Multiple Linear Regression Anlysis on PCs

Model: MODEL1
Dependent Variable: SalePrice SalePrice

Number of Observations Read	2630
Number of Observations Used	2630

Maximum R-Square Improvement: Step 1

Variable Prin1 Entered: R-Square = 0.7845 and C(p) = 1096.060

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	1.301284E13	1.301284E13	9566.19	<.0001
Error	2628	3.574855E12	1360294840		
Corrected Total	2629	1.658769E13			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	185496	719.18174	9.049505E13	66526.1	<.0001
Prin1	24532	250.82406	1.301284E13	9566.19	<.0001

Bounds on condition number: 1, 1

The above model is the best 1-variable model found.

Maximum R-Square Improvement: Step 2

Variable Prin3 Entered: R-Square = 0.8185 and C(p) = 510.3186

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	1.357733E13	6.788666E12	5924.15	<.0001
Error	2627	3.010359E12	1145930151		
Corrected Total	2629	1.658769E13			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	185496	660.08703	9.049505E13	78970.8	<.0001
Prin1	24532	230.21400	1.301284E13	11355.7	<.0001
Prin3	9677.42893	436.02210	5.644963E11	492.61	<.0001

Bounds on condition number: 1, 4

The above model is the best 2-variable model found.

Maximum R-Square Improvement: Step 3

Variable Prin6 Entered: R-Square = 0.8301 and C(p) = 312.7754

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	1.376898E13	4.589661E12	4275.88	<.0001
Error	2626	2.818707E12	1073384281		
Corrected Total	2629	1.658769E13			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	185496	638.85124	9.049505E13	84308.2	<.0001
Prin1	24532	222.80774	1.301284E13	12123.2	<.0001

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Prin3	9677.42893	421.99475	5.644963E11	525.90	<.0001
Prin6	6834.02727	511.44430	1.916514E11	178.55	<.0001

Bounds on condition number: 1, 9

The above model is the best 3-variable model found.

Maximum R-Square Improvement: Step 4

Variable Prin8 Entered: R-Square = 0.8355 and C(p) = 221.0119

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	1.385904E13	3.46476E12	3333.15	<.0001
Error	2625	2.728652E12	1039486447		
Corrected Total	2629	1.658769E13			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	185496	628.68275	9.049505E13	87057.5	<.0001
Prin1	24532	219.26135	1.301284E13	12518.5	<.0001
Prin3	9677.42893	415.27792	5.644963E11	543.05	<.0001
Prin6	6834.02727	503.30372	1.916514E11	184.37	<.0001
Prin8	-5310.15529	570.50867	90055197920	86.63	<.0001

Bounds on condition number: 1, 16

The above model is the best 4-variable model found.

Maximum R-Square Improvement: Step 5

Variable Prin5 Entered: R-Square = 0.8405 and C(p) = 137.4950

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	1.394117E13	2.788235E12	2764.51	<.0001
Error	2624	2.646517E12	1008581218		
Corrected Total	2629	1.658769E13			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	185496	619.26647	9.049505E13	89725.1	<.0001
Prin1	24532	215.97730	1.301284E13	12902.1	<.0001
Prin3	9677.42893	409.05798	5.644963E11	559.69	<.0001
Prin5	4118.94608	456.43393	82134807795	81.44	<.0001
Prin6	6834.02727	495.76534	1.916514E11	190.02	<.0001
Prin8	-5310.15529	561.96371	90055197920	89.29	<.0001

Bounds on condition number: 1, 25

The above model is the best 5-variable model found.

Maximum R-Square Improvement: Step 6

Variable Prin7 Entered: R-Square = 0.8453 and C(p) = 56.4314

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	1.402095E13	2.336825E12	2388.05	<.0001

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Error	2623	2.566739E12	978550775		
Corrected Total	2629	1.658769E13			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	185496	609.97749	9.049505E13	92478.6	<.0001
Prin1	24532	212.73764	1.301284E13	13298.1	<.0001
Prin3	9677.42893	402.92212	5.644963E11	576.87	<.0001
Prin5	4118.94608	449.58744	82134807795	83.94	<.0001
Prin6	6834.02727	488.32888	1.916514E11	195.85	<.0001
Prin7	4830.07806	534.93755	79778432402	81.53	<.0001
Prin8	-5310.15529	553.53427	90055197920	92.03	<.0001

Bounds on condition number: 1, 36

The above model is the best 6-variable model found.

Maximum R-Square Improvement: Step 7

Variable Prin9 Entered: R-Square = 0.8473 and C(p) = 23.9485

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	1.405407E13	2.007724E12	2077.76	<.0001
Error	2622	2.53362E12	966292723		
Corrected Total	2629	1.658769E13			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	185496	606.14493	9.049505E13	93651.8	<.0001
Prin1	24532	211.40099	1.301284E13	13466.8	<.0001
Prin3	9677.42893	400.39052	5.644963E11	584.19	<.0001
Prin5	4118.94608	446.76263	82134807795	85.00	<.0001
Prin6	6834.02727	485.26066	1.916514E11	198.34	<.0001
Prin7	4830.07806	531.57648	79778432402	82.56	<.0001
Prin8	-5310.15529	550.05635	90055197920	93.20	<.0001
Prin9	-3294.69625	562.76886	33119163087	34.27	<.0001

Bounds on condition number: 1, 49

The above model is the best 7-variable model found.

Maximum R-Square Improvement: Step 8

Variable Prin10 Entered: R-Square = 0.8482 and C(p) = 9.9184

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	1.406947E13	1.758683E12	1830.46	<.0001
Error	2621	2.518223E12	960787256		
Corrected Total	2629	1.658769E13			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	185496	604.41571	9.049505E13	94188.4	<.0001
Prin1	24532	210.79790	1.301284E13	13543.9	<.0001

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Prin3	9677.42893	399.24827	5.644963E11	587.54	<.0001
Prin5	4118.94608	445.48809	82134807795	85.49	<.0001
Prin6	6834.02727	483.87629	1.916514E11	199.47	<.0001
Prin7	4830.07806	530.05998	79778432402	83.03	<.0001
Prin8	-5310.15529	548.48714	90055197920	93.73	<.0001
Prin9	-3294.69625	561.16338	33119163087	34.47	<.0001
Prin10	2310.24275	577.11926	15396121625	16.02	<.0001

Bounds on condition number: 1, 64

The above model is the best 8-variable model found.

Maximum R-Square Improvement: Step 9

Variable Prin4 Entered: R-Square = 0.8484 and C(p) = 8.8137

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	1.407245E13	1.563605E12	1628.73	<.0001
Error	2620	2.515241E12	960015828		
Corrected Total	2629	1.658769E13			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	185496	604.17301	9.049505E13	94264.1	<.0001
Prin1	24532	210.71326	1.301284E13	13554.8	<.0001
Prin3	9677.42893	399.08796	5.644963E11	588.01	<.0001
Prin4	742.33823	421.20387	2981929297	3.11	0.0781
Prin5	4118.94608	445.30921	82134807795	85.56	<.0001
Prin6	6834.02727	483.68200	1.916514E11	199.63	<.0001
Prin7	4830.07806	529.84714	79778432402	83.10	<.0001
Prin8	-5310.15529	548.26690	90055197920	93.81	<.0001
Prin9	-3294.69625	560.93805	33119163087	34.50	<.0001
Prin10	2310.24275	576.88752	15396121625	16.04	<.0001

Bounds on condition number: 1, 81

The above model is the best 9-variable model found.

Maximum R-Square Improvement: Step 10

Variable Prin2 Entered: R-Square = 0.8485 and C(p) = 9.2153

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	10	1.407398E13	1.407398E12	1466.35	<.0001
Error	2619	2.513706E12	959796219		
Corrected Total	2629	1.658769E13			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	185496	604.10390	9.049505E13	94285.7	<.0001
Prin1	24532	210.68915	1.301284E13	13557.9	<.0001
Prin2	419.76611	331.90838	1535173081	1.60	0.2061
Prin3	9677.42893	399.04231	5.644963E11	588.14	<.0001
Prin4	742.33823	421.15569	2981929297	3.11	0.0781
Prin5	4118.94608	445.25828	82134807795	85.58	<.0001

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Prin6	6834.02727	483.62667	1.916514E11	199.68	<.0001
Prin7	4830.07806	529.78654	79778432402	83.12	<.0001
Prin8	-5310.15529	548.20419	90055197920	93.83	<.0001
Prin9	-3294.69625	560.87389	33119163087	34.51	<.0001
Prin10	2310.24275	576.82154	15396121625	16.04	<.0001

Bounds on condition number: 1, 100

The above model is the best 10-variable model found.

Maximum R-Square Improvement: Step 11

Variable Prin11 Entered: R-Square = 0.8485 and C(p) = 11.0327

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	1.407416E13	1.279469E12	1332.65	<.0001
Error	2618	2.513531E12	960095832		
Corrected Total	2629	1.658769E13			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	185496	604.19819	9.049505E13	94256.3	<.0001
Prin1	24532	210.72204	1.301284E13	13553.7	<.0001
Prin2	419.76611	331.96018	1535173081	1.60	0.2062
Prin3	9677.42893	399.10459	5.644963E11	587.96	<.0001
Prin4	742.33823	421.22142	2981929297	3.11	0.0781
Prin5	4118.94608	445.32777	82134807795	85.55	<.0001
Prin6	6834.02727	483.70215	1.916514E11	199.62	<.0001
Prin7	4830.07806	529.86922	79778432402	83.09	<.0001
Prin8	-5310.15529	548.28974	90055197920	93.80	<.0001
Prin9	-3294.69625	560.96142	33119163087	34.50	<.0001
Prin10	2310.24275	576.91156	15396121625	16.04	<.0001
Prin11	-251.29635	587.91962	175408668	0.18	0.6691

Bounds on condition number: 1, 121

The above model is the best 11-variable model found.

Maximum R-Square Improvement: Step 12

Variable Prin12 Entered: R-Square = 0.8485 and C(p) = 13.0000

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	12	1.407419E13	1.172849E12	1221.14	<.0001
Error	2617	2.5135E12	960450717		
Corrected Total	2629	1.658769E13			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	185496	604.30984	9.049505E13	94221.4	<.0001
Prin1	24532	210.76098	1.301284E13	13548.7	<.0001
Prin2	419.76611	332.02152	1535173081	1.60	0.2062
Prin3	9677.42893	399.17834	5.644963E11	587.74	<.0001
Prin4	742.33823	421.29926	2981929297	3.10	0.0782
Prin5	4118.94608	445.41007	82134807795	85.52	<.0001

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Prin6	6834.02727	483.79154	1.916514E11	199.54	<.0001
Prin7	4830.07806	529.96714	79778432402	83.06	<.0001
Prin8	-5310.15529	548.39107	90055197920	93.76	<.0001
Prin9	-3294.69625	561.06509	33119163087	34.48	<.0001
Prin10	2310.24275	577.01817	15396121625	16.03	<.0001
Prin11	-251.29635	588.02826	175408668	0.18	0.6692
Prin12	108.48080	600.32250	31362565	0.03	0.8566

Bounds on condition number: 1, 144

The above model is the best 12-variable model found.

No further improvement in R-Square is possible.

Multiple Linear Regression Anlysis on PCs

Model: MODEL1
Dependent Variable: SalePrice SalePrice

Number of Observations Read	2630
Number of Observations Used	2630

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	12	1.407419E13	1.172849E12	1221.14	<.0001
Error	2617	2.5135E12	960450717		
Corrected Total	2629	1.658769E13			

Root MSE	30991	R-Square	0.8485
Dependent Mean	185496	Adj R-Sq	0.8478
Coeff Var	16.70717		

Parameter Estimates											
Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	Type I SS	Type II SS	Standardized Estimate	Squared Partial Corr Type I	Variance Inflation
Intercept	Intercept	1	185496	604.30984	306.96	<.0001	9.049505E13	9.049505E13	0	.	0
Prin1		1	24532	210.76098	116.40	<.0001	1.301284E13	1.301284E13	0.88571	0.78449	1.00000
Prin2		1	419.76611	332.02152	1.26	0.2062	1535173081	1535173081	0.00962	0.00042944	1.00000
Prin3		1	9677.42893	399.17834	24.24	<.0001	5.644963E11	5.644963E11	0.18448	0.15798	1.00000
Prin4		1	742.33823	421.29926	1.76	0.0782	2981929297	2981929297	0.01341	0.00099106	1.00000
Prin5		1	4118.94608	445.41007	9.25	<.0001	82134807795	82134807795	0.07037	0.02733	1.00000
Prin6		1	6834.02727	483.79154	14.13	<.0001	1.916514E11	1.916514E11	0.10749	0.06555	1.00000
Prin7		1	4830.07806	529.96714	9.11	<.0001	79778432402	79778432402	0.06935	0.02920	1.00000
Prin8		1	-5310.15529	548.39107	-9.68	<.0001	90055197920	90055197920	-0.07368	0.03395	1.00000
Prin9		1	-3294.69625	561.06509	-5.87	<.0001	33119163087	33119163087	-0.04468	0.01293	1.00000
Prin10		1	2310.24275	577.01817	4.00	<.0001	15396121625	15396121625	0.03047	0.00609	1.00000
Prin11		1	-251.29635	588.02826	-0.43	0.6692	175408668	175408668	-0.00325	0.00006978	1.00000
Prin12		1	108.48080	600.32250	0.18	0.8566	31362565	31362565	0.00138	0.00001248	1.00000

Multiple Linear Regression Anlysis on PCs

Model: MODEL1

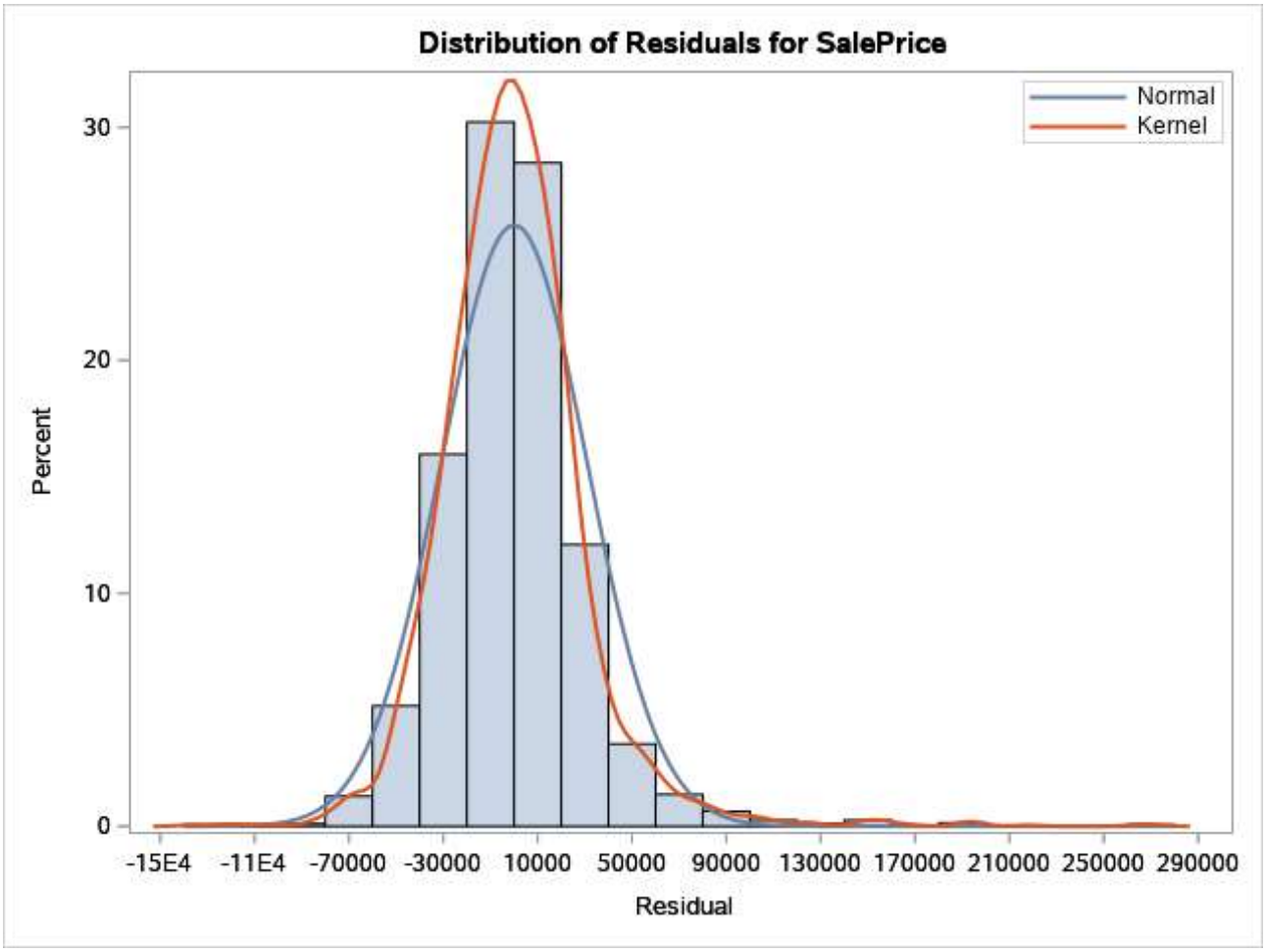
Dependent Variable: SalePrice SalePrice

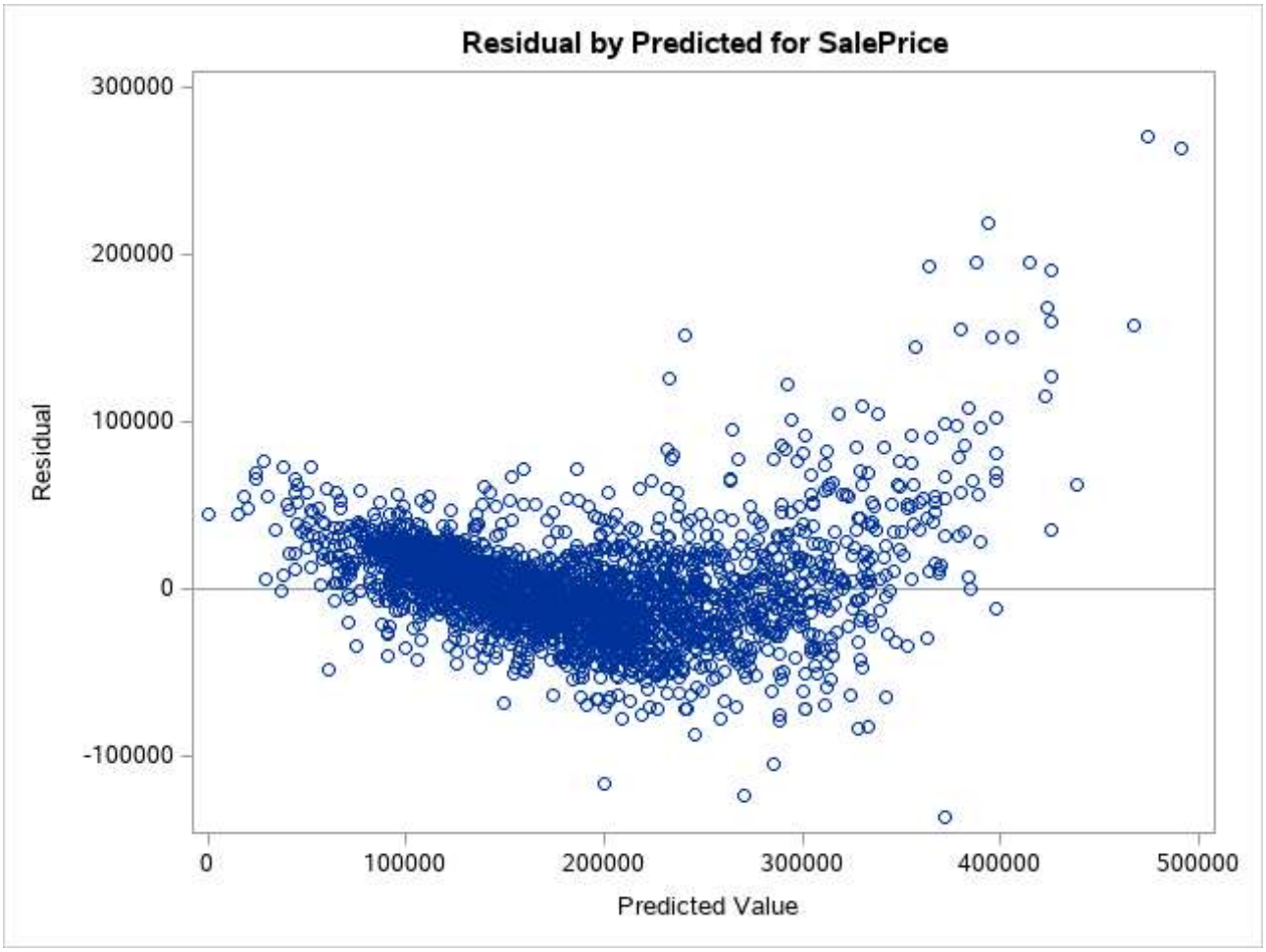
Durbin-Watson D	1.545
Pr < DW	<.0001
Pr > DW	1.0000
Number of Observations	2630
1st Order Autocorrelation	0.227

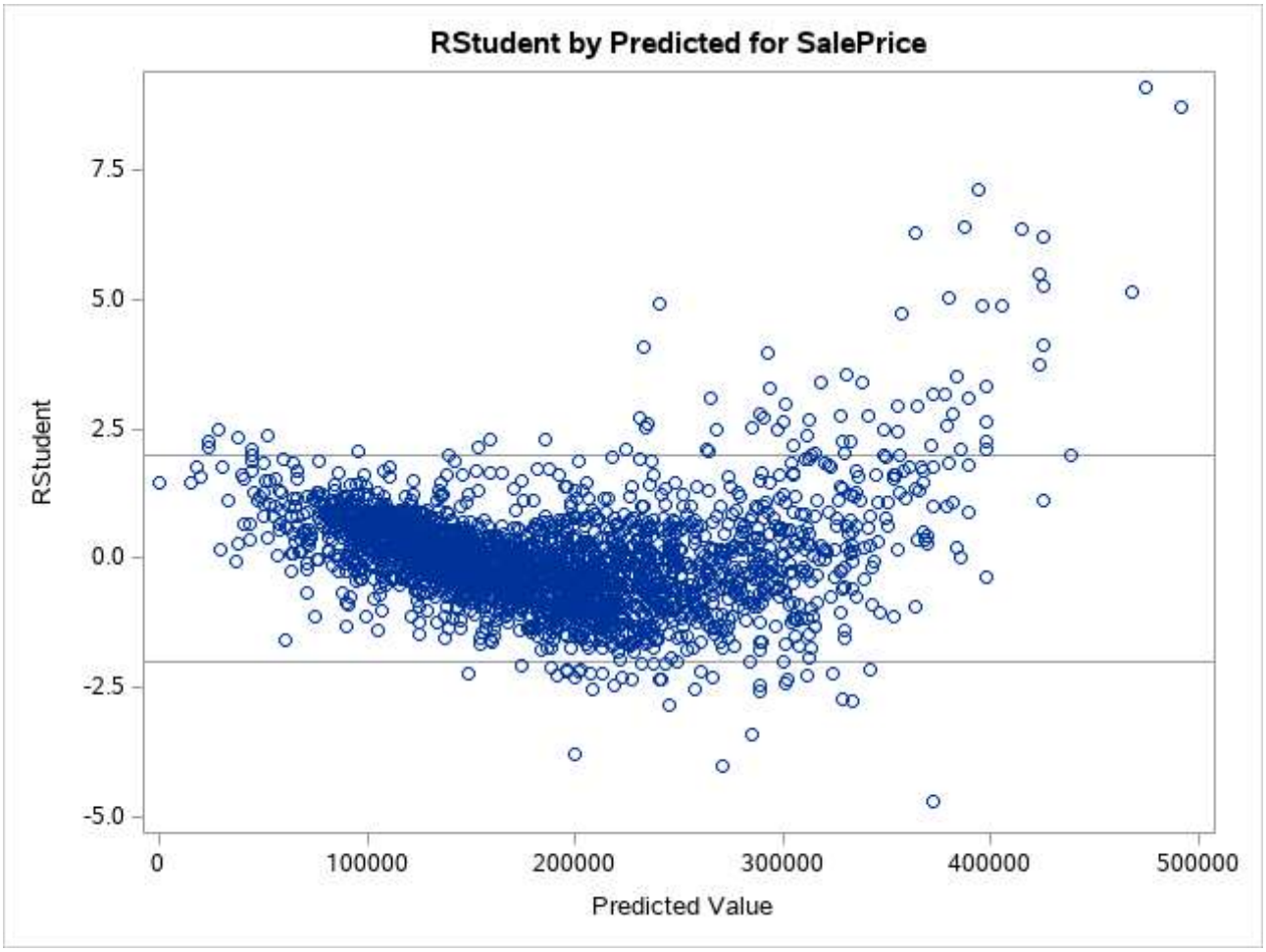
Note: Pr<DW is the p-value for testing positive autocorrelation, and Pr>DW is the p-value for testing negative autocorrelation.

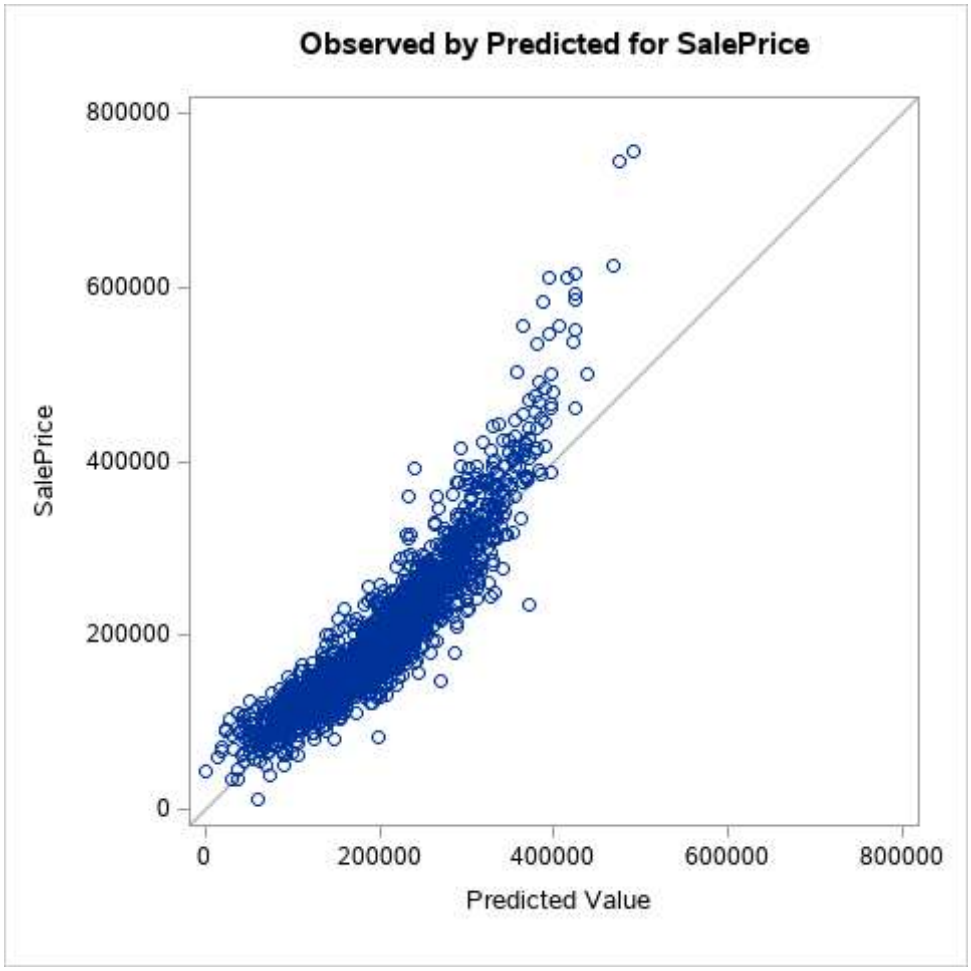
Multiple Linear Regression Anlysis on PCs

Model: MODEL1
Dependent Variable: SalePrice SalePrice




Residual by Predicted for SalePrice
Residual
300000
200000
100000
0
-100000
0
100000
200000
300000
400000
500000
Predicted Value


RStudent by Predicted for SalePrice
RStudent
7.5
5.0
2.5
0.0
-2.5
-5.0
0
100000
200000
300000
400000
500000
Predicted Value


Observed by Predicted for SalePrice
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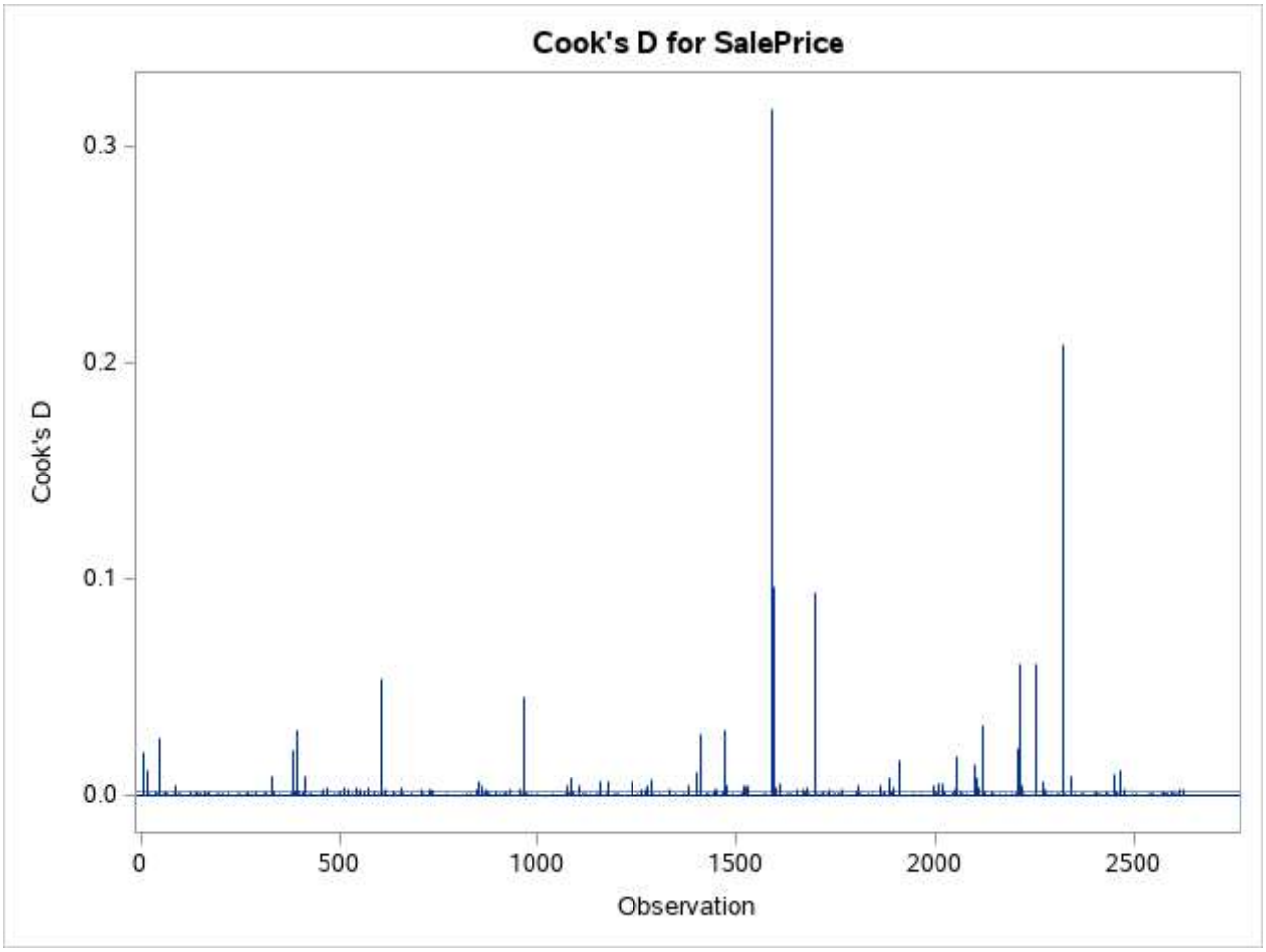
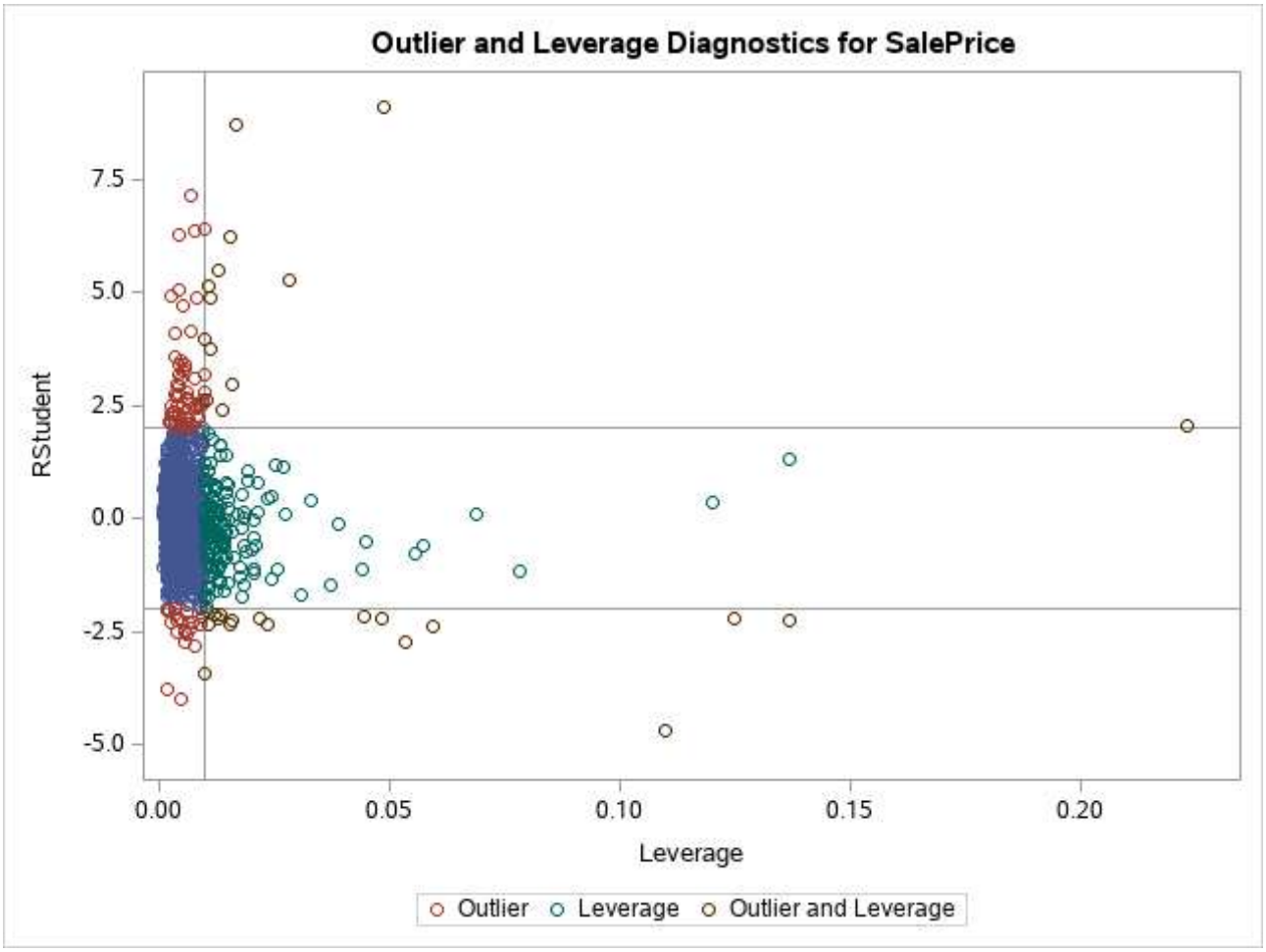
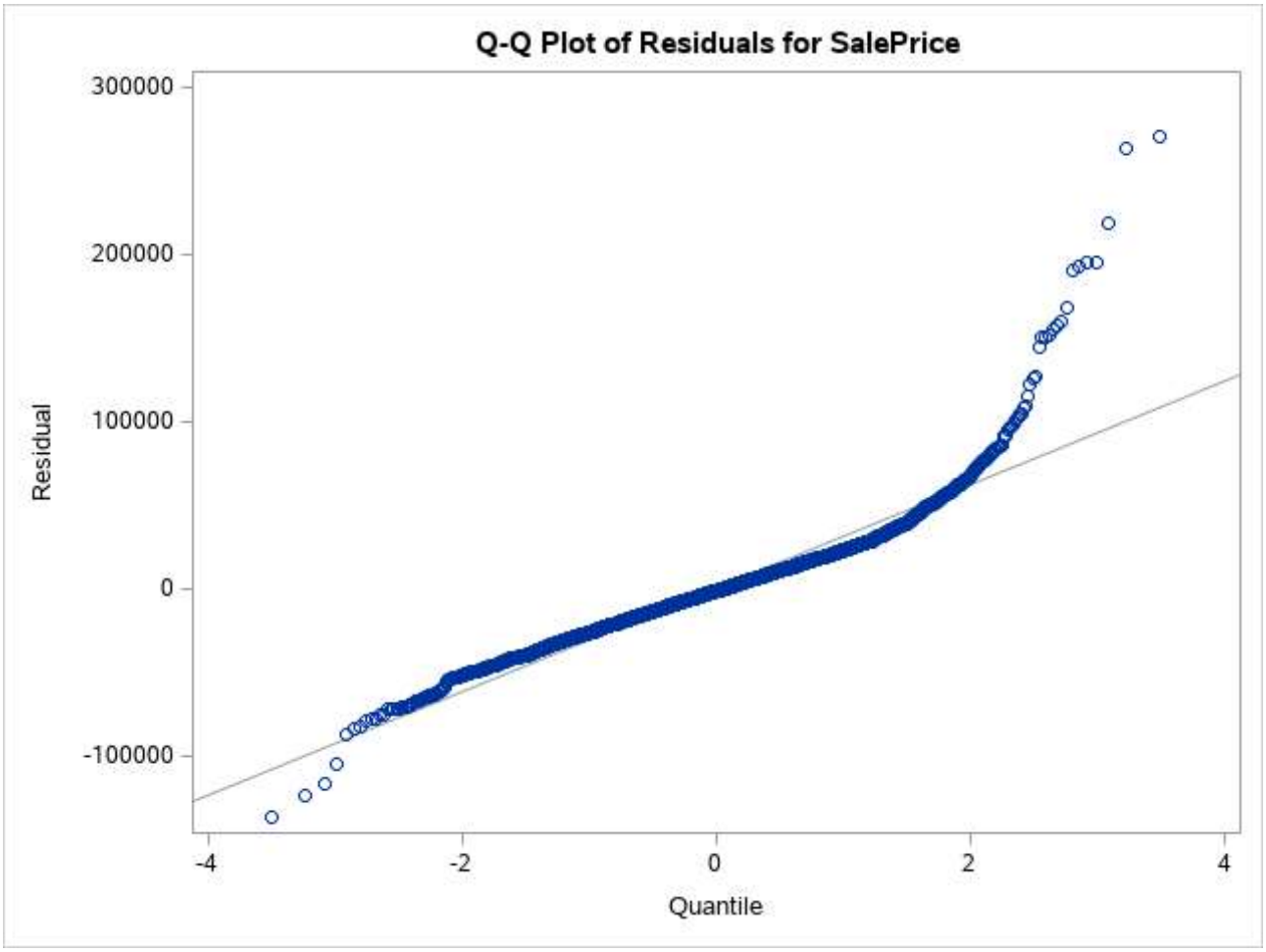
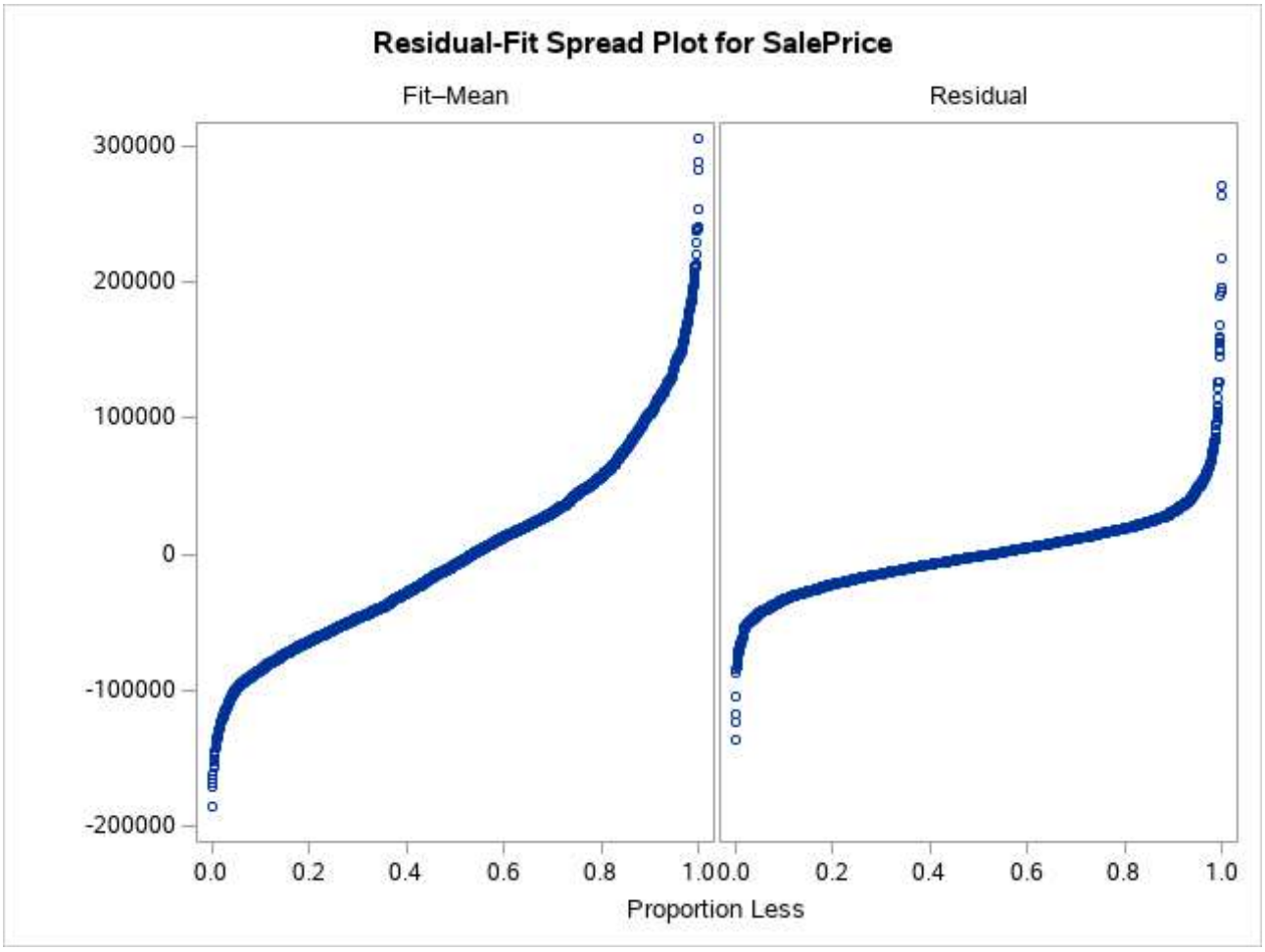
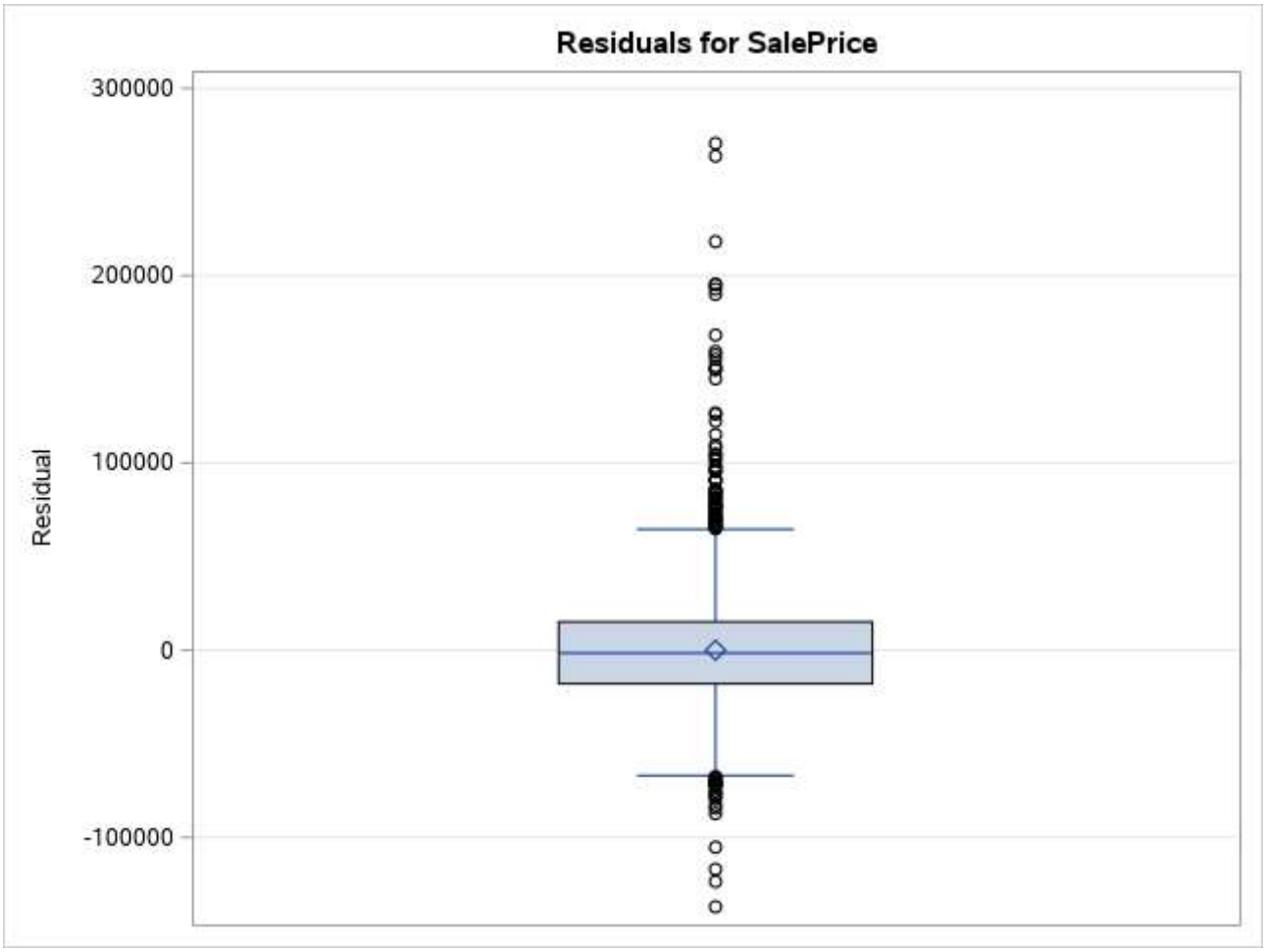
600000
400000
200000
0
SalePrice
0
200000
400000
600000
800000
Predicted Value

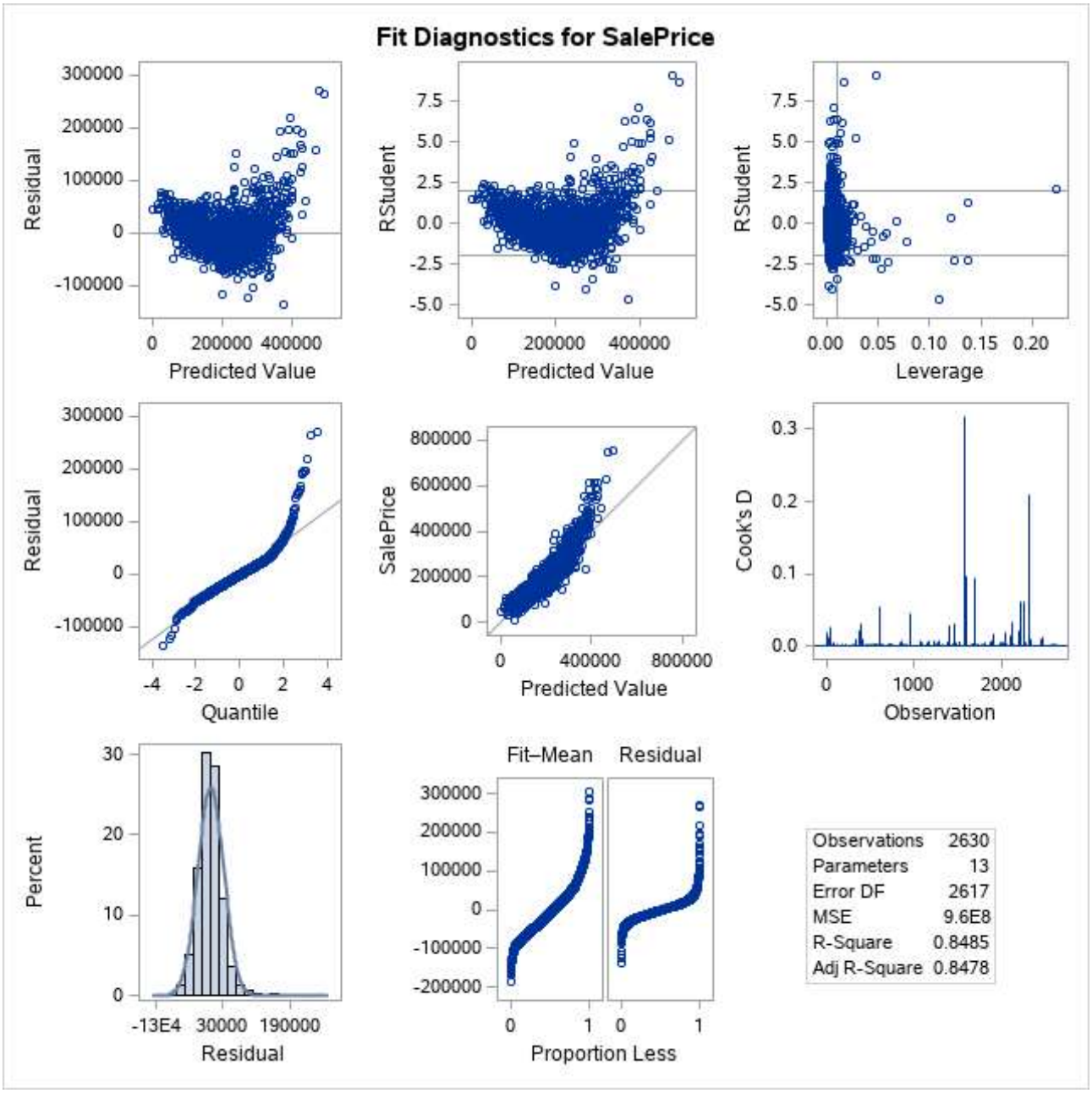

Cook's D for SalePrice
0.3
0.2
0.1
0.0
Cook's D
0
500
1000
1500
2000
2500
Observation

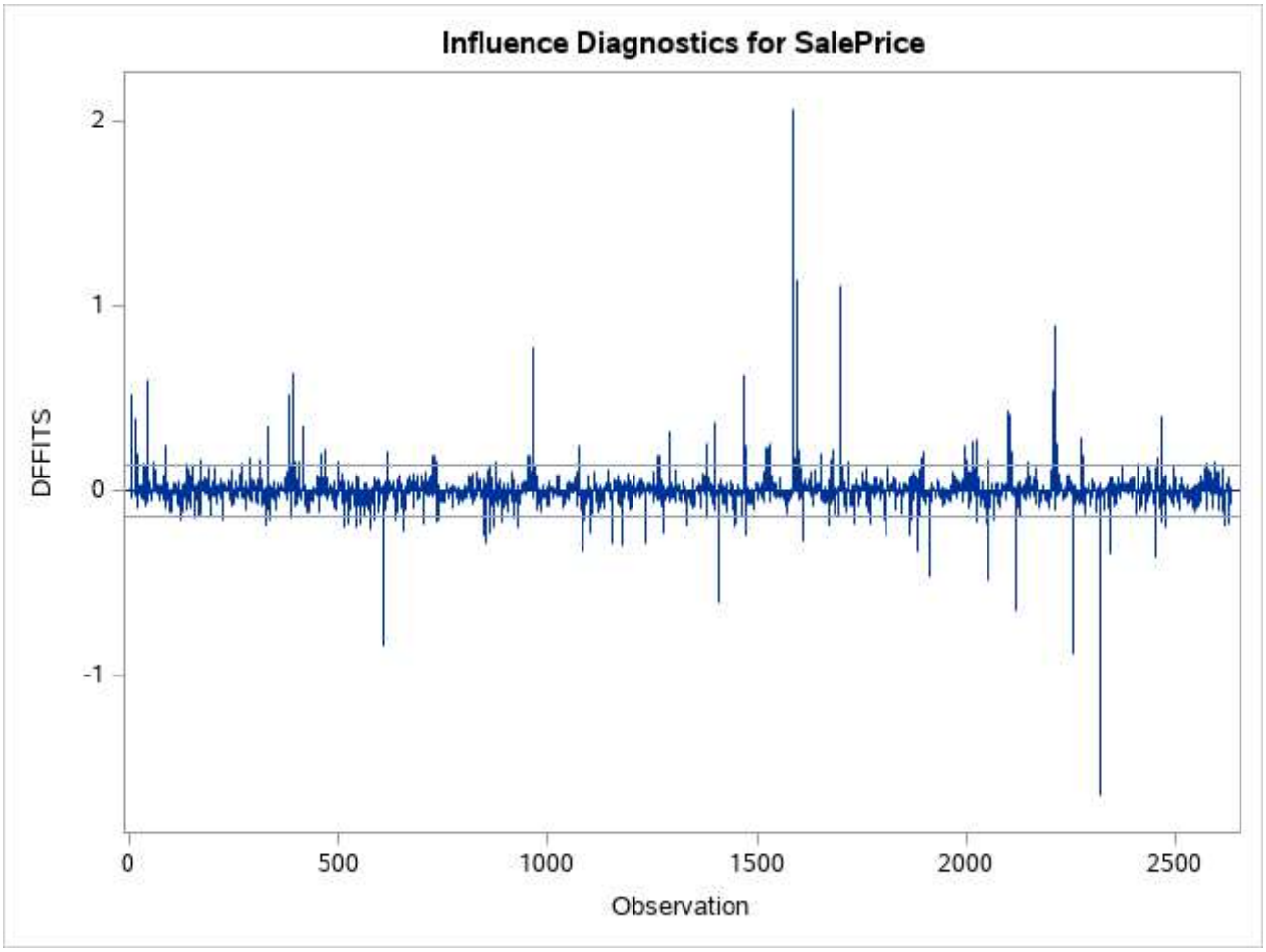

Outlier and Leverage Diagnostics for SalePrice
RStudent
7.5
5.0
2.5
0.0
-2.5
-5.0
0.00
0.05
0.10
0.15
0.20
Leverage
Outlier
Leverage
Outlier and Leverage

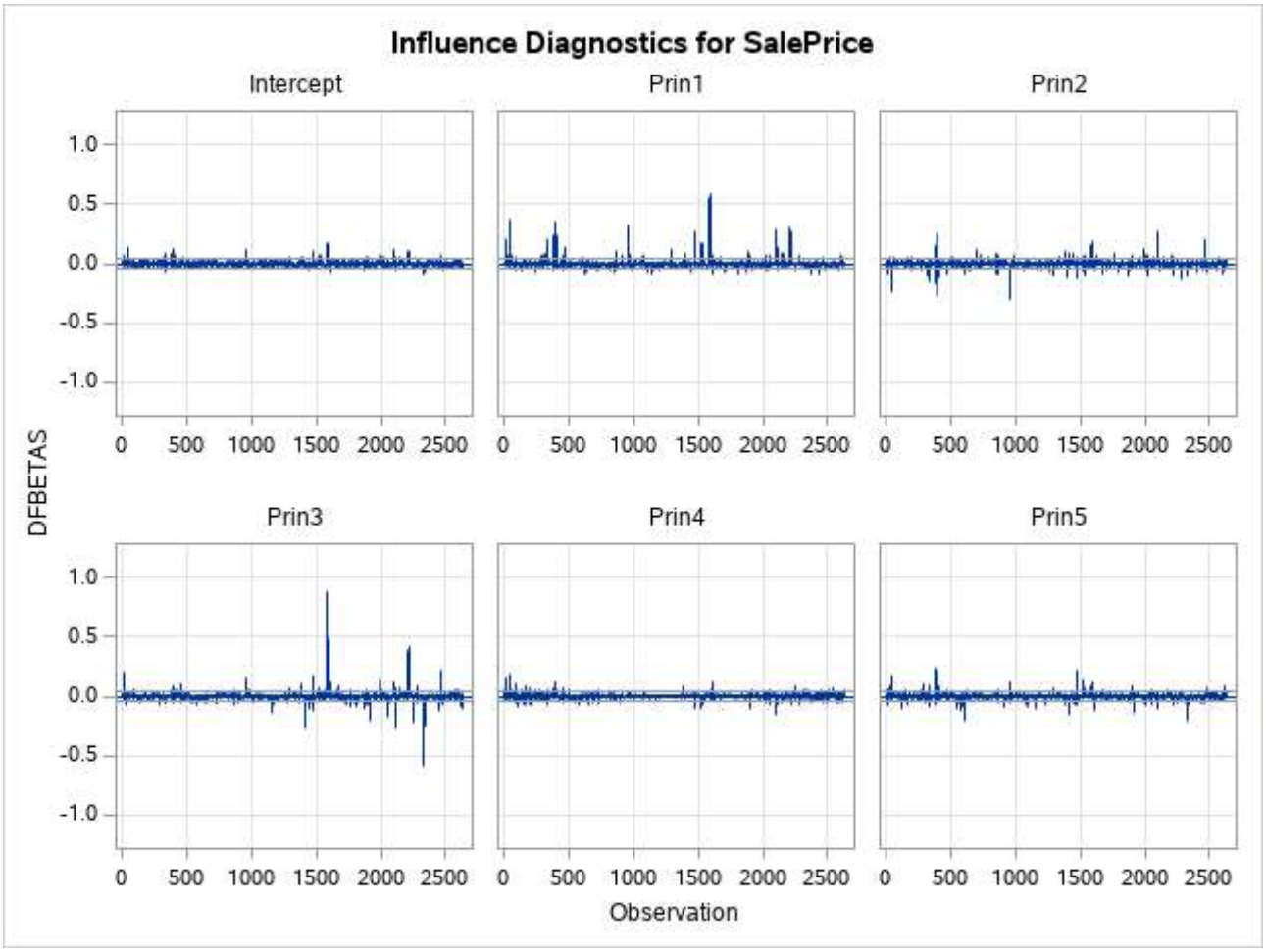

Q-Q Plot of Residuals for SalePrice
Residual
300000
200000
100000
0
-100000
-4
-2
0
2
4
Quantile


Residual-Fit Spread Plot for SalePrice
Fit–Mean
Residual
300000
200000
100000
0
-100000
-200000
0.0
0.2
0.4
0.6
0.8
1.0
Proportion Less


Residuals for SalePrice
Residual
300000
200000
100000
0
-100000


Fit Diagnostics for SalePrice
Residual
Predicted Value
RStudent
Predicted Value
RStudent
Leverage
Residual
Quantile
SalePrice
Predicted Value
Cook's D
Observation
Percent
Residual
Fit–Mean
Residual
Proportion Less
Observations 2630
Parameters 13
Error DF 2617
MSE 9.6E8
R-Square 0.8485
Adj R-Square 0.8478


Influence Diagnostics for SalePrice
DFFITS
2
1
0
-1
0
500
1000
1500
2000
2500
Observation


Influence Diagnostics for SalePrice
Intercept
Prin1
Prin2
Prin3
Prin4
Prin5
DFBETAS
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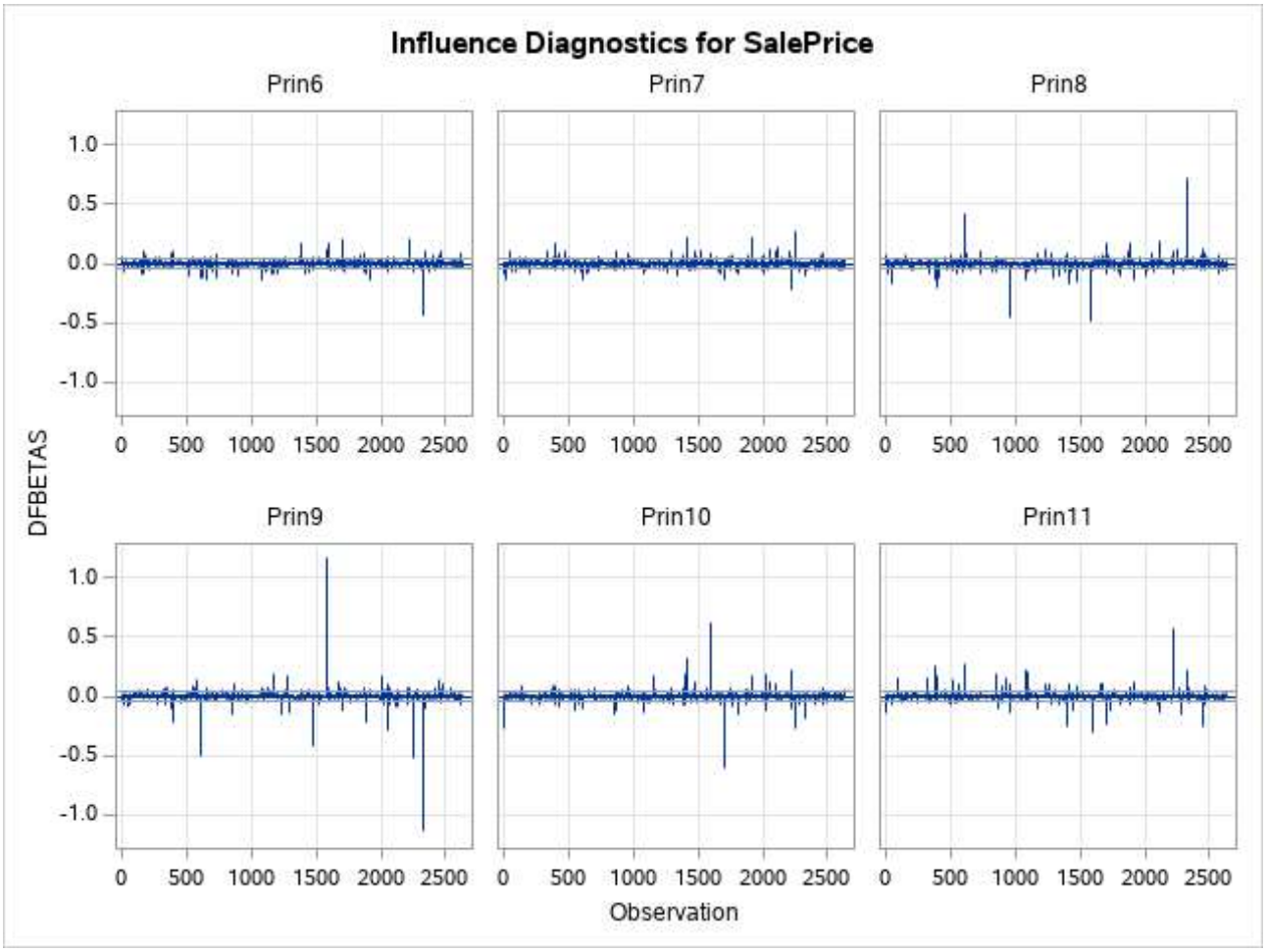
0.5
0.0
-0.5
-1.0
0
500
1000
1500
2000
2500
Observation


Influence Diagnostics for SalePrice
Prin6
Prin7
Prin8
Prin9
Prin10
Prin11
DFBETAS
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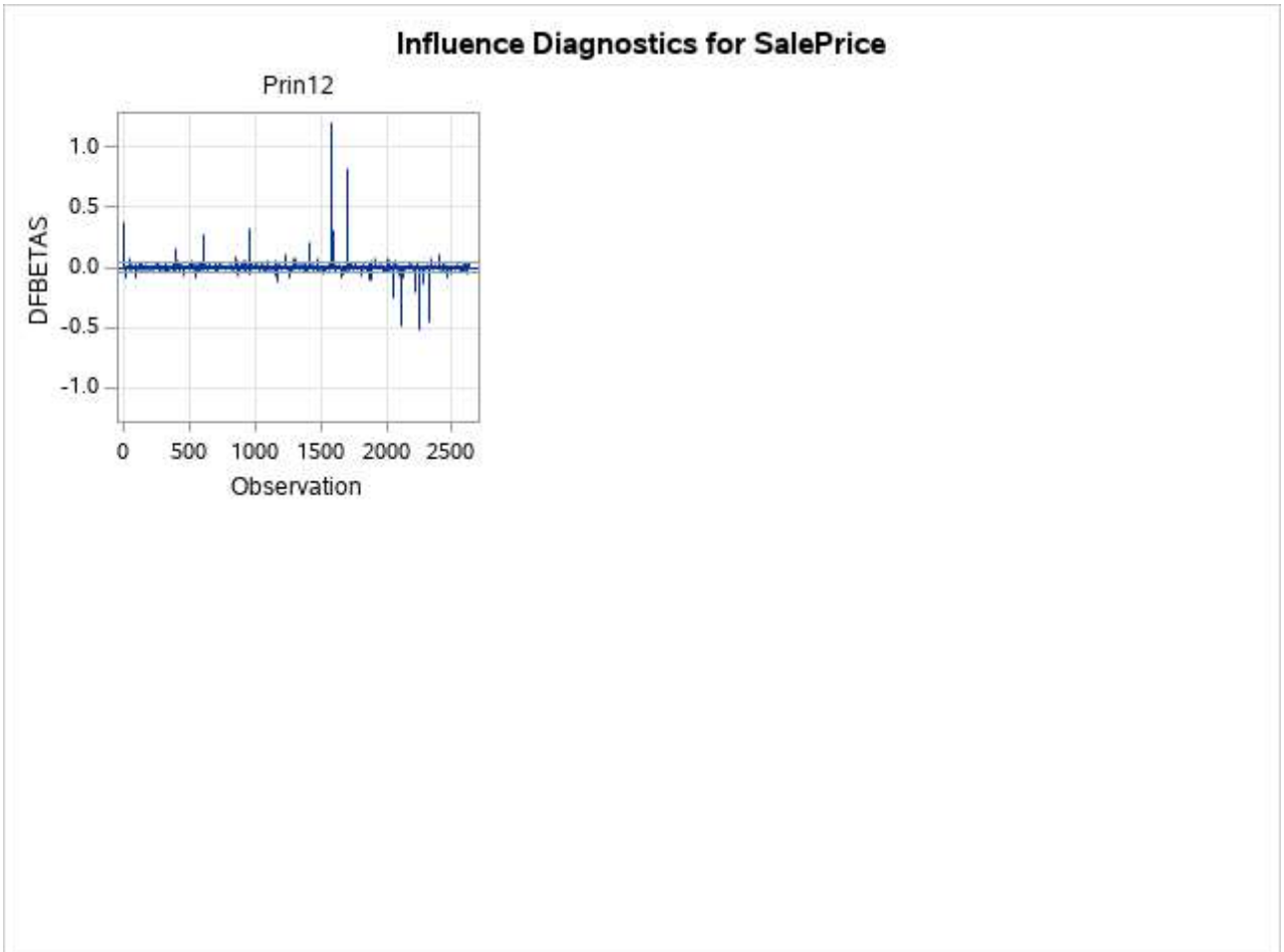
0.5
0.0
-0.5
-1.0
0
500
1000
1500
2000
2500
Observation


Influence Diagnostics for SalePrice
Prin12
DFBETAS
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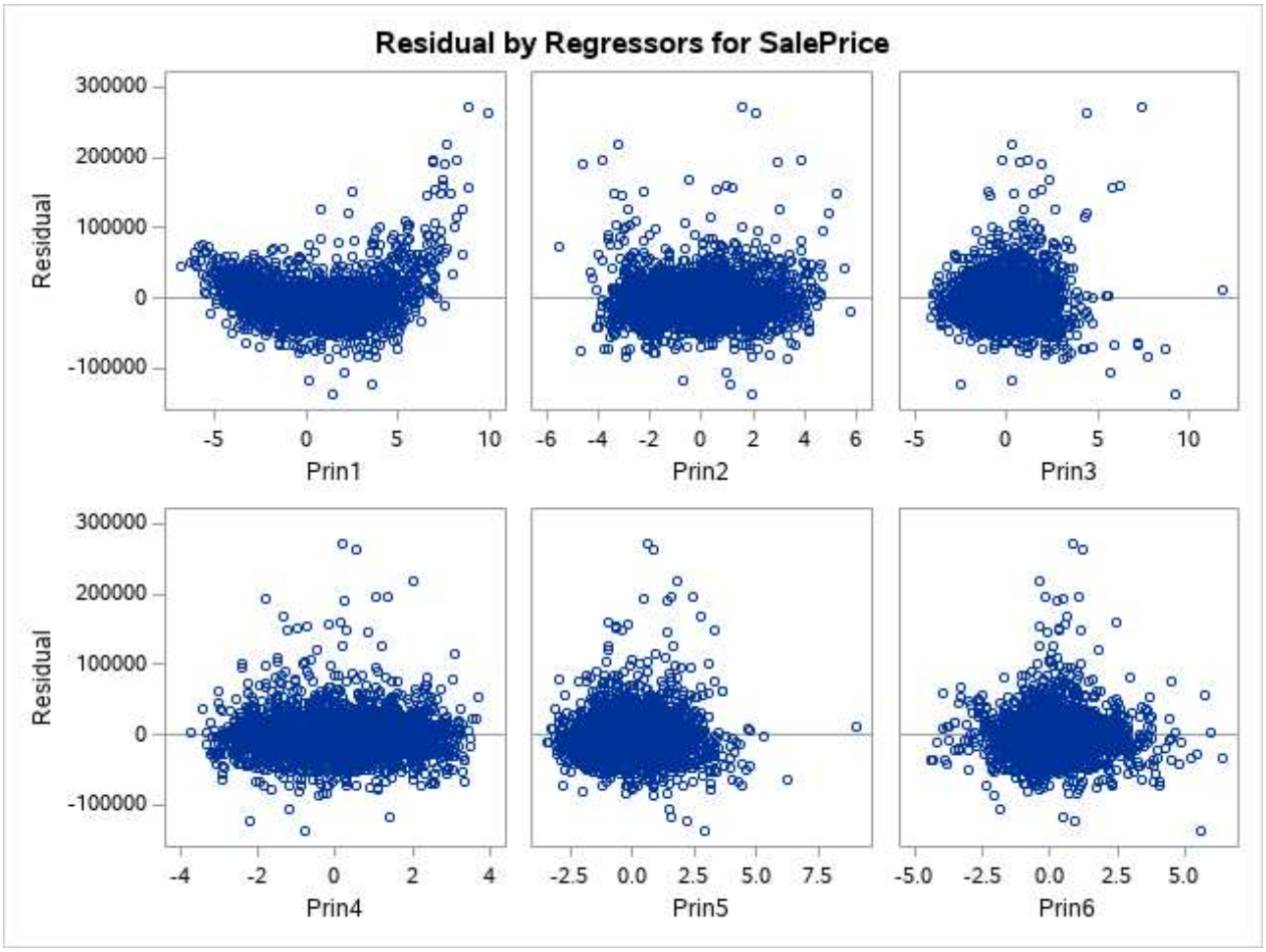
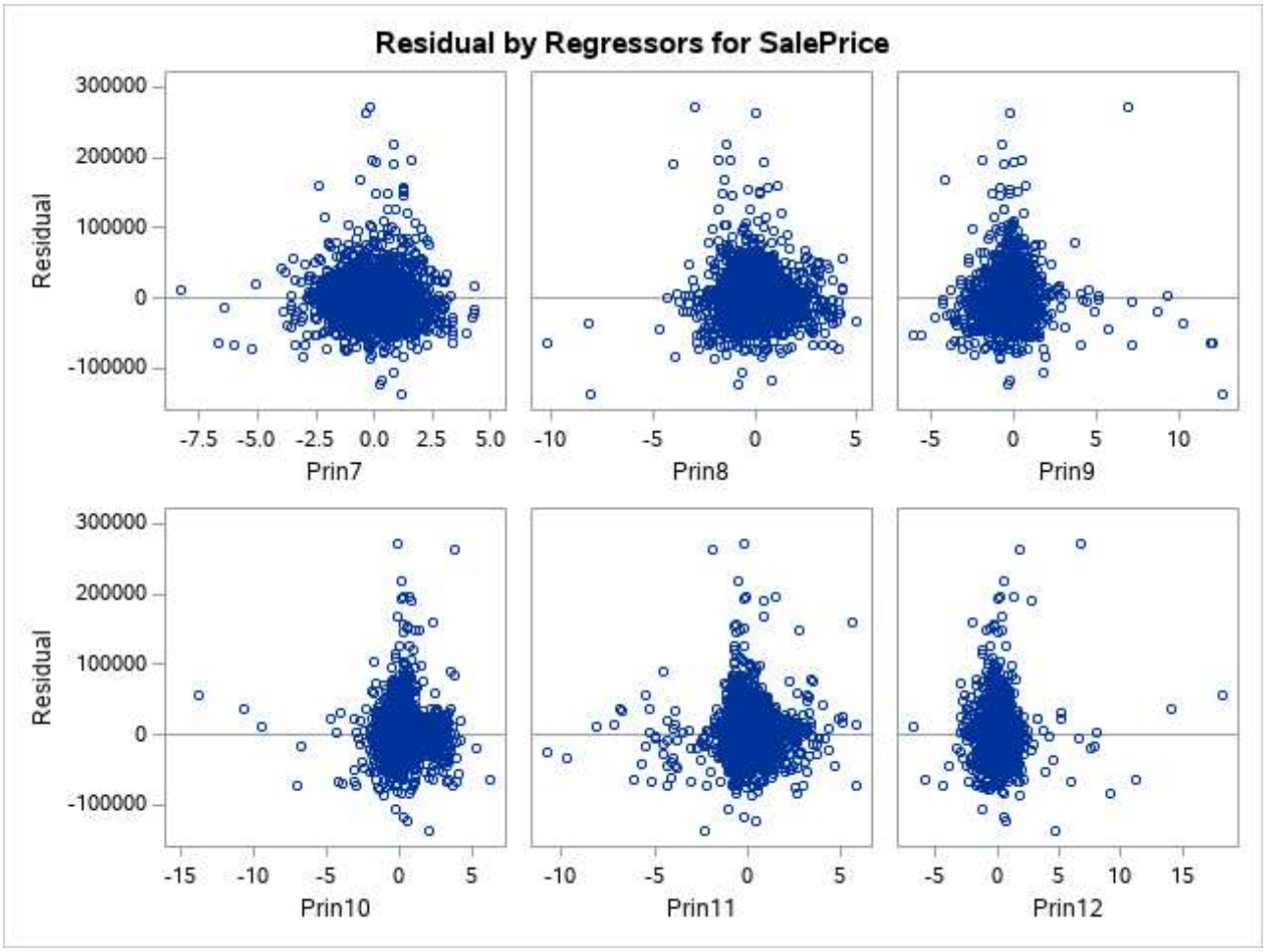
0.0
-0.5
-1.0
0
500
1000
1500
2000
2500
Observation


Residual by Regressors for SalePrice
Residual
300000
200000
100000
0
-100000
-5
0
5
10
Prin1
-6
-4
-2
0
2
4
6
Prin2
-5
0
5
10
Prin3
-4
-2
0
2
4
Prin4
-2.5
0.0
2.5
5.0
7.5
Prin5
-5.0
-2.5
0.0
2.5
5.0
Prin6


Residual by Regressors for SalePrice
Residual
300000
200000
100000
0
-100000
-7.5
-5.0
-2.5
0.0
2.5
5.0
Prin7
-10
-5
0
5
Prin8
-5
0
5
10
Prin9
-15
-10
-5
0
5
Prin10
-10
-5
0
5
Prin11
-5
0
5
10
15
Prin12