

P507 IMPLICITLY LINEAR REGRESSION EXAMPLE

Obs	SAT	TOTHR	COLGPA	ATHLETE	VERBMATH	H SIZE	HSRANK	HSPERC	FEMALE	BLACK	WHITE	LNCOLGPA	LNHSIZE	LNHSRANK	SATSQ
1	920	43	2.04	1	0.48387	0.1	4	40	1	0	0	0.71295	-2.30259	1.38629	846400
2	1170	18	4	0	0.82813	9.4	191	20.31915	0	0	1	1.38629	2.24071	5.25227	1368900
3	810	14	1.78	1	0.88372	1.19	42	35.29412	0	0	1	0.57661	0.17395	3.73767	656100
4	940	40	2.42	0	0.80769	5.71	252	44.1331	0	0	1	0.88377	1.74222	5.52943	883600
5	1180	18	2.61	0	0.73529	2.14	86	40.18692	0	0	1	0.95935	0.76081	4.45435	1392400
6	980	114	3.03	0	0.81481	2.68	41	15.29851	1	0	1	1.10856	0.98582	3.71357	960400
7	880	78	1.84	0	0.76	3.11	161	51.76849	0	0	0	0.60977	1.13462	5.08140	774400
8	980	55	3.05	0	0.88462	2.68	101	37.68657	0	0	1	1.11514	0.98582	4.61512	960400
9	1240	18	3	0	0.69863	3.67	161	43.86921	0	0	1	1.09861	1.30019	5.08140	1537600
10	1230	17	2	0	0.86364	0.1	3	30	0	0	1	0.69315	-2.30259	1.09861	1512900

**P507 IMPLICITLY LINEAR REGRESSION EXAMPLE  
INITIAL REGRESSION MODEL**

The REG Procedure  
Model: MODEL1  
Dependent Variable: COLGPA COLGPA

Number of Observations Read	4137
Number of Observations Used	4137

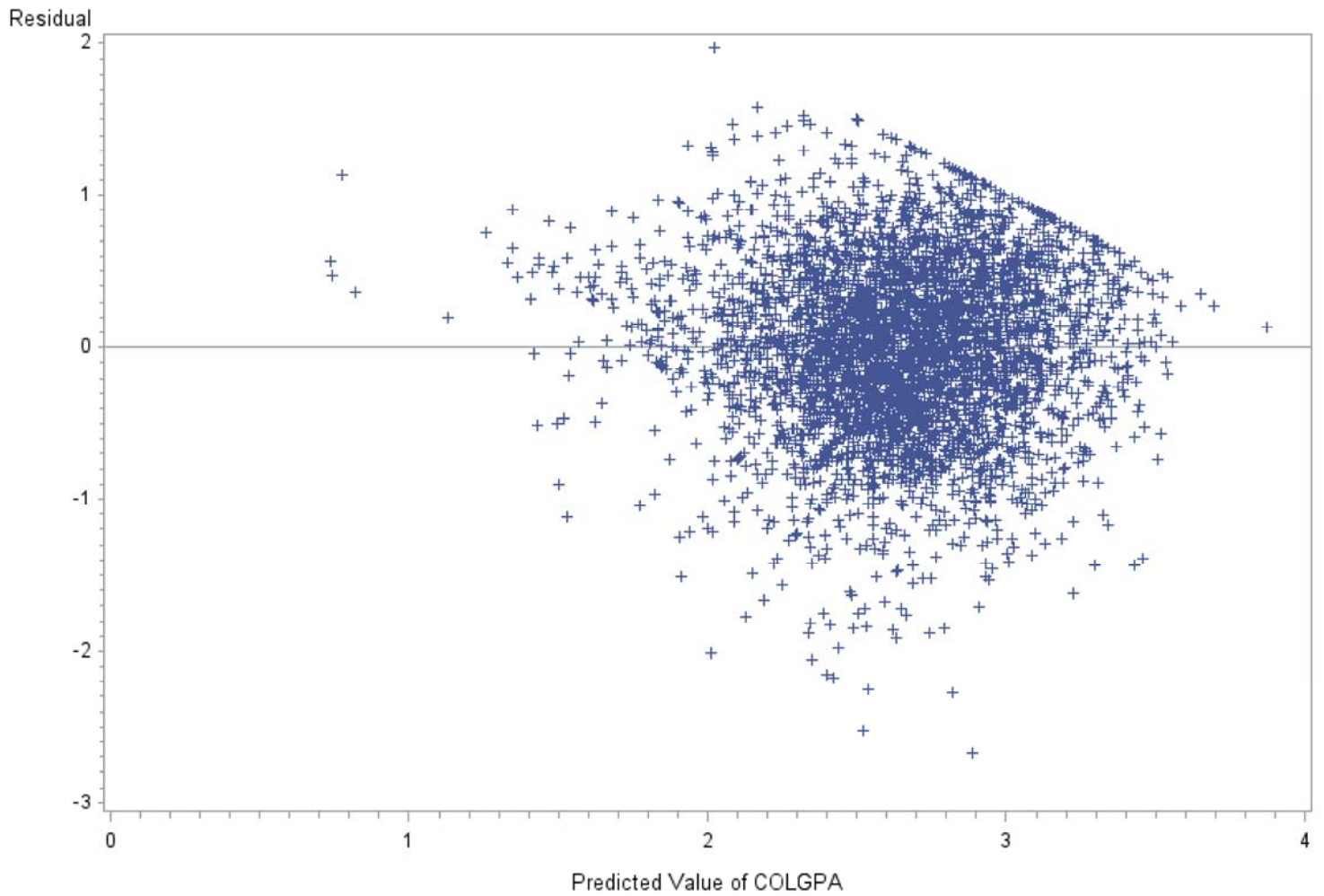
Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	510.45284	102.09057	328.52	<.0001
Error	4131	1283.74282	0.31076		
Corrected Total	4136	1794.19566			

Root MSE	0.55746	R-Square	0.2845
Dependent Mean	2.65269	Adj R-Sq	0.2836
Coeff Var	21.01482		

Parameter Estimates								
Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr >  t	Standardized Estimate	Variance Inflation
Intercept	Intercept	1	0.76689	0.07206	10.64	<.0001	0	0
SAT	SAT	1	0.00167	0.00006609	25.33	<.0001	0.35431	1.12982
TOTHR	TOTHR	1	0.00190	0.00024681	7.69	<.0001	0.10185	1.01199
HSIZE	HSIZE	1	0.06350	0.00649	9.78	<.0001	0.16742	1.69179
HSRANK	HSRANK	1	-0.00358	0.00017910	-19.97	<.0001	-0.35128	1.78615
FEMALE	FEMALE	1	0.15987	0.01794	8.91	<.0001	0.12076	1.05970

# P507 IMPLICITLY LINEAR REGRESSION EXAMPLE

## INITIAL REGRESSION MODEL



**P507 IMPLICITLY LINEAR REGRESSION EXAMPLE  
INITIAL REGRESSION MODEL**

The REG Procedure  
Model: MODEL1  
Dependent Variable: COLGPA COLGPA

Number of Observations Read	4137
Number of Observations Used	4137

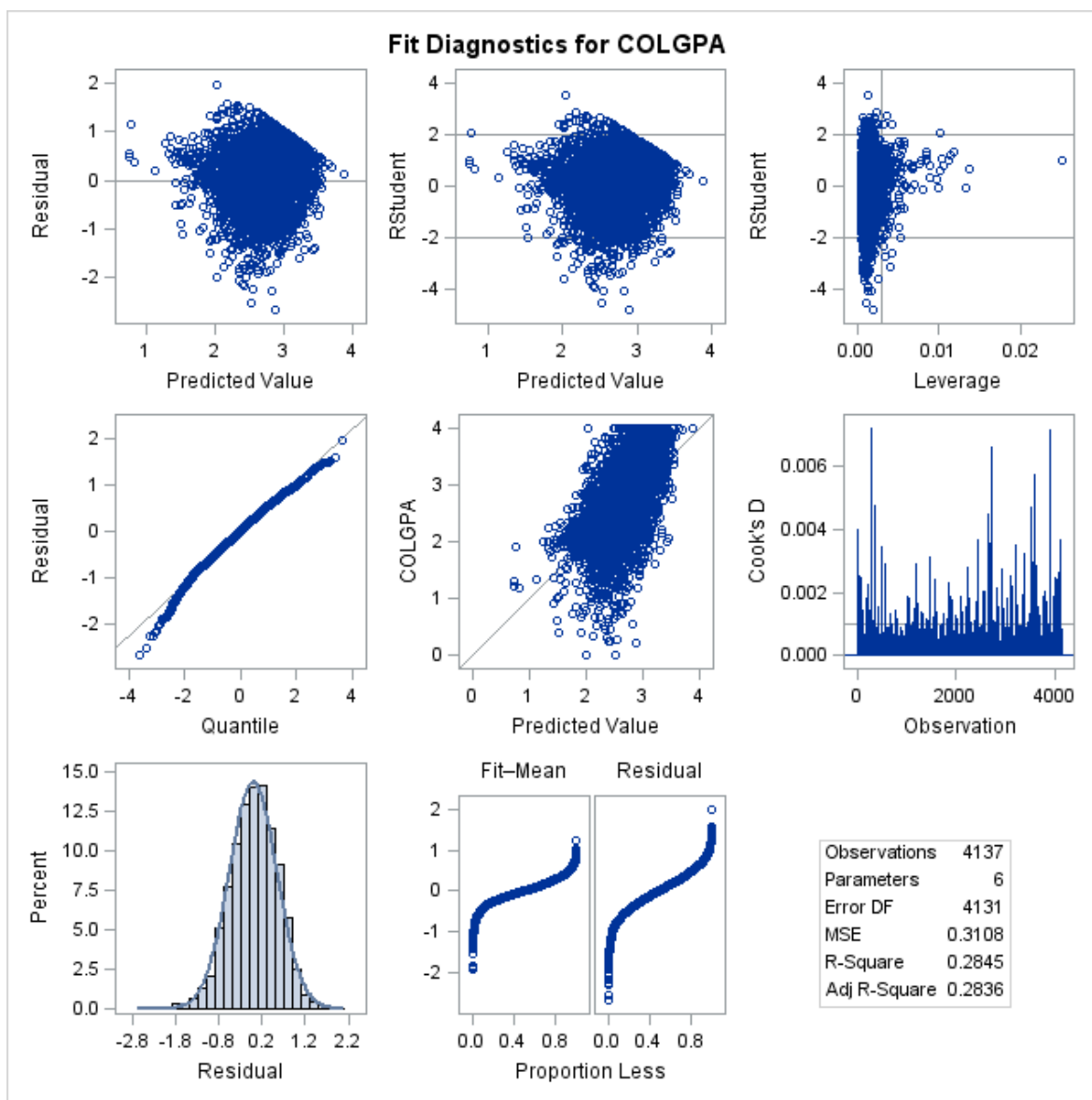
Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	5	510.45284	102.09057	328.52	<.0001
Error	4131	1283.74282	0.31076		
Corrected Total	4136	1794.19566			

Root MSE	0.55746	R-Square	0.2845
Dependent Mean	2.65269	Adj R-Sq	0.2836
Coeff Var	21.01482		

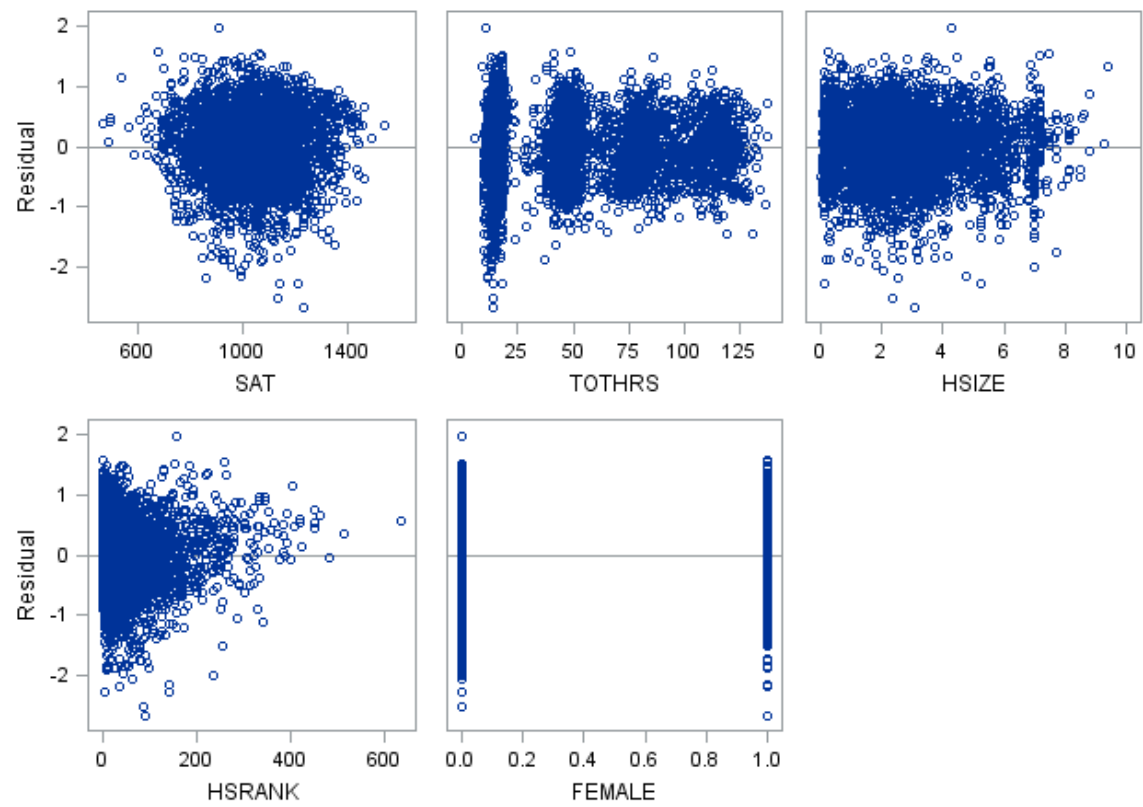
Parameter Estimates								
Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr >  t	Standardized Estimate	Variance Inflation
Intercept	Intercept	1	0.76689	0.07206	10.64	<.0001	0	0
SAT	SAT	1	0.00167	0.00006609	25.33	<.0001	0.35431	1.12982
TOTHR	TOTHR	1	0.00190	0.00024681	7.69	<.0001	0.10185	1.01199
HSIZE	HSIZE	1	0.06350	0.00649	9.78	<.0001	0.16742	1.69179
HSRANK	HSRANK	1	-0.00358	0.00017910	-19.97	<.0001	-0.35128	1.78615
FEMALE	FEMALE	1	0.15987	0.01794	8.91	<.0001	0.12076	1.05970

P507 IMPLICITLY LINEAR REGRESSION EXAMPLE  
INITIAL REGRESSION MODEL

The REG Procedure  
Model: MODEL1  
Dependent Variable: COLGPA COLGPA



Residual by Regressors for COLGPA



**P507 IMPLICITLY LINEAR REGRESSION EXAMPLE  
ADDED VARIABLE REGRESSION MODEL**

The REG Procedure  
Model: MODEL1  
Dependent Variable: COLGPA COLGPA

Number of Observations Read	4137
Number of Observations Used	4137

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	513.98880	85.66480	276.36	<.0001
Error	4130	1280.20686	0.30998		
Corrected Total	4136	1794.19566			

Root MSE	0.55676	R-Square	0.2865
Dependent Mean	2.65269	Adj R-Sq	0.2854
Coeff Var	20.98840		

Parameter Estimates								
Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr >  t	Standardized Estimate	Variance Inflation
Intercept	Intercept	1	0.72344	0.07311	9.90	<.0001	0	0
SAT	SAT	1	0.00171	0.00006687	25.57	<.0001	0.36197	1.15958
TOTHR	TOTHR	1	0.00187	0.00024662	7.59	<.0001	0.10045	1.01297
HSIZE	HSIZE	1	0.06435	0.00649	9.92	<.0001	0.16967	1.69436
HSRANK	HSRANK	1	-0.00366	0.00018061	-20.27	<.0001	-0.35957	1.82110
FEMALE	FEMALE	1	0.16629	0.01801	9.23	<.0001	0.12561	1.07163
ATHLETE	ATHLETE	1	0.14361	0.04252	3.38	0.0007	0.04610	1.07839

**P507 IMPLICITLY LINEAR REGRESSION EXAMPLE  
EXPONENTIAL GROWTH (LOG-LIN) REGRESSION MODEL**

The REG Procedure  
Model: MODEL1  
Dependent Variable: LNCOLGPA

Number of Observations Read	4137
Number of Observations Used	4135
Number of Observations with Missing Values	2

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	86.24816	14.37469	224.56	<.0001
Error	4128	264.24289	0.06401		
Corrected Total	4134	350.49105			

Root MSE	0.25301	R-Square	0.2461
Dependent Mean	0.93937	Adj R-Sq	0.2450
Coeff Var	26.93361		

Parameter Estimates								
Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr >  t	Standardized Estimate	Variance Inflation
Intercept	Intercept	1	0.17280	0.03322	5.20	<.0001	0	0
SAT	SAT	1	0.00065727	0.00003039	21.63	<.0001	0.31472	1.15961
TOTHR	TOTHR	1	0.00115	0.00011210	10.24	<.0001	0.13928	1.01277
HSIZE	HSIZE	1	0.02676	0.00295	9.07	<.0001	0.15950	1.69266
HSRANK	HSRANK	1	-0.00151	0.00008210	-18.43	<.0001	-0.33590	1.81881
FEMALE	FEMALE	1	0.06866	0.00819	8.39	<.0001	0.11733	1.07146
ATHLETE	ATHLETE	1	0.05933	0.01932	3.07	0.0022	0.04309	1.07855



**P507 IMPLICITLY LINEAR REGRESSION EXAMPLE  
DECLINING RETURNS (LIN-LOG) REGRESSION MODEL**

The REG Procedure  
Model: MODEL1  
Dependent Variable: COLGPA COLGPA

Number of Observations Read	4137
Number of Observations Used	4137

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	560.32173	93.38695	312.58	<.0001
Error	4130	1233.87394	0.29876		
Corrected Total	4136	1794.19566			

Root MSE	0.54659	R-Square	0.3123
Dependent Mean	2.65269	Adj R-Sq	0.3113
Coeff Var	20.60509		

Parameter Estimates								
Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr >  t	Standardized Estimate	Variance Inflation
Intercept	Intercept	1	1.43871	0.08295	17.34	<.0001	0	0
SAT	SAT	1	0.00145	0.00006836	21.20	<.0001	0.30672	1.25707
TOTHR	TOTHR	1	0.00182	0.00024203	7.51	<.0001	0.09756	1.01224
HSIZE	HSIZE	1	0.07674	0.00633	12.13	<.0001	0.20234	1.67163
LNHSRANK		1	-0.20391	0.00846	-24.11	<.0001	-0.42183	1.83783
FEMALE	FEMALE	1	0.14828	0.01774	8.36	<.0001	0.11200	1.07863
ATHLETE	ATHLETE	1	0.05943	0.04137	1.44	0.1509	0.01908	1.05902

**P507 IMPLICITLY LINEAR REGRESSION EXAMPLE  
SAT SQUARED REGRESSION MODEL**

The REG Procedure  
Model: MODEL1  
Dependent Variable: COLGPA COLGPA

Number of Observations Read	4137
Number of Observations Used	4137

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	7	522.06928	74.58133	242.07	<.0001
Error	4129	1272.12638	0.30810		
Corrected Total	4136	1794.19566			

Root MSE	0.55506	R-Square	0.2910
Dependent Mean	2.65269	Adj R-Sq	0.2898
Coeff Var	20.92459		

Parameter Estimates								
Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr >  t	Standardized Estimate	Variance Inflation
Intercept	Intercept	1	2.38804	0.33311	7.17	<.0001	0	0
SAT	SAT	1	-0.00156	0.00064237	-2.43	0.0151	-0.33055	107.64550
SATSQ		1	0.00000158	3.080028E-7	5.12	<.0001	0.69477	107.18119
TOTHR	TOTHR	1	0.00186	0.00024589	7.57	<.0001	0.09982	1.01306
HSIZE	HSIZE	1	0.06411	0.00647	9.91	<.0001	0.16902	1.69445
HSRANK	HSRANK	1	-0.00361	0.00018033	-20.02	<.0001	-0.35462	1.82656
FEMALE	FEMALE	1	0.17113	0.01798	9.52	<.0001	0.12927	1.07460
ATHLETE	ATHLETE	1	0.09930	0.04326	2.30	0.0218	0.03188	1.12331