 31.000000 10.051908 7.003066 7.003066
[181] 6.907755 5.958425 8.268732 6.434546 7.649693 6.118097
[187] 8.268732 6.278522 6.167517 6.519147 8.648221 7.244227
[193] 6.324359 6.741701 7.090077 6.411819 6.779922 7.696213
[199] 7.313221 8.070906 6.126869 8.682708 7.740664 7.495542
[205] 6.569481 7.313221 8.455317 9.116030 8.732305 8.630522
[211] 9.433484 7.600903 8.366370 7.090077 6.021023 9.923290
[217] 9.792556 6.839477 6.188264 7.937375 10.666627 8.496990
[223] 6.507277 9.705036 6.287858 8.809863 10.177324 8.648221
[229] 8.294049 6.163315 6.622736 7.377759 9.642123 5.998937
[235] 7.783224 6.705639 8.748305 6.210600 8.987197 8.160519
[241] 6.502790 7.600903 6.052089 6.040255 7.090077 5.986452
[247] 6.107023 7.003066 7.495542 6.467699 6.788972 6.699501
[253] 6.779922 9.841612 7.090077 8.496990 7.244227 7.313221
[259] 6.822197 7.863267 8.216088 6.645091 5.966147 7.863267
[265] 8.895630 7.090077 7.244227 6.705639 7.696213 9.148465
[271] 8.476371 6.248043 7.244227 7.696213 6.216606 6.267200
[277] 7.972466 9.210340 6.255750 7.313221 6.309918 7.863267
[283] 9.883285 10.069002 6.366470 6.790097 7.377759 6.791222
[289] 6.159095 9.220291 7.244227 7.438384 6.530878 6.805723
[295] 7.549609 7.003066 6.040255 8.070906 6.870053 7.495542
[301] 7.090077 7.438384 6.380123 9.746834 6.907755 8.575462
[307] 6.711740 6.726233 6.886532 6.306275 6.656726 10.723268
[313] 6.018593 6.660575 6.171700 7.649693 8.268732 7.170120
[319] 7.090077 7.901007 8.630522 8.294049 7.170120 6.298949
[325] 6.322565 6.395262 6.530878 6.862758 6.224558 9.277999
[331] 8.895630 7.696213 6.505784 8.006368 8.242756 6.047372
[337] 7.170120 6.340359 8.476371 7.170120 7.649693 7.824046
[343] 7.783224 6.278522 7.090077 8.411833 6.280396 6.481577
[349] 6.042633 6.173786 6.327937 6.167517 6.291569 6.719013
> cor(ceosal[, c(profits, lmktval)])
Error in cor(ceosal[, c(profits, lmktval)]) :
supply both 'x' and 'y' or a matrix-like 'x'
> cor(profits, lmktval)
Error in is.data.frame(y) : object 'lmktval' not found
> cor(profits + lmktval, data = ceosal)
Error in cor(profits + lmktval, data = ceosal) :
unused argument (data = ceosal)

```