

The SAS System

Obs	i1	v1	k1	i2	v2	k2
1	33.1	1170.6	97.8	12.93	191.5	1.8
2	45.0	2015.8	104.4	25.90	516.0	0.8
3	77.2	2803.3	118.0	35.05	729.0	7.4
4	44.6	2039.7	156.2	22.89	560.4	18.1
5	48.1	2256.2	172.6	18.84	519.9	23.5
6	74.4	2132.2	186.6	28.57	628.5	26.5
7	113.0	1834.1	220.9	48.51	537.1	36.2
8	91.9	1588.0	287.8	43.34	561.2	60.8
9	61.3	1749.4	319.9	37.02	617.2	84.4
10	56.8	1687.2	321.3	37.81	626.7	91.2
11	93.6	2007.7	319.6	39.27	737.2	92.4
12	159.9	2208.3	346.0	53.46	760.5	86.0
13	147.2	1656.7	456.4	55.56	581.4	111.1
14	146.3	1604.4	543.4	49.56	662.3	130.6
15	98.3	1431.8	618.3	32.04	583.8	141.8
16	93.5	1610.5	647.4	32.24	635.2	136.7
17	135.2	1819.4	671.3	54.38	723.8	129.7
18	157.3	2079.7	726.1	71.78	864.1	145.5
19	179.5	2371.6	800.3	90.08	1193.5	174.8
20	189.6	2759.9	888.9	68.60	1188.9	213.5

SEPARATE OLS REGRESSIONS FOR GE AND WE

The REG Procedure
 Model: ge
 Dependent Variable: i1

Number of Observations Read	20
Number of Observations Used	20

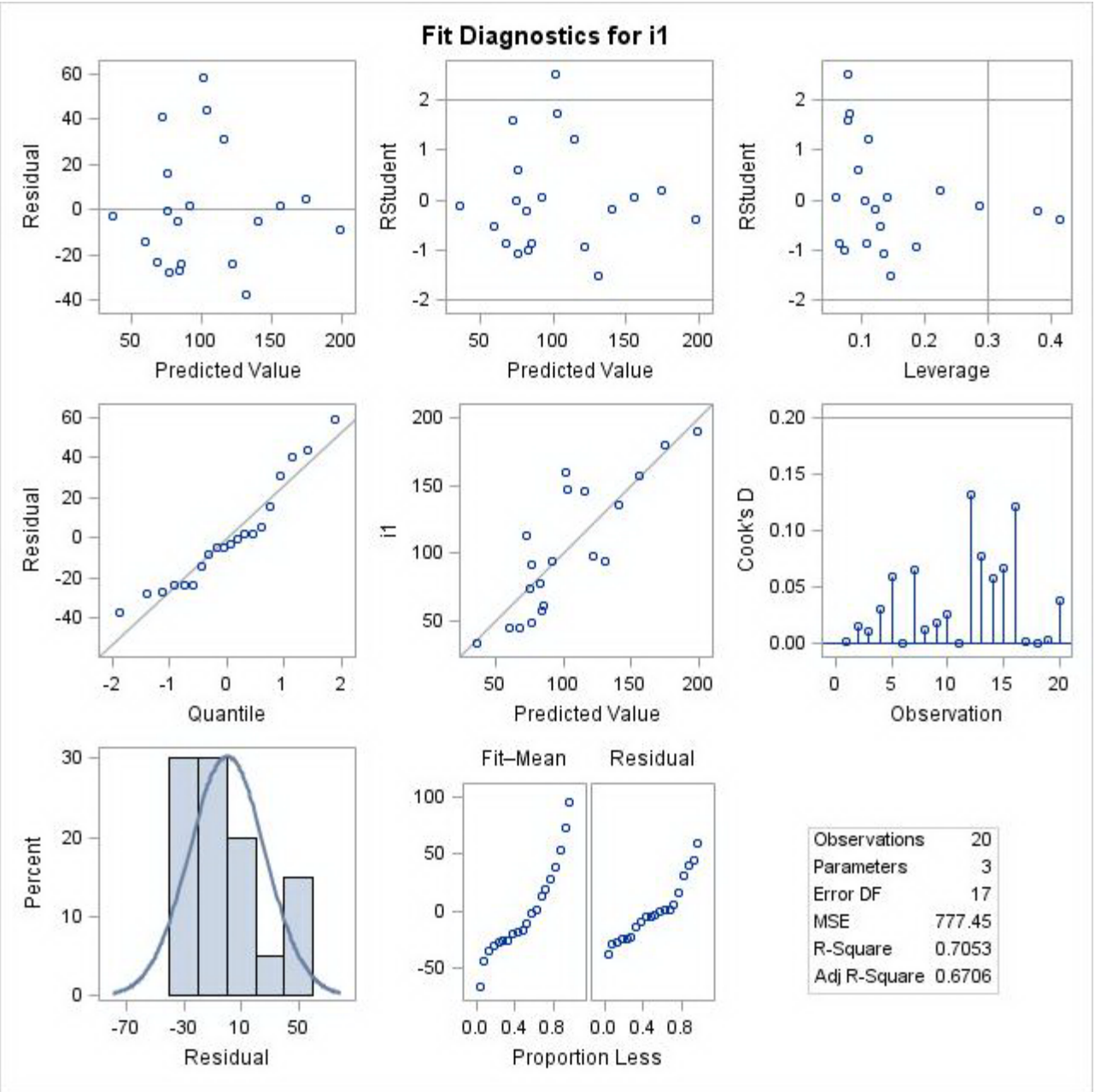
Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	31632	15816	20.34	<.0001
Error	17	13217	777.44634		
Corrected Total	19	44849			

Root MSE	27.88272	R-Square	0.7053
Dependent Mean	102.29000	Adj R-Sq	0.6706
Coeff Var	27.25850		

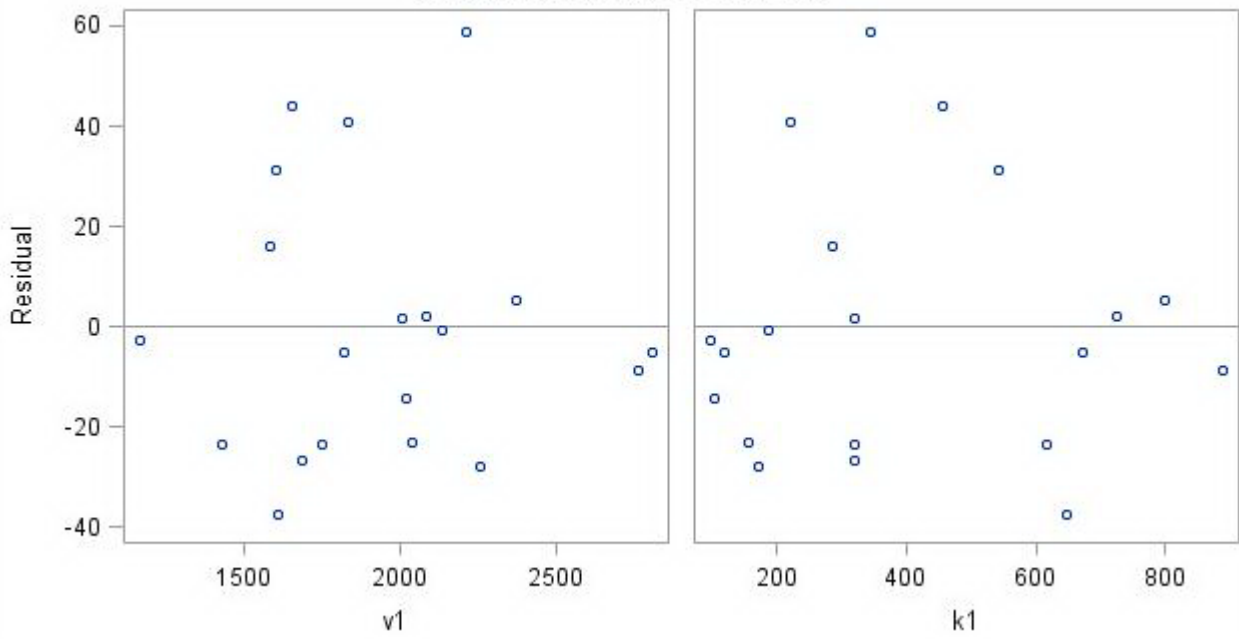
Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	-9.95631	31.37425	-0.32	0.7548
v1	1	0.02655	0.01557	1.71	0.1063
k1	1	0.15169	0.02570	5.90	<.0001

SEPARATE OLS REGRESSIONS FOR GE AND WE

The REG Procedure
Model: ge
Dependent Variable: i1



Residual by Regressors for i1



SEPARATE OLS REGRESSIONS FOR GE AND WE

The REG Procedure
 Model: west
 Dependent Variable: i2

Number of Observations Read	20
Number of Observations Used	20

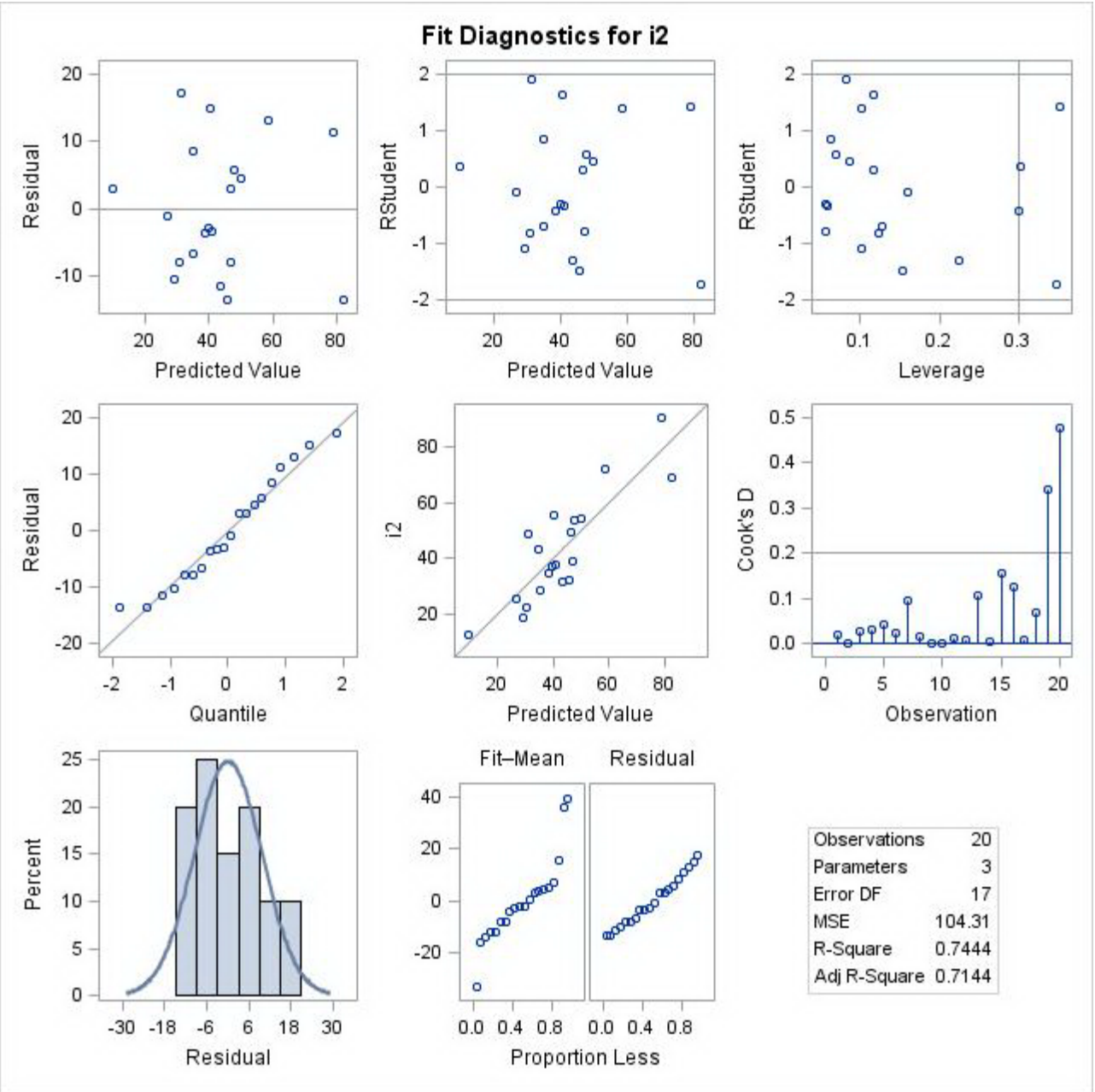
Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	5165.55292	2582.77646	24.76	<.0001
Error	17	1773.23393	104.30788		
Corrected Total	19	6938.78685			

Root MSE	10.21312	R-Square	0.7444
Dependent Mean	42.89150	Adj R-Sq	0.7144
Coeff Var	23.81153		

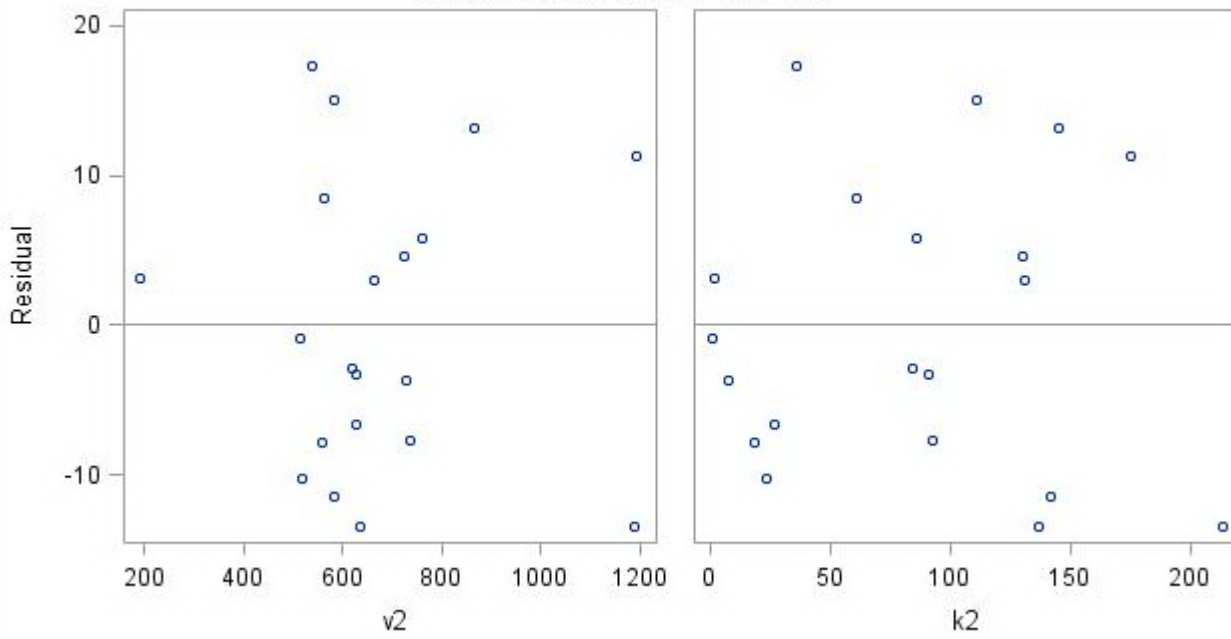
Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	-0.50939	8.01529	-0.06	0.9501
v2	1	0.05289	0.01571	3.37	0.0037
k2	1	0.09241	0.05610	1.65	0.1179

SEPARATE OLS REGRESSIONS FOR GE AND WE

The REG Procedure
Model: west
Dependent Variable: i2



Residual by Regressors for i2



GLS ESTIMATION OF THE SUR MODEL

The SYSLIN Procedure
 Ordinary Least Squares Estimation

Model	GE
Dependent Variable	i1

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	31632.03	15816.02	20.34	<.0001
Error	17	13216.59	777.4463		
Corrected Total	19	44848.62			

Root MSE	27.88272	R-Square	0.70531
Dependent Mean	102.29000	Adj R-Sq	0.67064
Coeff Var	27.25850		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	-9.95631	28.92563	-0.34	0.7349
v1	1	0.026551	0.014351	1.85	0.0818
k1	1	0.151694	0.023698	6.40	<.0001

Covariances of Parameter Estimates			
	Intercept	v1	k1
Intercept	836.692	-.383740	-.146660
v1	-0.384	0.000206	-.000040
k1	-0.147	-.000040	0.000562

GLS ESTIMATION OF THE SUR MODEL

The SYSLIN Procedure
 Ordinary Least Squares Estimation

Model	WEST
Dependent Variable	i2

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	5165.553	2582.776	24.76	<.0001
Error	17	1773.234	104.3079		
Corrected Total	19	6938.787			

Root MSE	10.21312	R-Square	0.74445
Dependent Mean	42.89150	Adj R-Sq	0.71438
Coeff Var	23.81153		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	-0.50939	7.389731	-0.07	0.9458
v2	1	0.052894	0.014481	3.65	0.0020
k2	1	0.092406	0.051721	1.79	0.0918

Covariances of Parameter Estimates			
	Intercept	v2	k2
Intercept	54.6081	-.093113	0.143575
v2	-0.0931	0.000210	-.000555
k2	0.1436	-.000555	0.002675

GLS ESTIMATION OF THE SUR MODEL

The SYSLIN Procedure
Seemingly Unrelated Regression Estimation

Cross Model Covariance		
	GE	WEST
GE	660.829	176.449
WEST	176.449	88.662

Cross Model Correlation		
	GE	WEST
GE	1.00000	0.72896
WEST	0.72896	1.00000

Cross Model Inverse Correlation		
	GE	WEST
GE	2.13397	-1.55559
WEST	-1.55559	2.13397

Cross Model Inverse Covariance		
	GE	WEST
GE	0.003229	-.006427
WEST	-.006427	0.024069

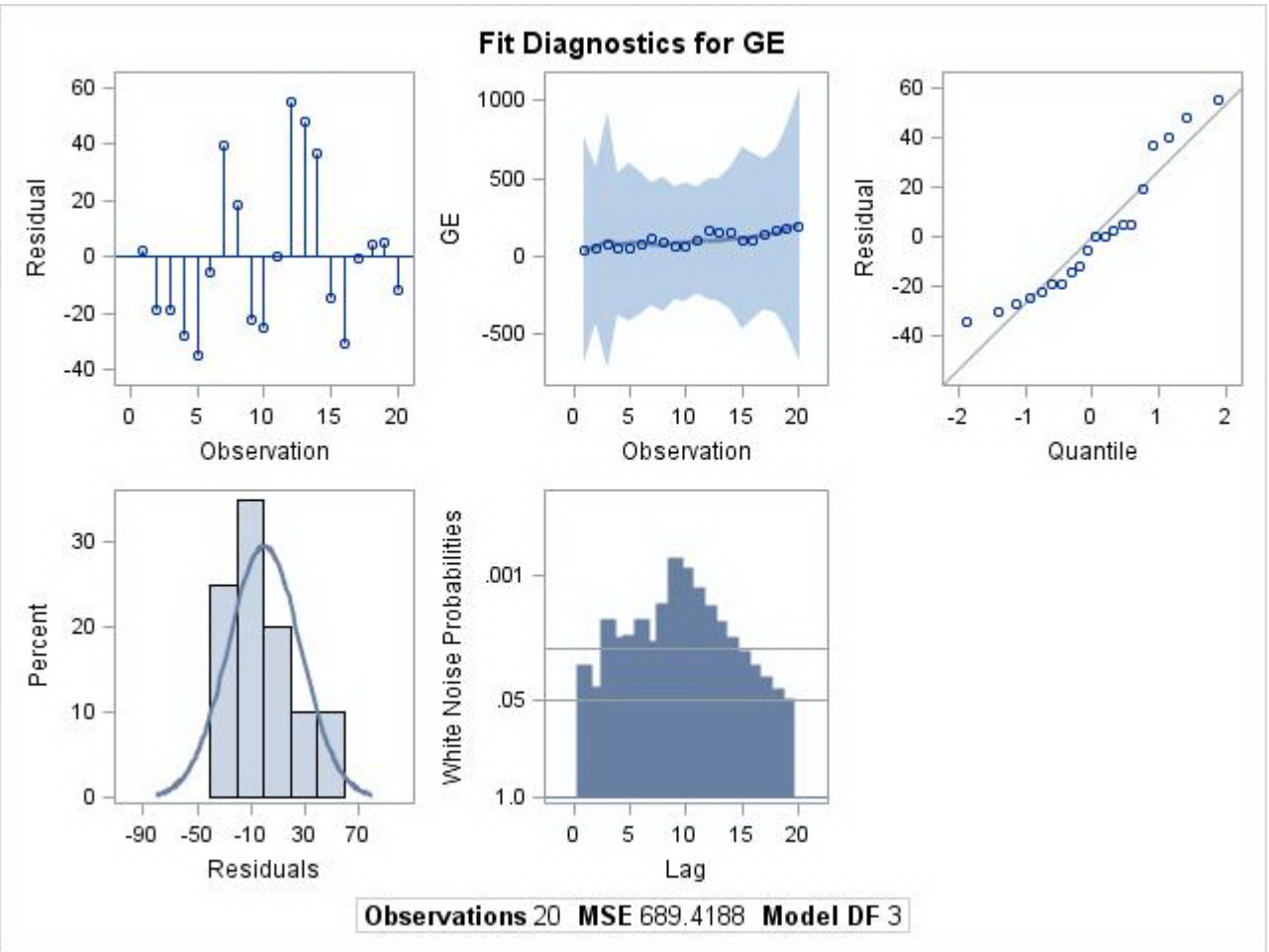
System Weighted MSE	1.1434
Degrees of freedom	34
System Weighted R-Square	0.6284

Model	GE
Dependent Variable	i1

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	-27.7193	27.03283	-1.03	0.3195
v1	1	0.038310	0.013290	2.88	0.0103
k1	1	0.139036	0.023036	6.04	<.0001

GLS ESTIMATION OF THE SUR MODEL

The SYSLIN Procedure
Seemingly Unrelated Regression Estimation

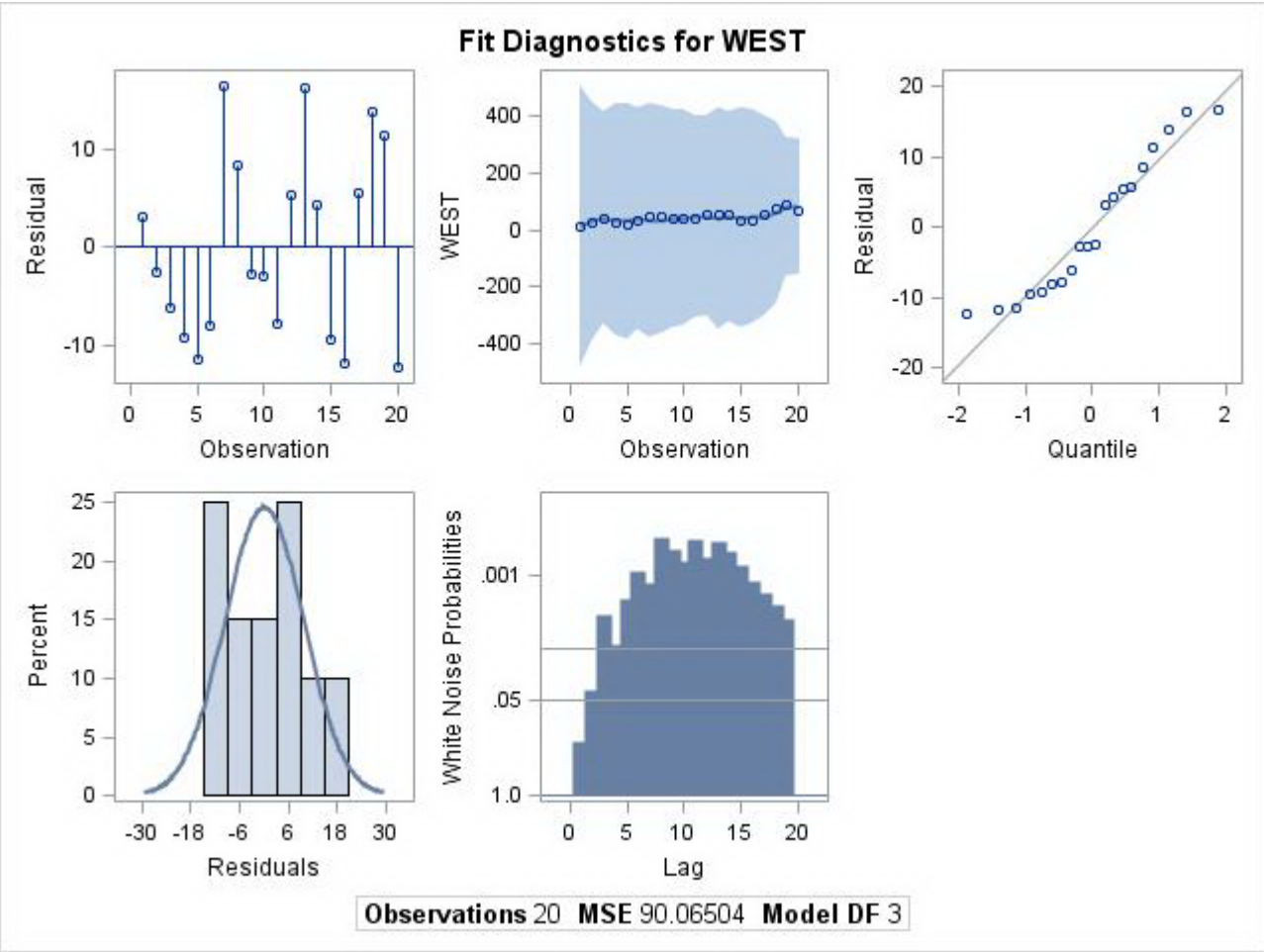


Model	WEST
Dependent Variable	i2

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	-1.25199	6.956347	-0.18	0.8593
v2	1	0.057630	0.013411	4.30	0.0005
k2	1	0.063978	0.048901	1.31	0.2082

GLS ESTIMATION OF THE SUR MODEL

The SYSLIN Procedure
Seemingly Unrelated Regression Estimation



Test Results			
Num DF	Den DF	F Value	Pr > F
3	34	3.01	0.0437

Covariances of Parameter Estimates						
	Intercept	v1	k1	Intercept	v2	k2
Intercept	730.774	-.329266	-.146242	126.963	-.226193	0.392515
v1	-0.329	0.000177	-.000034	-0.053	0.000120	-.000325
k1	-0.146	-.000034	0.000531	-0.040	-.000017	0.000595
Intercept	126.963	-.052688	-.039621	48.391	-.080023	0.113618
v2	-0.226	0.000120	-.000017	-0.080	0.000180	-.000475
k2	0.393	-.000325	0.000595	0.114	-.000475	0.002391

GLS WITH DIAGONAL W IS EQUIVALENT TO SEPARATE OLS

The SYSLIN Procedure
 Ordinary Least Squares Estimation

Model	GE
Dependent Variable	i1

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	31632.03	15816.02	20.34	<.0001
Error	17	13216.59	777.4463		
Corrected Total	19	44848.62			

Root MSE	27.88272	R-Square	0.70531
Dependent Mean	102.29000	Adj R-Sq	0.67064
Coeff Var	27.25850		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	-9.95631	28.92563	-0.34	0.7349
v1	1	0.026551	0.014351	1.85	0.0818
k1	1	0.151694	0.023698	6.40	<.0001

GLS WITH DIAGONAL W IS EQUIVALENT TO SEPARATE OLS

The SYSLIN Procedure
 Ordinary Least Squares Estimation

Model	WEST
Dependent Variable	i2

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	5165.553	2582.776	24.76	<.0001
Error	17	1773.234	104.3079		
Corrected Total	19	6938.787			

Root MSE	10.21312	R-Square	0.74445
Dependent Mean	42.89150	Adj R-Sq	0.71438
Coeff Var	23.81153		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	-0.50939	7.389731	-0.07	0.9458
v2	1	0.052894	0.014481	3.65	0.0020
k2	1	0.092406	0.051721	1.79	0.0918

GLS WITH DIAGONAL W IS EQUIVALENT TO SEPARATE OLS

The SYSLIN Procedure
Seemingly Unrelated Regression Estimation

Cross Model Covariance		
	GE	WEST
GE	660.829	0.0000
WEST	0.000	88.6617

Cross Model Correlation		
	GE	WEST
GE	1.00000	0.00000
WEST	0.00000	1.00000

Cross Model Inverse Correlation		
	GE	WEST
GE	1.00000	0.00000
WEST	0.00000	1.00000

Cross Model Inverse Covariance		
	GE	WEST
GE	0.001513	0.000000
WEST	0.000000	0.011279

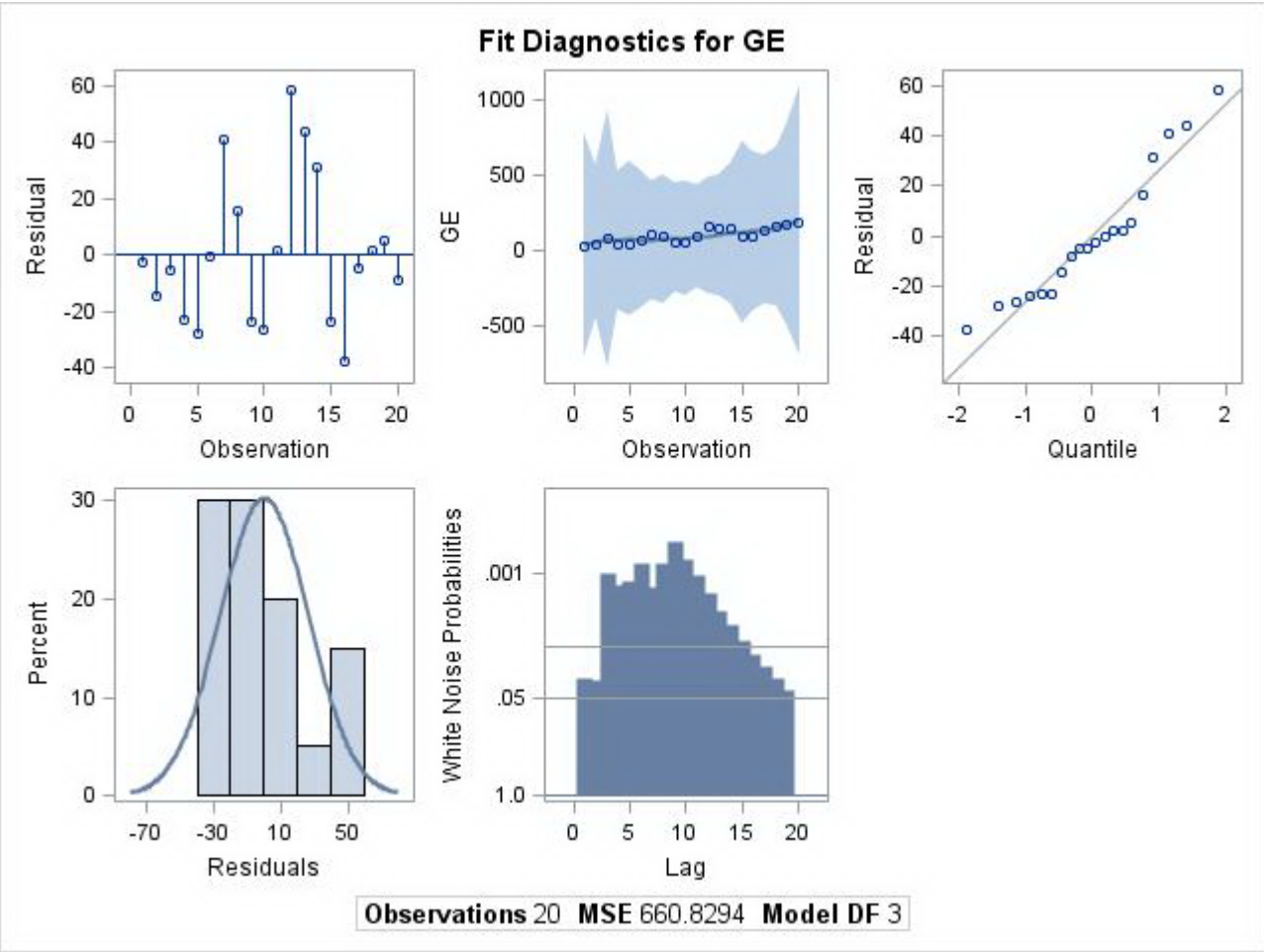
System Weighted MSE	1.1765
Degrees of freedom	34
System Weighted R-Square	0.7263

Model	GE
Dependent Variable	i1

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	-9.95631	28.92563	-0.34	0.7349
v1	1	0.026551	0.014351	1.85	0.0818
k1	1	0.151694	0.023698	6.40	<.0001

GLS WITH DIAGONAL W IS EQUIVALENT TO SEPARATE OLS

The SYSLIN Procedure Seemingly Unrelated Regression Estimation



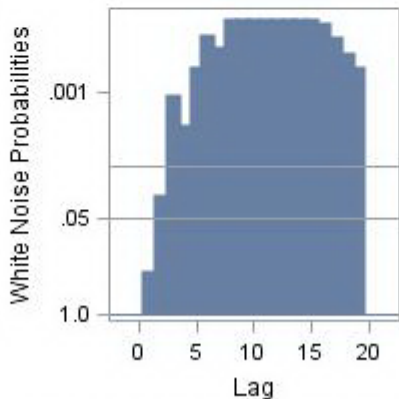
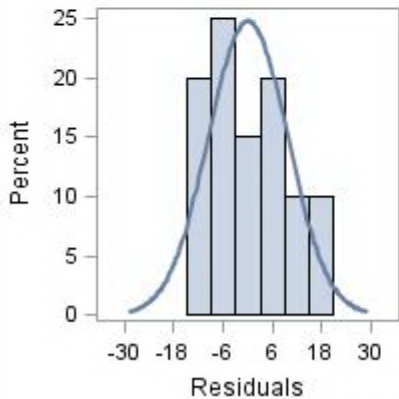
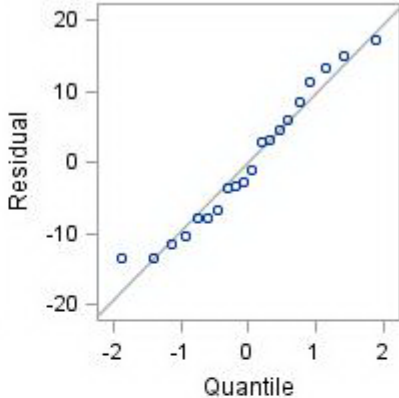
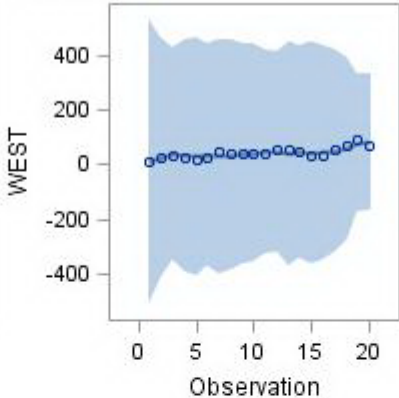
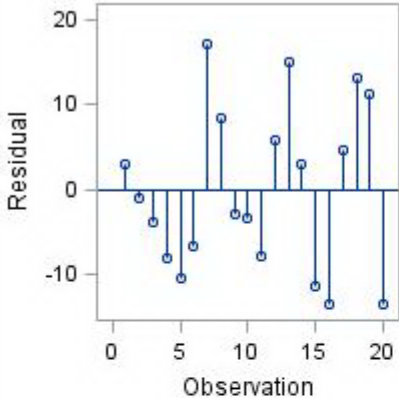
Model	WEST
Dependent Variable	i2

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	-0.50939	7.389731	-0.07	0.9458
v2	1	0.052894	0.014481	3.65	0.0020
k2	1	0.092406	0.051721	1.79	0.0918

GLS WITH DIAGONAL W IS EQUIVALENT TO SEPARATE OLS

The SYSLIN Procedure
Seemingly Unrelated Regression Estimation

Fit Diagnostics for WEST



Observations 20 MSE 88.6617 Model DF 3

RESTRICTED SUR

The SYSLIN Procedure
Ordinary Least Squares Estimation

Model	GE
Dependent Variable	i1

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	31632.03	15816.02	20.34	<.0001
Error	17	13216.59	777.4463		
Corrected Total	19	44848.62			

Root MSE	27.88272	R-Square	0.70531
Dependent Mean	102.29000	Adj R-Sq	0.67064
Coeff Var	27.25850		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	-9.95631	28.92563	-0.34	0.7349
v1	1	0.026551	0.014351	1.85	0.0818
k1	1	0.151694	0.023698	6.40	<.0001

RESTRICTED SUR

The SYSLIN Procedure
Ordinary Least Squares Estimation

Model	WEST
Dependent Variable	i2

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	5165.553	2582.776	24.76	<.0001
Error	17	1773.234	104.3079		
Corrected Total	19	6938.787			

Root MSE	10.21312	R-Square	0.74445
Dependent Mean	42.89150	Adj R-Sq	0.71438
Coeff Var	23.81153		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	-0.50939	7.389731	-0.07	0.9458
v2	1	0.052894	0.014481	3.65	0.0020
k2	1	0.092406	0.051721	1.79	0.0918

RESTRICTED SUR

The SYSLIN Procedure Seemingly Unrelated Regression Estimation

Cross Model Covariance		
	GE	WEST
GE	660.829	176.449
WEST	176.449	88.662

Cross Model Correlation		
	GE	WEST
GE	1.00000	0.72896
WEST	0.72896	1.00000

Cross Model Inverse Correlation		
	GE	WEST
GE	2.13397	-1.55559
WEST	-1.55559	2.13397

Cross Model Inverse Covariance		
	GE	WEST
GE	0.003229	-.006427
WEST	-.006427	0.024069

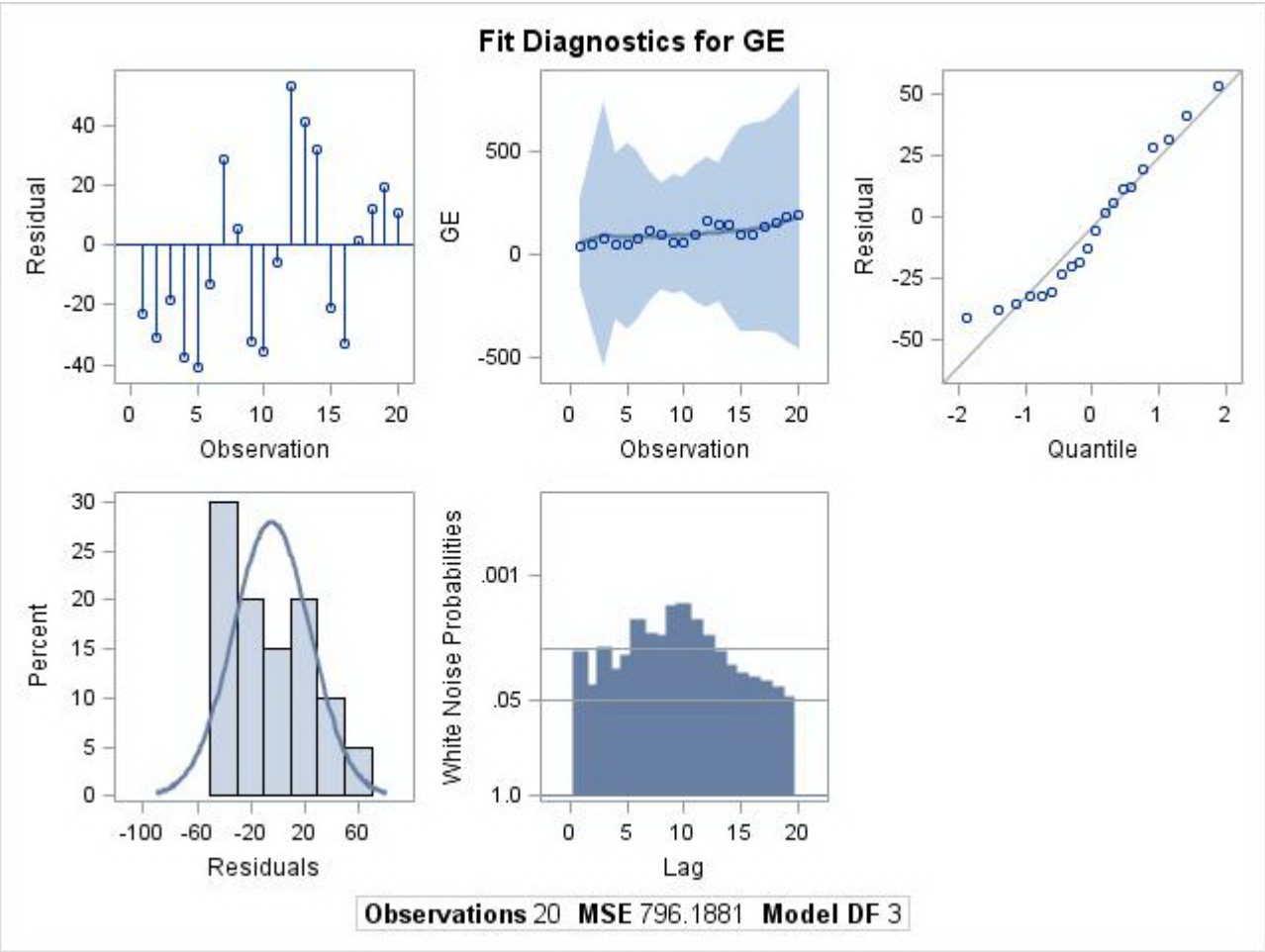
System Weighted MSE	1.3294
Degrees of freedom	37
System Weighted R-Square	0.5298

Model	GE
Dependent Variable	i1

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	19.15783	2.542651	7.53	<.0001
v1	1	0.022681	0.005027	4.51	0.0003
k1	1	0.109053	0.019048	5.73	<.0001

RESTRICTED SUR

The SYSLIN Procedure Seemingly Unrelated Regression Estimation



Model	WEST
Dependent Variable	i2

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	19.15783	2.542651	7.53	<.0001
v2	1	0.022681	0.005027	4.51	0.0003
k2	1	0.109053	0.019048	5.73	<.0001

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
RESTRICT	-1	-0.18732	0.079109	-2.37	0.0127
RESTRICT	-1	-432.993	165.5023	-2.62	0.0047
RESTRICT	-1	-40.0943	39.87214	-1.01	0.3294