INFSCI 2725: Data Analytics

Assignment 2: Fundamental concepts from statistics

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In this assignment 2, we use SPSS to analyze the given data.

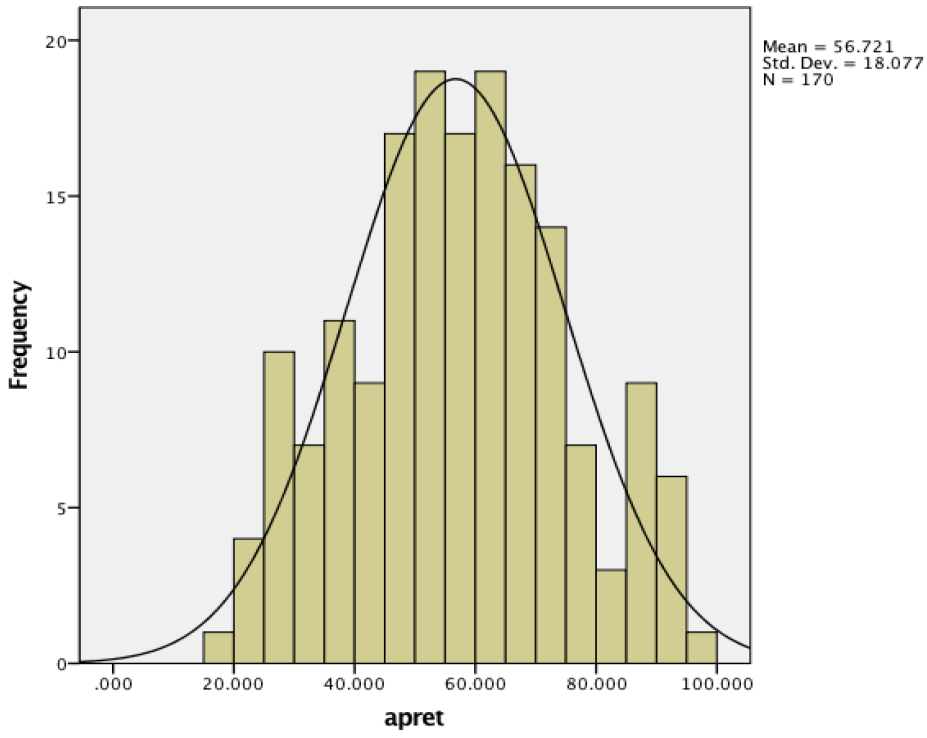
(1) Generate descriptive statistics and histograms for apret, tstsc, and salar.

apret:

Descriptive Statistics

	N	Range	Minimum	Maximum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
apret	170	76.500	18.750	95.250	56.72108	1.386450	18.077097	326.781
Valid N (listwise)	170							

Histogram for apret

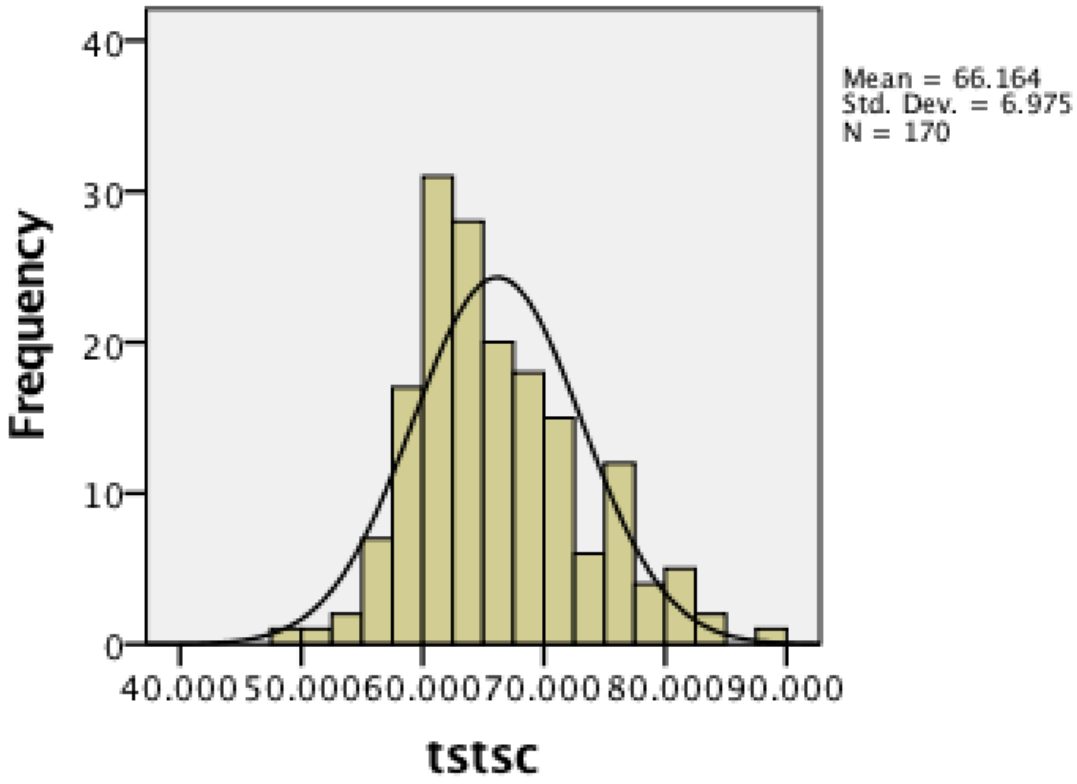


tstsc:

Descriptive Statistics

	N	Range	Minimum	Maximum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
tstsc	170	39.375	48.125	87.500	66.16416	.534982	6.975306	48.655
Valid N (listwise)	170							

Histogram for tstsc

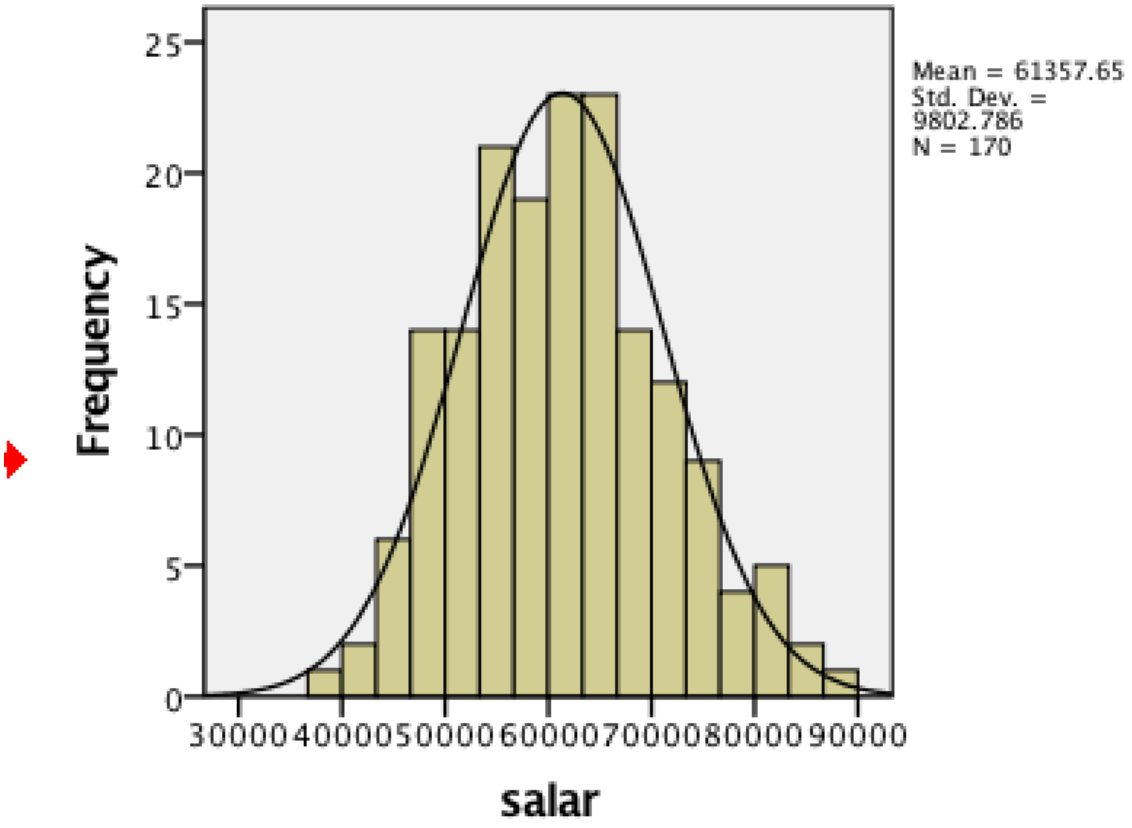


salar:

Descriptive Statistics

	N	Range	Minimum	Maximum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
salar	170	49260	38640	87900	61357.65	751.839	9802.786	96094622.3
Valid N (listwise)	170							

Histogram for tstsc



（2）perform linear regression

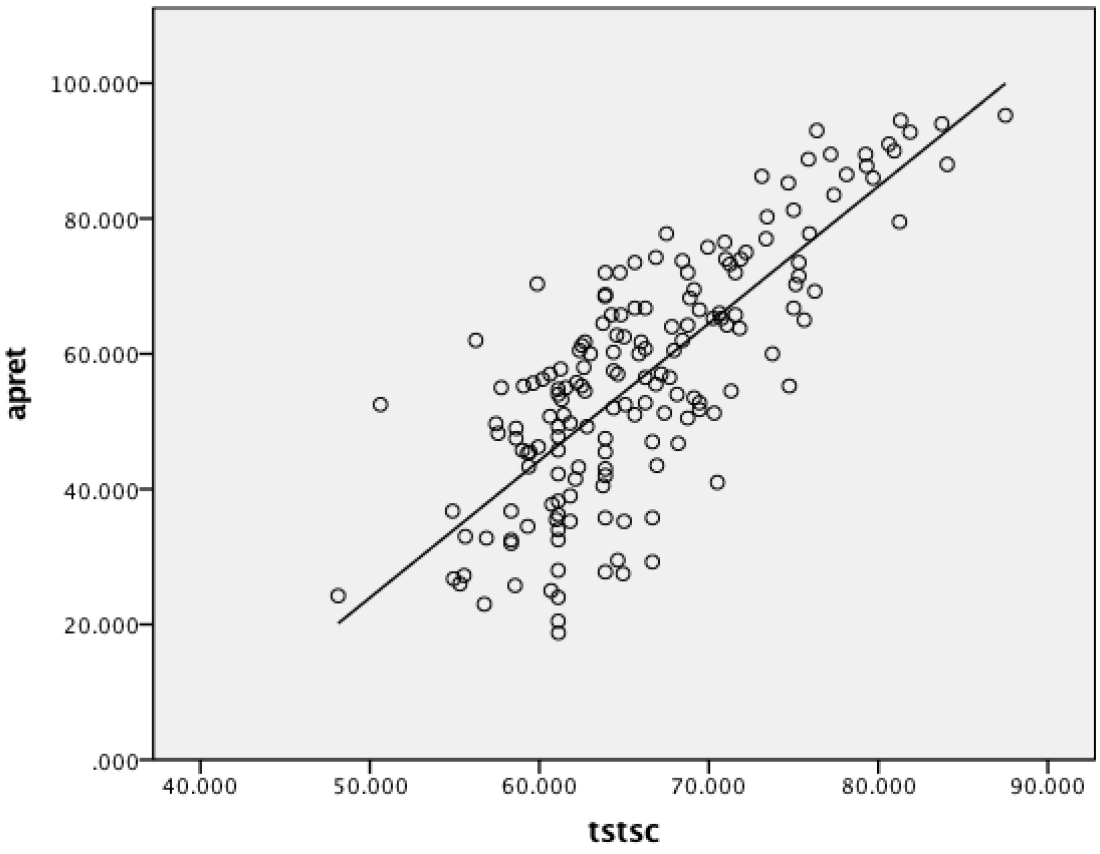
(a) linear regression of apret on tstsc

Dependent Variable: apret

Variables Entered: tstsc

Linear model:Y=AX+B

95% confidence intervals



Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.782[a]	.612	.609	11.296381

R^2=0.612 and adjusted R^2=0.609, so the fitting degree of model and data is good

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	33787.880	1	33787.880	264.778	.000[b]
	Residual	21438.181	168	127.608		
	Total	55226.061	169			

a. Dependent Variable: apret

The sig=0.000<0.05, so the regression equation is valid

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-77.400	8.288		-9.339	.000	-93.762	-61.038
	tstsc	2.027	.125	.782	16.272	.000	1.781	2.273

a. Dependent Variable: apret

Constant=-77.400

tstsc(B)=2.027

apret=2.027tstsc-77.4000

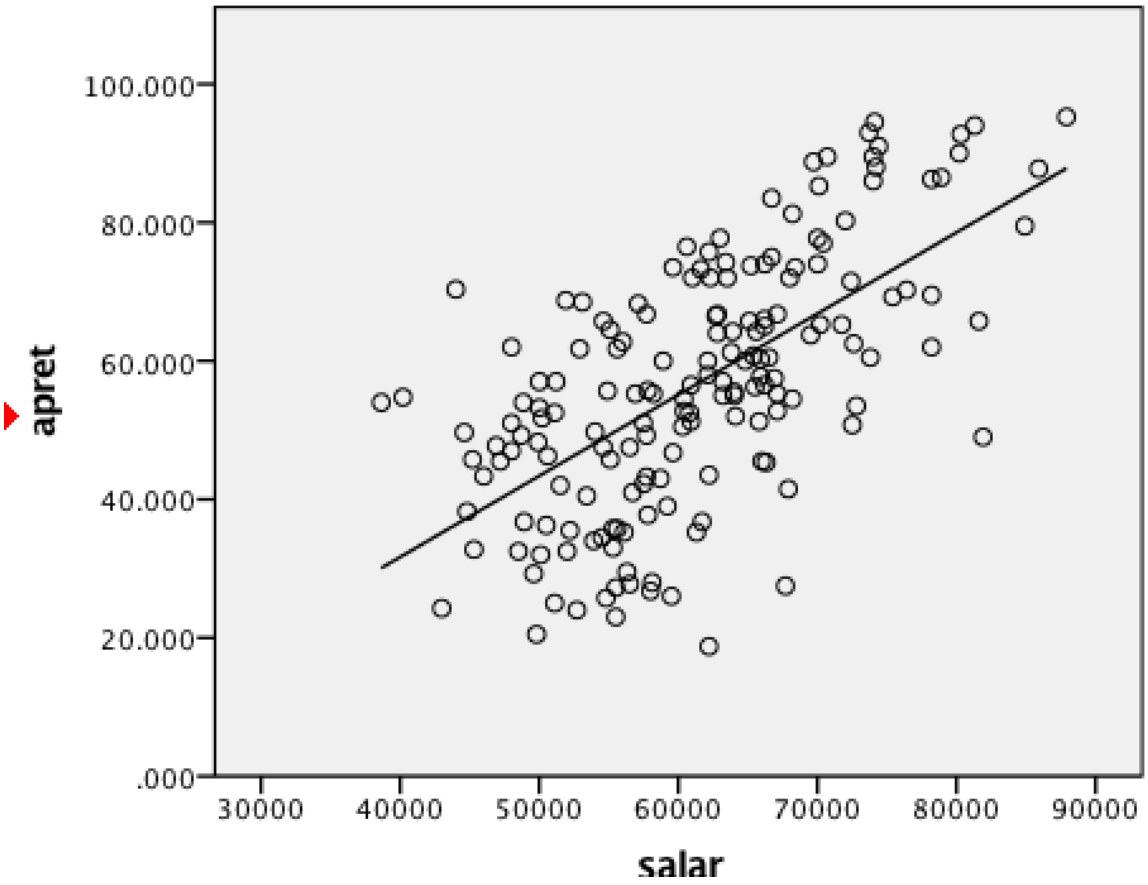
（b）linear regression of apret on salar

Dependent Variable: apret

Variables Entered: salar

Linear model:Y=AX+B

95% confidence intervals



Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.636[a]	.404	.401	13.993569

a. Predictors: (Constant), salar

b. Dependent Variable: apret

R^2=0.404 and adjusted R^2=0.404, so the fitting degree of model and data is good

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	22328.307	1	22328.307	114.025	.000[b]
	Residual	32897.755	168	195.820		
	Total	55226.061	169			

a. Dependent Variable: apret

b. Predictors: (Constant), salar

Sig=0.000<0.05 , so the regression equation is valid

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-15.224	6.823		-2.231	.027	-28.693	-1.755
	salar	.001	.000	.636	10.678	.000	.001	.001

a. Dependent Variable: apret

Constant=-15.224

salar(B)=0.001

apret=0.001salar-15.224

(c) linear regression of apret on tstsc and salar

Dependent Variable: apret
Variables Entered: salar， tstsc
R^2=0.624
Adjusted R^2=0.619
Sig=0.000
Constant=-75.911
tstsc(B)=1.738
salar(B)=0.000

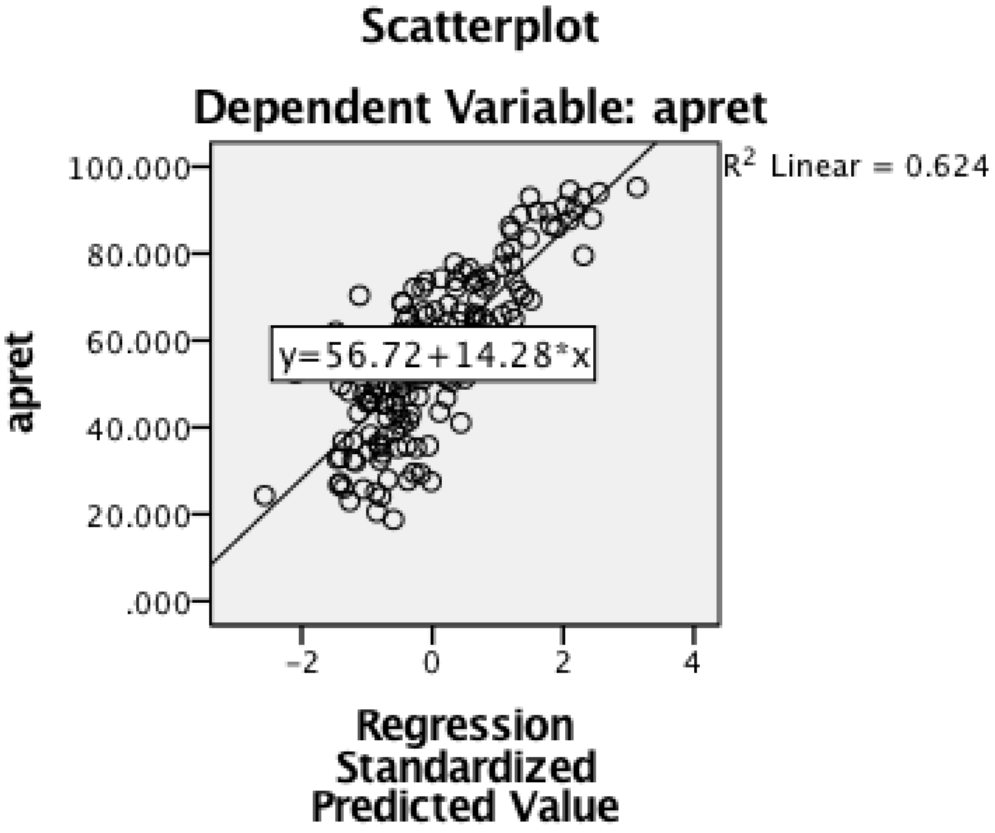
ANOVA[a]

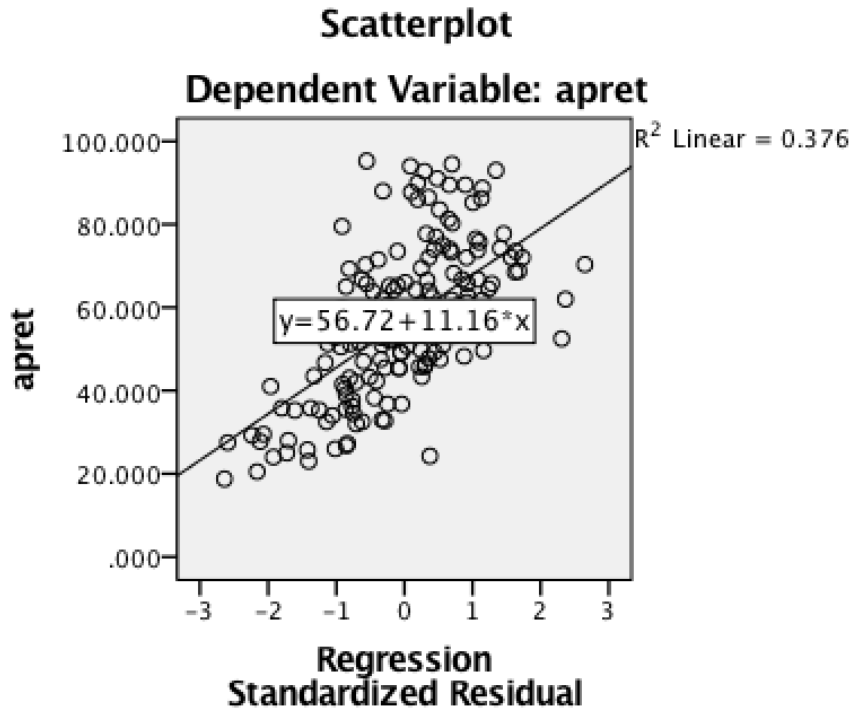
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	34445.228	2	17222.614	138.405	.000[b]
	Residual	20780.833	167	124.436		
	Total	55226.061	169			

a. Dependent Variable: apret
b. Predictors: (Constant), salar, tstsc

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	-75.911	8.210		-9.246	.000	-92.119	-59.703
	tstsc	1.738	.176	.670	9.868	.000	1.390	2.085
	salar	.000	.000	.156	2.298	.023	.000	.001


Scatterplot
Dependent Variable: apret
R² Linear = 0.624
y=56.72+14.28*x
apret
100.000
80.000
60.000
40.000
20.000
.000
-2
0
2
4
Regression
Standardized
Predicted Value

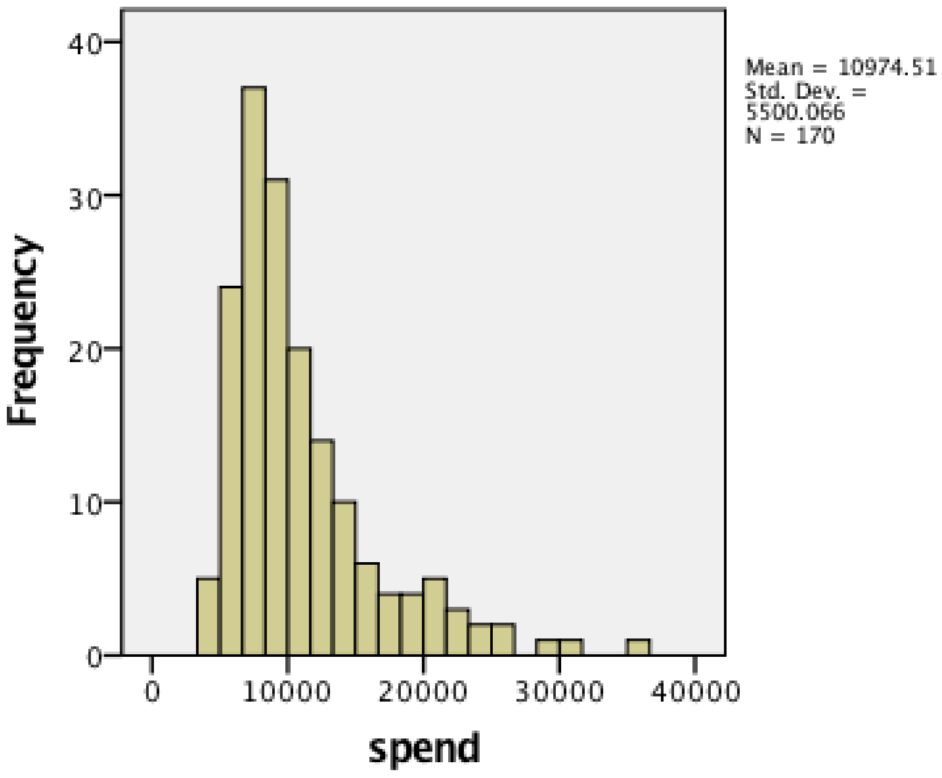

Scatterplot
Dependent Variable: apret
R² Linear = 0.376
y=56.72+11.16*x
apret
100.000
80.000
60.000
40.000
20.000
.000
-3
-2
-1
0
1
2
3
Regression
Standardized Residual

（3）Generate descriptive statistics and histograms for spend，top10，rejr，pacc，strat

(a)spend

Descriptive Statistics

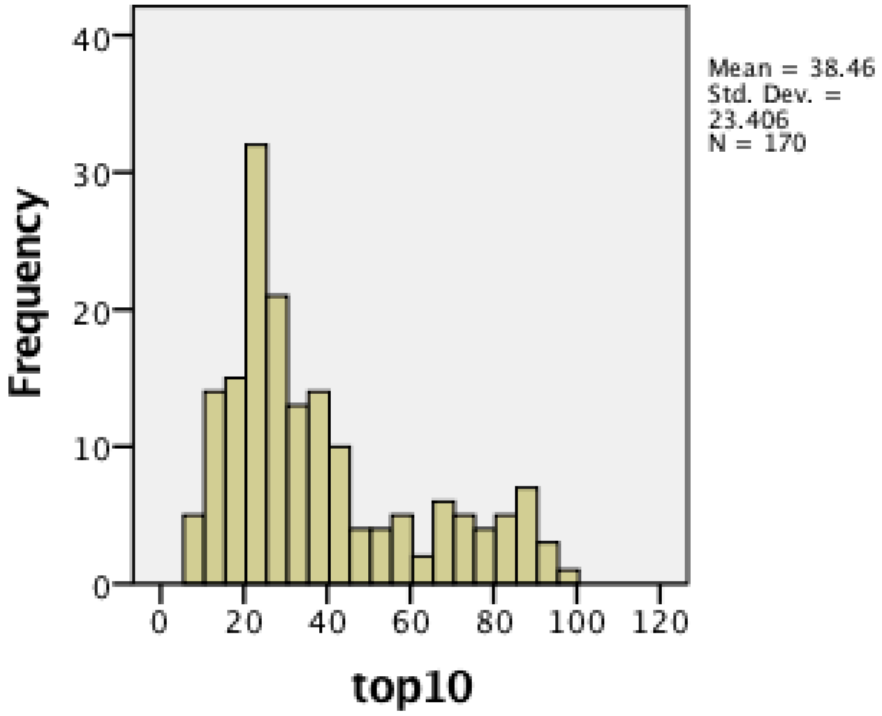
	N	Range	Minimum	Maximum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
spend	170	31738	4125	35863	10974.51	421.836	5500.066	30250721.4
Valid N (listwise)	170							



(b) top 10

Descriptive Statistics

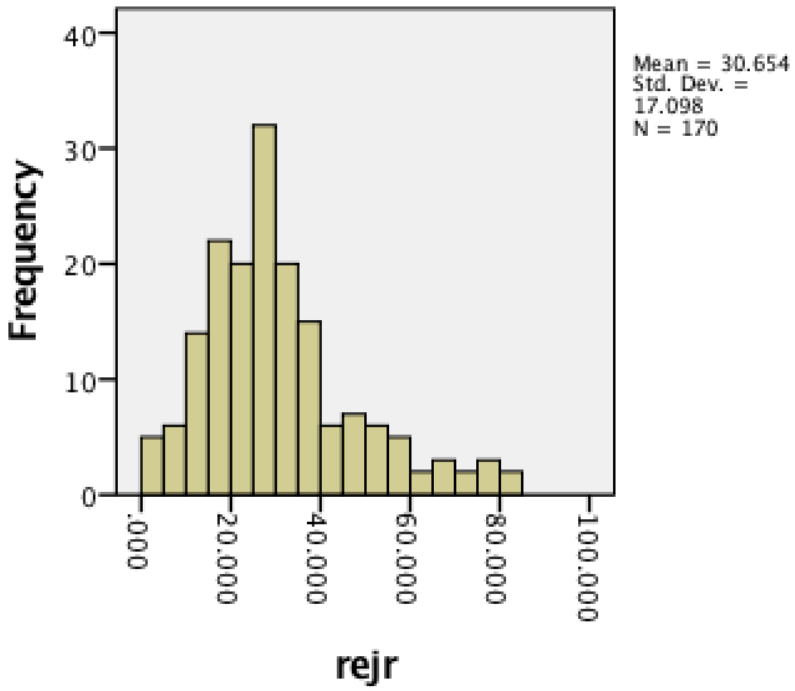
	N	Range	Minimum	Maximum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
top10	170	90	8	98	38.46	1.795	23.406	547.859
Valid N (listwise)	170							



(c) rejr

Descriptive Statistics

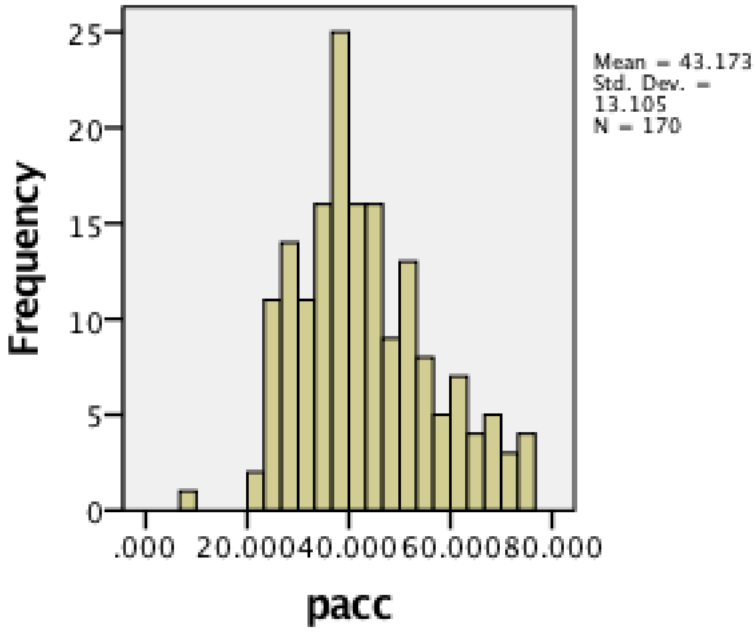
	N	Range	Minimum	Maximum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
rejr	170	84.067	.000	84.067	30.65422	1.311365	17.098104	292.345
Valid N (listwise)	170							



(d) pacc

Descriptive Statistics

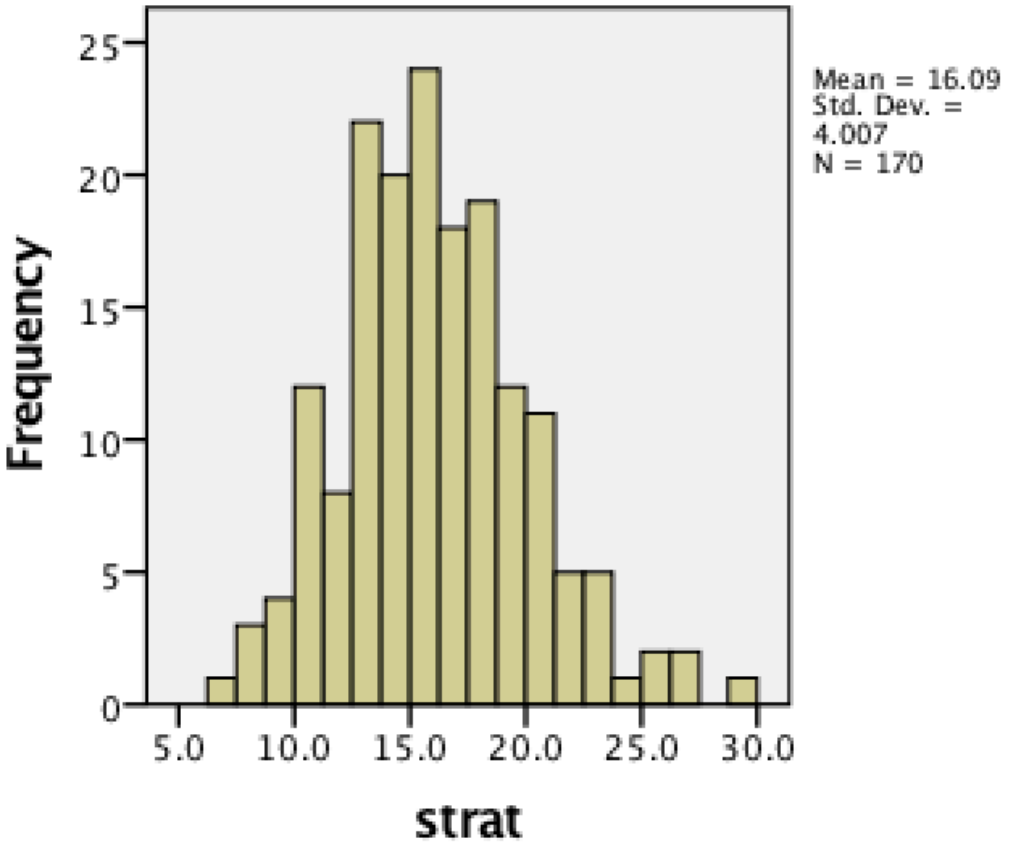
	N	Range	Minimum	Maximum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
pacc	170	67.289	8.964	76.253	43.17311	1.005123	13.105195	171.746
Valid N (listwise)	170							



(e) strat

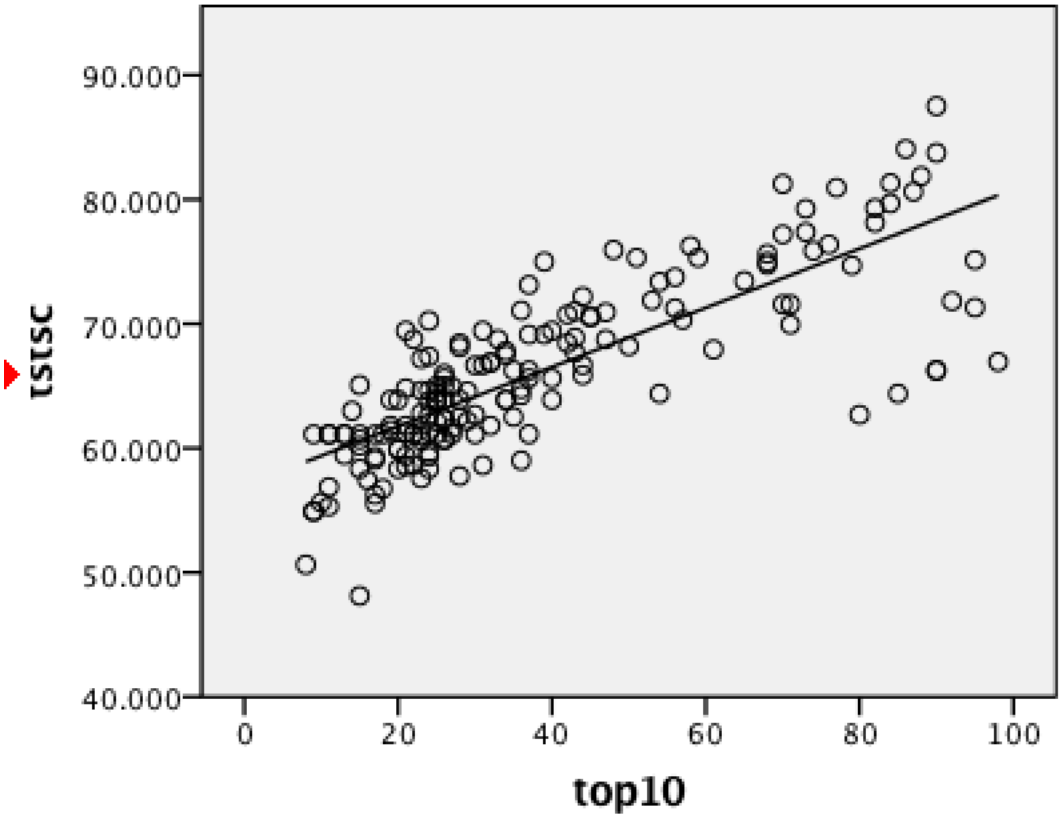
Descriptive Statistics

	N	Range	Minimum	Maximum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
strat	170	22.0	7.2	29.2	16.086	.3073	4.0065	16.052
Valid N (listwise)	170							



(4) Analyze the tstsc and top10

Dependent Variable: tstsc
Variables Entered: top10



Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.799[a]	.638	.636	4.208723

a. Predictors: (Constant), top10

R^2=0.638 and Adjusted R^2=0.636 so the fitting degree of model and data is good

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	57.009	.622		91.621	.000
	top10	.238	.014	.799	17.211	.000

a. Dependent Variable: tstsc

Constant=57.009
Top10(B)=0.238
So tstsc=0.238top10+57.009