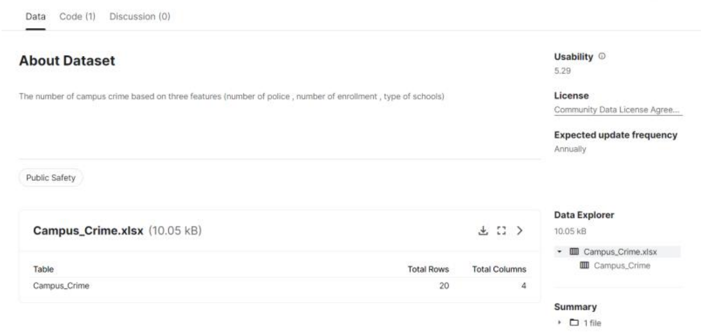
Campus Crime Prediction-predictive analysis with Analytic Solver

Data source: Campus Crime Dataset,
link:https://www.kaggle.com/datasets/tobijoshua/campuscrime



Introduction:

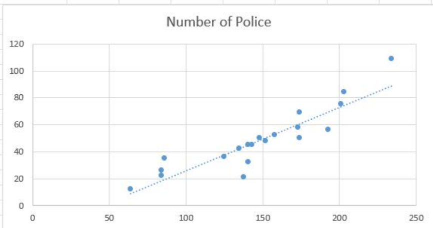
Campus Crime Prediction Based on number of police, number of enrollment, schools

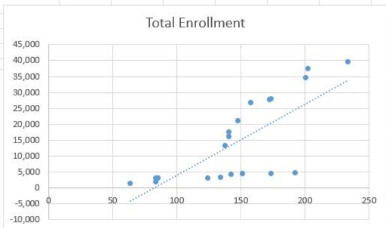
Y:number of crimes X_1:Total enrollment X_2:Police X_3:Private school

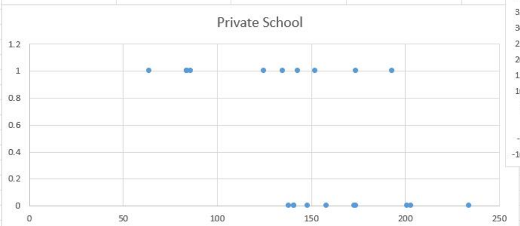
Data process and modeling:

Step 1:scatter plot

obs	Number of Crimes	Total Enrollment	Number of Police	Private School
1	64	1,131	12	1
2	138	12,954	21	0
3	141	16,009	32	0
4	84	1,682	22	1
5	86	2,888	35	1
6	141	17,407	45	0
7	135	3,028	42	1
8	174	4,306	50	1
9	201	34,511	75	0
10	203	37,240	84	0
11	125	2,918	36	1
12	234	39,414	109	0
13	143	4,000	45	1
14	148	20,950	50	0
15	152	4,277	48	1
16	158	26,519	52	0
17	174	27,687	69	0
18	84	2,810	26	1
19	173	27,619	58	0
20	193	4,563	56	1







According to the scatter plot,when use a simple linear regression model to estimate the crime amount ,police and total enrollment should be used because there seems to be linear relationship between them with number of crimes.

Step 2:

X_1:

SUMMARY OUTPUT

Regression Ststistics	
Multiple R	0.743583027
R Square	0.552915719
Adjusted R Squ	0.528077703
Standard Error	30.46099978
Observations	20

ANOVA

	df	SS	MS	F	Significance F
Regression	1	20655.24486	20655.24486	22.26086524	0.000171498
Residual	18	16701.70514	927.8725078		
Total	19	37356.95			

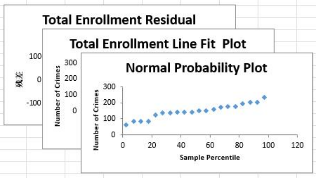
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	下限 95.0%	上限 95.0%
Intercept	111.4739324	10.24005263	10.88607026	2.38127E-09	89.9603801	132.9874846	89.9603801	132.9874846
Total Enrollme	0.0024717	0.000523871	4.718142139	0.000171498	0.001371087	0.003572313	0.001371087	0.003572313

RESIDUAL OUTPUT

Observation	Predicted Price	Residuals	
1	114.269425	-50.26942503	-1.695509831
2	143.4923337	-5.492333749	-0.185247909
3	151.0433771	-10.04337715	-0.338747552
4	115.6313317	-31.63133172	-1.066875817
5	118.6122019	-32.61220188	-1.099959048
6	154.4988137	-13.4988137	-0.455294074
7	118.9582399	16.04176013	0.541063718
8	122.1170724	51.88292757	1.749930772
9	196.7747699	4.225230054	0.142510464
10	203.5200392	-0.520039157	-0.017540115
11	118.6863529	6.313647124	0.212949537
12	208.8935149	25.10648511	0.846802849
13	121.3607322	21.63926776	0.729858979
14	163.2560467	-15.25604669	-0.514562821
15	122.0453931	29.95460687	1.010322485
16	177.0209438	-19.02094381	-0.641546968
17	179.9078894	-5.907889368	-0.199263956
18	118.4194093	-34.41940928	-1.160913354
19	179.7398138	-6.73981377	-0.227323477
20	122.7522993	70.24770068	2.369346119

PROBABILITY OUTPUT

Percentile	Price	Number of Crimes
	2.5	64
	7.5	84
	12.5	84
	17.5	86
	22.5	125
	27.5	135
	32.5	138
	37.5	141
	42.5	141
	47.5	143
	52.5	148
	57.5	152
	62.5	158
	67.5	173
	72.5	174
	77.5	174
	82.5	193
	87.5	201
	92.5	203
	97.5	234



Campus_Crime | X1-Enrollment | X2-police | X3-Private | X2&X1 | X2&X3 | X1&X2&X3 | Crime Rate | Crim ...

X_2:

The model using X_2accounts for 80% of the variation in y,leaving 20% unaccounted for.

SUMMARY OUTPUT

Regression Ststistics	
Multiple R	0.901572497
R Square	0.812832967
Adjusted R Square	0.802434798
Standard Error	19.7089792
Observations	20

ANOVA

	df	SS	MS	F	Significance F
Regression	1	30364.9605	30365	78.1708	5.73404E-08
Residual	18	6991.9895	388.444		
Total	19	37356.95			

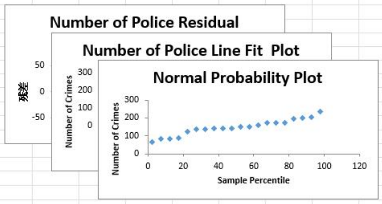
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	下限 95.0%	上限 95.0%
Intercept	64.04793454	10.42205055	6.14543	8.4E-06	42.15201884	85.94385024	42.15201884	85.94385024
Number of Police	1.727033412	0.1953343	8.84142	5.7E-08	1.316651276	2.137415548	1.316651276	2.137415548

RESIDUAL OUTPUT

Observation	Predicted Price	Residuals	
1	84.77233548	-20.77233548	-1.08283
2	100.3156362	37.68436381	1.96443
3	119.3130037	21.68699628	1.13051
4	102.0426696	-18.0426696	-0.94054
5	124.494104	-38.49410395	-2.00665
6	141.7644381	-0.764438071	-0.03985
7	136.5833378	-1.583337835	-0.08254
8	150.3996051	23.60039487	1.23026
9	193.5754404	7.424559577	0.38703
10	209.1187411	-6.118741129	-0.31896
11	126.2211374	-1.221137365	-0.06366
12	252.2945764	-18.29457642	-0.95367
13	141.7644381	1.235561929	0.06441
14	150.3996051	-2.399605129	-0.12509
15	146.9455383	5.054461694	0.26348
16	153.853672	4.146328047	0.21614
17	183.21324	-9.213239953	-0.48027
18	108.9508032	-24.95080325	-1.30065
19	164.2158724	8.784127577	0.4579
20	160.7618056	32.2381944	1.68053

PROBABILITY OUTPUT

Percentile	Price	Number of Crimes
	2.5	64
	7.5	84
	12.5	84
	17.5	86
	22.5	125
	27.5	135
	32.5	138
	37.5	141
	42.5	141
	47.5	143
	52.5	148
	57.5	152
	62.5	158
	67.5	173
	72.5	174
	77.5	174
	82.5	193
	87.5	201
	92.5	203
	97.5	234



Campus_Crime | X1-Enrollment | X2-police | X3-Private | X2&X1 | X2&X3 | X1&X2&X3 | Crime Rate | Crim ...

X_3:

SUMMARY OUTPUT

Regression Ststistics	
Multiple R	0.743583027
R Square	0.552915719
Adjusted R Squa	0.528077703
Standard Error	30.46099978
Observations	20

ANOVA

	df	SS	MS	F	Significance F
Regression	1	20655.24486	20655.24486	22.26086524	0.000171498
Residual	18	16701.70514	927.8725078		
Total	19	37356.95			

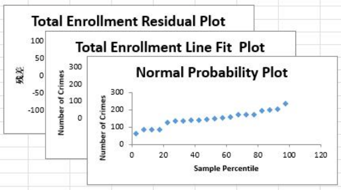
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	下限 95.0%	上限 95.0%
Intercept	111.4739324	10.24005263	10.88607026	2.38127E-09	89.9603801	132.9874846	89.9603801	132.9874846
Total Enrollmen	0.0024717	0.000523871	4.718142139	0.000171498	0.001371087	0.003572313	0.001371087	0.003572313

RESIDUAL OUTPUT

Observation	Predicted Price	Residuals	
1	114.269425	-50.26942503	-1.695509831
2	143.4923337	-5.492333749	-0.185247909
3	151.0433771	-10.04337715	-0.338747552
4	115.6313317	-31.63133172	-1.066875817
5	118.6122019	-32.61220188	-1.099959048
6	154.4988137	-13.4988137	-0.455294074
7	118.9582399	16.04176013	0.541063718
8	122.1170724	51.88292757	1.749930772
9	196.7747699	4.225230054	0.142510464
10	203.5200392	-0.520039157	-0.017540115
11	118.6863529	6.313647124	0.212949537
12	208.8935149	25.10648511	0.846802849
13	121.3607322	21.63926776	0.729858979
14	163.2560467	-15.25604669	-0.514562821
15	122.0453931	29.95460687	1.010322485
16	177.0209438	-19.02094381	-0.641546968
17	179.9078894	-5.907889368	-0.199263956
18	118.4194093	-34.41940928	-1.160913354
19	179.7398138	-6.73981377	-0.227323477
20	122.7522993	70.24770068	2.369346119

PROBABILITY OUTPUT

Percentile	Price	Number of Crimes
	2.5	64
	7.5	84
	12.5	84
	17.5	86
	22.5	125
	27.5	135
	32.5	138
	37.5	141
	42.5	141
	47.5	143
	52.5	148
	57.5	152
	62.5	158
	67.5	173
	72.5	174
	77.5	174
	82.5	193
	87.5	201
	92.5	203
	97.5	234



Campus_Crime | X1-Enrollment | X2-police | X3-Private | X2&X1 | X2&X3 | X1&X2&X3 | Crime Rate | Crim ...

$X_2 \& X_1$:

SUMMARY OUTPUT

Regression Ststistics	
Multiple R	0.902111953
R Square	0.813805975
Adjusted R Squ	0.791900796
Standard Error	20.22758872
Observations	20

ANOVA

	df	SS	MS	F	Significance F
Regression	2	30401.30913	15200.65456	37.1513039	6.23317E-07
Residual	17	6955.640871	409.1553453		
Total	19	37356.95			

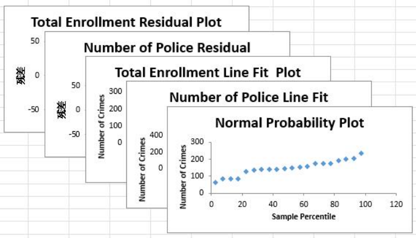
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	下限 95.0%	上限 95.0%
Intercept	65.41072225	11.63253732	5.62308295	3.0418E-05	40.86821381	89.95323069	40.86821381	89.95323069
Total Enrollme	0.000174451	0.000585294	0.298057395	0.76927142	-0.001060412	0.001409314	-0.001060412	0.001409314
Number of Poli	1.646185057	0.337293626	4.880569716	0.00014079	0.93455771	2.357812403	0.93455771	2.357812403

RESIDUAL OUTPUT

Observation	Predicted Price	Residuals	
1	85.36224736	-21.36224736	-1.116490841
2	102.2404507	35.75954929	1.868961097
3	120.8814351	20.11856492	1.051490187
4	101.9202206	-17.9202206	-0.936594443
5	123.5310146	-37.53101462	-1.96154615
6	142.5257237	-1.525723749	-0.079741451
7	135.0787332	-0.0787332	-0.004114965
8	148.4711624	25.52883757	1.33425631
9	194.8950906	6.104909352	0.319071082
10	210.1868338	-7.186833782	-0.375617507
11	125.1824332	-0.182433215	-0.009534812
12	251.7207173	-17.72071735	-0.926167471
13	140.186855	2.813144957	0.147028097
14	151.37473	-3.374730022	-0.176379156
15	145.1737332	6.826266774	0.356772591
16	155.6386195	2.361380522	0.123416777
17	183.8275246	-9.827524572	-0.513632343
18	108.7017419	-24.70174191	-1.291028426
19	165.7076263	7.292373741	0.381133518

PROBABILITY OUTPUT

Percentile	Price	Number of Crimes
	2.5	64
	7.5	84
	12.5	84
	17.5	86
	22.5	125
	27.5	135
	32.5	138
	37.5	141
	42.5	141
	47.5	143
	52.5	148
	57.5	152
	62.5	158
	67.5	173
	72.5	174
	77.5	174
	82.5	193
	87.5	201
	92.5	203



Campus_Crime | X1-Enrollment | X2-police | X3-Private | X2&X1 | X2&X3 | X1&X2&X3 | Crime Rate | Crim ...

X_1 doesn't help to explain the crime amount when X_2 is also in the model.

$X_2 \& X_3$:

SUMMARY OUTPUT

Regression Ststistics	
Multiple R	0.908785996
R Square	0.825891987
Adjusted R Squai	0.805408692
Standard Error	19.56007988
Observations	20

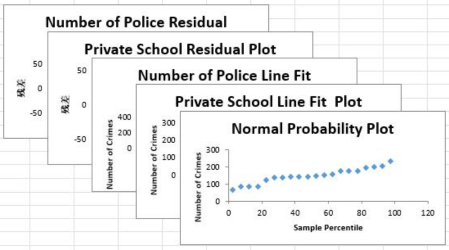
ANOVA

	df	SS	MS	F	Significance F
Regression	2	30852.80568	15426.4028	40.32026892	3.5234E-07
Residual	17	6504.144324	382.596725		
Total	19	37356.95			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	下限 95.0%	上限 95.0%
Intercept	75.74580003	14.63906082	5.17422538	7.62293E-05	44.8600815	106.631519	44.8600815	106.631519
Number of Polic	1.602591596	0.222993247	7.18672704	1.52156E-06	1.13211697	2.07306622	1.13211697	2.07306622
Private School	-11.36220741	10.06218573	-1.1291987	0.274496796	-32.591564	9.86714879	-32.591564	9.86714879

RESIDUAL OUTPUT | PROBABILITY OUTPUT

Observation	Predicted Price	Residuals		Percentile	Price	umber of Crimes
1	83.61469178	-19.61469178	-1.06014		2.5	64
2	109.4002235	28.59977645	1.54576815		7.5	84
3	127.0287311	13.97126889	0.75512277		12.5	84
4	99.64060774	-15.64060774	-0.8453476		17.5	86
5	120.4742985	-34.47429849	-1.8632758		22.5	125
6	147.8624219	-6.862421856	-0.370902		27.5	135
7	131.6924397	3.307560338	0.17876788		32.5	138
8	144.5131724	29.48682757	1.59371172		37.5	141
9	195.9401697	5.05983026	0.27347502		42.5	141
10	210.3634941	-7.363494106	-0.397984		47.5	143
11	122.0768901	2.923109915	0.157989		52.5	148
12	250.428284	-16.42828401	-0.8879202		57.5	152
13	136.5002145	6.49978555	0.3513021		62.5	158
14	155.8753798	-7.875379836	-0.4256506		67.5	173
15	141.3079892	10.69201076	0.57788458		72.5	174
16	159.080563	-1.080563029	-0.0584026		77.5	174
17	186.3246202	-12.32462016	-0.6661243		82.5	193
18	106.0509741	-22.05097412	-1.1918168		87.5	201
19	168.6961126	4.303887394	0.23261762		92.5	203
20	154.128722	38.87127799	2.10092493		97.5	234



X_1&X_2&X_3:

SUMMARY OUTPUT

Regression Ststistics	
Multiple R	0.932637874
R Square	0.869813405
Adjusted R Square	0.845403418
Standard Error	17.43447398
Observations	20

ANOVA

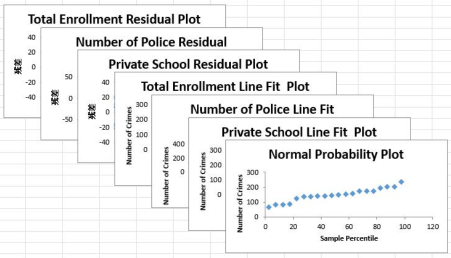
	df	SS	MS	F	Significance F
Regression	3	32493.57587	10831.19196	35.63350604	2.59036E-07
Residual	16	4863.374127	303.960883		
Total	19	37356.95			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	下限 95.0%	上限 95.0%
Intercept	105.9195379	18.4098457	5.753418016	2.9639E-05	66.89240845	144.9466674	66.89240845	144.9466674
Total Enrollment	-0.003256672	0.001401713	-2.323352096	0.033661647	-0.00622817	-0.000285174	-0.00622817	-0.000285174
Number of Police	2.520250195	0.44216337	5.699816773	3.28633E-05	1.582905723	3.457594667	1.582905723	3.457594667
Private School	-65.38078516	24.92013866	-2.623612415	0.018434193	-118.2091192	-12.55245116	-118.2091192	-12.55245116

RESIDUAL OUTPUT | PROBABILITY OUTPUT

Observation	Predicted Price	Residuals		Percentile	Price	Number of Crimes
1	67.09845924	-3.09845924	-0.193666163		2.5	64
2	116.6578651	21.34213494	1.33396926		7.5	84
3	134.4314848	6.568515244	0.410558618		12.5	84
4	90.50653501	-6.506535009	-0.406684604		17.5	86
5	119.3422413	-33.34224131	-2.084024167		22.5	125
6	162.6419101	-21.64191007	-1.352706411		27.5	135
7	136.5280586	-1.528058619	-0.095509809		32.5	138
8	152.5280336	21.47196642	1.34208425		37.5	141
9	182.5473009	18.45269913	1.153367902		42.5	141
10	196.3420952	6.657904807	0.416145825		47.5	143
11	121.7647914	3.235208649	0.202213551		52.5	148
12	252.2683455	-18.2683455	-1.141845059		57.5	152
13	140.9233242	2.076675818	0.12980059		62.5	158
14	163.7047727	-15.70477273	-0.981611452		67.5	173
15	147.5819767	4.418023331	0.276144225		72.5	174
16	150.6088677	7.391132317	0.461975493		77.5	174

Campus_Crime | X1-Enrollment | X2-police | X3-Private | X2&X1 | X2&X3 | X1&X2&X3 | Crime Rate | Crim ...



The model using X_2 accounts for 80% of the variation in y,leaving 20% unaccounted for.If X_3 ,X_2 is also in the model,then the model using X_1, X_2 and X_3 accounts for 84.5% of the variation in y,leaving 15.5% unaccounted for.

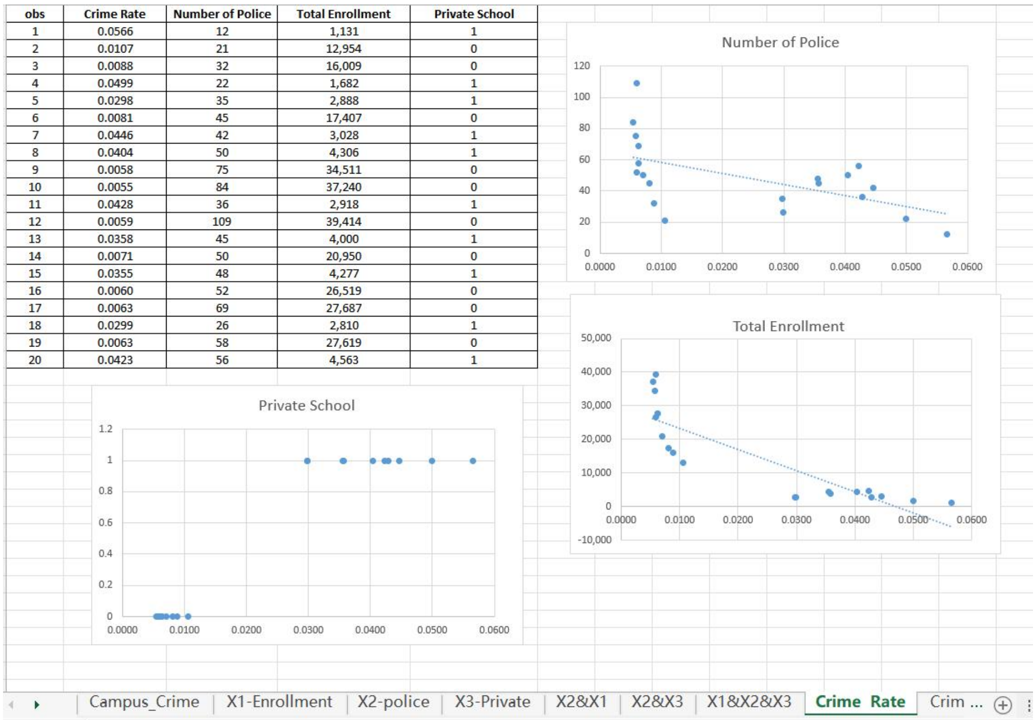
Y:crime X_1:Total enrollment X_2:Police X_3:Private school

$\hat{Y} = b_1 + b_1X_1 + b_2X_2 + + b_3X_3$

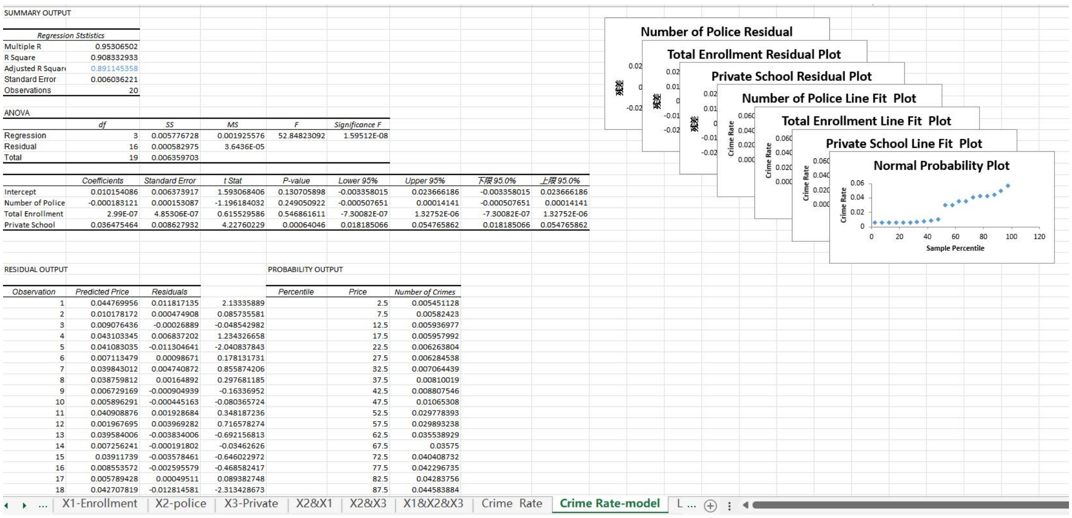
$\hat{Y} = 105.9195 - 0.0032567X_1 + 2.52X_2 - 65.38X_3$

Step 3-Crime rate mode:

To reduce the sample bias from total amount of Enrollment,use crime rate as dependent variable(crime rate=crime/total enrollment):



obs	Crime Rate	Number of Police	Total Enrollment	Private School
1	0.0566	12	1,131	1
2	0.0107	21	12,954	0
3	0.0088	32	16,009	0
4	0.0499	22	1,682	1
5	0.0298	35	2,888	1
6	0.0081	45	17,407	0
7	0.0446	42	3,028	1
8	0.0404	50	4,306	1
9	0.0058	75	34,511	0
10	0.0055	84	37,240	0
11	0.0428	36	2,918	1
12	0.0059	109	39,414	0
13	0.0358	45	4,000	1
14	0.0071	50	20,950	0
15	0.0355	48	4,277	1
16	0.0060	52	26,519	0
17	0.0063	69	27,687	0
18	0.0299	26	2,810	1
19	0.0063	58	27,619	0
20	0.0423	56	4,563	1



SUMMARY OUTPUT

Regression Ststistics	
Multiple R	0.95306502
R Square	0.908332933
Adjusted R Squar	0.891145358
Standard Error	0.006036221
Observations	20

ANOVA

	df	SS	MS	F	Significance F
Regression	3	0.005776728	0.001925576	52.84823092	1.59512E-08
Residual	16	0.000582975	3.6436E-05		
Total	19	0.006359703			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	下限 95.0%	上限 95.0%
Intercept	0.010154086	0.006373917	1.593068406	0.130705898	-0.003358015	0.023666186	-0.003358015	0.023666186
Number of Police	-0.000183121	0.000153087	-1.196184032	0.249050922	-0.000507651	0.00014141	-0.000507651	0.00014141
Total Enrollment	2.99E-07	4.85306E-07	0.615529586	0.546861611	-7.30082E-07	1.32752E-06	-7.30082E-07	1.32752E-06
Private School	0.036475464	0.008627932	4.22760229	0.00064046	0.018185066	0.054765862	0.018185066	0.054765862

RESIDUAL OUTPUT

Observation	Predicted Price	Residuals	
1	0.044769956	0.011817135	2.13335889
2	0.010178172	0.000474908	0.085735581
3	0.009076436	-0.00026889	-0.048542982
4	0.043103345	0.006837202	1.234326658
5	0.041083035	-0.011304641	-2.040837843
6	0.007113479	0.00098671	0.178131731
7	0.039843012	0.004740872	0.855874206
8	0.038759812	0.00164892	0.297681185
9	0.006729169	-0.000904939	-0.16336952
10	0.005896291	-0.000445163	-0.080365724
11	0.040908876	0.001928684	0.348187236
12	0.001967695	0.003969282	0.716578274
13	0.039584006	-0.003834006	-0.692156813
14	0.007256241	-0.000191802	-0.03462626
15	0.03911739	-0.003578461	-0.646022972
16	0.008553572	-0.002595579	-0.468582417
17	0.005789428	0.00049511	0.089382748
18	0.042707819	-0.012814581	-2.313428673

PROBABILITY OUTPUT

Percentile	Price	Number of Crimes
	2.5	0.005451128
	7.5	0.00582423
	12.5	0.005936977
	17.5	0.005957992
	22.5	0.006263804
	27.5	0.006284538
	32.5	0.007064439
	37.5	0.00810019
	42.5	0.008807546
	47.5	0.01065308
	52.5	0.029778393
	57.5	0.029893238
	62.5	0.035538929
	67.5	0.03575
	72.5	0.040408732
	77.5	0.042296735
	82.5	0.04283756
	87.5	0.044583884

Y:crime-rate X_1:Total enrollment X_2:Police X_3:Private school

$\hat{Y} = \alpha_1 + \alpha_1 X_1 + \alpha_2 X_2 ++ \alpha_3 X_3$

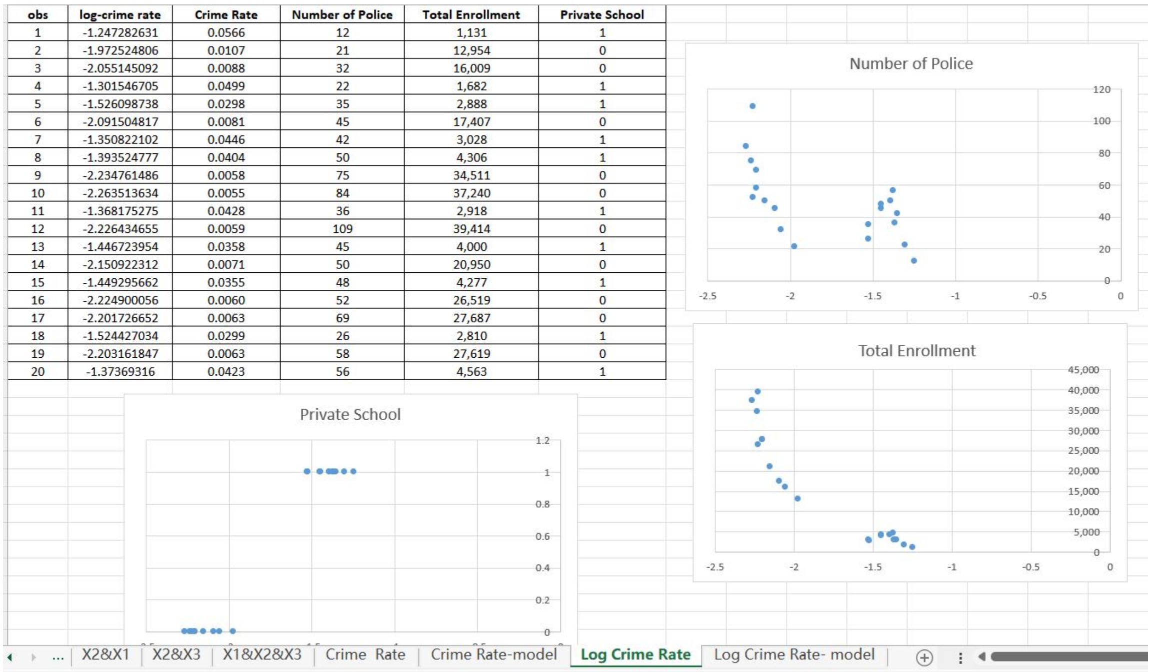
$\hat{Y}$ = 0.010154 +1.99E07X_1 -0.000183121X_2 + 0.036475474X_3

According to the above model,on average, if 1 unite increase in amount of police,then crime rate can be estimated decreased by 0.0183%,but not significant.And crime rate in private school is higher than non-private school.

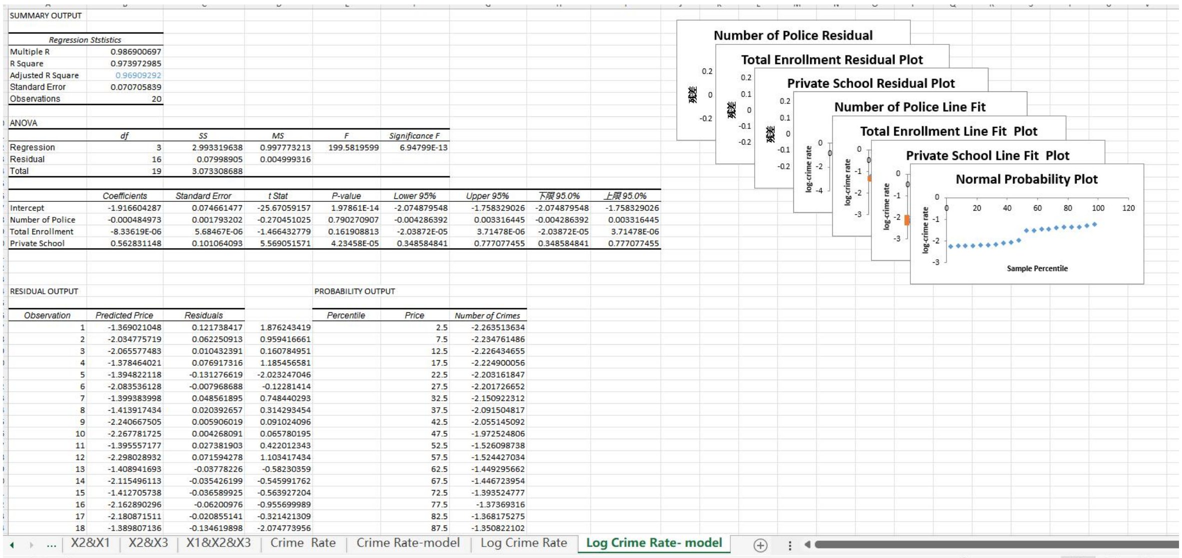
Step 4-log-Crime rate mode:

Finally, log-scale graph may help us find better accuracy

Log- y-axis:



obs	log-crime rate	Crime Rate	Number of Police	Total Enrollment	Private School
1	-1.247282631	0.0566	12	1,131	1
2	-1.972524806	0.0107	21	12,954	0
3	-2.055145092	0.0088	32	16,009	0
4	-1.301546705	0.0499	22	1,682	1
5	-1.526098738	0.0298	35	2,888	1
6	-2.091504817	0.0081	45	17,407	0
7	-1.350822102	0.0446	42	3,028	1
8	-1.393524777	0.0404	50	4,306	1
9	-2.234761486	0.0058	75	34,511	0
10	-2.263513634	0.0055	84	37,240	0
11	-1.368175275	0.0428	36	2,918	1
12	-2.226434655	0.0059	109	39,414	0
13	-1.446723954	0.0358	45	4,000	1
14	-2.150922312	0.0071	50	20,950	0
15	-1.449295662	0.0355	48	4,277	1
16	-2.224900056	0.0060	52	26,519	0
17	-2.201726652	0.0063	69	27,687	0
18	-1.524427034	0.0299	26	2,810	1
19	-2.203161847	0.0063	58	27,619	0
20	-1.37369316	0.0423	56	4,563	1



SUMMARY OUTPUT

Regression Ststistics	
Multiple R	0.986900697
R Square	0.973972985
Adjusted R Square	0.96909292
Standard Error	0.070705839
Observations	20

ANOVA

	df	SS	MS	F	Significance F
Regression	3	2.993319638	0.997773213	199.5819599	6.94799E-13
Residual	16	0.07998905	0.004999316		
Total	19	3.073308688			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	下限 95.0%	上限 95.0%
Intercept	-1.916604287	0.074661477	-25.67059157	1.97861E-14	-2.074879548	-1.758329026	-2.074879548	-1.758329026
Number of Police	-0.000484973	0.001793202	-0.270451025	0.790270907	-0.004286392	0.003316445	-0.004286392	0.003316445
Total Enrollment	-8.33619E-06	5.68467E-06	-1.466432779	0.161908813	-2.03872E-05	3.71478E-06	-2.03872E-05	3.71478E-06
Private School	0.562831148	0.101064093	5.569051571	4.23458E-05	0.348584841	0.777077455	0.348584841	0.777077455

RESIDUAL OUTPUT

Observation	Predicted Price	Residuals	
1	-1.369021048	0.121738417	1.876243419
2	-2.034775719	0.062250913	0.959416661
3	-2.065577483	0.010432391	0.160784951
4	-1.378464021	0.076917316	1.185456581
5	-1.394822118	-0.131276619	-2.023247046
6	-2.083536128	-0.007968688	-0.12281414
7	-1.399383998	0.048561895	0.748440293
8	-1.413917434	0.020392657	0.314293454
9	-2.240667505	0.005906019	0.091024096
10	-2.267781725	0.004268091	0.065780195
11	-1.395557177	0.027381903	0.422012343
12	-2.298028932	0.071594278	1.103417434
13	-1.408941693	-0.03778226	-0.58230359
14	-2.115496113	-0.035426199	-0.545991762
15	-1.412705738	-0.036589925	-0.563927204
16	-2.162890296	-0.06200976	-0.955699989
17	-2.180871511	-0.020855141	-0.321421309
18	-1.389807136	-0.134619898	-2.074773956

PROBABILITY OUTPUT

Percentile	Price	Number of Crimes
	2.5	-2.263513634
	7.5	-2.234761486
	12.5	-2.226434655
	17.5	-2.224900056
	22.5	-2.203161847
	27.5	-2.201726652
	32.5	-2.150922312
	37.5	-2.091504817
	42.5	-2.055145092
	47.5	-1.972524806
	52.5	-1.526098738
	57.5	-1.524427034
	62.5	-1.449295662
	67.5	-1.446723954
	72.5	-1.393524777
	77.5	-1.37369316
	82.5	-1.368175275
	87.5	-1.350822102

Variables	R^2	Adj-R^2	SE
X_1(total enrollment)	0.552916	0.528078	30.46099978
X_2(police)	0.812833	0.802435	19.7089792
X_3(private)	0.552916	0.528078	30.46099978
X_2&X_1	0.791901	0.791901	20.22758872
X_2&X_3	0.825892	0.805409	19.56007988
X_1&X_2&X_3	0.869813	0.845403	17.43447398
Crime rate-X_1&X_2&X_3	0.908333	0.891145	0.006036221
Log(Crime rate)-X_1&X_2&X_3	0.973973	0.969092	0.070705839

Regression models recommended to use and Conclusion:

When completed the log transform of crime rate,then use regression model methods,X_1:Total enrollment X_2:Police X_3:Private school should be used to estimate log(crime-rate),since its highest Adj-R^2(0.973973),the recommended model is log(crime rate)^ = -1.9166 -8.33619E06Enrollment -0.000484973police+ 0.56283Private.If 1 unit increase in police,than crime rate will be decreased by 0.0000485%.And on average,the crime rate of private school higher than non-private school.