Visit Forecasting Using Economic Indicators

By Jon Brager, Kean Hiri, and Kristi Weichmann

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Executive Summary

Concentra is a health care service provider primarily dealing with injuries workers incur on the job. They strive to help companies in many ways concerning injuries. They provide many services to help companies to achieve this. The company was doing very well until the attacks on 9/11. It was around that time that Concentra's management decided to change their business strategy from growth to efficiency. Instead of opening new facilities, they emphasized optimizing the centers already in place. For the past 18 months this has been the policy. The company wants to find out what economic indicators could be linked to the existing center volume. They want to know their forecasted revenue for 2003.

Statistical methods were used to come up with a predicting regression line for the next year. Sixteen different economic indicators were tested to see which ones were related to this stagnant behavior in the company. These included employment rates, unemployment, workforce, unemployment rate, goods produced, public transportation, manufacturing, CPI, PPI, ECI, GDP, productivity, USIP, prime rate, discrete, and fed funds. The regression lines were then tested against the data that had already come out for 2003 to see which one was the closest predictor. The economic indicators that affect the company the most are unemployment rate, USIP index, and fed fund rate. Concentra can monitor these three main indicators and use them as predictors of visit growth. Predictions from these indicators have been made for the 2003-year. From the graphs that were modeled for 2003 it looks as if the company is going to begin to grow as 2003 continues.

Concentra Background

Concentra is a Health Care service provider that provides injury care and other occupational medicine services to companies across the United States and Canada. Their services primarily deal with primary care physicians, physical therapists, injury management experts, cost containment nurses, medical and vocational case managers, and preferred provider network professionals. The company is comprised of over 130,000 employers throughout the United States and Canada. Concentra primarily offers employment testing, loss prevention, first report of injury, injury care, case management, and specialist networks. Concentra has a stepwise plan in order to try and lower costs for companies dealing with injuries. The four-step plan includes: prevention, medical treatment, network services, and care management. Concentra strives to do whatever they can in order to help companies lower their costs dealing with injuries.

Concentra has been growing largely in past years. They were expanding across the U.S. and Canada. The change from a growth strategy to efficiency strategy caused Concentra to look at growth in new way. Because they were no longer growing by buying new centers, Concentra decided they would try to grow by expanding within the current centers. Concentra is trying to see how the economic indicators might help to predict business volume.

Problem Description

Like many businesses, Concentra was negatively affected by the attacks on 9/11. Before that happened, Concentra was enjoying steady growth as well as steady profits. However, 9/11 changed everything. Consumers stopped spending and business's stopped growing, with a few exceptions. Upper management within Concentra believes that 9/11 was not the only exterior factor affecting the company's growth. Management questioned whether certain economic indicators could predict business volume. Considering that the bulk of Concentra's accounts deal with occupational injury, one would tend to believe that the employment rate would have a positive relationship with Concentra's visit growth. We felt that a correct combination of these indicators could model past visit growth, and predict future growth. There are many other indicators we have chosen to analyze for our model. Listed below are the 16 indicators we felt had a potential effect on visit growth:

X1 – Employment
Total non-farm payroll employment for the US

X2 – Workforce
Total civilian non-farm, non-government employment in the US

X3 – Unemployment
Total amount of non-farm unemployed out of labor force

X4 – Unemployment Rate
The unemployment rate represents the number unemployed as a percent of the labor force.

X5 – Goods Produced
Total non-farm employment by the goods producing industries: Manufacturing, mining and construction

X6 – Transportation and Public Utility
Total non-farm employment by the transportation and Public Utilities industries: Airlines, railroad, mass-transit, oil, gas, and water

X7 – Manufacturing
Total non-farm employment by the manufacturing industry

X8 – Consumer Price Index (CPI)
The Consumer Price Indexes (CPI) measures a price change for a constant market basket of goods and services from one period to the next within the same city (or in the Nation).

X9 – Producer Price Index (PPI)
The Producer Price Index (PPI) program measures the average change over time in the selling prices received by domestic producers for their output. The prices included in the PPI are from the first commercial transaction for many products and some services.

X10 – Employment Cost Index (ECI)

All types of employee compensation: wages and salaries, non-wage cash payments and fringe benefits. Total compensation in the Employment Cost Index is defined as the employer's cost of wages and salaries and employee benefits.

X11 – Gross Domestic Product (GDP)

Gross Domestic Product, or GDP for short, measures the value of a nation's output of goods and services for some period of time, usually a year. It is not the only measure of output--the Federal Reserve, for example, publishes an index of industrial production--but the GDP has become a favorite among economists because it is the most comprehensive of output measures.

X12 – Productivity

Productivity is a measure of economic efficiency which shows how effectively economic inputs are converted into output. Productivity is measured by comparing the amount of goods and services produced with the inputs that were used in production.

X13 – USIP Index

The US Import Price Index or Import Price Index (MPI) contains data on changes in the prices of nonmilitary goods and services traded between the U.S. and the rest of the world.

X14 – Prime Rate

The Prime Rate is the interest rate charged by banks to their most creditworthy customers (usually the most prominent and stable business customers). The rate is almost always the same amongst major banks. Adjustments to the prime rate are made by banks at the same time; although, the prime rate does not adjust on any regular basis.

X 15 – Discrete

Commonly called the discount rate, it's the rate charged by the Federal Reserve to banks for overnight loans.

X16 – Fed Fund Rate

The interest rate at which the Federal Reserve Board lends money to US Banks. The benchmark Fed Funds rate is one of the most closely monitored monetary policy indicators.

As seen above, we decided to break down national employment into industries that better reflect Concentra's visit growth. Industries like manufacturing, mining, construction, transportation, and utilities historically have been more susceptible to work-related injuries. We also included some price indices like CPI, PPI, and ECI. We felt these indices could imitate commercial and industrial spending. However, we were not able to use these indices because they are measured quarterly and our model required monthly data. Furthermore, we looked at several other indicators such as GDP, productivity, and the Fed Fund Rate. All of these indicators were chosen because they have some quality that correlates with visit growth. However, some relate more than others, which we'll discuss further in the Analysis of the Situation section.

Analysis of the Situation

The problem outlined for our group was to find a relationship between certain economic indicators and visit growth. The data supplied was the visit growth in 2001 and 2002 totals, comp, noncomp, and injury. However, seasonality trends were apparent upon further investigation of the data. In order to reduce the effects of seasonality, we took the percent change year over year: for example ((Jan 2002-Jan 2001)/Jan 2002) *100. Furthermore, upon plotting the economic indicators vs. total visits, it was apparent that some form of linear model could establish a relationship for future forecasts.

The data was given in Excel files then transferred into Word and then into telnet by copying and pasting. We decided to use SAS in order to solve the problem, but we ran three different variations with the same data and plotted the residuals. One variation was just a multiple regression analysis, the other was a stepwise analysis, and the last was the significant variables from the stepwise analysis ran in multiple regression formats. A data file and a program file were created for every category for 2001, 2002, and 2001-2002. The data file was set up as y x1 x2 x3 x4 x5 x6 x7 x8 x9 x10 x11 x12 x13 x14 x15 x16, with the data being Total Visit Growth, Employment, Workforce, Unemployment, Unemployment Rate, Goods Produced, Tranpub, Manufacturing, CPI, PPI, ECI, GDP, Productivity, USIP Index, Prime Rate, Discrete, and Fed Funds respectfully. The program files were short and here is an example of total 2001:

```
filename f5  'total_2001.data';
Data one;
infile f5;
  input y x1 x2 x3 x4 x5 x6 x7 x8 x9 x10 x11 x12 x13 x14 x15 x16;
  proc REG;
  model y=x1 x2 x3 x4 x5 x6 x7 x8 x9 x10 x11 x12 x13 x14 x15
       x16/selection=stepwise;
run;
```

Upon presenting the linear regression equations taken from ANOVA charts to our client, the coefficients along with the significance of the variables were incorrect. Our client wasn't able to reproduce any results that even closely related to visit growth.

Further analysis of the data revealed that there was a mistake made copying the files from Word into telnet. Somehow the data was misconstrued for several years of the data. When the problem was corrected, our results were still obviously incorrect. We decided to arrange the data line by line so it could be easily read. Before, the data was spaced out on different lines and spaced with tab marks. When we arranged each set of data on one line, it was apparent that there were spacing problems in several of the categories. Furthermore, we incorporated a function called PROC print into the SAS program that allowed us to view what data corresponded to which variables. This function also showed us some mistakes in spacing and order, which we corrected. The resulting data produced more than satisfactory significance and reliable and reproducible results. An example of the comp 2002 regression equation is y=20.70042+0.2739x4+0.52392x15.

Technical Description of the Model

In our project we used a Statistical application, SAS, to solve the problem at hand. In SAS we used what is known as stepwise regression (forward selection) in order to solve for the best variable. Stepwise regression is an application in SAS that allows the user to have one dependent variable (y) and several independent variables (X_1, ...,X_k) and solve for the best independent variables. Stepwise screens all the variables and picks the variables that are most effective and produce the highest correlation. Stepwise with forward selection chooses variables one at a time and inserts them in until an acceptable regression equation is found. It goes through three main steps:

1. Chooses the variable (out of all the independent variables) that gives the largest value for R^2.
2. Next it chooses the next variable that gives the largest increase in R^2 when combined with the first variable chosen.
3. It continues to add variables until the variable fails to produce a significant increase in the R^2 value.

The system allows you to arrive at the most effective predictive model. Stepwise regression on SAS gives a printout of data to be analyzed in order to come up with an effective regression line.

In our problem we had 16 economic indicators which were the independent variables and one dependent variable. There were four different areas that were being tested; comp, non comp, injury, and total. Under these categories there is data for 2001, 2002, and 2001-2002. The 2001 data was not very applicable because of everything that happened in the economy that year so we just used the 2001-2002 and 2002 data. All

eight of these were run in stepwise regression with the 16 economic indicators to come up with a regression equation using the most efficient amount of indicators. Most of the models came up with using very similar indicators (Appendix B.9)

The indicators that stepwise chose are in a table with their R^2 values, p-values, and coefficients. The R^2 value is the overall measure of how the independent variables (as a group) help in predicting the dependent variable (y). The r-value is between 1 and -1. The closer the number is to 1 the better. The p-value is the lowest significant value at which we would reject the null hypothesis. This value helps you to see if the value that SAS picks is significant or not. The value needs to be very small in order to be significant. These can either be significant at the .05 level or .01 level. The p-value has to be smaller than .05 or .01 to be significant at that level. The coefficients are also produced. These are the coefficients that are used for the regression equations. These values can show you whether or not the relationship with the variable is positive or negative depending on the sign of the coefficient.

In addition to this information, SAS plots the residuals. The residual plots are an analysis of the calculated residuals from the regression lines. The residual measures how far the values fall from the prediction line. Patterns in the residuals can reveal that there may be a problem with the regression line. Residual plots are very useful in indicating a problem in the values that were chosen in SAS.

After entering in all the data into SAS, 8 regression models were chosen by stepwise. Here are the eight regression models that were produced:

Comp 2001-2002: y = 5.51421 + 0.18999x16
Comp 2002: y = 13.69712 + 0.27561x4 + 0.47296x16
Non Comp 2001-2002: y = 18.22907 + 0.26701x4 + -5.13318x8 + 1.52450x13 + 0.20906x16
Non Comp 2002: y = 3.08714 + 0.83110x13

Injury 2001-2002: y = 4.56589 + 0.18381x16
Injury 2002: y = 9.36805 + 0.26636x16
Total 2001-2002: y = -1.60189 + 0.19052x4 + 1.54776x13
Total 2002: y = 0.24455 + 0.86062x13

We plotted these regression equations versus the data points. (Appendices B.1-B.8) We examined the plots and the data produced by SAS in order to narrow our 8 equations down to four (one from each category). Here is the data that we examined from SAS for the 8 equations:

Comp 2001-2002: $R^2 = 0.3998$, p-value = 0.0009 (Appendix A.1)
Comp 2002: $R^2 = 0.5595$, p-value = 0.0250 (Appendix A.3)
Injury 2001-2002: $R^2 = 0.3407$, p-value = 0.0028 (Appendix A.5)
Injury 2002: $R^2 = 0.3193$, p-value = 0.0556 (Appendix A.7)
Non Comp 2001-2002: $R^2 = 0.6852$, p-value = 0.0001 (Appendix A.9)
Non Comp 2002: $R^2 = 0.3448$, p-value = 0.0447 (Appendix A.11)
Total 2001-2002: $R^2 = 0.4623$, p-value = 0.0015 (Appendix A.13)
Total 2002: $R^2 = 0.3773$, p-value = 0.0336 (Appendix A.15)

We compared the p-values, R^2, plotted residuals (Appendices A.2, A.4, A.6, A.8, A.10, A.12, A.14, A.16), and actual graphs (Appendices B.1-B.8). After examining these values, we chose Comp 2002, Injury 2001-2002, Non Comp 2001-2002, and Total 2001-2002 to be the four best models. We chose the graphs that had the best combination of the R^2 closest to one, the smallest p-value, graphs with points that were closest to the regression line, and residuals plots that were evenly spaced with similar amounts of points on both sides. The four best regression equations are:

Comp 2002: y = 13.69712 + 0.27561x4 + 0.47296x16
Non Comp 2001-2002: y = 18.22907 + 0.26701x4 + -5.13318x8 + 1.52450x13 + 0.20906x16
Injury 2001-2002: y = 4.56589 + 0.18381x16
Total 2001-2002: y = -1.60189 + 0.19052x4 + 1.54776x13

You can tell a lot just by looking at the coefficients in the equations. For Comp 2002, x4 (Unemployment Rate) and x16 (Fed Fund Rate) were used. Both of these have a positive coefficient, which shows a positive relationship. Non Comp chose x4 (Unemployment

Rate), x8 (Consumer Price Index), x13 (USIP Index), and x16(Fed Fund Rate). All of these except x8 have a positive relationship. Injury 2001-2002 chose x16 (Fed Fund Rate), which also has a positive relationship. Lastly, Total 2001-2002 chose x4 (Unemployment) and x13 (USIP Index), which also have a positive relationship. All of the values have positive coefficients showing a positive relationship.

From these regression lines, we predicted the 2003 values. We looked at various data on the internet and various trends to predict values for the 2003 year. We used the predicted values to plug into our regression equations to find a prediction for 2003 year.

Analysis and Managerial Interpretation

The results of the stepwise regression analysis yielded results that can explain the relationship between the indicators and the visit growth. Each of the regression equations that were chosen has a relationship to the data and the economic indicators. For Comp 2001-2002: $y = 5.51421 + 0.18999x16$ was the regression equation. Here x16, the Fed Funds Rate, was chosen. As the Fed Funds rate increases, so does the visit growth. This indicates a positive relationship between the Fed Funds Rate and the visit growth. The higher the rate set by the Fed, the more likely consumers are going to invest their money. The Federal Reserve lowers the Fed Funds Rate when more spending is desired in the economy. A slow and declining economy usually indicates a slow growth for companies and therefore fewer visits due to fewer employees. The regression equation for Comp 2002 was $y = 13.69712 + 0.27561x4 + 0.47296x16$. This equation used x4, unemployment rate, and x16, Fed Funds rate. The equation again has a positive relationship between the indicators and visit growth. This equation, however, uses the unemployment rate. The positive value indicates the higher the unemployment rate the more the visits. However, when the unemployment rate is high, the economy is not growing, and visits should go down. This discrepancy can be explained by analyzing the situation. When unemployment is up, businesses usually don't hire employees and cut back on their workforce. Since these cutbacks occur, less people are left to do jobs therefore putting them at more of a risk for injury and sickness. Of the two equations, Comp 2002 was chosen because the results were more significant and better predicted the old data.

The regression equation for Non Comp 2001-2002 was y = 18.22907 + 0.26701x4 + -5.13318x8 + 1.52450x13 + 0.20906x16. The equation used x4, unemployment rate, x8, CPI, x13, USIP index, and x16, Fed Funds Rate. The unemployment rate here also is positive and again can be explained by the downsizing of the workforce. The CPI has a negative coefficient that results in an inverse relationship with visit growth. The higher CPI indicates fewer consumer spending and smaller to less growth in the economy. Therefore the smaller the CPI, the more consumers spend in the economy and the more growth. More growth in the economy, again leads to more jobs and more people getting hurt, sick, and needing screening. The USIP index directly relates to positive visit growth. The higher the USIP index the more trade with other countries occurs the more the economy grows. Again, the better the economy does, the more businesses employ, and the more visits grow. The regression equation uses the Fed Funds Rate. Non Comp 2002 was y = 3.08714 + 0.83110x13. This regression line only used one indicator x13, the USIP index. The coefficient is again high relative to other values. Non Comp 2001-2002 was chosen because it better predicted visit growth and its variables were more significant.

The equation for Injury 2001-2002 was y = 4.56589 + 0.18381x16 and Injury 2002 was y = 9.36805 + 0.26636x16. Both equations used x16, the Fed Funds Rate, but the 2001-2002 regression equation was used because it better predicted visit growth.

Total 2001-2002 was y = -1.60189 + 0.19052x4 + 1.54776x13. This equation used x4, unemployment rate, and x13, the USIP index. The coefficient for the unemployment rate is positive and can be explained by the downsizing of the workforce. The coefficient for the USIP index is also positive. Total 2002 was y = 0.24455 +

0.86062x13. Both equations had small to negative y intercepts, but 2001-2002 was chosen because it best predicted visit growth.

All of the regression equations chosen were 2001-2002 except for Comp 2002. For future predictions of visit growth the unemployment rate, CPI, USIP index, and Fed Funds Rate should be closely monitored in order to forecast data. Visit growth cannot always be predicted due to uncertain events that shift the economy like the attacks of September 11, 2001. However, linear regression models are not the best way to predict visit growth. It is very possible that other trends such as quadratic equations could properly predict visit growth.

The forecast for fitting 2003 and future data is a problem when using linear regression models on SAS. There is no way of generating or predicting any of the economic indicators. Our program is designed to predict visit volume based on economic indicators. In order to make up for the lack of data, we looked at past trends from our data and looked for predictions over the Internet. The economic indicators chosen for 2003 were predictions and averages taken from past economic indicators and predictions found over the Internet.

With the unemployment rate we looked at the past five years of data and found a consistent pattern for each year. The unemployment rate decreased until May and then went up in June and then fluctuated back and forth. For the CPI index there wasn't enough data to make an accurate or significant prediction. The USIP index had a pattern of slow growth and then slow decline, which we applied to the 2003 models. After researching the past ten years of data for the Fed Funds Rate, we predict that the rate will not be lowered because the war with Iraq is now over. The Fed Funds Rate was steadily

lowered during the war and now that the war has ended the rate will slowly increase over the year.

The model for Total 2001-2002 for 2003 shows a sharp rise in February then a small decline and then a small rise and then a decline to the end of the year (Appendix B1). The model for Injury 2001-2002 shows 2003 steadily increasing and then sharply increasing at the end of the year (Appendix B5). Comp 2002 also predicts a steady rise in visit growth and then a sharp rise in November (Appendix B6). NonComp 2001-2002 shows a steady increase until September, a small decrease in September, and increase in October, a sharp increase in November, and a decline in December (Appendix B7).

Conclusion and Closing Remarks

Before we began this project, our goals were to:

1. Successfully develop a model to predict past, present, and future data.
2. Gain understanding of what economic indicators can drive a business especially Concentra.
3. Provide a practical visit forecast for Concentra's management.

Upon completion of the project, we successfully developed 4 mathematical models that fit past data rather well. Looking at the charts B.1-8, one can see how closely our regression lines mimic the actual visit growth data. After developing these models, we tested them by inputting indicator data from 2003 (Jan. Feb. March). Charts B.1-8 illustrate the projected growth versus the actual growth during these three months. For total, comp, and noncomp, our model projected a continual increase in growth while actual growth dipped due to decreased growth in February. At first, it looks as if our models are incorrect. However, our models are reflective of the economic indicators. . What our model is demonstrating here is that the current economic condition suggests that while visit growth dipped in February, growth in the long-term will maintain a positive trend. Injury growth, however, increased in February and decreased in March. Our model was relatively accurate in that it cut through the actual growth.

A major component of this project was to develop a model(s) that can predict future growth. To do this, we had to project what the economy would do, more importantly what our significant indicators do in 2003. After researching unemployment rate, CPI, USIP Index, and the Fed Funds rate, we came up with data we felt was

predictive of the economy in 2003. We plotted this data on charts B.1-8 and for the most part all predict slow, steady growth.

Although our models were accurate, they weren't perfect. There are limitations to multiple linear regressions. The foremost is that not all trends are linear. There are many possible approaches to solving this problem and many acceptable answers. However, we are limited to the skills and resources we possess. No model can be 100% accurate, so it's a matter of confidence in the model and we are confident in our models.

Another goal of this project was to develop an understanding of what the economic indicators were and how they could affect a business in terms of growth. Before creating our models, we researched each indicator. For each one, we needed to know what it measured, how often, and could it affect Concentra. We feel confident the indicators selected will be good predictors for Concentra's management to gauge visit growth.

Because this project centered on statistical analysis, our SAS programming skills have enhanced greatly. Along with programming, we enhanced our problem solving skills by using teamwork. The fact that this was a group project, gave us a great experience in working with others, time-management, and group responsibility. But, by far the greatest experience was to provide independent consulting for a real company and get to use our skills in the real world.

Appendix A

Appendix A.1

Comp 2001 - 2002 Stepwise Output

The REG Procedure
Model: MODEL1
Dependent Variable: y

Stepwise Selection: Step 1

Variable x16 Entered: R-Square = 0.3998 and C(p) = -1.4210

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	371.22370	371.22370	14.65	0.0009
Error	22	557.29835	25.33174		
Corrected Total	23	928.52205			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	5.51421	2.45765	127.52364	5.03	0.0352
x16	0.18999	0.04963	371.22370	14.65	0.0009

Bounds on condition number: 1, 1

All variables left in the model are significant at the 0.1500 level.

No other variable met the 0.1500 significance level for entry into the model.

Summary of Stepwise Selection

Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	x16		1	0.3998	0.3998	-1.4210	14.65	0.0009

Appendix A.2

Comp 2001 - 2002 Significant Output

The REG Procedure
Model: MODEL1
Dependent Variable: y

Analysis of Variance

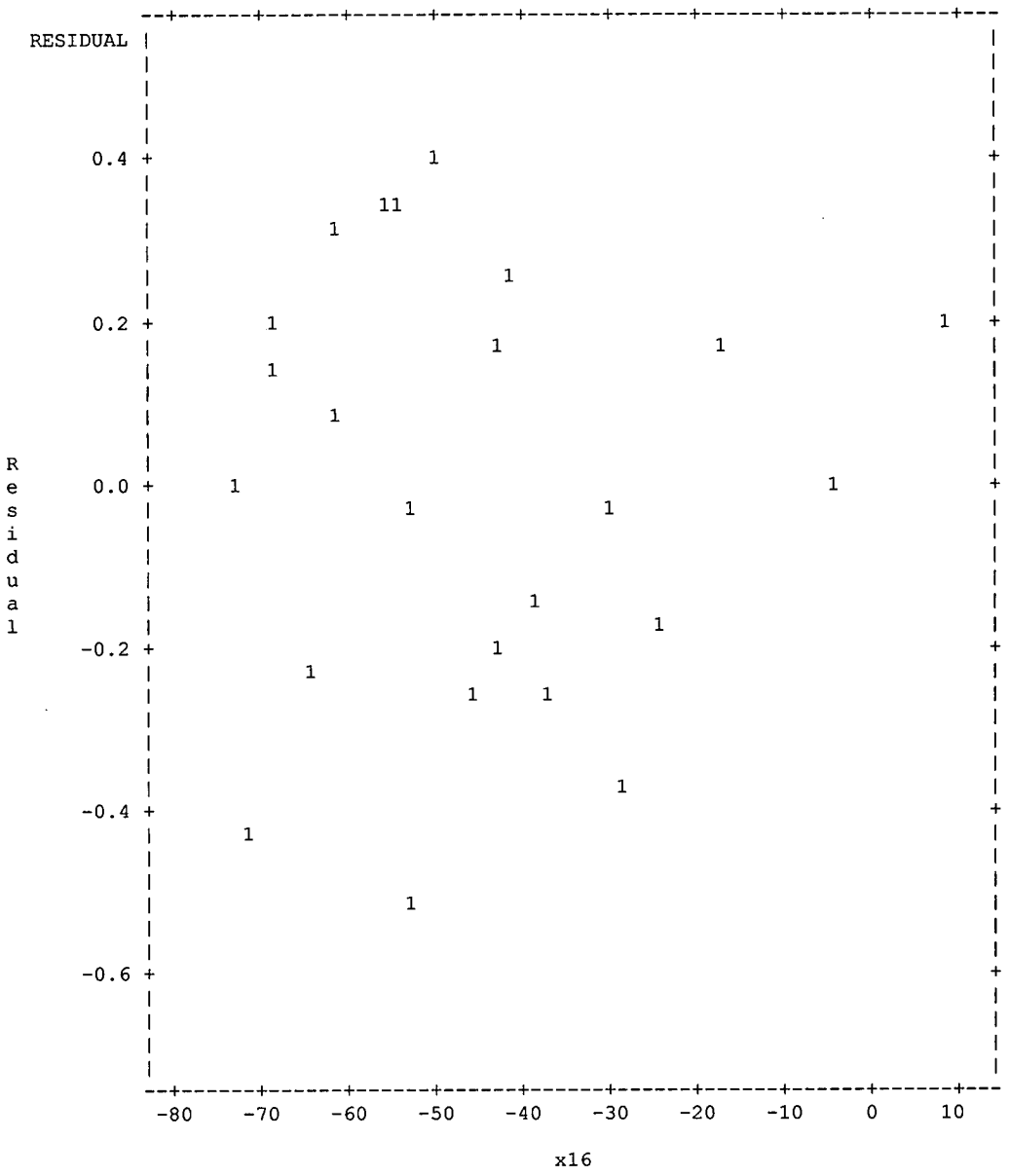
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.25466	0.25466	3.59	0.0715
Error	22	1.56189	0.07099		
Corrected Total	23	1.81655			

Root MSE	0.26645	R-Square	0.1402
Dependent Mean	0.56318	Adj R-Sq	0.1011
Coeff Var	47.31185		

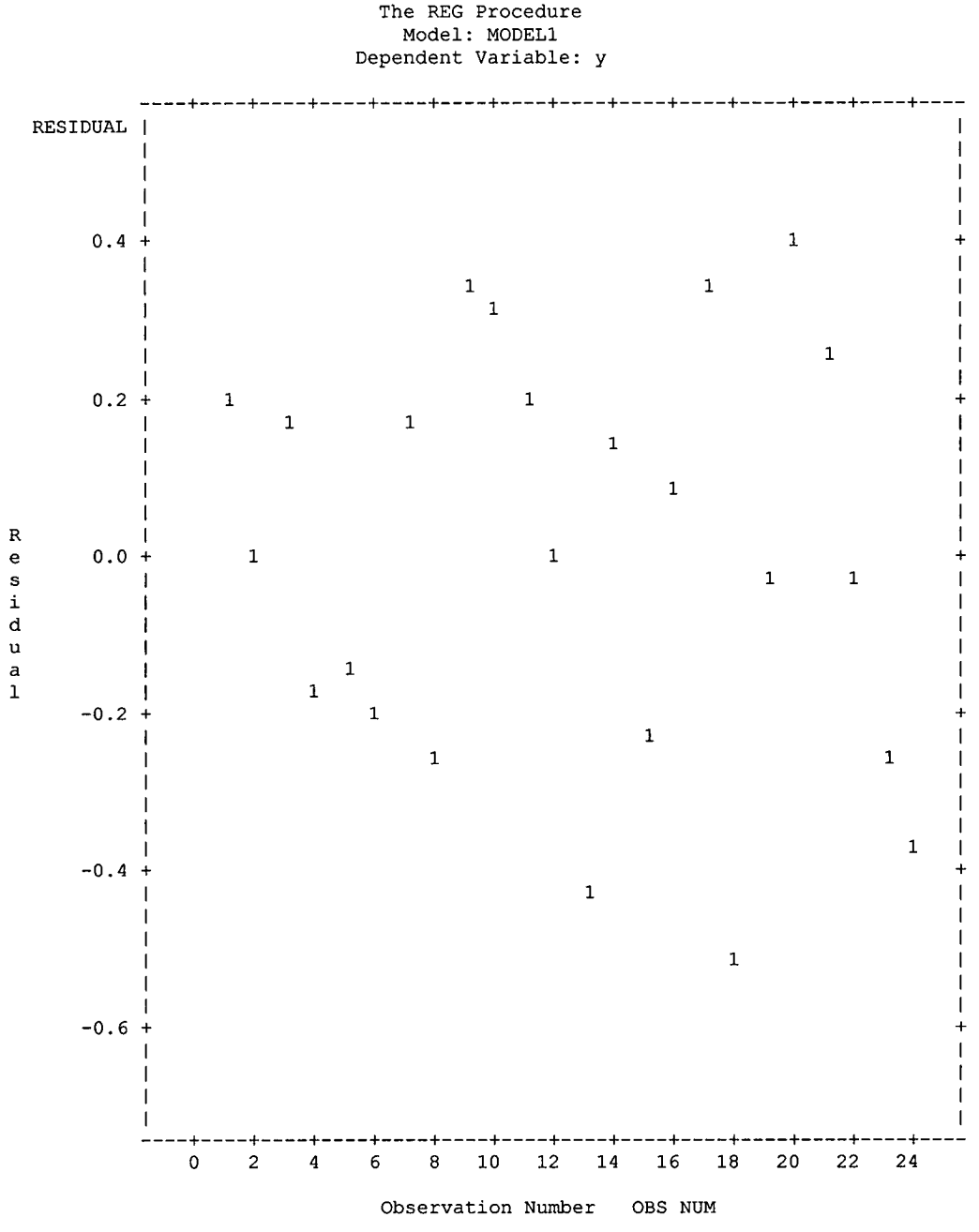
Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	0.78703	0.13011	6.05	<.0001
x16	1	0.00498	0.00263	1.89	0.0715

Appendix
A.2


The REG Procedure
Model: MODEL1
Dependent Variable: y
RESIDUAL
Residual
0.4
0.2
0.0
-0.2
-0.4
-0.6
-80
-70
-60
-50
-40
-30
-20
-10
0
10
x16

Appendix
A.2


The REG Procedure
Model: MODEL1
Dependent Variable: y
RESIDUAL
0.4
0.2
0.0
-0.2
-0.4
-0.6
Residual
0
2
4
6
8
10
12
14
16
18
20
22
24
Observation Number OBS NUM

Appendix A.3

Comp 2002 Stepwise Output

The REG Procedure
Model: MODEL1
Dependent Variable: y

Stepwise Selection: Step 1

Variable x16 Entered: R-Square = 0.4147 and C(p) = .

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	153.97258	153.97258	7.09	0.0238
Error	10	217.28764	21.72876		
Corrected Total	11	371.26022			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	8.56082	5.23177	58.17920	2.68	0.1328
x16	0.26227	0.09852	153.97258	7.09	0.0238

Bounds on condition number: 1, 1

Stepwise Selection: Step 2

Variable x4 Entered: R-Square = 0.5595 and C(p) = .

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	207.73845	103.86923	5.72	0.0250
Error	9	163.52177	18.16909		
Corrected Total	11	371.26022			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	13.69712	5.63937	107.18410	5.90	0.0381
x4	0.27561	0.16022	53.76587	2.96	0.1195
x16	0.47296	0.15204	175.80717	9.68	0.0125

Bounds on condition number: 2.8481, 11.393

All variables left in the model are significant at the 0.1500 level.

Stepwise Selection: Step 2

No other variable met the 0.1500 significance level for entry into the model.

Summary of Stepwise Selection

Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	x16		1	0.4147	0.4147	.	7.09	0.0238

Appendix A.3

2	x4	2	0.1448	0.5595	.	2.96	0.1195

Appendix A.4

Comp 2002 Significant Output

The REG Procedure
Model: MODEL1
Dependent Variable: y

Analysis of Variance

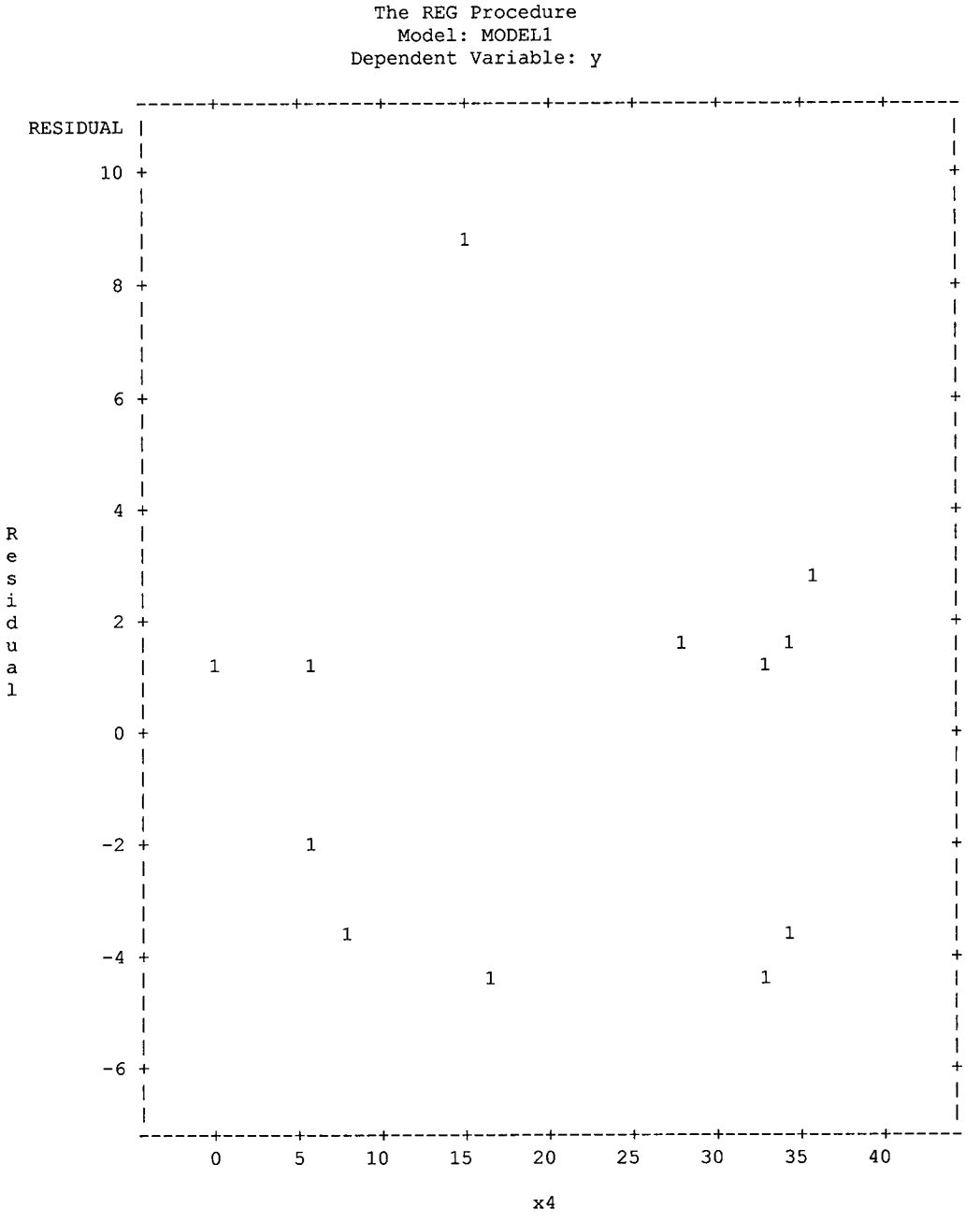
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	207.73845	103.86923	5.72	0.0250
Error	9	163.52177	18.16909		
Corrected Total	11	371.26022			

Root MSE	4.26252	R-Square	0.5595
Dependent Mean	-4.89750	Adj R-Sq	0.4617
Coeff Var	-87.03463		

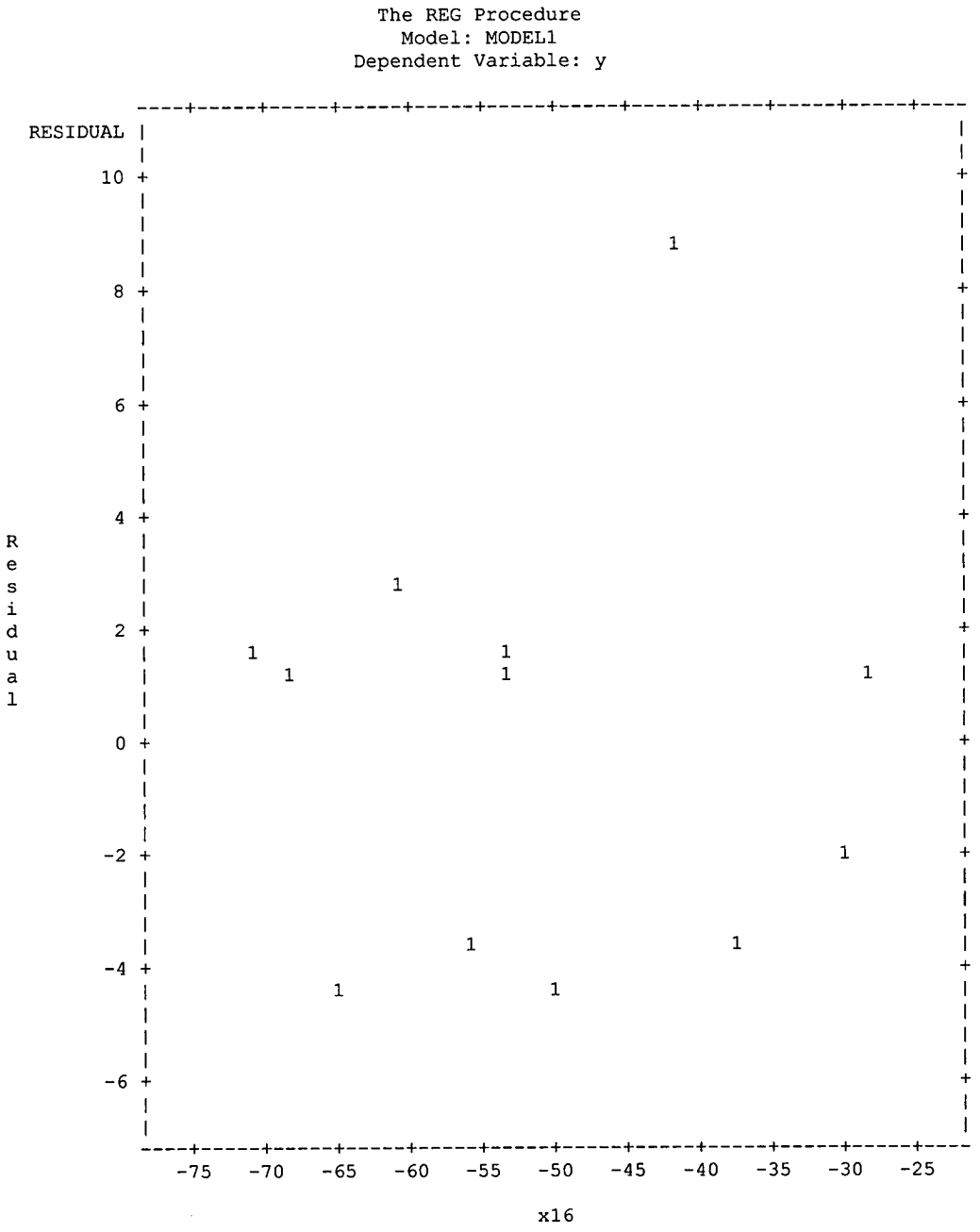
Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	13.69712	5.63937	2.43	0.0381
x4	1	0.27561	0.16022	1.72	0.1195
x16	1	0.47296	0.15204	3.11	0.0125

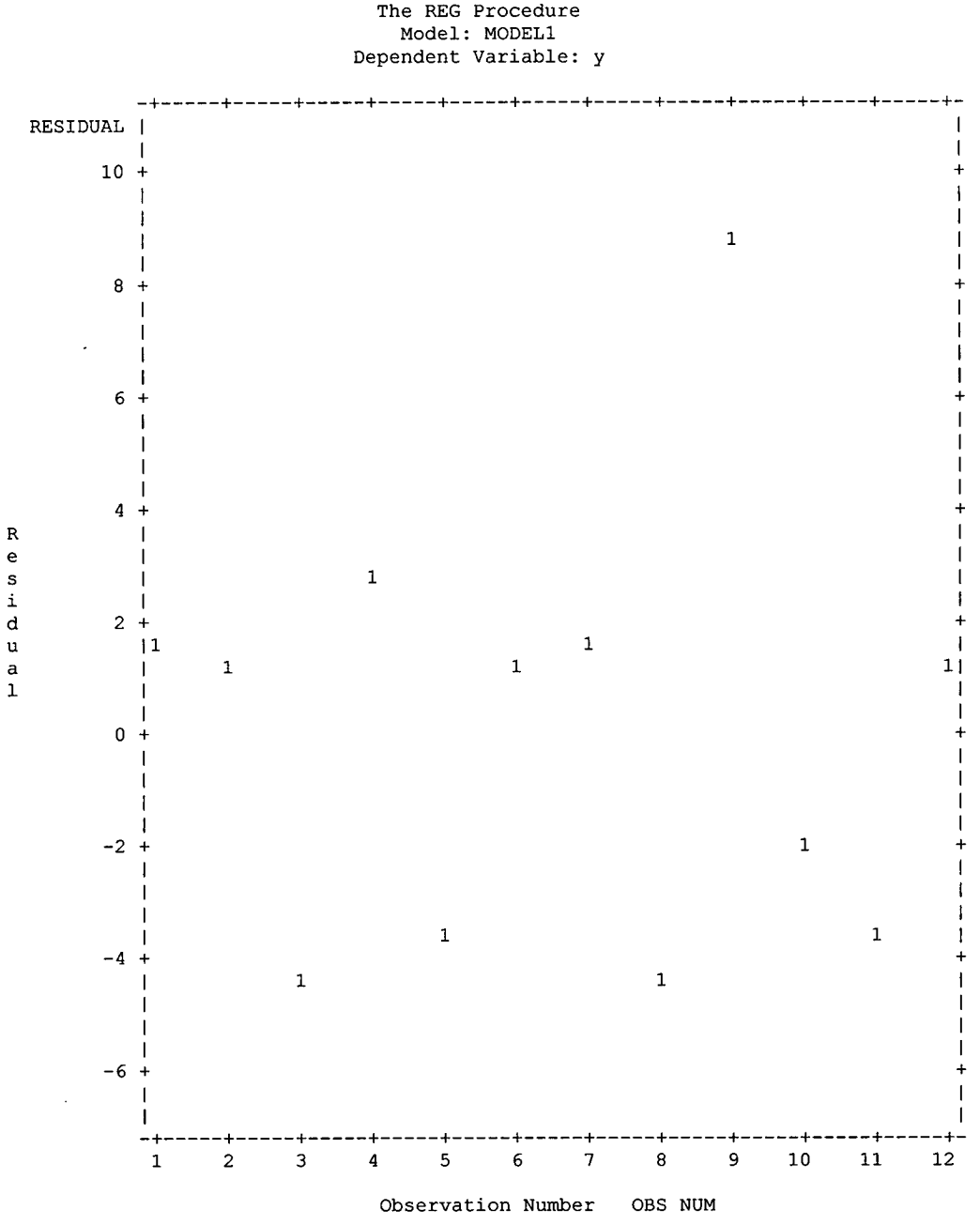
Appendix
A.4


The REG Procedure
Model: MODEL1
Dependent Variable: y
RESIDUAL
Residual
10
8
6
4
2
0
-2
-4
-6
0
5
10
15
20
25
30
35
40
x4

Appendix
A.4


The REG Procedure
Model: MODEL1
Dependent Variable: y
RESIDUAL
Residual
10
8
6
4
2
0
-2
-4
-6
-75
-70
-65
-60
-55
-50
-45
-40
-35
-30
-25
x16

Appendix
A.4


The REG Procedure
Model: MODEL1
Dependent Variable: y
RESIDUAL
Residual
Observation Number
OBS NUM

Appendix A.5

Injury 2001 - 2002 Stepwise Output

The REG Procedure
Model: MODEL1
Dependent Variable: y

Stepwise Selection: Step 1

Variable x16 Entered: R-Square = 0.3407 and C(p) = -4.7883

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	347.47527	347.47527	11.37	0.0028
Error	22	672.45042	30.56593		
Corrected Total	23	1019.92570			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	4.56589	2.69964	87.43309	2.86	0.1049
x16	0.18381	0.05452	347.47527	11.37	0.0028

Bounds on condition number: 1, 1

All variables left in the model are significant at the 0.1500 level.

No other variable met the 0.1500 significance level for entry into the model.

Summary of Stepwise Selection

Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	x16		1	0.3407	0.3407	-4.7883	11.37	0.0028

Appendix A.6

Injury 2001 – 2002 significant Output

The REG Procedure
Model: MODEL1
Dependent Variable: y

Analysis of Variance

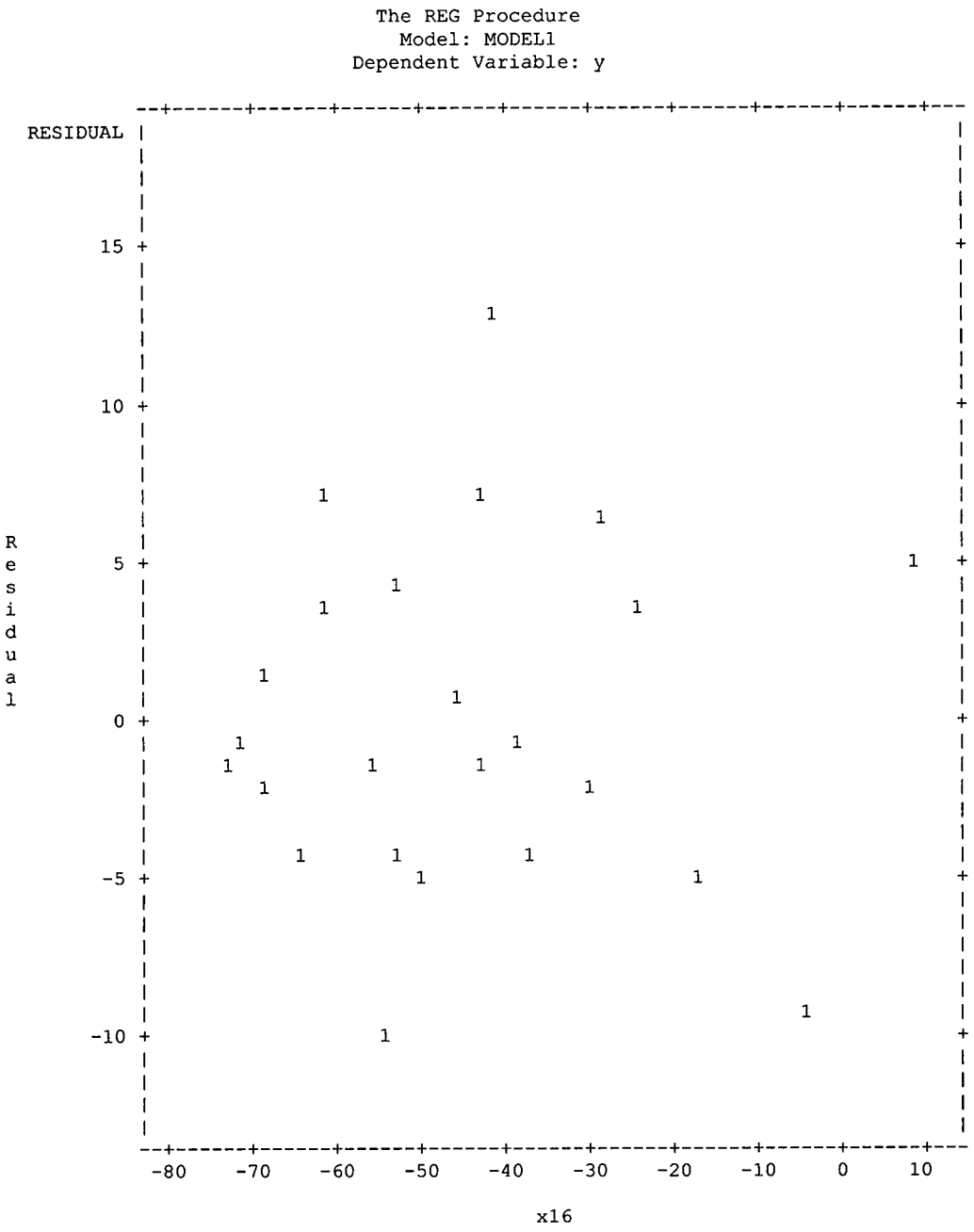
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	347.47527	347.47527	11.37	0.0028
Error	22	672.45042	30.56593		
Corrected Total	23	1019.92570			

Root MSE	5.52865	R-Square	0.3407
Dependent Mean	-3.70292	Adj R-Sq	0.3107
Coeff Var	-149.30517		

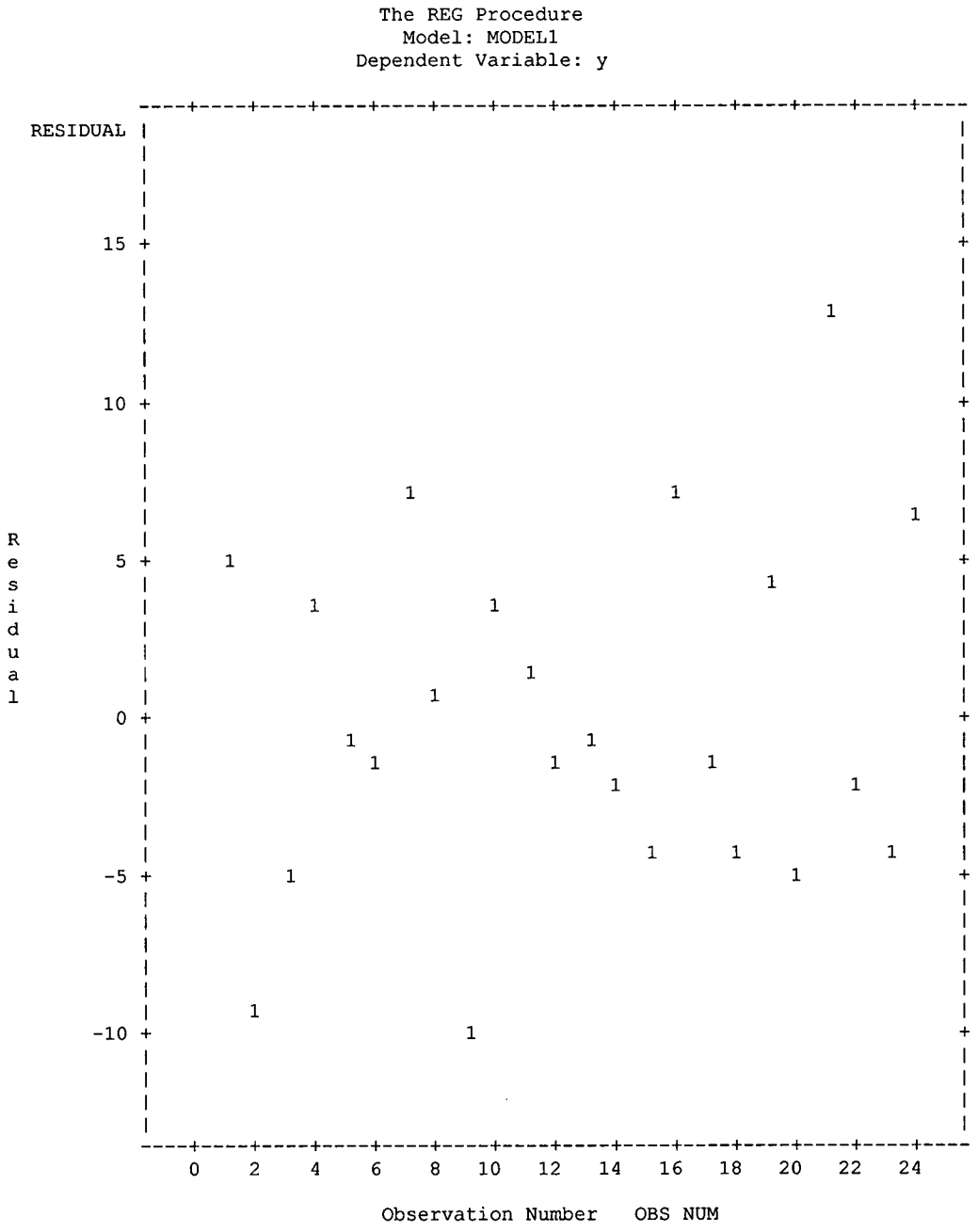
Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	4.56589	2.69964	1.69	0.1049
x16	1	0.18381	0.05452	3.37	0.0028

Appendix
A.6


The REG Procedure
Model: MODEL1
Dependent Variable: y
RESIDUAL
Residual
15
10
5
0
-5
-10
-80
-70
-60
-50
-40
-30
-20
-10
0
10
x16

Appendix
A.6


The REG Procedure
Model: MODEL1
Dependent Variable: y
RESIDUAL
Residual
15
10
5
0
-5
-10
0
2
4
6
8
10
12
14
16
18
20
22
24
Observation Number OBS NUM

Appendix A.7

Injury 2002 Stepwise Output

The REG Procedure
Model: MODEL1
Dependent Variable: y

Stepwise Selection: Step 1

Variable x16 Entered: R-Square = 0.3193 and C(p) = .

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	158.80894	158.80894	4.69	0.0556
Error	10	338.56546	33.85655		
Corrected Total	11	497.37440			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	9.36805	6.53060	69.66836	2.06	0.1820
x16	0.26636	0.12298	158.80894	4.69	0.0556

Bounds on condition number: 1, 1

All variables left in the model are significant at the 0.1500 level.

No other variable met the 0.1500 significance level for entry into the model.

Summary of Stepwise Selection

Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	x16		1	0.3193	0.3193	.	4.69	0.0556

Appendix A.8

Injury 2002 significant Output

The REG Procedure
Model: MODEL1
Dependent Variable: y

Analysis of Variance

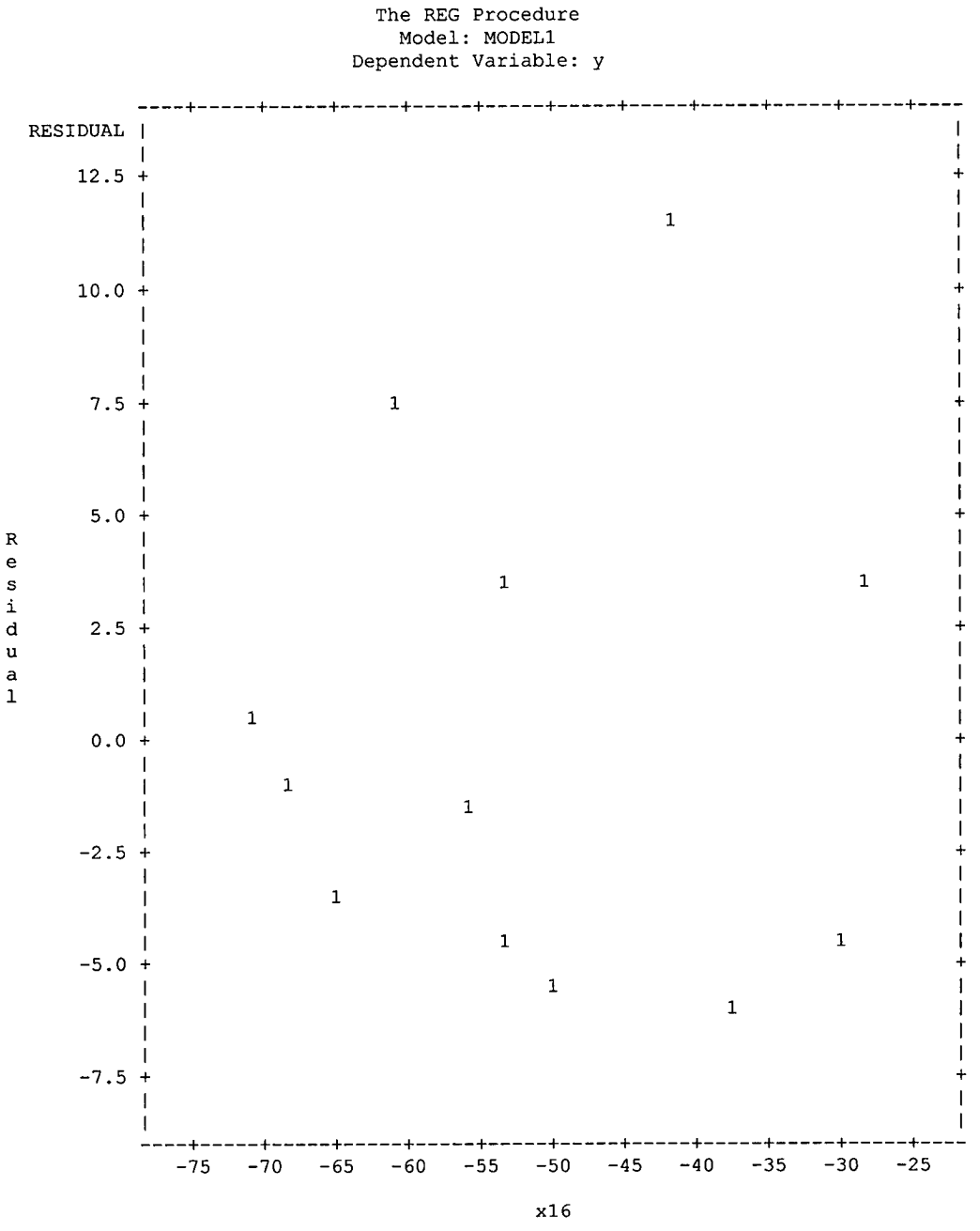
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	158.80894	158.80894	4.69	0.0556
Error	10	338.56546	33.85655		
Corrected Total	11	497.37440			

Root MSE	5.81864	R-Square	0.3193
Dependent Mean	-4.30000	Adj R-Sq	0.2512
Coeff Var	-135.31716		

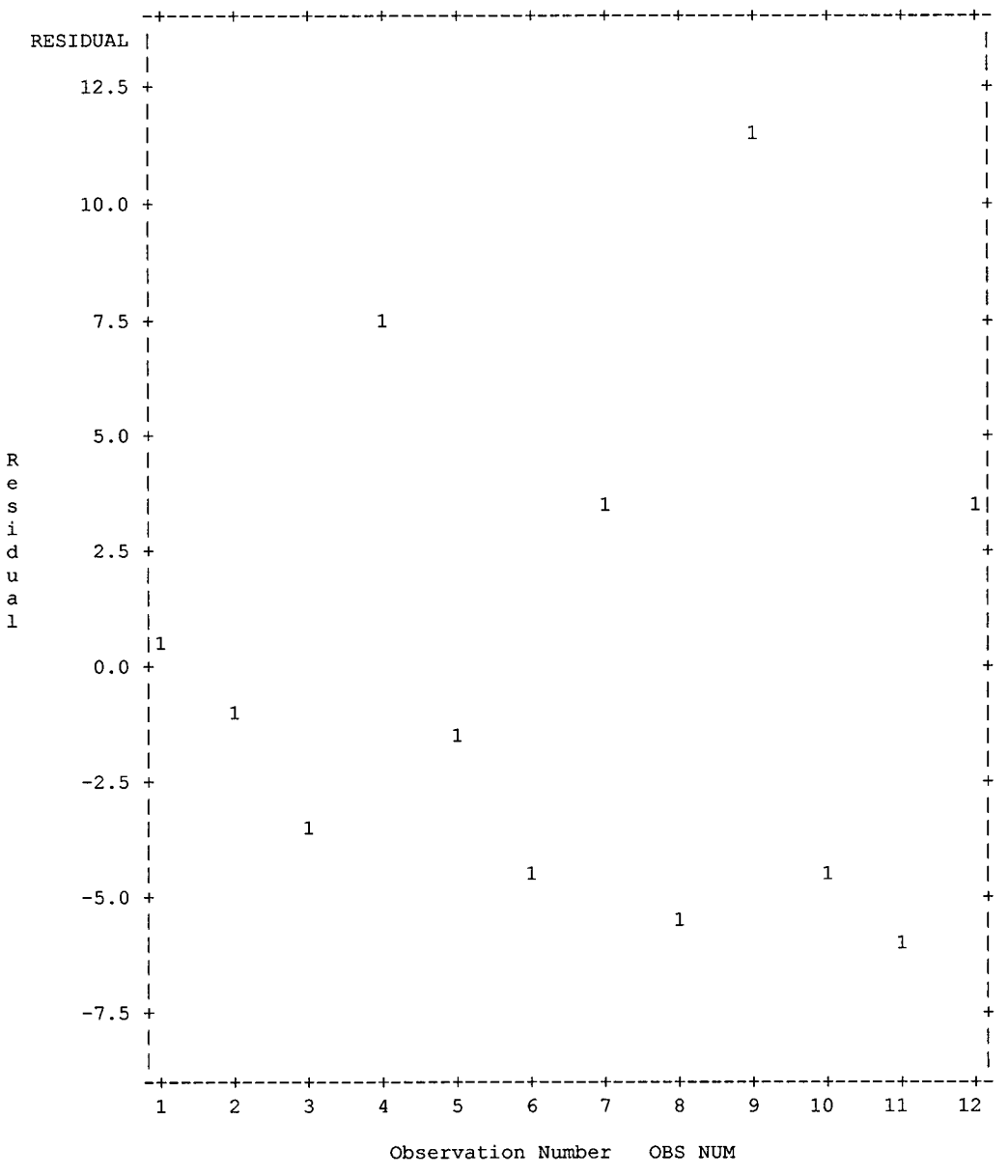
Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	9.36805	6.53060	1.43	0.1820
x16	1	0.26636	0.12298	2.17	0.0556

Appendix
A.8


The REG Procedure
Model: MODEL1
Dependent Variable: y
RESIDUAL
12.5
10.0
7.5
5.0
2.5
0.0
-2.5
-5.0
-7.5
Residual
-75
-70
-65
-60
-55
-50
-45
-40
-35
-30
-25
x16

Appendix
A.8


The REG Procedure
Model: MODEL1
Dependent Variable: y
RESIDUAL
12.5
10.0
7.5
5.0
2.5
0.0
-2.5
-5.0
-7.5
Residual
1 2 3 4 5 6 7 8 9 10 11 12
Observation Number OBS NUM

Appendix A.9

NonComp 2001 - 2002 Stepwise Output

The REG Procedure
Model: MODEL1
Dependent Variable: y

Stepwise Selection: Step 1

Variable x13 Entered: R-Square = 0.3920 and C(p) = 3.5557

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	399.79468	399.79468	14.18	0.0011
Error	22	620.08852	28.18584		
Corrected Total	23	1019.88320			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	1.43612	1.38798	30.17514	1.07	0.3121
x13	1.09888	0.29177	399.79468	14.18	0.0011

Bounds on condition number: 1, 1

Stepwise Selection: Step 2

Variable x8 Entered: R-Square = 0.5582 and C(p) = -0.8846

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	569.33180	284.66590	13.27	0.0002
Error	21	450.55140	21.45483		
Corrected Total	23	1019.88320			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	10.75085	3.52794	199.23596	9.29	0.0061
x8	-3.64838	1.29787	169.53712	7.90	0.0105
x13	1.51011	0.29360	567.57192	26.45	<.0001

Bounds on condition number: 1.3303, 5.321

Stepwise Selection: Step 3

Variable x4 Entered: R-Square = 0.6186 and C(p) = -1.2238

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	630.90879	210.30293	10.81	0.0002
Error	20	388.97441	19.44872		
Corrected Total	23	1019.88320			

Appendix
A.9

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	6.39015	4.15795	45.93614	2.36	0.1400
x4	0.21290	0.11965	61.57699	3.17	0.0904
x8	-2.84463	1.31567	90.91722	4.67	0.0429
x13	2.05459	0.41446	477.94579	24.57	<.0001

Bounds on condition number: 3.3021, 23.203

Stepwise Selection: Step 4

Variable x16 Entered: R-Square = 0.6852 and C(p) = -1.8038

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	698.82530	174.70633	10.34	0.0001
Error	19	321.05790	16.89778		
Corrected Total	23	1019.88320			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	18.22907	7.06350	112.54299	6.66	0.0183
x4	0.26701	0.11475	91.49510	5.41	0.0312
x8	-5.13318	1.67543	158.61812	9.39	0.0064
x13	1.52450	0.46814	179.19676	10.60	0.0042
x16	0.20906	0.10428	67.91651	4.02	0.0594

Bounds on condition number: 6.6184, 68.89

All variables left in the model are significant at the 0.1500 level.

No other variable met the 0.1500 significance level for entry into the model.

Summary of Stepwise Selection

Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	x13		1	0.3920	0.3920	3.5557	14.18	0.0011
2	x8		2	0.1662	0.5582	-0.8846	7.90	0.0105
3	x4		3	0.0604	0.6186	-1.2238	3.17	0.0904
4	x16		4	0.0666	0.6852	-1.8038	4.02	0.0594

Appendix A.10

NonComp 2001 - 2002 Significant Output

The REG Procedure
Model: MODEL1
Dependent Variable: y

Analysis of Variance

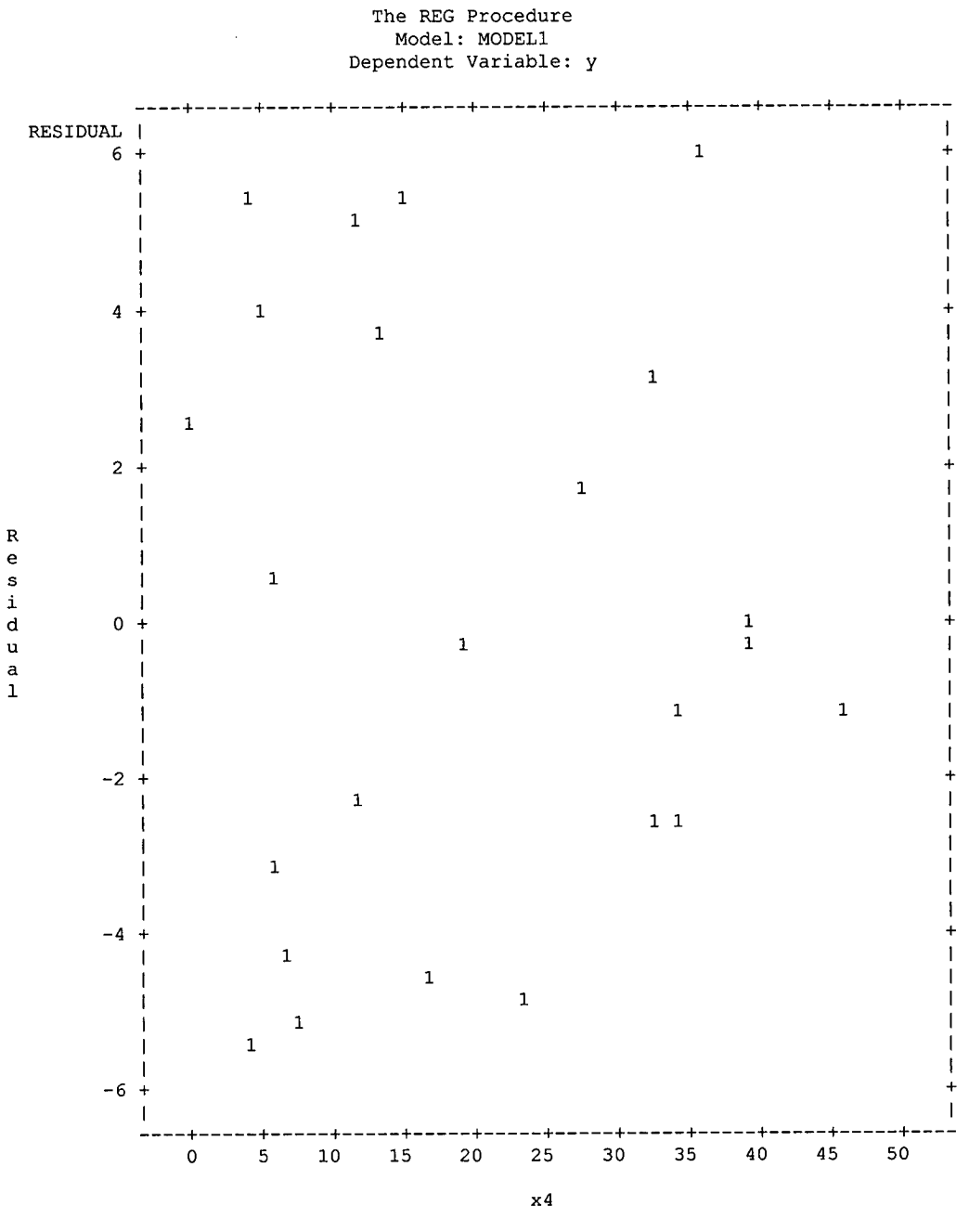
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	698.82530	174.70633	10.34	0.0001
Error	19	321.05790	16.89778		
Corrected Total	23	1019.88320			

Root MSE	4.11069	R-Square	0.6852
Dependent Mean	-1.83000	Adj R-Sq	0.6189
Coeff Var	-224.62795		

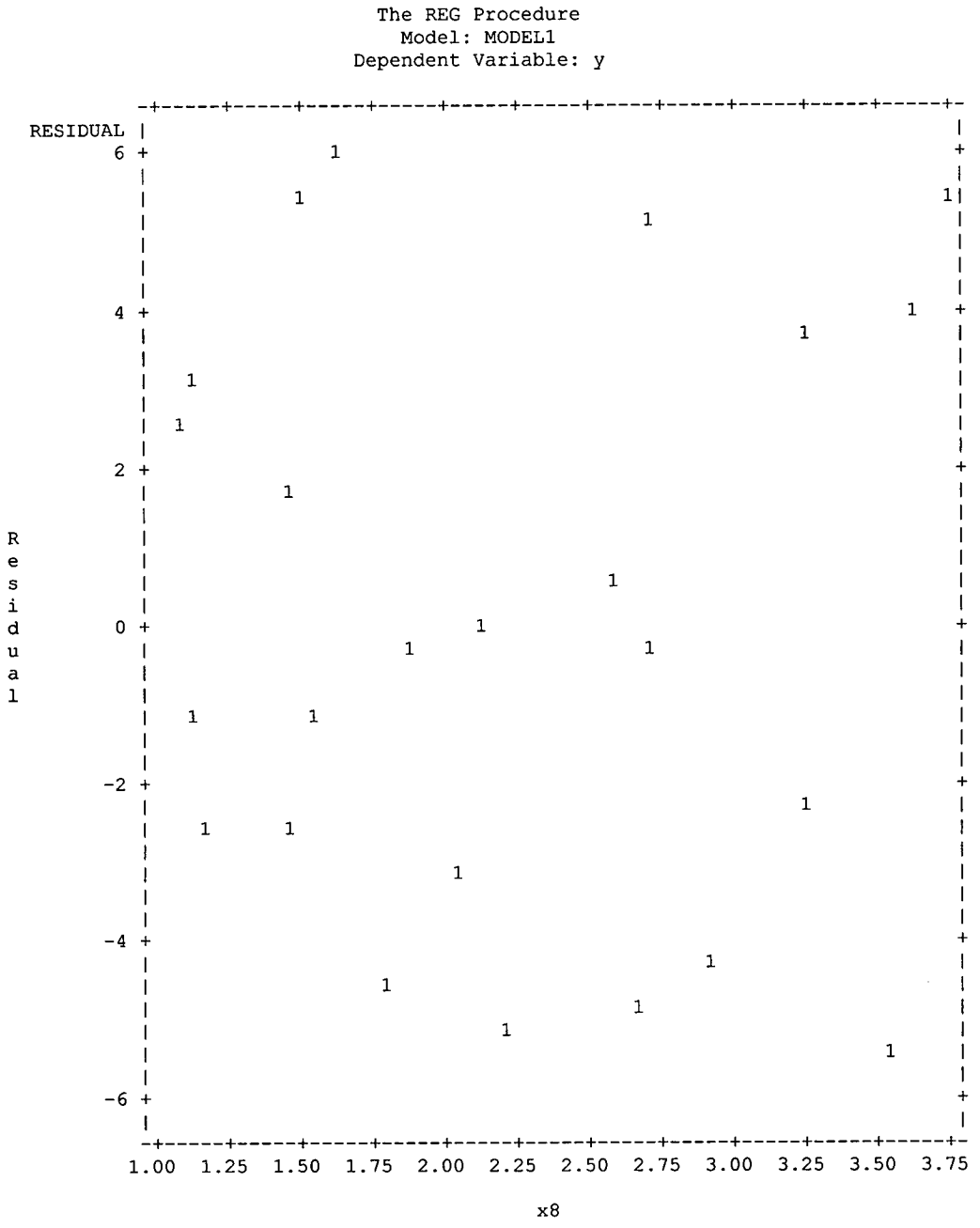
Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	18.22907	7.06350	2.58	0.0183
x4	1	0.26701	0.11475	2.33	0.0312
x8	1	-5.13318	1.67543	-3.06	0.0064
x13	1	1.52450	0.46814	3.26	0.0042
x16	1	0.20906	0.10428	2.00	0.0594

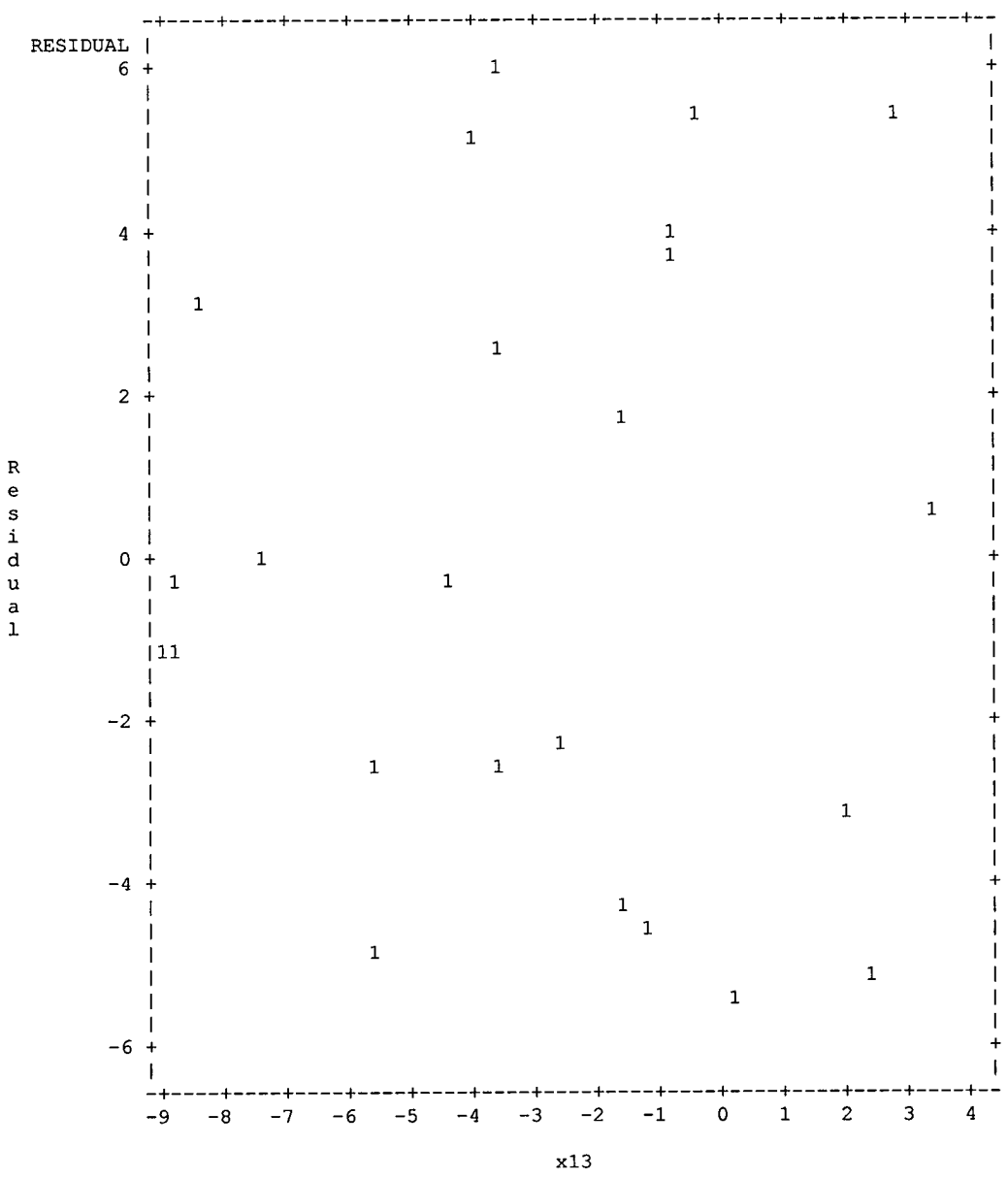
Appendix
A.10



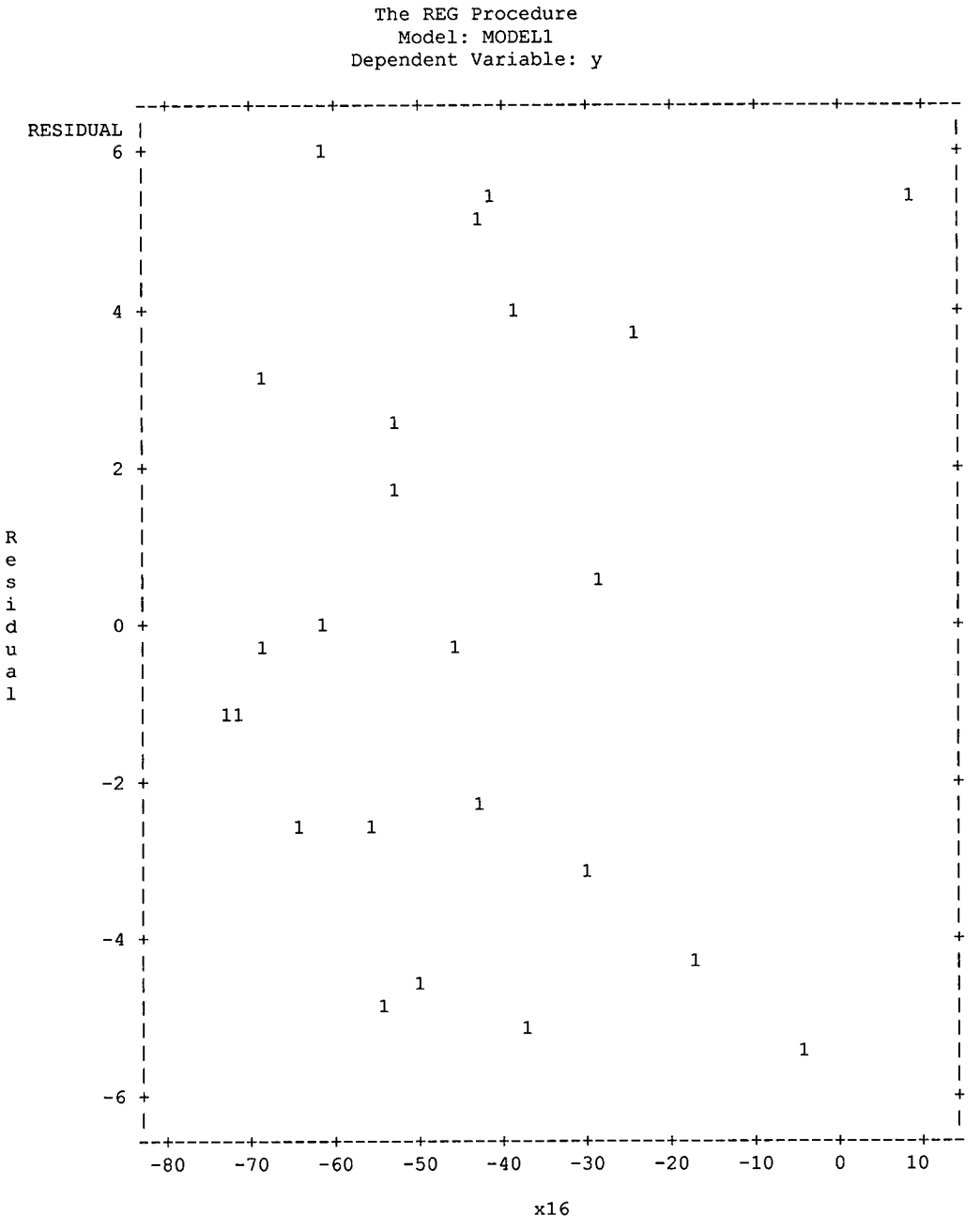
Appendix
A.10



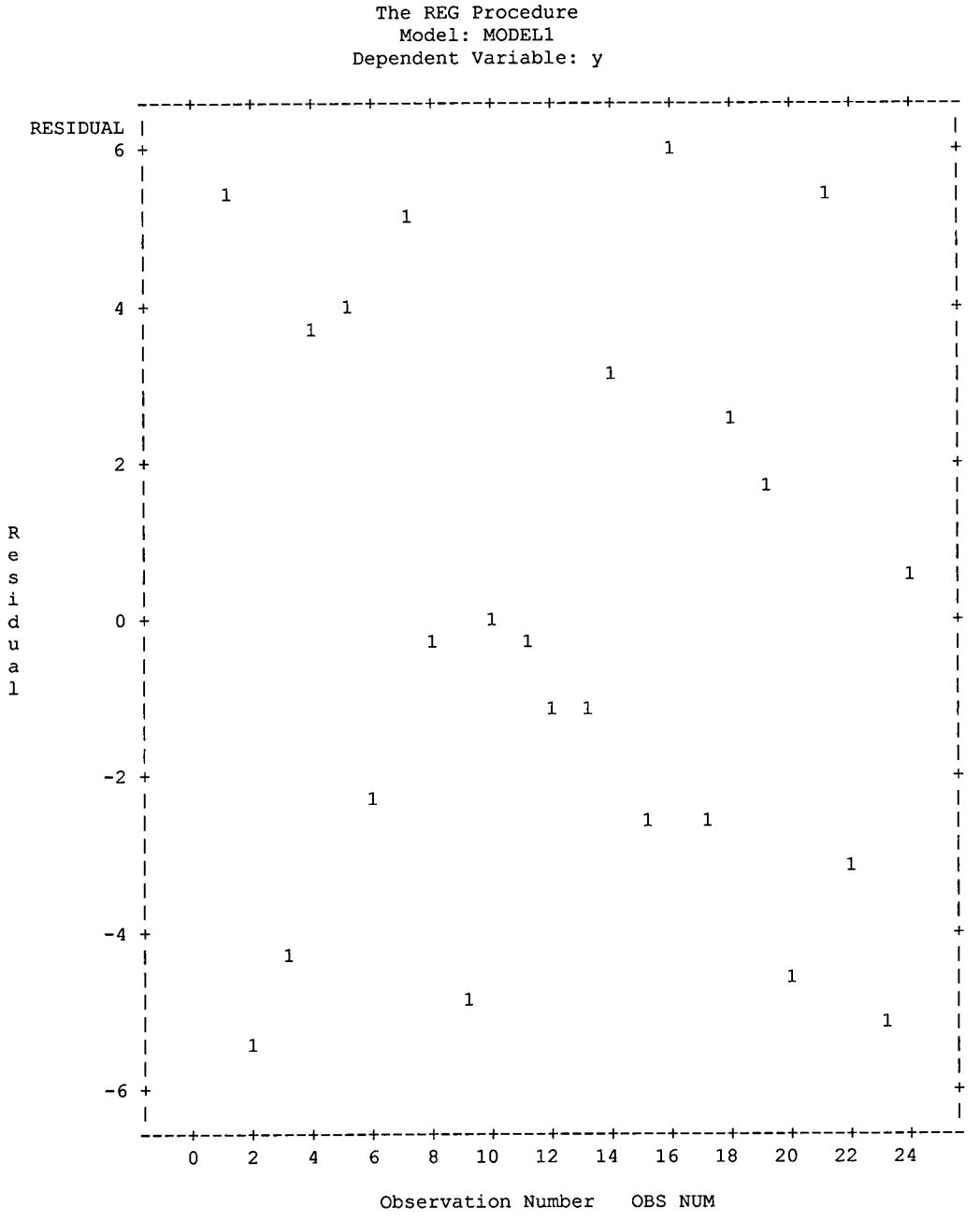
Appendix
A.10



Appendix
A.10



Appendix
A.10



Appendix A.11

NonComp 2002 Stepwise Output

The REG Procedure
Model: MODEL1
Dependent Variable: y

Stepwise Selection: Step 1

Variable x13 Entered: R-Square = 0.3448 and C(p) = .

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	118.86496	118.86496	5.26	0.0447
Error	10	225.82787	22.58279		
Corrected Total	11	344.69283			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	3.08714	1.63116	80.89029	3.58	0.0877
x13	0.83110	0.36226	118.86496	5.26	0.0447

Bounds on condition number: 1, 1

All variables left in the model are significant at the 0.1500 level.

No other variable met the 0.1500 significance level for entry into the model.

Summary of Stepwise Selection

Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	x13		1	0.3448	0.3448	.	5.26	0.0447

Appendix A.12

NonComp 2002 Significant Output

The REG Procedure
Model: MODEL1
Dependent Variable: y

Analysis of Variance

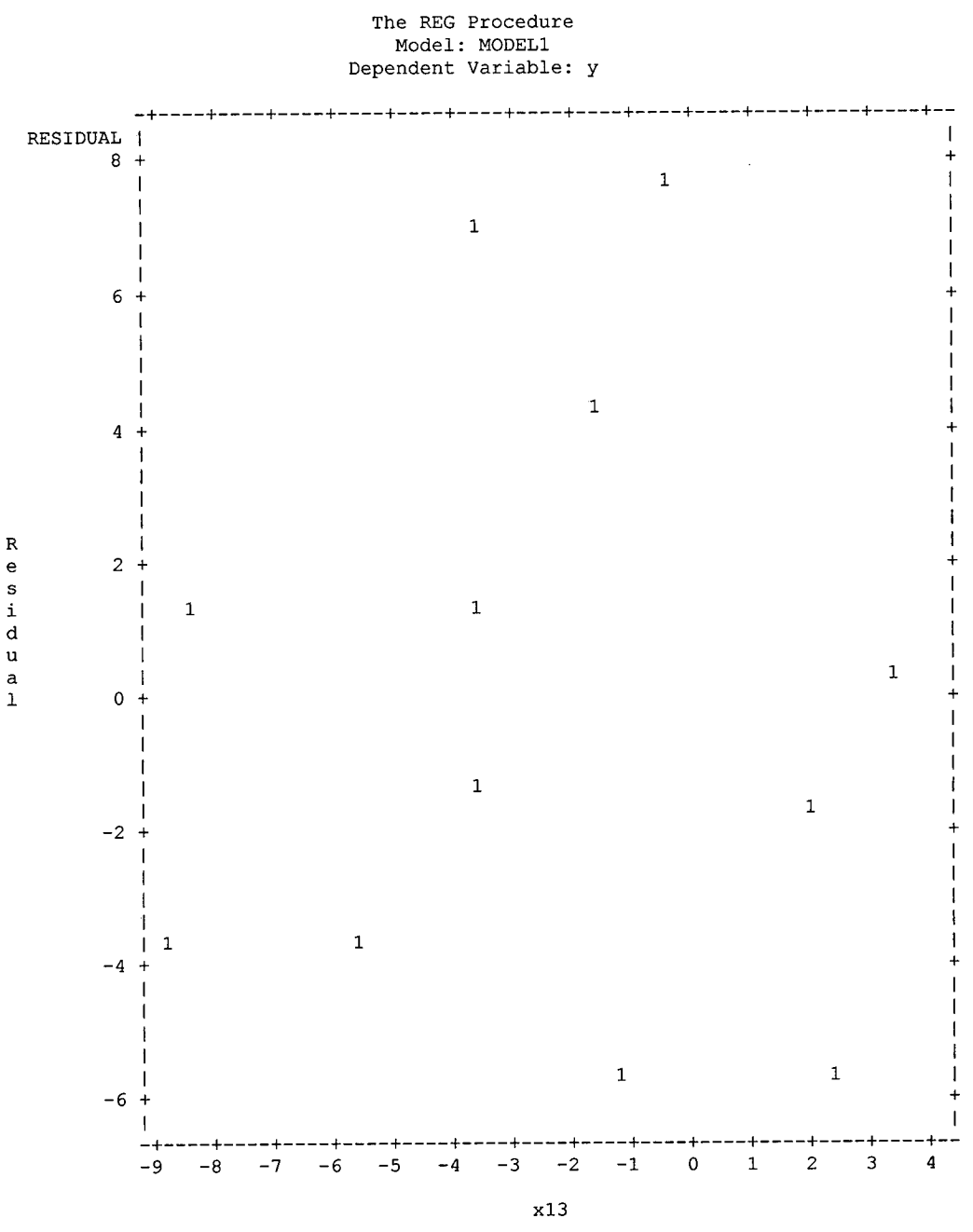
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	118.86496	118.86496	5.26	0.0447
Error	10	225.82787	22.58279		
Corrected Total	11	344.69283			

Root MSE	4.75213	R-Square	0.3448
Dependent Mean	1.06250	Adj R-Sq	0.2793
Coeff Var	447.25976		

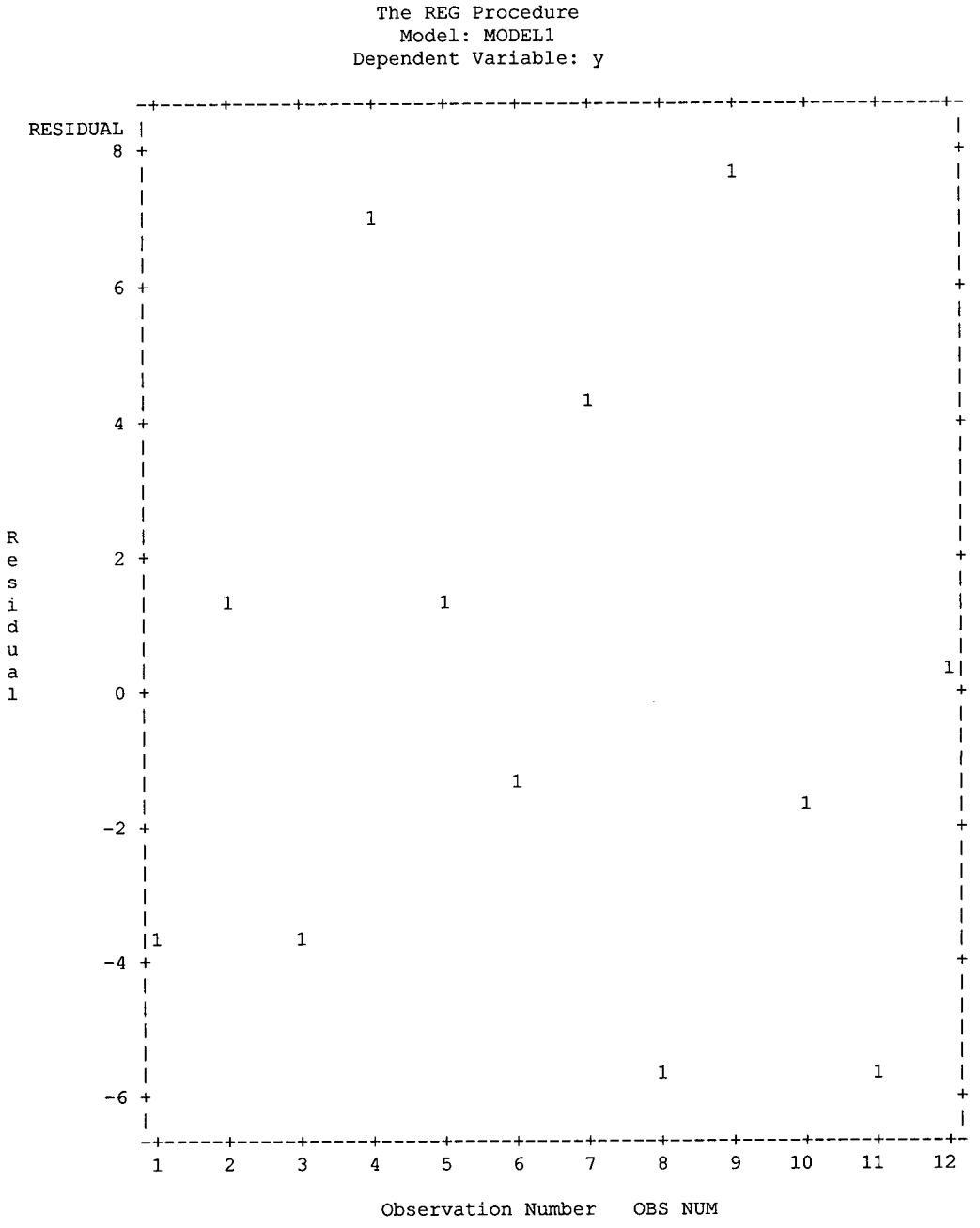
Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	3.08714	1.63116	1.89	0.0877
x13	1	0.83110	0.36226	2.29	0.0447

Appendix
A.12



Appendix
A.12



Appendix A.13

Total 2001 - 2002 Stepwise Output

The REG Procedure
Model: MODEL1
Dependent Variable: y

Stepwise Selection: Step 1

Variable x13 Entered: R-Square = 0.3931 and C(p) = 0.6789

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	317.61121	317.61121	14.25	0.0010
Error	22	490.41289	22.29149		
Corrected Total	23	808.02410			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.46405	1.23434	3.15060	0.14	0.7106
x13	0.97944	0.25948	317.61121	14.25	0.0010

Bounds on condition number: 1, 1

Stepwise Selection: Step 2

Variable x4 Entered: R-Square = 0.4623 and C(p) = 0.3218

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	373.51161	186.75580	9.03	0.0015
Error	21	434.51249	20.69107		
Corrected Total	23	808.02410			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	-1.60189	1.73032	17.73343	0.86	0.3651
x4	0.19052	0.11591	55.90040	2.70	0.1151
x13	1.54776	0.42666	272.27927	13.16	0.0016

Bounds on condition number: 2.9129, 11.652

All variables left in the model are significant at the 0.1500 level.

Summary of Stepwise Selection

Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	x13		1	0.3931	0.3931	0.6789	14.25	0.0010
2	x4		2	0.0692	0.4623	0.3218	2.70	0.1151

Appendix A.14

Total 2001 - 2002 Significant Output

The REG Procedure
Model: MODEL1
Dependent Variable: y

Analysis of Variance

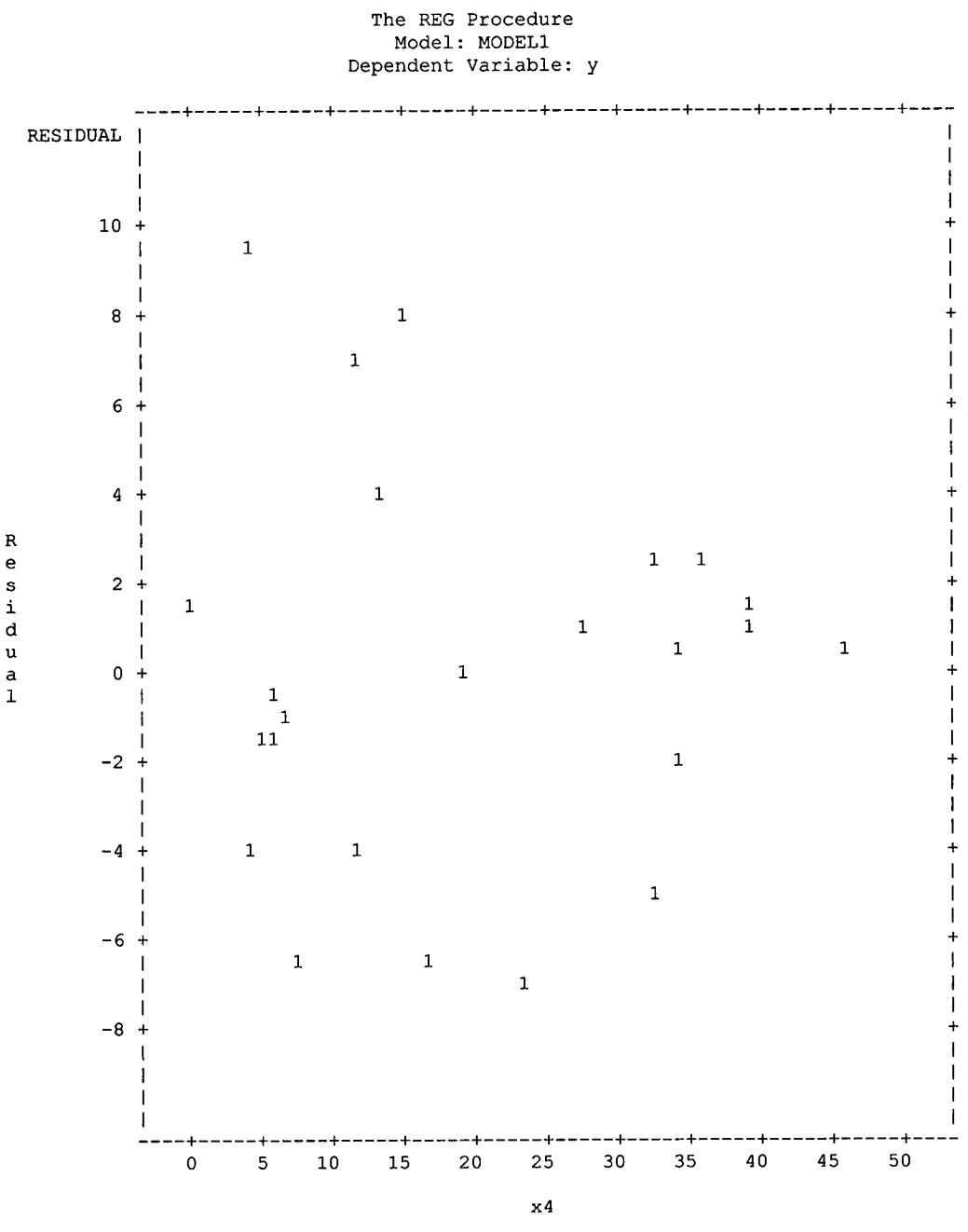
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	373.51161	186.75580	9.03	0.0015
Error	21	434.51249	20.69107		
Corrected Total	23	808.02410			

Root MSE	4.54874	R-Square	0.4623
Dependent Mean	-2.44708	Adj R-Sq	0.4110
Coeff Var	-185.88431		

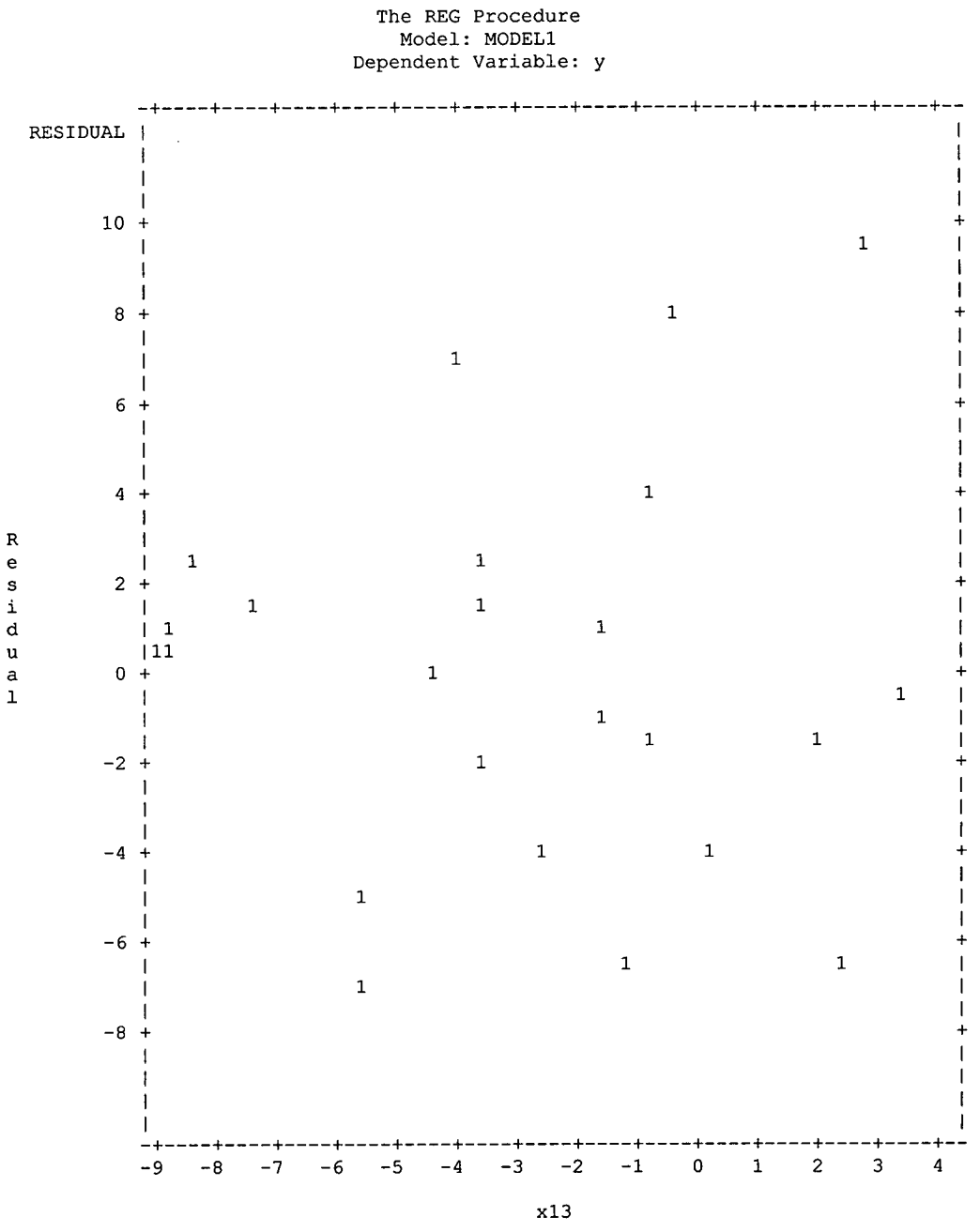
Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	-1.60189	1.73032	-0.93	0.3651
x4	1	0.19052	0.11591	1.64	0.1151
x13	1	1.54776	0.42666	3.63	0.0016

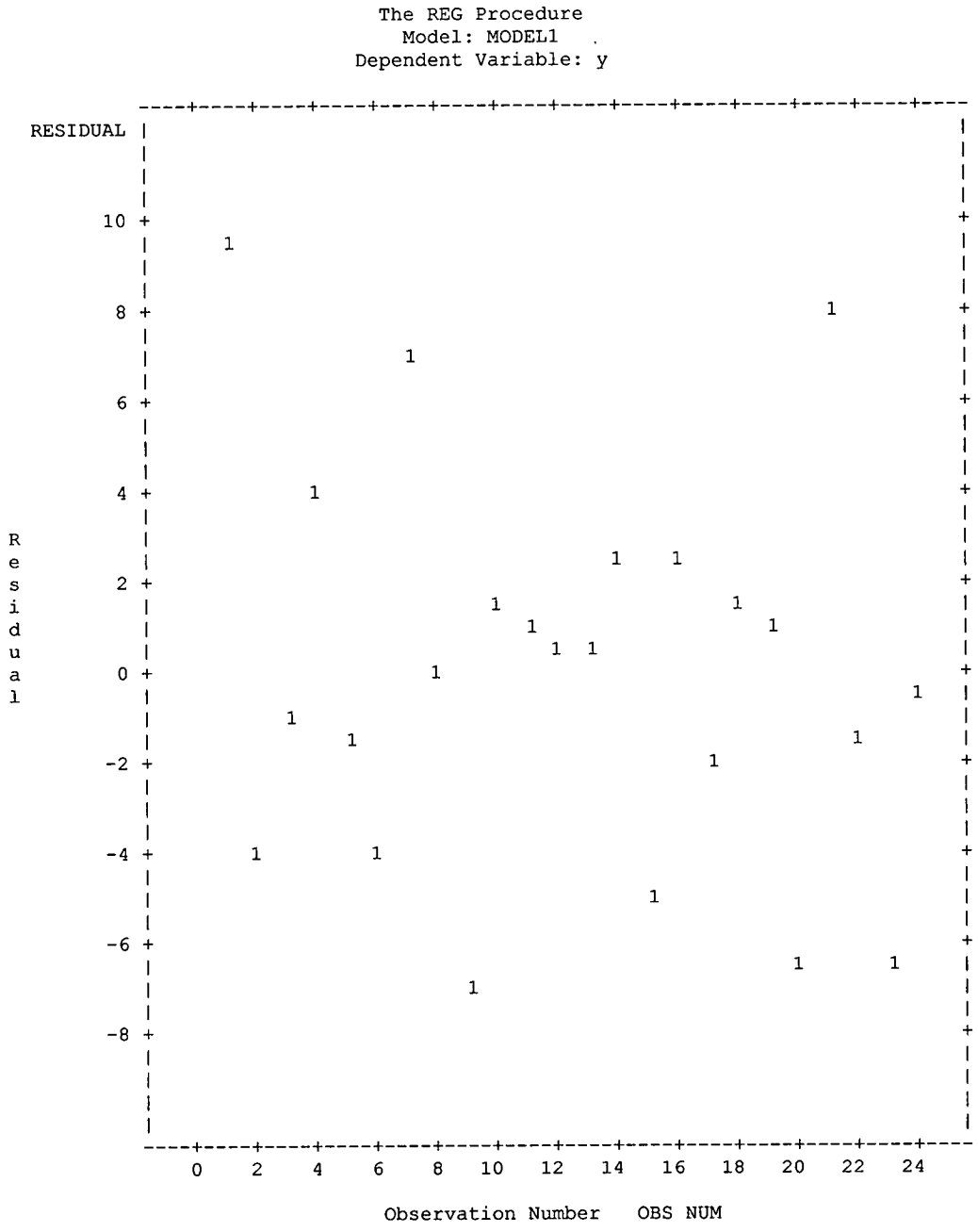
Appendix
A.14



Appendix
A.14



Appendix
A.14



Appendix A.15

Total 2002 Stepwise Output

The REG Procedure
Model: MODEL1
Dependent Variable: y

Stepwise Selection: Step 1

Variable x13 Entered: R-Square = 0.3773 and C(p) = .

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	127.45887	127.45887	6.06	0.0336
Error	10	210.36143	21.03614		
Corrected Total	11	337.82030			

Variable	Parameter Estimate	Standard Error	Type II SS	F Value	Pr > F
Intercept	0.21155	1.57431	0.37986	0.02	0.8958
x13	0.86062	0.34963	127.45887	6.06	0.0336

Bounds on condition number: 1, 1

All variables left in the model are significant at the 0.1500 level.

No other variable met the 0.1500 significance level for entry into the model.

Summary of Stepwise Selection

Step	Variable Entered	Variable Removed	Number Vars In	Partial R-Square	Model R-Square	C(p)	F Value	Pr > F
1	x13		1	0.3773	0.3773	.	6.06	0.0336

Appendix A.16

Total 2002 Significant Output

The REG Procedure
Model: MODEL1
Dependent Variable: y

Analysis of Variance

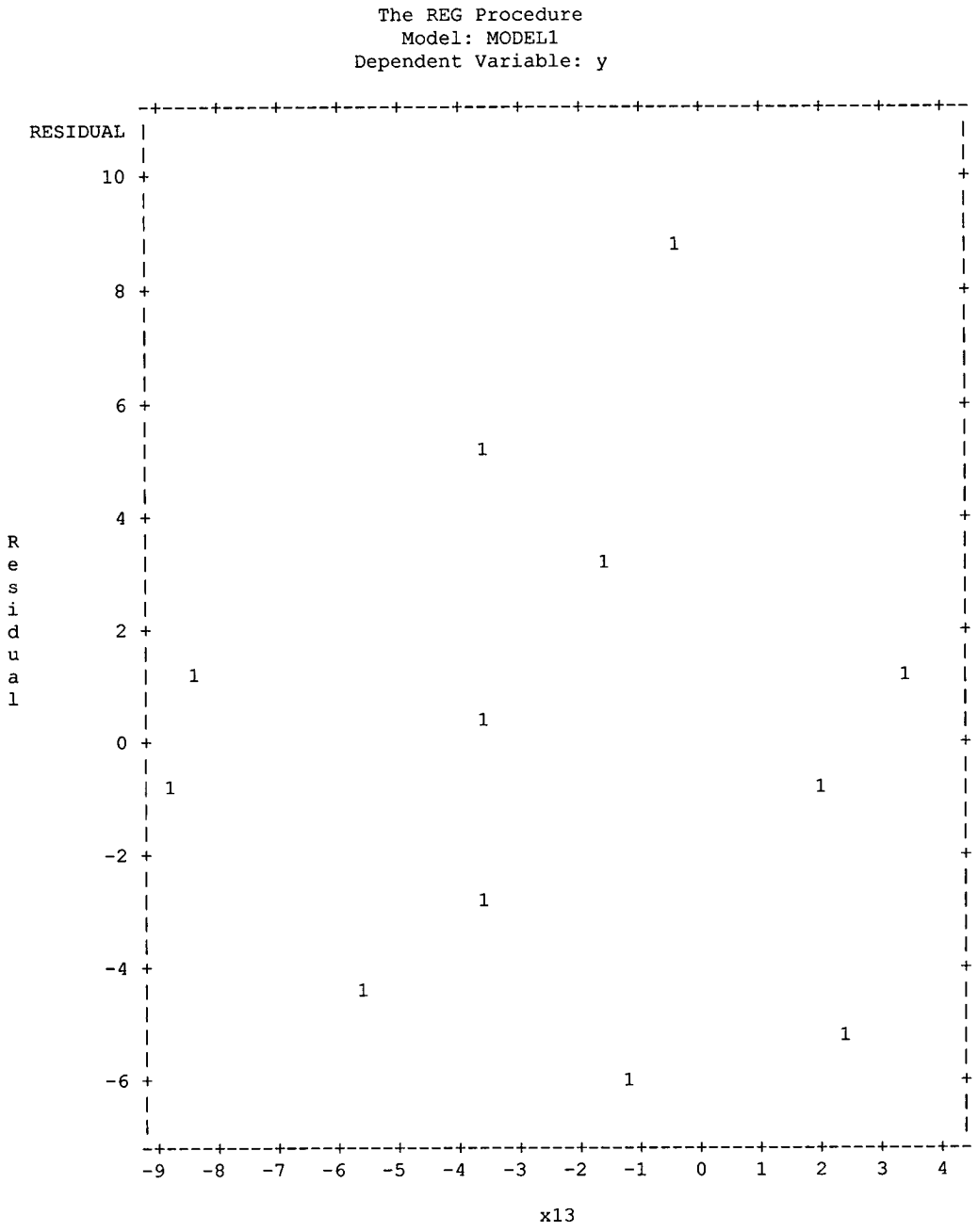
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	127.45887	127.45887	6.06	0.0336
Error	10	210.36143	21.03614		
Corrected Total	11	337.82030			

Root MSE	4.58652	R-Square	0.3773
Dependent Mean	-1.88500	Adj R-Sq	0.3150
Coeff Var	-243.31658		

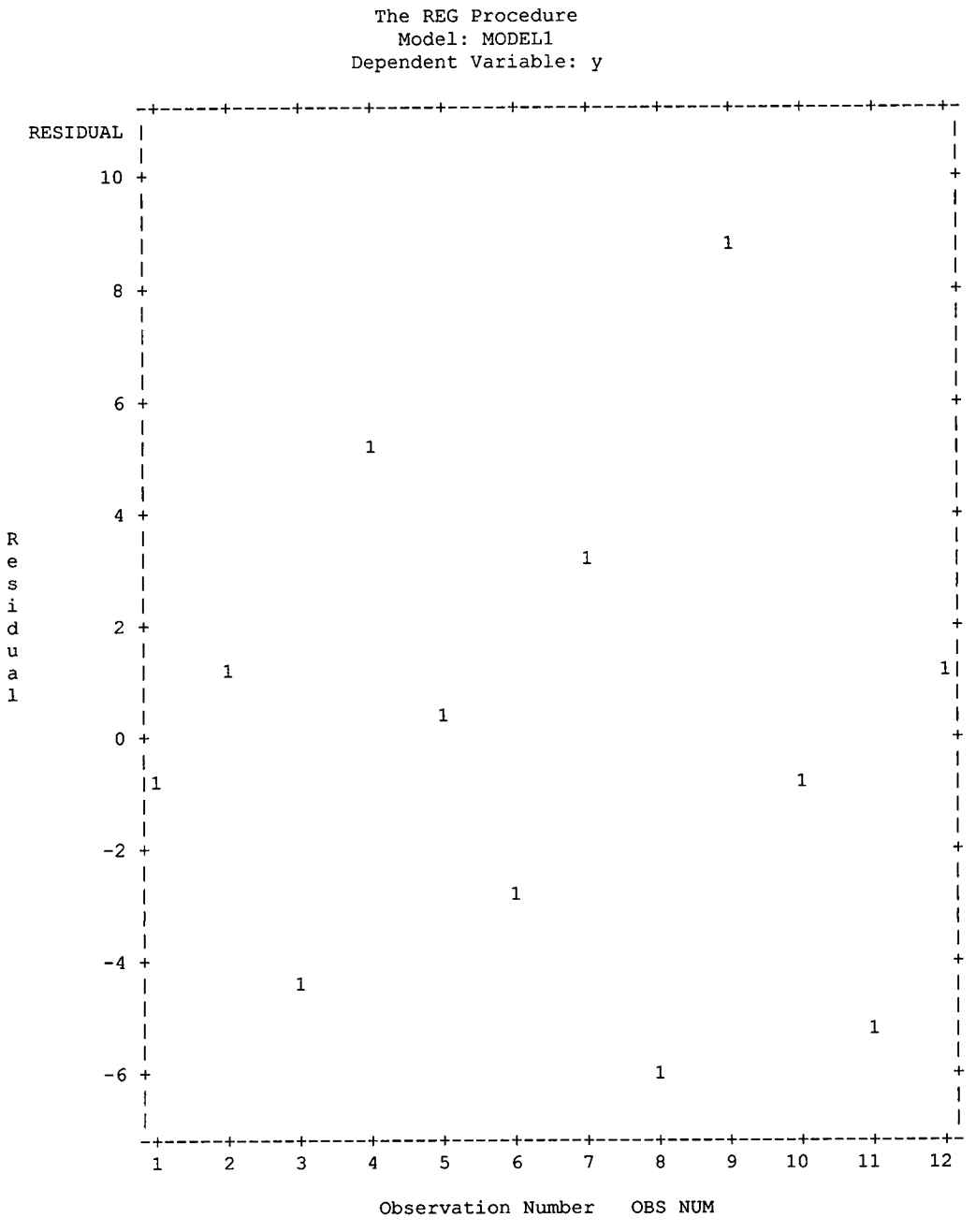
Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	0.21155	1.57431	0.13	0.8958
x13	1	0.86062	0.34963	2.46	0.0336

Appendix
A.16

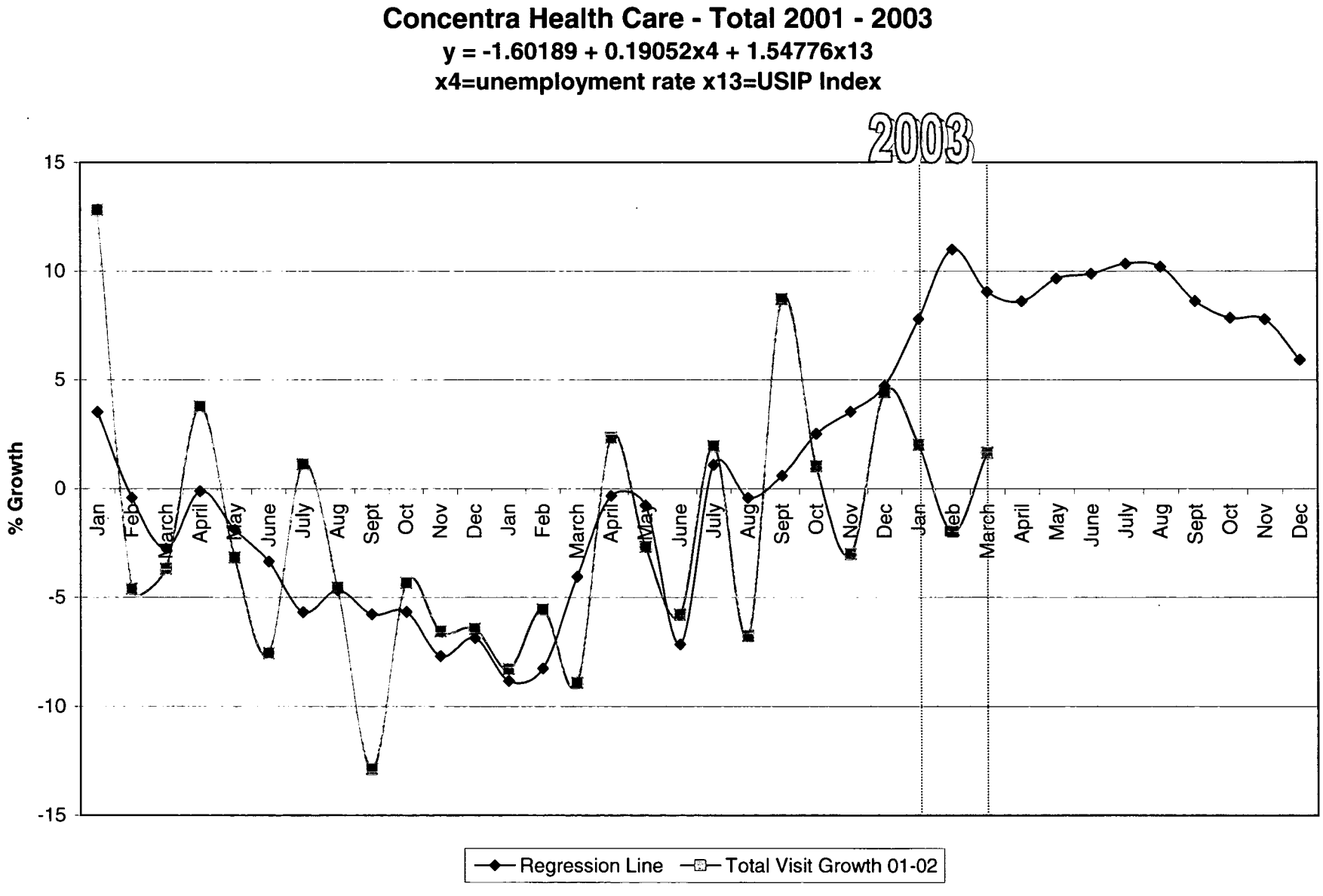


Appendix
A.16

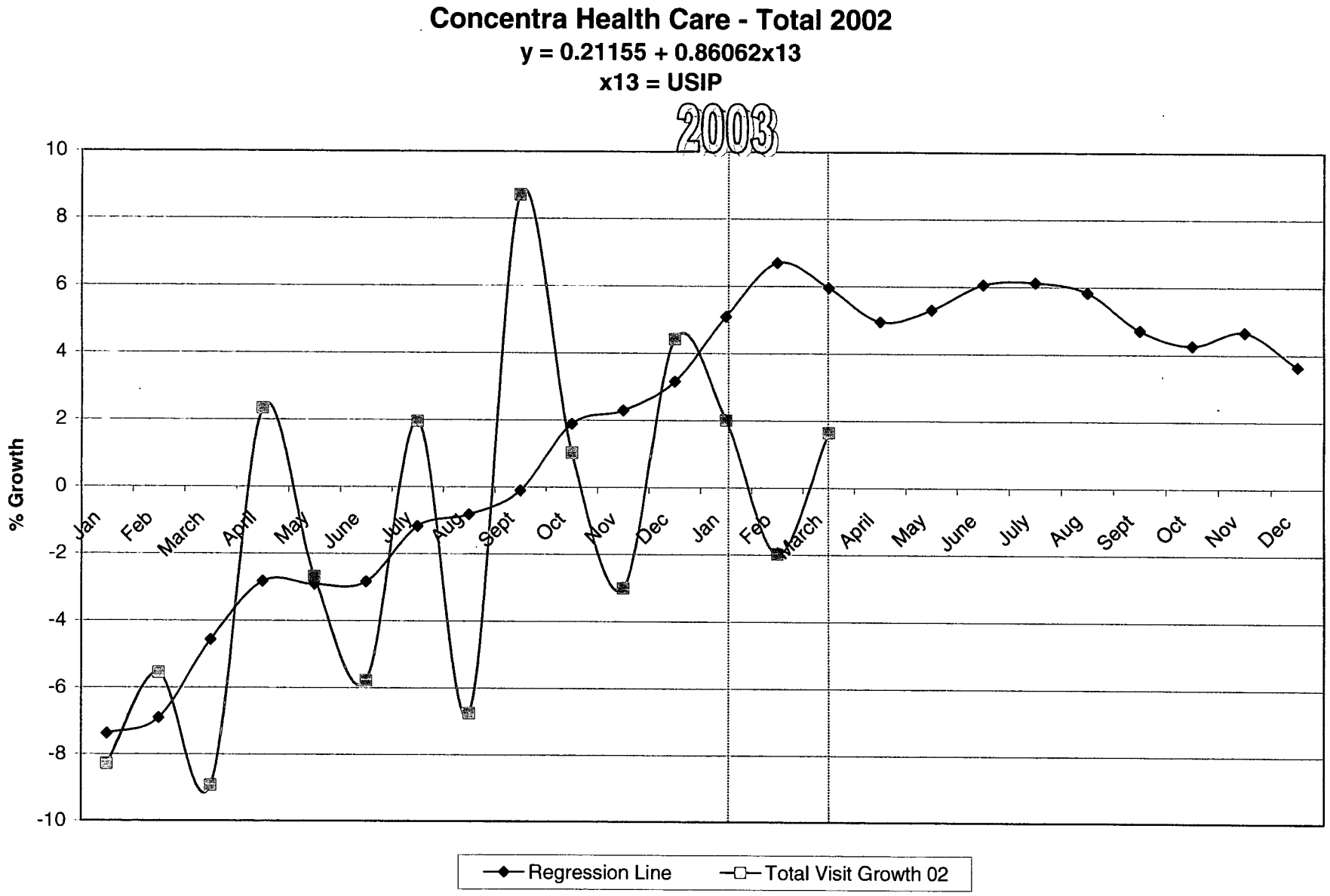


Appendix B

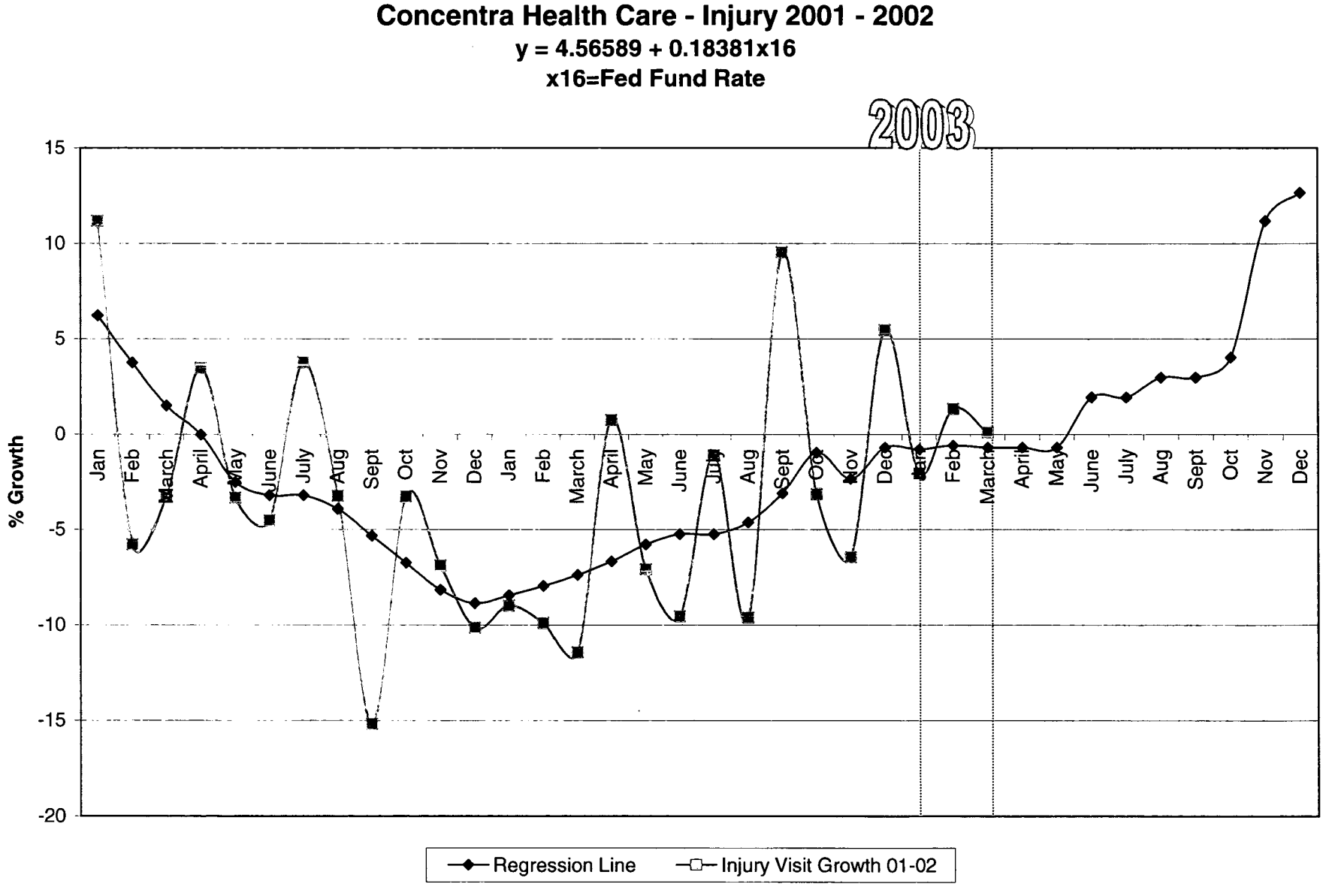
Appendix
B.1


Concentra Health Care - Total 2001 - 2003
y = -1.60189 + 0.19052x4 + 1.54776x13
x4=unemployment rate x13=USIP Index
2003
% Growth
15
10
5
0
-5
-10
-15
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
Nov
Dec
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
Nov
Dec
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
Nov
Dec
Regression Line
Total Visit Growth 01-02

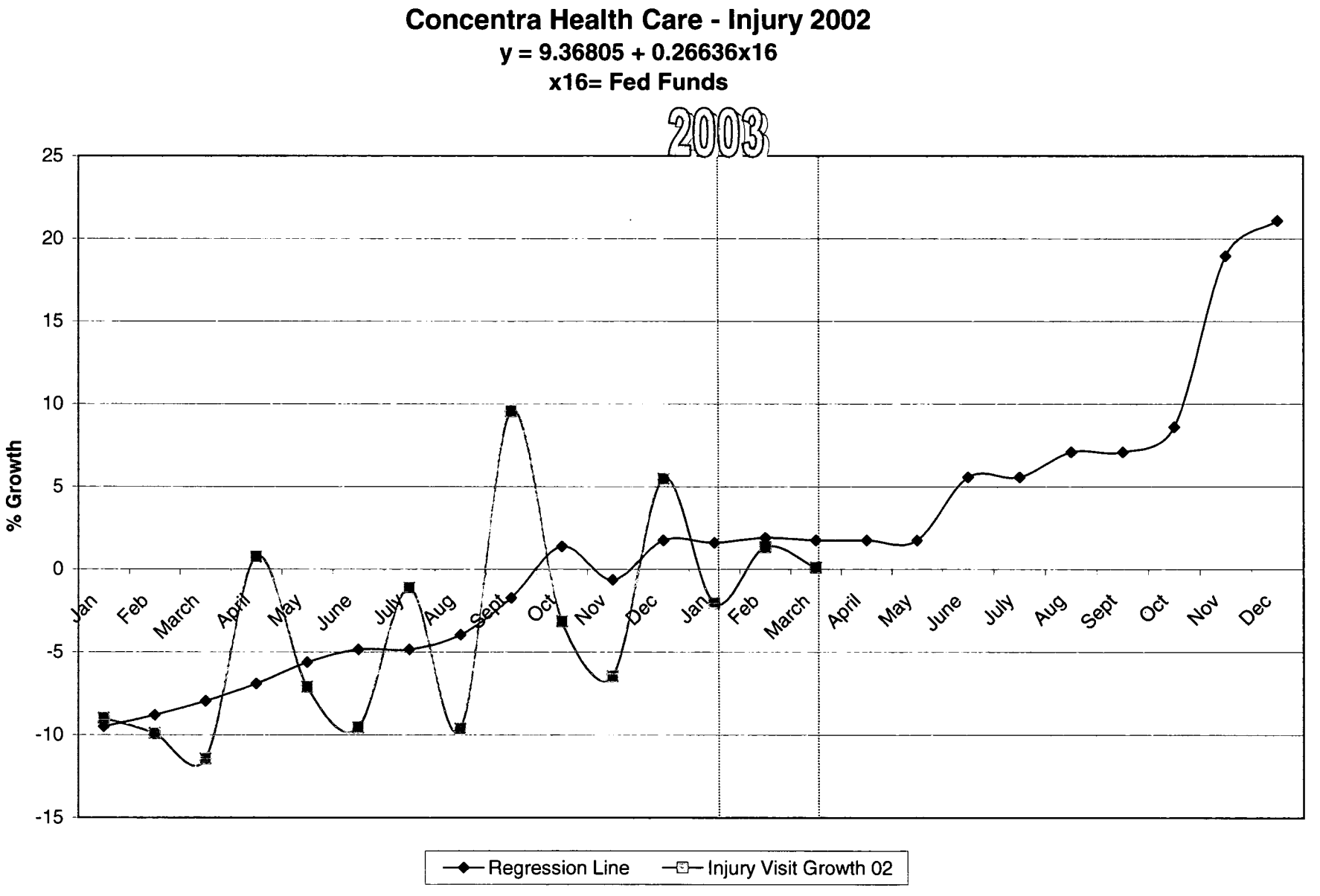
Appendix
B.2


Concentra Health Care - Total 2002
y = 0.21155 + 0.86062x13
x13 = USIP
2003
% Growth
10
8
6
4
2
0
-2
-4
-6
-8
-10
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
Nov
Dec
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
Nov
Dec
Regression Line
Total Visit Growth 02

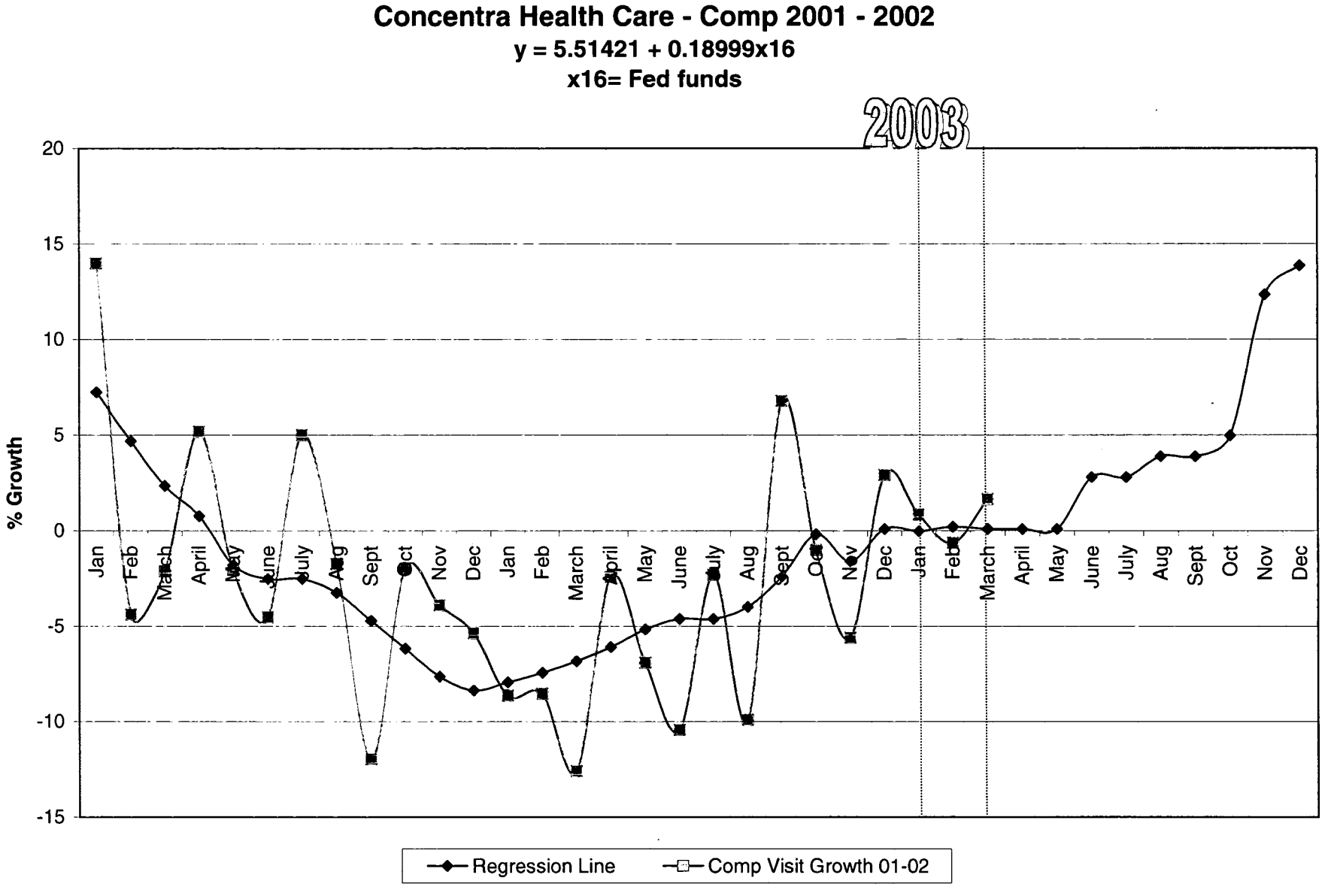
Appendix
B.3


Concentra Health Care - Injury 2001 - 2002
y = 4.56589 + 0.18381x16
x16=Fed Fund Rate
2003
% Growth
15
10
5
0
-5
-10
-15
-20
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
Nov
Dec
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
Nov
Dec
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
Nov
Dec
Regression Line
Injury Visit Growth 01-02

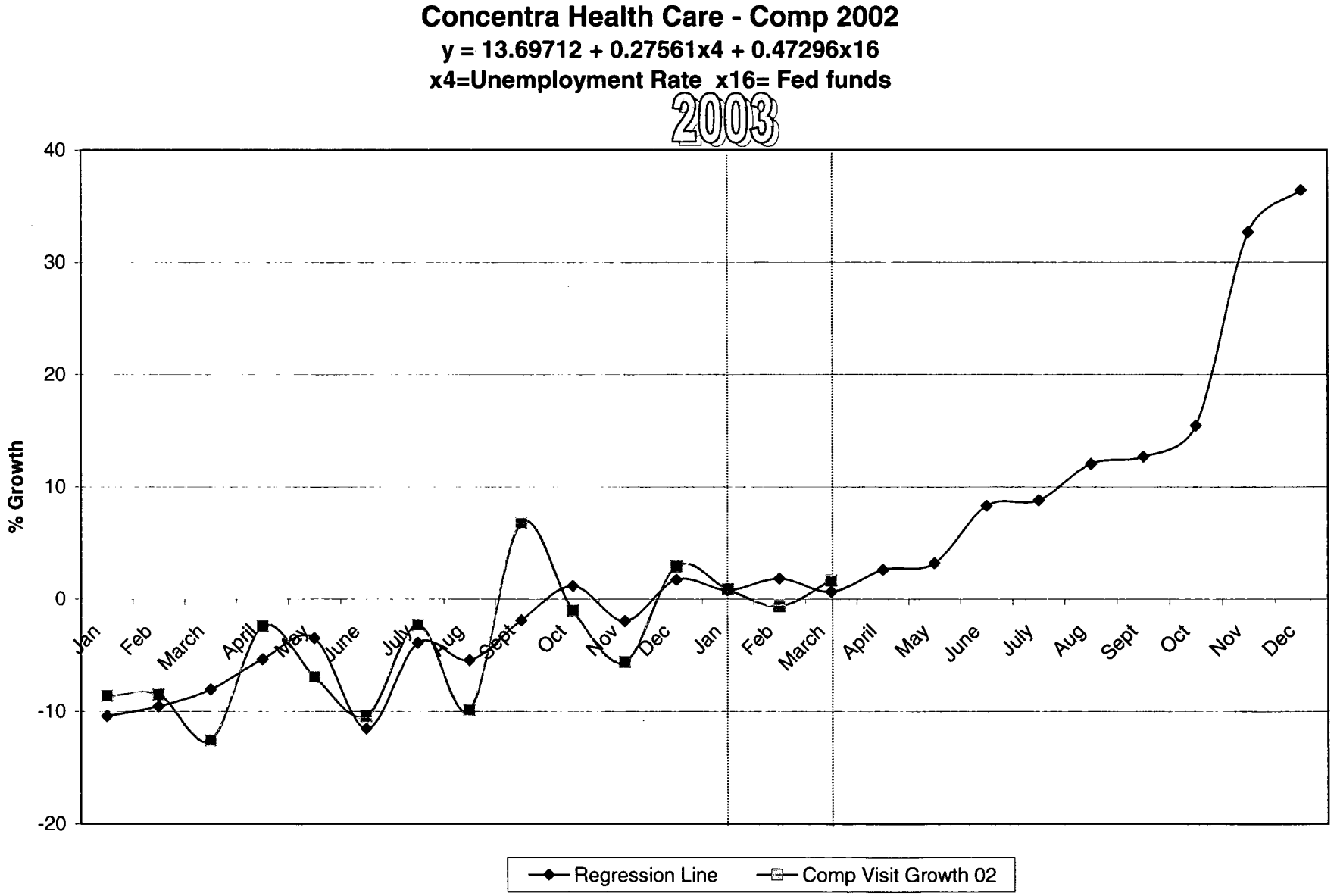
Appendix
B.4


Concentra Health Care - Injury 2002
y = 9.36805 + 0.26636x16
x16= Fed Funds
2003
% Growth
25
20
15
10
5
0
-5
-10
-15
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
Nov
Dec
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
Nov
Dec
Regression Line
Injury Visit Growth 02

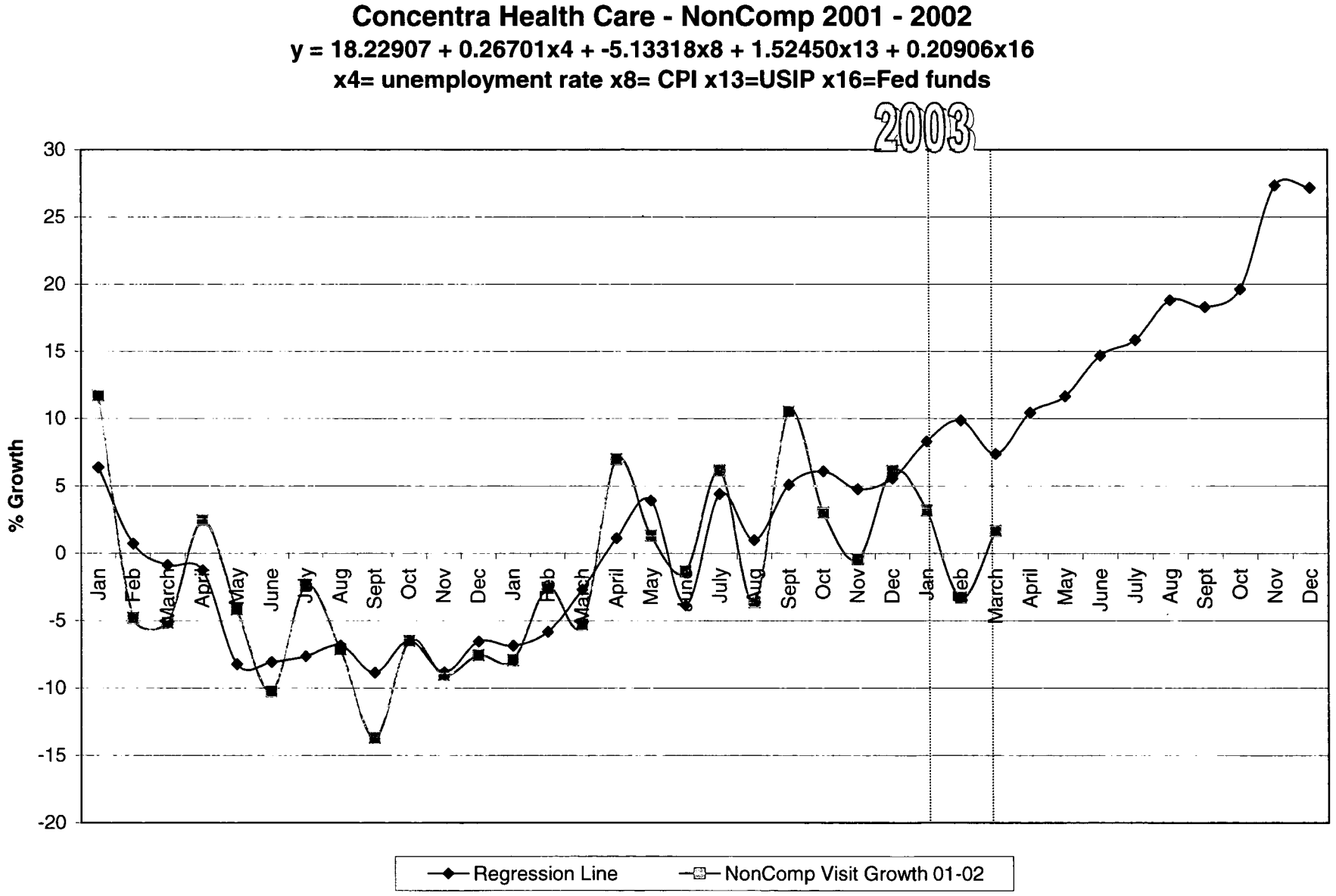
Appendix
B.5


Concentra Health Care - Comp 2001 - 2002
y = 5.51421 + 0.18999x16
x16= Fed funds
2003
% Growth
20
15
10
5
0
-5
-10
-15
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
Nov
Dec
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
Nov
Dec
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
Nov
Dec
Regression Line
Comp Visit Growth 01-02

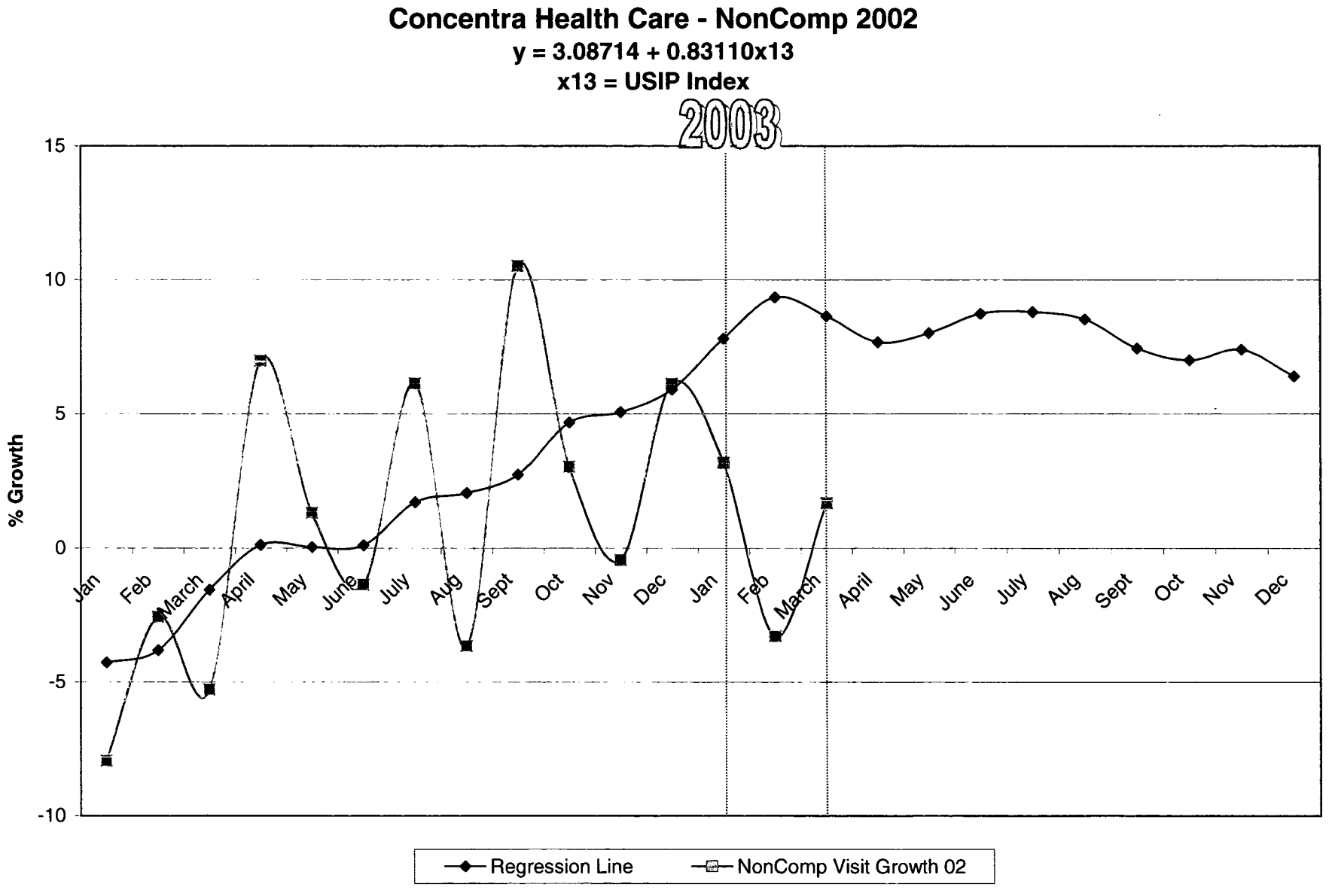
Appendix
B.6


Concentra Health Care - Comp 2002
y = 13.69712 + 0.27561x4 + 0.47296x16
x4=Unemployment Rate x16= Fed funds
2003
% Growth
40
30
20
10
0
-10
-20
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
Nov
Dec
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
Nov
Dec
Regression Line
Comp Visit Growth 02

Appendix
B.7


Concentra Health Care - NonComp 2001 - 2002
y = 18.22907 + 0.26701x4 + -5.13318x8 + 1.52450x13 + 0.20906x16
x4= unemployment rate x8= CPI x13=USIP x16=Fed funds
2003
% Growth
30
25
20
15
10
5
0
-5
-10
-15
-20
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
Nov
Dec
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
Nov
Dec
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
Nov
Dec
Regression Line
NonComp Visit Growth 01-02

Appendix
B.8


Concentra Health Care - NonComp 2002
y = 3.08714 + 0.83110x13
x13 = USIP Index
2003
% Growth
15
10
5
0
-5
-10
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
Nov
Dec
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
Nov
Dec
Regression Line
NonComp Visit Growth 02

Appendix
B.9

Significant Economic Indicators

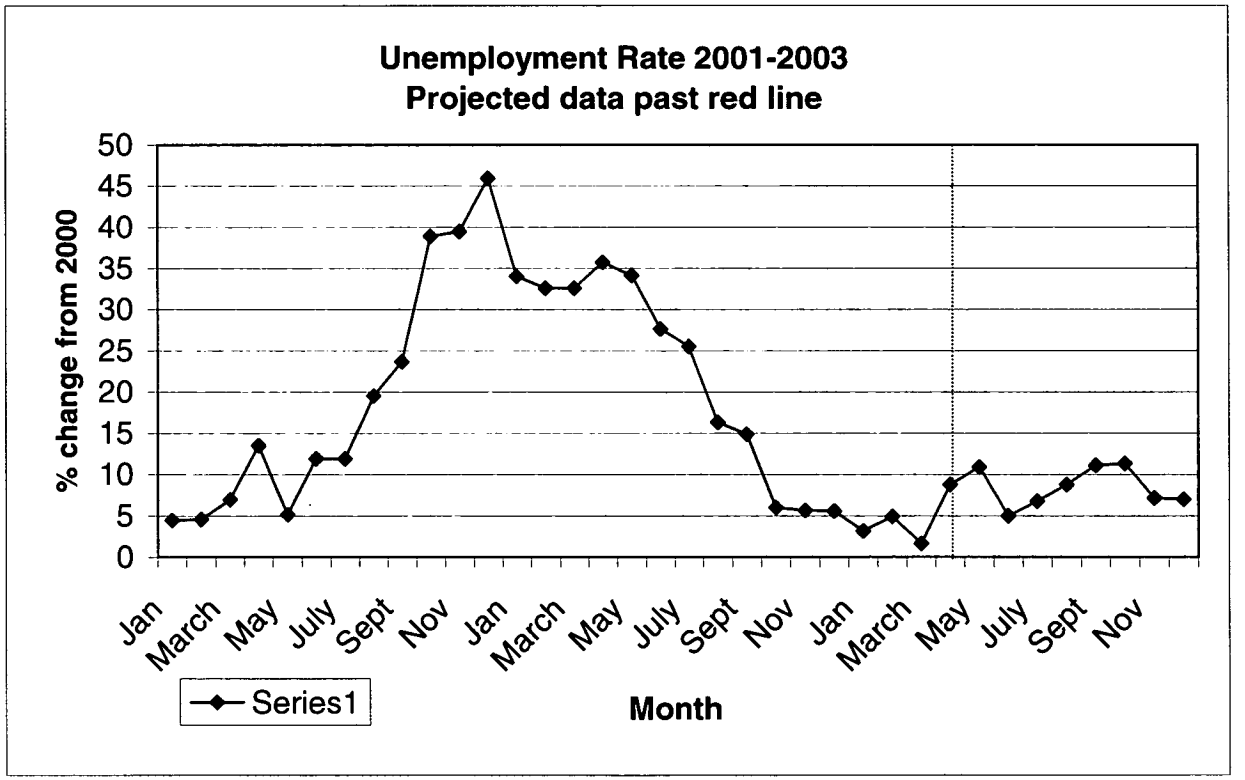
	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10	x11	x12	x13	x14	x15	x16	Regression Equations
Comp 2001-2002																*	y = 5.51421 + 0.18999x16
Comp 2002				*													y = 13.69712 + 0.27561x4 + 0.47296x16
NonComp 2001-2002				*				*					*			*	y = 18.22907 + 0.26701x4 + -5.13318x8 + 1.52450x13 + 0.20906x16
NonComp 2002													*				y = 3.08714 + 0.83110x13
Injury 2001-2002																*	y = 4.56589 + 0.18381x16
Injury 2002																*	y = 9.36805 + 0.26636x16
Total 2001-2002				*									*				y = -1.60189 + 0.19052x4 + 1.54776x13
Total 2002													*				y = 0.24455 + 0.86062x13
TOTAL INDICATORS	0	0	0	3	0	0	0	1	0	0	0	0	4	0	0	4	

x1	Employment
x2	Workforce
x3	Unemployment
x4	Unemployment Rate
x5	Goods Produced
x6	Transportation and Public Utility
x7	Manufacturing
x8	Consumer Price Index
x9	Producer Price Index
x10	Employment Cost Index
x11	Gross Domestic Product
x12	Productivity
x13	USIP Index
x14	Prime Rate
x15	Discrete
x16	Fed Funds Rate

Appendix
B.10

Unemployment Rate

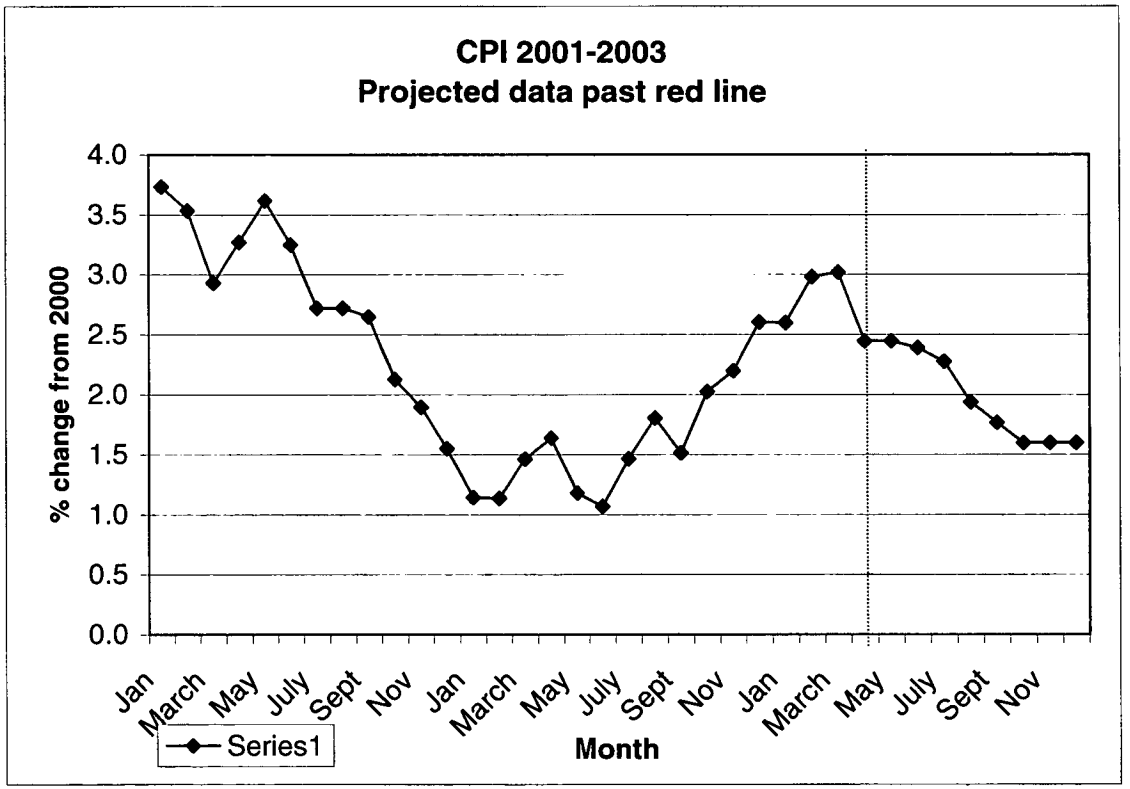
	2000	2001	2002	2003	2001 % change	2002 % change	2003 % change
Jan	4.50	4.70	6.30	6.5	4.4444	34.0426	3.1746
Feb	4.40	4.60	6.10	6.4	4.5455	32.6087	4.9180
March	4.30	4.60	6.10	6.2	6.9767	32.6087	1.6393
April	3.70	4.20	5.70	6.20	13.5135	35.7143	8.7719
May	3.90	4.10	5.50	6.10	5.1282	34.1463	10.9091
June	4.20	4.70	6.00	6.30	11.9048	27.6596	5.0000
July	4.20	4.70	5.90	6.30	11.9048	25.5319	6.7797
Aug	4.10	4.90	5.70	6.20	19.5122	16.3265	8.7719
Sept	3.80	4.70	5.40	6.00	23.6842	14.8936	11.1111
Oct	3.60	5.00	5.30	5.90	38.8889	6.0000	11.3208
Nov	3.80	5.30	5.60	6.00	39.4737	5.6604	7.1429
Dec	3.70	5.40	5.70	6.10	45.9459	5.5556	7.0175
Jan					34.0426		
Feb	RED: Projected				32.6087		
March					32.6087		
April					35.7143		
May					34.1463		
June					27.6596		
July					25.5319		
Aug					16.3265		
Sept					14.8936		
Oct					6.0000		
Nov					5.6604		
Dec					5.5556		
Jan					3.1746		
Feb					4.9180		
March					1.6393		
April					8.7719		
May					10.9091		
June					5.0000		
July					6.7797		
Aug					8.7719		
Sept					11.1111		
Oct					11.3208		
Nov					7.1429		
Dec					7.0175		



Appendix
B.11

CPI

	2000	2001	2002	2003	2001 % change	2002 % change	2003 % change
Jan	168.80	175.10	177.10	181.70	3.7322	1.1422	2.5974
Feb	169.80	175.80	177.80	183.10	3.5336	1.1377	2.9809
March	171.20	176.22	178.80	184.20	2.9322	1.4641	3.0201
April	171.30	176.90	179.80	184.20	3.2691	1.6393	2.4472
May	171.50	177.70	179.80	184.20	3.6152	1.1818	2.4472
June	172.40	178.00	179.90	184.20	3.2483	1.0674	2.3902
July	172.80	177.50	180.10	184.20	2.7199	1.4648	2.2765
Aug	172.80	177.50	180.70	184.20	2.7199	1.8028	1.9369
Sept	173.70	178.30	181.00	184.20	2.6482	1.5143	1.7680
Oct	174.00	177.70	181.30	184.20	2.1264	2.0259	1.5996
Nov	174.10	177.40	181.30	184.20	1.8955	2.1984	1.5996
Dec	174.00	176.70	181.30	184.20	1.5517	2.6033	1.5996
Jan					1.1422		
Feb	RED: Projection				1.1377		
March					1.4641		
April					1.6393		
May					1.1818		
June					1.0674		
July					1.4648		
Aug					1.8028		
Sept					1.5143		
Oct					2.0259		
Nov					2.1984		
Dec					2.6033		
Jan					2.5974		
Feb					2.9809		
March					3.0201		
April					2.4472		
May					2.4472		
June					2.3902		
July					2.2765		
Aug					1.9369		
Sept					1.7680		
Oct					1.5996		
Nov					1.5996		
Dec					1.5996		

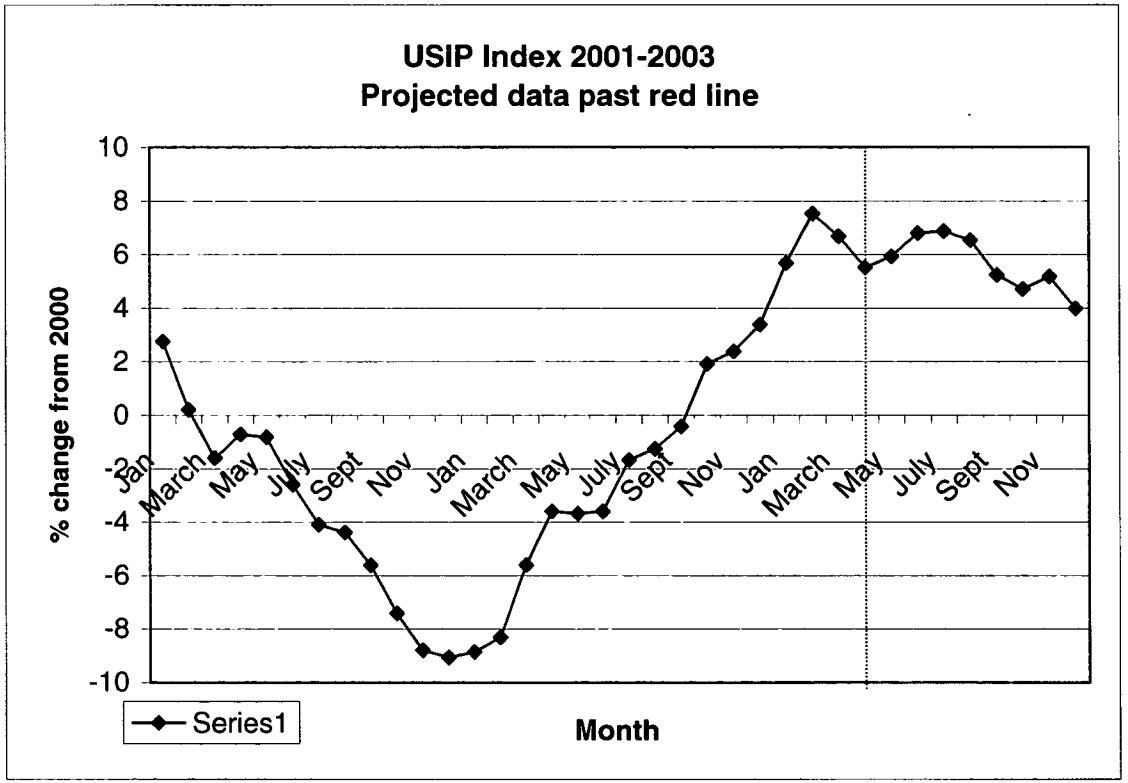


Appendix
B.12

USIP Index

	2000	2001	2002	2003	2001 % change	2002 % change	2003 % change
Jan	97.80	100.50	91.60	96.80	2.7607	-8.8557	5.6769
Feb	99.70	99.90	91.60	98.50	0.2006	-8.3083	7.5328
March	99.90	98.30	92.80	99.00	-1.6016	-5.5951	6.6810
April	98.50	97.80	94.30	99.50	-0.7107	-3.5787	5.5143
May	98.80	98.00	94.40	100.00	-0.8097	-3.6735	5.9322
June	100.20	97.60	94.10	100.50	-2.5948	-3.5861	6.8013
July	100.20	96.10	94.50	101.00	-4.0918	-1.6649	6.8783
Aug	100.40	96.00	94.80	101.00	-4.3825	-1.2500	6.5401
Sept	101.60	95.90	95.50	100.50	-5.6102	-0.4171	5.2356
Oct	101.20	93.70	95.50	100.00	-7.4111	1.9210	4.7120
Nov	101.20	92.30	94.60	99.50	-8.7945	2.4919	5.1797
Dec	100.50	91.40	95.20	99.00	-9.0547	4.1575	3.9916

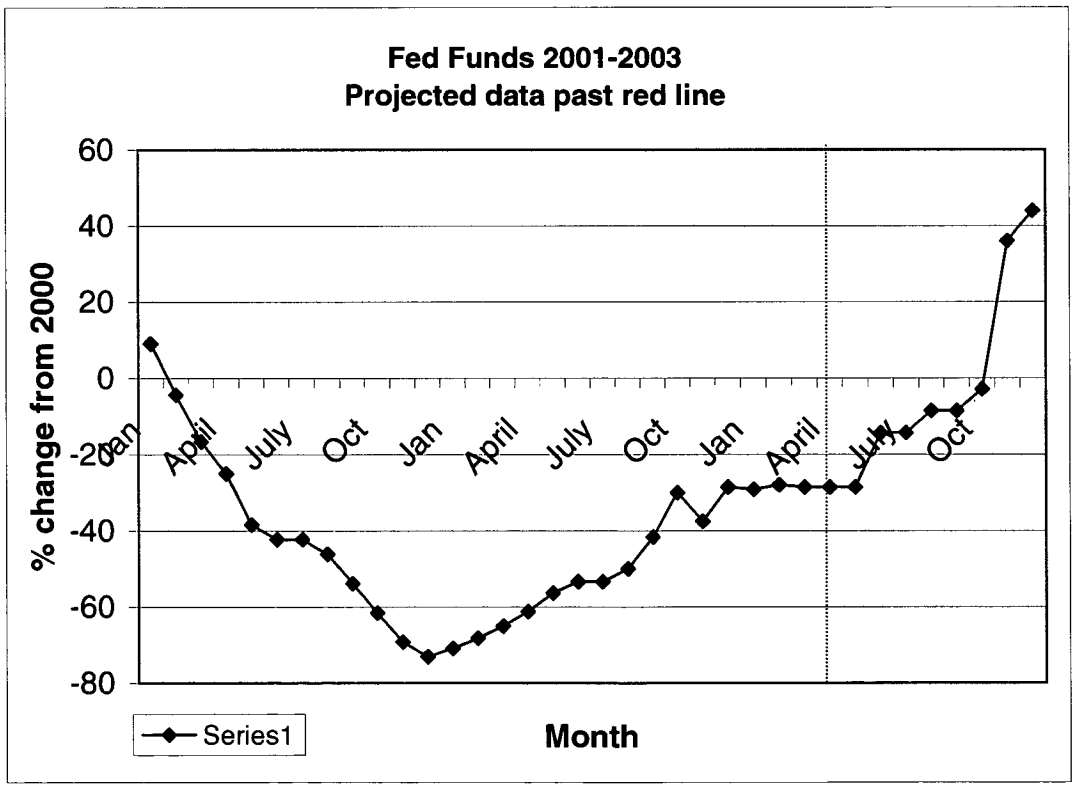
Jan		-8.8557
Feb	RED: Projected	-8.3083
March		-5.5951
April		-3.5787
May		-3.6735
June		-3.5861
July		-1.6649
Aug		-1.2500
Sept		-0.4171
Oct		1.9210
Nov		2.3835
Dec		3.3917
Jan		5.6769
Feb		7.5328
March		6.6810
April		5.5143
May		5.9322
June		6.8013
July		6.8783
Aug		6.5401
Sept		5.2356
Oct		4.7120
Nov		5.1797
Dec		3.9916



Appendix
B.13

Fed Funds

	2000	2001	2002	2003	2001 % change	2002 % change	2003 % change
Jan	5.50	6.00	1.75	1.24	9.0909	-70.8333	-29.1429
Feb	5.75	5.50	1.75	1.26	-4.3478	-68.1818	-28.0000
March	6.00	5.00	1.75	1.25	-16.6667	-65.0000	-28.5714
April	6.00	4.50	1.75	1.25	-25.0000	-61.1111	-28.5714
May	6.50	4.00	1.75	1.25	-38.4615	-56.2500	-28.5714
June	6.50	3.75	1.75	1.5	-42.3077	-53.3333	-14.2857
July	6.50	3.75	1.75	1.5	-42.3077	-53.3333	-14.2857
Aug	6.50	3.50	1.75	1.6	-46.1538	-50.0000	-8.5714
Sept	6.50	3.00	1.75	1.6	-53.8462	-41.6667	-8.5714
Oct	6.50	2.50	1.75	1.7	-61.5385	-30.0000	-2.8571
Nov	6.50	2.00	1.25	1.7	-69.2308	-37.5000	36.0000
Dec	6.50	1.75	1.25	1.8	-73.0769	-28.5714	44.0000
Jan					-70.8333		
Feb	RED: Projected				-68.1818		
March					-65.0000		
April					-61.1111		
May					-56.2500		
June					-53.3333		
July					-53.3333		
Aug					-50.0000		
Sept					-41.6667		
Oct					-30.0000		
Nov					-37.5000		
Dec					-28.5714		
Jan					-29.1429		
Feb					-28.0000		
March					-28.5714		
April					-28.5714		
May					-28.5714		
June					-14.2857		
July					-14.2857		
Aug					-8.5714		
Sept					-8.5714		
Oct					-2.8571		
Nov					36.0000		
Dec					44.0000		



Appendix C

Appendix C.1

Comp 2001 – 2002 Stepwise SAS and data files

```
filename f5 'comp_0102.data';
Data one;
 infile f5;
 input y x1 x2 x3 x4 x5 x6 x7 x8 x9 x10 x11 x12 x13 x14 x15 x16;
 proc REG;
  model y=x1 x2 x3 x4 x5 x6 x7 x8 x9 x10 x11 x12 x13 x14 x15
x16/selection=stepwise;
proc means;
proc print;
run;
```

```
13.98 0.828603 1.022769 5.156450 4.444444 -0.501852 2.701133 -1.141863 3.732227 9.119252 4.223433 3.923519
1.743679 2.760736 11.764706 2.400000 9.090909
-4.4 0.612150 0.751150 3.739368 4.545455 -0.657921 2.594955 -1.592218 3.533569 5.855162 4.223433 3.923519
1.743679 0.200602 -2.857143 -2.476190 -4.347826
-2.13 0.597796 0.889673 7.424671 6.976744 -1.257364 2.439024 -2.174502 2.932243 3.899083 4.223433 3.923519
1.743679 -1.601602 -2.857143 -18.181818 -16.666667
5.16 -0.068779 0.477198 14.707016 13.513514 -1.761544 2.011205 -2.727026 3.269119 4.361132 4.040404 2.333846
0.171821 -0.710660 -11.111111 -27.272727 -25.000000
-2.08 0.179312 0.465116 7.562098 5.128205 -2.023976 1.840753 -3.411306 3.615160 3.951368 4.040404 2.333846
0.171821 -0.809717 -16.666667 -41.666667 -38.461538
-4.54 -0.198250 0.388371 13.838384 11.904762 -2.664210 1.303485 -4.236469 3.248260 1.270553 4.040404
2.333846 0.171821 -2.594810 -26.315789 -45.833333 -42.307692
4.99 0.210879 0.760023 13.207861 11.904762 -3.073558 0.853485 -4.736217 2.719907 -0.224383 4.002668 2.257261
0.943396 -4.091816 -28.947368 -45.833333 -42.307692
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-11.96 -0.122192 0.868500 25.995492 23.684211 -3.703418 -0.309032 -5.391812 2.648244 -1.039347 4.002668
2.257261 0.943396 -5.610236 -31.578947 -58.333333 -53.846154
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-3.92 -1.010094 0.628257 42.625118 39.473684 -4.994567 -2.891869 -6.792166 1.895462 -3.851852 4.174950
2.002291 1.878736 -8.794466 -42.105263 -75.000000 -69.230769
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-8.64 -1.727625649 0.017724337 35.64596933 34.04255319 -5.632280533 -4.029977376 -7.353830922 1.142204455 -
8.214285714 3.85620915 2.842013941 4.370179949 -8.855721393 -50 -75.5859375 -70.83333333
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1.649175412 3.656189865 4.045475702 5.182667799 -1.664932362 -29.62962963 -61.53846154 -53.33333333
-9.91 0.090433339 0.926252273 17.13628522 16.32653061 -3.922735205 -4.522968198 -4.753531114 1.802816901 -
1.424287856 3.656189865 4.045475702 5.182667799 -1.25 -29.62962963 -58.33333333 -50
6.77 0.144585817 0.825704922 14.53488372 14.89361702 -3.637746118 -4.523037903 -4.424374071 1.514301739 -
0.975243811 3.656189865 4.045475702 5.182667799 -0.417101147 -26.92307692 -50 -41.66666667
-1.03 0.251300983 0.61547562 7.514776245 6 -3.277365192 -3.547513891 -4.001845231 2.025886325 2.148887183
2.798982188 3.47979395 3.772003353 1.921024546 -20.83333333 -37.5 -30
-5.62 -0.000744275 0.348105503 6.554555085 7.547169811 -2.887953923 -2.834124586 -3.527152087 2.198421646
2.619414484 2.798982188 3.47979395 3.772003353 2.383531961 -13.63636364 -50 -37.5
2.89 -0.002234887 0.271999549 5.067083496 5.555555556 -2.878292875 -2.572997976 -3.511441447 2.6032824
3.981264637 2.798982188 3.47979395 3.772003353 3.391684902 -15 -40 -28.57142857
```

Appendix
C.2

Comp 2001 – 2002 SAS and data files

```
filename f5 'comp_0102_sig.data';
Data one;
 infile f5;
 input y x16;
 proc REG lp;
   model y=x16;
   plot residual.*x16;
   plot residual.*obs.;
run;
```

```
1.022768781 9.090909091
0.751150266 -4.347826087
0.889673383 -16.66666667
0.477197781 -25
0.465116279 -38.46153846
0.388371373 -42.30769231
0.760022801 -42.30769231
0.308997702 -46.15384615
0.868499612 -53.84615385
0.788541659 -61.53846154
0.628257401 -69.23076923
0.419618027 -73.07692308
0.017724337 -70.83333333
0.579872272 -68.18181818
0.240562677 -65
0.576297378 -61.11111111
0.854319097 -56.25
0 -53.33333333
0.491685349 -53.33333333
0.926252273 -50
0.825704922 -41.66666667
0.615475623 -30
0.348105503 -37.5
0.271999549 -28.57142857
```

Appendix
C.3

Comp 2002 Significant SAS and data files

```
filename f5 'comp_2002.data';
Data one;
  infile f5;
  input y x1 x2 x3 x4 x5 x6 x7 x8 x9 x10 x11 x12 x13 x14 x15 x16;
  proc REG;
    model y=x1 x2 x3 x4 x5 x6 x7 x8 x9 x13 x14 x16/selection=stepwise;
proc print;
proc MEANS mean var;
run;
```

```
-8.64 -1.727625649 0.017724337 35.64596933 34.04255319 -5.632280533 -4.029977376 -7.353830922 1.142204455 -
8.214285714 3.85620915 2.842013941 4.370179949 -8.855721393 -50 -75.5859375 -70.83333333
-8.54 -1.057325597 0.579872272 34.71534653 32.60869565 -5.783896604 -4.309735764 -7.272626871 1.137656428 -
6.550218341 3.85620915 2.842013941 4.370179949 -8.308308308 -44.11764706 -75.5859375 -68.18181818
-12.59 -1.378438706 0.240562677 34.18565009 32.60869565 -5.826292396 -4.663285433 -7.084257206 1.464078992
-4.488594555 3.85620915 2.842013941 4.370179949 -5.595116989 -44.11764706 -72.22222222 -65
-2.43 -1.022779414 0.576297378 36.88455722 35.71428571 -5.347444089 -4.731727926 -6.677070561 1.639344262 -
4.105571848 4.012944984 3.253763719 4.888507719 -3.578732106 -40.625 -68.75 -61.11111111
-6.92 -0.619073682 0.854319097  34.92986658 34.14634146 -4.993643731 -4.693848956 -6.048884404 1.181767023
-4.385964912 4.012944984 3.253763719 4.888507719 -3.673469388 -36.66666667 -64.28571429 -56.25
-10.43  0.000735716 0 0 0 -4.5829225 -4.587412587 -5.567703953 1.06741573 -3.394833948 4.012944984
3.253763719 4.888507719 -3.586065574 -32.14285714 -61.53846154 -53.33333333
-2.32 -0.802880103 0.491685349 26.45284684 27.65957447 -4.358669834 -4.598025388 -5.158550396 1.464788732 -
1.649175412 3.656189865 4.045475702 5.182667799 -1.664932362 -29.62962963 -61.53846154 -53.33333333
-9.91 0.090433339 0.926252273 17.13628522 16.32653061 -3.922735205 -4.522968198 -4.753531114 1.802816901 -
1.424287856 3.656189865 4.045475702 5.182667799 -1.25 -29.62962963 -58.33333333 -50
6.77 0.144585817 0.825704922 14.53488372 14.89361702 -3.637746118 -4.523037903 -4.424374071 1.514301739 -
0.975243811 3.656189865 4.045475702 5.182667799 -0.417101147 -26.92307692 -50 -41.66666667
-1.03 0.251300983 0.61547562 7.514776245 6 -3.277365192 -3.547513891 -4.001845231 2.025886325 2.148887183
2.798982188 3.47979395 3.772003353 1.921024546 -20.83333333 -37.5 -30
-5.62 -0.000744275 0.348105503 6.554555085 7.547169811 -2.887953923 -2.834124586 -3.527152087 2.198421646
2.619414484 2.798982188 3.47979395 3.772003353 2.383531961 -13.63636364 -50 -37.5
2.89 -0.002234887 0.271999549 5.067083496 5.555555556 -2.878292875 -2.572997976 -3.511441447 2.6032824
3.981264637 2.798982188 3.47979395 3.772003353 3.391684902 -15 -40 -28.57142857
```

Appendix C.4

Comp 2002 Significant SAS and data files

```
filename f5 'comp_2002.data';
Data one;
 infile f5;
 input y x1 x2 x3 x4 x5 x6 x7 x8 x9 x10 x11 x12 x13 x14 x15 x16;
 proc REG lp;
   model y=x4 x16;
   plot residual.*x4;
   plot residual.*x16;
   plot residual.*obs.;
run;
```

```
-8.64 34.04255319 -75.5859375
-8.54 32.60869565 -75.5859375
-12.59 32.60869565 -72.22222222
-2.43 35.71428571 -68.75
-6.92 34.14634146 -64.28571429
-10.43 0 -61.53846154
-2.32 27.65957447 -61.53846154
-9.91 16.32653061 -58.33333333
6.77 14.89361702 -50
-1.03 6 -37.5
-5.62 7.547169811 -50
2.89 5.555555556  -40
```

Appendix C.5

Injury 2001 – 2002 Stepwise SAS and data files

```
filename f5 'injury_0102.data';
Data one;
 infile f5;
 input y x1 x2 x3 x4 x5 x6 x7 x8 x9 x10 x11 x12 x13 x14 x15 x16;
 ALPHA=.5;
 proc REG;
  model y=x1 x2 x3 x4 x5 x6 x7 x8 x9 x10 x11 x12 x13 x14 x15
x16/selection=stepwise;
PROC print;
run;
```

```
11.17 0.82860 1.02277 5.15645 4.44444 -0.50185 2.70113 -1.14186 3.73223  9.11925 4.22343 3.92352 1.74368
2.76074 11.76471 2.40000 9.09091
-5.79 0.61215 0.75115 3.73937 4.54545 -0.65792 2.59496 -1.59222 3.53357 5.85516 4.22343 3.92352 1.74368
0.20060 -2.85714 -2.47619 -4.34783
-3.25 0.59780 0.88967 7.42467 6.97674 -1.25736 2.43902 -2.17450 2.93224 3.89908 4.22343 3.92352 1.74368 -
1.60160 -2.85714 -18.18182 -16.66667
3.48 -0.06878 0.47720 14.70702 13.51351 -1.76154 2.01121 -2.72703 3.26912 4.36113 4.04040 2.33385 0.17182 -
0.71066 -11.11111 -27.27273 -25.00000
-3.35 0.17931 0.46512 7.56210 5.12821 -2.02398 1.84075 -3.41131 3.61516 3.95137 4.04040 2.33385 0.17182 -
0.80972 -16.66667 -41.66667 -38.46154
-4.52 -0.19825 0.38837 13.83838 11.90476 -2.66421 1.30349 -4.23647 3.24826 1.27055 4.04040 2.33385 0.17182 -
2.59481 -26.31579 -45.83333 -42.30769
3.76 0.21088 0.76002 13.20786 11.90476 -3.07356 0.85349 -4.73622 2.71991 -0.22438 4.00267 2.25726 0.94340 -
4.09182 -28.94737 -45.83333 -42.30769
-3.25 -0.51253 0.30900 19.43681 19.51220 -3.43930 1.34651 -5.11330 2.71991 0.37622 4.00267 2.25726 0.94340 -
4.38247 -28.94737 -50.00000 -46.15385
-15.2 -0.12219 0.86850 25.99549 23.68421 -3.70342 -0.30903 -5.39181 2.64824 -1.03935 4.00267 2.25726 0.94340 -
5.61024 -31.57895 -58.33333 -53.84615
-3.27 -0.64299 0.78854 38.73487 38.88889 -4.39514 -1.68091 -6.05634 2.12644 -3.76662 4.17495 2.00229 1.87874 -
7.41107 -36.84211 -66.66667 -61.53846
-6.89 -1.01009 0.62826 42.62512 39.47368 -4.99457 -2.89187 -6.79217 1.89546 -3.85185 4.17495 2.00229 1.87874 -
8.79447 -42.10526 -75.00000 -69.23077
-10.16 -1.36452 0.41962 46.87201 45.94595 -5.22830 -3.98334 -7.13082 1.55172 -5.94714 4.17495 2.00229 1.87874 -
9.05473 -47.36842 -79.16667 -73.07692
-9 -1.727625649 0.017724337 35.64596933 34.04255319 -5.632280533 -4.029977376 -7.353830922 1.142204455 -
8.214285714 3.85620915 2.842013941 4.370179949 -8.855721393 -50 -75.5859375 -70.83333333
-9.91 -1.057325597 0.579872272 34.71534653 32.60869565 -5.783896604 -4.309735764 -7.272626871 1.137656428 -
6.550218341 3.85620915 2.842013941 4.370179949 -8.308308308 -44.11764706 -75.5859375 -68.18181818
-11.45 -1.378438706 0.240562677 34.18565009 32.60869565 -5.826292396 -4.663285433 -7.084257206 1.464078992
-4.488594555 3.85620915 2.842013941 4.370179949 -5.595116989 -44.11764706 -72.22222222 -65
0.75 -1.022779414 0.576297378 36.88455722 35.71428571 -5.347444089 -4.731727926 -6.677070561 1.639344262 -
4.105571848 4.012944984 3.253763719 4.888507719 -3.57873210 -40.625 -68.75 -61.11111111
-7.1 -0.619073682 0.854319097 34.92986658 34.14634146 -4.993643731 -4.693848956 -6.048884404 1.181767023 -
4.38596491 4.012944984 3.253763719 4.888507719 -3.673469388 -36.66666667 -64.28571429 -56.25
-9.55 0.000735716 0 0 0 -4.5829225 -4.587412587 -5.567703953 1.06741573 -3.394833948 4.012944984
3.253763719 4.888507719 -3.586065574 -32.14285714 -61.53846154 -53.33333333
-1.12 -0.802880103 0.491685349 26.45284684 27.65957447 -4.358669834 -4.598025388 -5.158550396 1.464788732 -
1.649175412 3.656189865 4.045475702 5.182667799 -1.664932362 -29.62962963 -61.53846154 -53.33333333
-9.63 0.090433339 0.926252273 17.13628522 16.32653061 -3.922735205 -4.522968198 -4.753531114 1.802816901 -
1.424287856 3.656189865 4.045475702 5.182667799 -1.25 -29.62962963 -58.33333333 -50
9.55 0.144585817 0.825704922 14.53488372 14.89361702 -3.637746118 -4.523037903 -4.424374071 1.514301739 -
0.975243811 3.656189865 4.045475702 5.182667799 -0.417101147 -26.92307692 -50 -41.66666667
-3.15 0.251300983 0.61547562 7.514776245 6 -3.277365192 -3.547513891 -4.001845231 2.025886325 2.148887183
2.798982188 3.47979395 3.772003353 1.921024546 -20.83333333 -37.5 -30
-6.46 -0.000744275 0.348105503 6.554555085 7.547169811 -2.887953923 -2.834124586 -3.527152087 2.198421646
2.619414484 2.798982188 3.47979395 3.772003353 2.383531961 -13.63636364 -50 -37.5
5.47 -0.002234887 0.271999549 5.067083496 5.555555556 -2.878292875 -2.572997976 -3.511441447 2.6032824
3.981264637 2.798982188 3.47979395 3.772003353 3.391684902 -15 -40 -28.57142857
```

Appendix C.6

Injury 2001 – 2002 Significant SAS and data files

```
filename f5 'injury_0102.data';
Data one;
 infile f5;
 input y x1 x2 x3 x4 x5 x6 x7 x8 x9 x10 x11 x12 x13 x14 x15 x16;
 proc REG lp;
   model y=x16;
   plot residual.*x16;
   plot residual.*obs.;
run;

11.17 0.828603
-5.79 0.612150
-3.25 0.597796
3.48 -0.068779
-3.35 0.179312
-4.52 -0.198250
3.76 0.210879
-3.25 -0.512533
-15.2 -0.122192
-3.27 -0.642994
-6.89 -1.010094
-10.16 -1.364518
-9 0.828603 1.022769
-9.91 0.612150
-11.45 0.597796
0.75 -0.068779
-7.1 0.179312
-9.55 -0.198250
-1.12 0.210879
-9.63 -0.512533
9.55 -0.122192
-3.15 -0.642994
-6.46 -1.010094
5.47 -1.364518
```

Appendix C.7

Injury 2002 Stepwise SAS and data files

```
filename f5 'injury_2002.data';
Data one;
 infile f5;
 input y x1 x2 x3 x4 x5 x6 x7 x8 x9 x10 x11 x12 x13 x14 x15 x16;
 proc REG;
  model y=x1 x2 x3 x4 x5 x6 x7 x8 x9 x13 x14 x16/selection=stepwise;
PROC print;
run;
```

```
-9 -1.727625649 0.017724337 35.64596933 34.04255319 -5.632280533 -4.029977376 -7.353830922 1.142204455 -
8.214285714 3.85620915 2.842013941 4.370179949 -8.855721393 -50 -75.5859375 -70.83333333
-9.91 -1.057325597 0.579872272 34.71534653 32.60869565 -5.783896604 -4.309735764 -7.272626871 1.137656428 -
6.550218341 3.85620915 2.842013941 4.370179949 -8.308308308 -44.11764706 -75.5859375 -68.18181818
-11.45 -1.378438706 0.240562677 34.18565009 32.60869565 -5.826292396 -4.663285433 -7.084257206 1.464078992
-4.488594555 3.85620915 2.842013941 4.370179949 -5.595116989 -44.11764706 -72.22222222 -65
0.75 -1.022779414 0.576297378 36.88455722 35.71428571 -5.347444089 -4.731727926 -6.677070561 1.639344262 -
4.105571848 4.012944984 3.253763719 4.888507719 -3.57873210 -40.625 -68.75 -61.11111111
-7.1 -0.619073682 0.854319097 34.92986658 34.14634146 -4.993643731 -4.693848956 -6.048884404 1.181767023 -
4.38596491 4.012944984 3.253763719 4.888507719 -3.673469388 -36.66666667 -64.28571429 -56.25
-9.55 0.000735716 0 0 0 -4.5829225 -4.587412587 -5.567703953 1.06741573 -3.394833948 4.012944984
3.253763719 4.888507719 -3.586065574 -32.14285714 -61.53846154 -53.33333333
-1.12 -0.802880103 0.491685349 26.45284684 27.65957447 -4.358669834 -4.598025388 -5.158550396 1.464788732 -
1.649175412 3.656189865 4.045475702 5.182667799 -1.664932362 -29.62962963 -61.53846154 -53.33333333
-9.63 0.090433339 0.926252273 17.13628522 16.32653061 -3.922735205 -4.522968198 -4.753531114 1.802816901 -
1.424287856 3.656189865 4.045475702 5.182667799 -1.25 -29.62962963 -58.33333333 -50
9.55 0.144585817 0.825704922 14.53488372 14.89361702 -3.637746118 -4.523037903 -4.424374071 1.514301739 -
0.975243811 3.656189865 4.045475702 5.182667799 -0.417101147 -26.92307692 -50 -41.66666667
-3.15 0.251300983 0.61547562 7.514776245 6 -3.277365192 -3.547513891 -4.001845231 2.025886325 2.148887183
2.798982188 3.47979395 3.772003353 1.921024546 -20.83333333 -37.5 -30
-6.46 -0.000744275 0.348105503 6.554555085 7.547169811 -2.887953923 -2.834124586 -3.527152087 2.198421646
2.619414484 2.798982188 3.47979395 3.772003353 2.383531961 -13.63636364 -50 -37.5
5.47 -0.002234887 0.271999549 5.067083496 5.555555556 -2.878292875 -2.572997976 -3.511441447 2.6032824
3.981264637 2.798982188 3.47979395 3.772003353 3.391684902 -15 -40 -28.57142857
```

Appendix C.8

Injury 2002 Significant SAS and data files

```
filename f5 'injury_2002.data';
Data one;
 infile f5;
 input y x1 x2 x3 x4 x5 x6 x7 x8 x9 x10 x11 x12 x13 x14 x15 x16;
 proc REG lp;
  model y=x16;
  plot residual.*x16;
  plot residual.*obs.;
run;

-9 0.828603 2.701133
-9.91 -0.657921
-11.45 -1.257364
0.75 -1.761544
-7.1 -2.023976
-9.55 -2.664210
-1.12 -3.073558
-9.63 -3.439295
9.55 -3.703418
-3.15 -4.395138
-6.46 -4.994567
5.47 -5.228297
```

Appendix C.9

NonComp 2001 – 2002 Stepwise SAS and data files

```
filename f5 'noncomp_0102.data';
Data one;
 infile f5;
 input y x1 x2 x3 x4 x5 x6 x7 x8 x9 x10 x11 x12 x13 x14 x15 x16;
 proc REG;
  model y=x1 x2 x3 x4 x5 x6 x7 x8 x9 x13 x14 x16/selection=stepwise;
PROC print;
run;
```

```
11.71 0.828603 1.022769 5.156450 4.444444 -0.501852 2.701133 -1.141863 3.732227 9.119252 4.223433 3.923519
1.743679 2.760736 11.764706 2.400000 9.090909
-4.8 0.612150 0.751150 3.739368 4.545455 -0.657921 2.594955 -1.592218 3.533569 5.855162 4.223433 3.923519
1.743679 0.200602 -2.857143 -2.476190 -4.347826
-5.18 0.597796 0.889673 7.424671 6.976744 -1.257364 2.439024 -2.174502 2.932243 3.899083 4.223433 3.923519
1.743679 -1.601602 -2.857143 -18.181818 -16.666667
2.43 -0.068779 0.477198 14.707016 13.513514 -1.761544 2.011205 -2.727026 3.269119 4.361132 4.040404 2.333846
0.171821 -0.710660 -11.111111 -27.272727 -25.000000
-4.18 0.179312 0.465116 7.562098 5.128205 -2.023976 1.840753 -3.411306 3.615160 3.951368 4.040404 2.333846
0.171821 -0.809717 -16.666667 -41.666667 -38.461538
-10.26 -0.198250 0.388371 13.838384 11.904762 -2.664210 1.303485 -4.236469 3.248260 1.270553 4.040404
2.333846 0.171821 -2.594810 -26.315789 -45.833333 -42.307692
-2.4 0.210879 0.760023 13.207861 11.904762 -3.073558 0.853485 -4.736217 2.719907 -0.224383 4.002668 2.257261
0.943396 -4.091816 -28.947368 -45.833333 -42.307692
-7.15 -0.512533 0.308998 19.436813 19.512195 -3.439295 1.346512 -5.113300 2.719907 0.376223 4.002668
2.257261 0.943396 -4.382470 -28.947368 -50.000000 -46.153846
-13.71 -0.122192 0.868500 25.995492 23.684211 -3.703418 -0.309032 -5.391812 2.648244 -1.039347 4.002668
2.257261 0.943396 -5.610236 -31.578947 -58.333333 -53.846154
-6.51 -0.642994 0.788542 38.734869 38.888889 -4.395138 -1.680908 -6.056338 2.126437 -3.766617 4.174950
2.002291 1.878736 -7.411067 -36.842105 -66.666667 -61.538462
-9.03 -1.010094 0.628257 42.625118 39.473684 -4.994567 -2.891869 -6.792166 1.895462 -3.851852 4.174950
2.002291 1.878736 -8.794466 -42.105263 -75.000000 -69.230769
-7.59 -1.364518 0.419618 46.872011 45.945946 -5.228297 -3.983345 -7.130822 1.551724 -5.947137 4.174950
2.002291 1.878736 -9.054726 -47.368421 -79.166667 -73.076923
-7.95 -1.727625649 0.017724337 35.64596933 34.04255319 -5.632280533 -4.029977376 -7.353830922 1.142204455 -
8.214285714 3.85620915 2.842013941 4.370179949 -8.855721393 -50 -75.5859375 -70.83333333
-2.57 -1.057325597 0.579872272 34.71534653 32.60869565 -5.783896604 -4.309735764 -7.272626871 1.137656428 -
6.550218341 3.85620915 2.842013941 4.370179949 -8.308308308 -44.11764706 -75.5859375 -68.18181818
-5.29 -1.378438706 0.240562677 34.18565009 32.60869565 -5.826292396 -4.663285433 -7.084257206 1.464078992 -
4.488594555 3.85620915 2.842013941 4.370179949 -5.595116989 -44.11764706 -72.22222222 -65
6.98 -1.022779414 0.576297378 36.88455722 35.71428571 -5.347444089 -4.731727926 -6.677070561 1.639344262 -
4.105571848 4.012944984 3.253763719 4.888507719 -3.578732106 -40.625 -68.75 -61.11111111
1.3 -0.619073682 0.854319097  34.92986658 34.14634146 -4.993643731 -4.693848956 -6.048884404 1.181767023 -
4.385964912 4.012944984 3.253763719 4.888507719 -3.673469388 -36.66666667 -64.28571429 -56.25
-1.37  0.000735716 0 0 0 -4.5829225 -4.587412587 -5.567703953 1.06741573 -3.394833948 4.012944984
3.253763719 4.888507719 -3.586065574 -32.14285714 -61.53846154 -53.33333333
6.13 -0.802880103 0.491685349 26.45284684 27.65957447 -4.358669834 -4.598025388 -5.158550396 1.464788732 -
1.649175412 3.656189865 4.045475702 5.182667799 -1.664932362 -29.62962963 -61.53846154 -53.33333333
-3.67 0.090433339 0.926252273 17.13628522 16.32653061 -3.922735205 -4.522968198 -4.753531114 1.802816901 -
1.424287856 3.656189865 4.045475702 5.182667799 -1.25 -29.62962963 -58.33333333 -50
10.51 0.144585817 0.825704922 14.53488372 14.89361702 -3.637746118 -4.523037903 -4.424374071 1.514301739 -
0.975243811 3.656189865 4.045475702 5.182667799 -0.417101147 -26.92307692 -50 -41.66666667
3.02 0.251300983 0.61547562 7.514776245 6 -3.277365192 -3.547513891 -4.001845231 2.025886325 2.148887183
2.798982188 3.47979395 3.772003353 1.921024546 -20.83333333 -37.5 -30
-.45 -0.000744275 0.348105503 6.554555085 7.547169811 -2.887953923 -2.834124586 -3.527152087 2.198421646
2.619414484 2.798982188 3.47979395 3.772003353 2.383531961 -13.63636364 -50 -37.5
6.11 -0.002234887 0.271999549 5.067083496 5.555555556 -2.878292875 -2.572997976 -3.511441447 2.6032824
3.981264637 2.798982188 3.47979395 3.772003353 3.391684902 -15 -40 -28.57142857
```

Appendix C.10

NonComp 2001 – 2002 Significant SAS and data files

```
filename f5 'noncomp_0102.data';
Data one;
 infile f5;
 input y x1 x2 x3 x4 x5 x6 x7 x8 x9 x10 x11 x12 x13 x14 x15 x16;
 proc REG lp;
   model y=x4 x8 x13 x16;
   plot residual.*x4;
   plot residual.*x8;
   plot residual.*x13;
   plot residual.*x16;
   plot residual.*obs.;
run;

11.71 0.828603
-4.8 0.612150
-5.18 0.597796
2.43 -0.068779
-4.18 0.179312
-10.26 -0.198250
-2.4 0.210879
-7.15 -0.51253
-13.71 -0.122192
-6.51 -0.642994
-9.03 -1.010094
-7.59 -1.364518
-7.95 0.828603
-2.57 0.612150
-5.29 0.597796
6.98 -0.068779
1.3 0.179312
-1.37 -0.198250
6.13 0.210879
-3.67 -0.512533
10.51 -0.122192
3.02 -0.642994
-0.45 -1.010094
6.11 -1.364518
```

Appendix C.11

NonComp 2002 Significant SAS and data files

```
filename f5 'noncomp_2002.data';
Data one;
 infile f5;
 input y x1 x2 x3 x4 x5 x6 x7 x8 x9 x10 x11 x12 x13 x14 x15 x16;
 proc REG;
  model y=x1 x2 x3 x4 x5 x6 x7 x8 x9 x13 x14 x16/selection=stepwise;
PROC print;
run;
```

```
-7.95 -1.727625649 0.017724337 35.64596933 34.04255319 -5.632280533 -4.029977376 -7.353830922 1.142204455 -
8.214285714 3.85620915 2.842013941 4.370179949 -8.855721393 -50 -75.5859375 -70.83333333
-2.57 -1.057325597 0.579872272 34.71534653 32.60869565 -5.783896604 -4.309735764 -7.272626871 1.137656428 -
6.550218341 3.85620915 2.842013941 4.370179949 -8.308308308 -44.11764706 -75.5859375 -68.18181818
-5.29 -1.378438706 0.240562677 34.18565009 32.60869565 -5.826292396 -4.663285433 -7.084257206 1.464078992 -
4.488594555 3.85620915 2.842013941 4.370179949 -5.595116989 -44.11764706 -72.22222222 -65
6.98 -1.022779414 0.576297378 36.88455722 35.71428571 -5.347444089 -4.731727926 -6.677070561 1.639344262 -
4.105571848 4.012944984 3.253763719 4.888507719 -3.578732106 -40.625 -68.75 -61.11111111
1.3 -0.619073682 0.854319097  34.92986658 34.14634146 -4.993643731 -4.693848956 -6.048884404 1.181767023 -
4.385964912 4.012944984 3.253763719 4.888507719 -3.673469388 -36.66666667 -64.28571429 -56.25
-1.37  0.000735716 0 0 0 -4.5829225 -4.587412587 -5.567703953 1.06741573 -3.394833948 4.012944984
3.253763719 4.888507719 -3.586065574 -32.14285714 -61.53846154 -53.33333333
6.13 -0.802880103 0.491685349 26.45284684 27.65957447 -4.358669834 -4.598025388 -5.158550396 1.464788732 -
1.649175412 3.656189865 4.045475702 5.182667799 -1.664932362 -29.62962963 -61.53846154 -53.33333333
-3.67 0.090433339 0.926252273 17.13628522 16.32653061 -3.922735205 -4.522968198 -4.753531114 1.802816901 -
1.424287856 3.656189865 4.045475702 5.182667799 -1.25 -29.62962963 -58.33333333 -50
10.51 0.144585817 0.825704922 14.53488372 14.89361702 -3.637746118 -4.523037903 -4.424374071 1.514301739 -
0.975243811 3.656189865 4.045475702 5.182667799 -0.417101147 -26.92307692 -50 -41.66666667
3.02 0.251300983 0.61547562 7.514776245 6 -3.277365192 -3.547513891 -4.001845231 2.025886325 2.148887183
2.798982188 3.47979395 3.772003353 1.921024546 -20.83333333 -37.5 -30
-.45 -0.000744275 0.348105503 6.554555085 7.547169811 -2.887953923 -2.834124586 -3.527152087 2.198421646
2.619414484 2.798982188 3.47979395 3.772003353 2.383531961 -13.63636364 -50 -37.5
6.11 -0.002234887 0.271999549 5.067083496 5.555555556 -2.878292875 -2.572997976 -3.511441447 2.6032824
3.981264637 2.798982188 3.47979395 3.772003353 3.391684902 -15 -40 -28.57142857
```

Appendix C.12

NonComp 2002 Significant SAS and data files

```
filename f5 'noncomp_2002.data';
Data one;
 infile f5;
 input y x1 x2 x3 x4 x5 x6 x7 x8 x9 x10 x11 x12 x13 x14 x15 x16;
 proc REG lp;
   model y=x13;
   plot residual.*x13;
   plot residual.*obs.;
run;

-7.95 -0.501852
-2.57 -0.657921
-5.29 -1.257364
6.98 -1.761544
1.3 -2.023976
-1.37 -2.664210
6.13 -3.073558
-3.67 -3.439295
10.51 -3.703418
3.02 -4.395138
-0.45 -4.994567
6.11 -5.228297
```

Appendix C.13

Total 2001 – 2002 Stepwise SAS and data files

```
filename f5 'total_0102.data';
Data one;
 infile f5;
 input y x1 x2 x3 x4 x5 x6 x7 x8 x9 x10 x11 x12 x13 x14 x15 x16;
 proc REG;
  model y=x1 x2 x3 x4 x5 x6 x7 x8 x9 x10 x11 x12 x13 x14 x15
x16/selection=stepwise;
proc print;
run;

12.81000 0.82860 1.02277 5.15645 4.44444 -0.50185 2.70113 -1.14186 3.73223 9.11925 4.22343 3.92352 1.74368
2.76074 11.76471 2.40000 9.09091
-4.60000 0.61215 0.75115 3.73937 4.54545 -0.65792 2.59496 -1.59222 3.53357 5.85516 4.22343 3.92352 1.74368
0.20060 -2.85714 -2.47619 -4.34783
-3.69000 0.59780 0.88967 7.42467 6.97674 -1.25736 2.43902 -2.17450 2.93224 3.89908 4.22343 3.92352 1.74368 -
1.60160 -2.85714 -18.18182 -16.66667
3.76000 -0.06878 0.47720 14.70702 13.51351 -1.76154 2.01121 -2.72703 3.26912 4.36113 4.04040 2.33385 0.17182 -
0.71066 -11.11111 -27.27273 -25.00000
-3.17000 0.17931 0.46512 7.56210 5.12821 -2.02398 1.84075 -3.41131 3.61516 3.95137 4.04040 2.33385 0.17182 -
0.80972 -16.66667 -41.66667 -38.46154
-7.57000 -0.19825 0.38837 13.83838 11.90476 -2.66421 1.30349 -4.23647 3.24826 1.27055 4.04040 2.33385 0.17182
-2.59481 -26.31579 -45.83333 -42.30769
1.11000 0.21088 0.76002 13.20786 11.90476 -3.07356 0.85349 -4.73622 2.71991 -0.22438 4.00267 2.25726 0.94340 -
4.09182 -28.94737 -45.83333 -42.30769
-4.56000 -0.51253 0.30900 19.43681 19.51220 -3.43930 1.34651 -5.11330 2.71991 0.37622 4.00267 2.25726 0.94340
-4.38247 -28.94737 -50.00000 -46.15385
-12.87000 -0.12219 0.86850 25.99549 23.68421 -3.70342 -0.30903 -5.39181 2.64824 -1.03935 4.00267 2.25726
0.94340 -5.61024 -31.57895 -58.33333 -53.84615
-4.33000 -0.64299 0.78854 38.73487 38.88889 -4.39514 -1.68091 -6.05634 2.12644 -3.76662 4.17495 2.00229
1.87874 -7.41107 -36.84211 -66.66667 -61.53846
-6.56000 -1.01009 0.62826 42.62512 39.47368 -4.99457 -2.89187 -6.79217 1.89546 -3.85185 4.17495 2.00229
1.87874 -8.79447 -42.10526 -75.00000 -69.23077
-6.44000 -1.36452 0.41962 46.87201 45.94595 -5.22830 -3.98334 -7.13082 1.55172 -5.94714 4.17495 2.00229
1.87874 -9.05473 -47.36842 -79.16667 -73.07692
-8.29 -1.727625649 0.017724337 35.64596933 34.04255319 -5.632280533 -4.029977376 -7.353830922 1.142204455 -
8.214285714 3.85620915 2.842013941 4.370179949 -8.855721393 -50 -75.5859375 -70.83333333
-5.56 -1.057325597 0.579872272 34.71534653 32.60869565 -5.783896604 -4.309735764 -7.272626871 1.137656428 -
6.550218341 3.85620915 2.842013941 4.370179949 -8.308308308 -44.11764706 -75.5859375 -68.18181818
-8.93 -1.378438706 0.240562677 34.18565009 32.60869565 -5.826292396 -4.663285433 -7.084257206 1.464078992 -
4.488594555 3.85620915 2.842013941 4.370179949 -5.595116989 -44.11764706 -72.22222222 -65
2.33 -1.022779414 0.576297378 36.88455722 35.71428571 -5.347444089 -4.731727926 -6.677070561 1.639344262 -
4.105571848 4.012944984 3.253763719 4.888507719 -3.578732106 -40.625 -68.75 -61.11111111
-2.69 -0.619073682 0.854319097 34.92986658 34.14634146 -4.993643731 -4.693848956 -6.048884404 1.181767023 -
4.385964912 4.012944984 3.253763719 4.888507719 -3.673469388 -36.66666667 -64.28571429 -56.25
-5.79 0.000735716 0 0 0 -4.5829225 -4.587412587 -5.567703953 1.06741573 -3.394833948 4.012944984
3.253763719 4.888507719 -3.586065574 -32.14285714 -61.53846154 -53.33333333
1.95 -0.802880103 0.491685349 26.45284684 27.65957447 -4.358669834 -4.598025388 -5.158550396 1.464788732 -
1.649175412 3.656189865 4.045475702 5.182667799 -1.664932362 -29.62962963 -61.53846154 -53.33333333
-6.76 0.090433339 0.926252273 17.13628522 16.32653061 -3.922735205 -4.522968198 -4.753531114 1.802816901 -
1.424287856 3.656189865 4.045475702 5.182667799 -1.25 -29.62962963 -58.33333333 -50
8.7 0.144585817 0.825704922 14.53488372 14.89361702 -3.637746118 -4.523037903 -4.424374071 1.514301739 -
0.975243811 3.656189865 4.045475702 5.182667799 -0.417101147 -26.92307692 -50 -41.66666667
1.02 0.251300983 0.61547562 7.514776245 6 -3.277365192 -3.547513891 -4.001845231 2.025886325 2.148887183
2.798982188 3.47979395 3.772003353 1.921024546 -20.83333333 -37.5 -30
-3.02 -0.000744275 0.348105503 6.554555085 7.547169811 -2.887953923 -2.834124586 -3.527152087 2.198421646
2.619414484 2.798982188 3.47979395 3.772003353 2.383531961 -13.63636364 -50 -37.5
4.42 -0.002234887 0.271999549 5.067083496 5.555555556 -2.878292875 -2.572997976 -3.511441447 2.6032824
3.981264637 2.798982188 3.47979395 3.772003353 3.391684902 -15 -40 -28.57142857
```

Appendix C.14

Total 2001 – 2002 Significant SAS and Data files

```
filename f5 'total_0102.data';
Data one;
 infile f5;
 input y x1 x2 x3 x4 x5 x6 x7 x8 x9 x10 x11 x12 x13 x14 x15 x16;
 proc REG lp;
  model y=x4 x13;
  plot residual.*x4;
  plot residual.*x13;
  plot residual.*obs.;
run;

12.81 1.022769
-4.6 0.751150
-3.69 0.889673
3.76 0.477198
-3.17 0.465116
-7.57 0.388371
1.11 0.760023
-4.56 0.308998
-12.87 0.868500
-4.33 0.788542
-6.56 0.628257
-6.44 0.419618
-8.29 1.022769
-5.56 0.751150
-8.93 0.889673
2.33 0.477198
-2.69 0.465116
-5.79 0.388371
1.95 0.760023
-6.76 0.308998
8.7 0.868500
1.02 0.788542
-3.02 0.628257
4.42 0.419618
```

Appendix C.15

Total 2002 Stepwise SAS and data files

```
filename f5 'total_2002.data';
Data one;
 infile f5;
 input y x1 x2 x3 x4 x5 x6 x7 x8 x9 x10 x11 x12 x13 x14 x15 x16;
 proc REG;
  model y=x1 x2 x3 x4 x5 x6 x7 x8 x9 x13 x14 x16/selection=stepwise;
proc print;
run;
```

```
-8.29 -1.727625649 0.017724337 35.64596933 34.04255319 -5.632280533 -4.029977376 -7.353830922 1.142204455 -
8.214285714 3.85620915 2.842013941 4.370179949 -8.855721393 -50 -75.5859375 -70.83333333
-5.56 -1.057325597 0.579872272 34.71534653 32.60869565 -5.783896604 -4.309735764 -7.272626871 1.137656428 -
6.550218341 3.85620915 2.842013941 4.370179949 -8.308308308 -44.11764706 -75.5859375 -68.18181818
-8.93 -1.378438706 0.240562677 34.18565009 32.60869565 -5.826292396 -4.663285433 -7.084257206 1.464078992 -
4.488594555 3.85620915 2.842013941 4.370179949 -5.595116989 -44.11764706 -72.22222222 -65
2.33 -1.022779414 0.576297378 36.88455722 35.71428571 -5.347444089 -4.731727926 -6.677070561 1.639344262 -
4.105571848 4.012944984 3.253763719 4.888507719 -3.578732106 -40.625 -68.75 -61.11111111
-2.69 -0.619073682 0.854319097 34.92986658 34.14634146 -4.993643731 -4.693848956 -6.048884404 1.181767023 -
4.385964912 4.012944984 3.253763719 4.888507719 -3.673469388 -36.66666667 -64.28571429 -56.25
-5.79 0.000735716 0 0 0 -4.5829225 -4.587412587 -5.567703953 1.06741573 -3.394833948 4.012944984
3.253763719 4.888507719 -3.586065574 -32.14285714 -61.53846154 -53.33333333
1.95 -0.802880103 0.491685349 26.45284684 27.65957447 -4.358669834 -4.598025388 -5.158550396 1.464788732 -
1.649175412 3.656189865 4.045475702 5.182667799 -1.664932362 -29.62962963 -61.53846154 -53.33333333
-6.76 0.090433339 0.926252273 17.13628522 16.32653061 -3.922735205 -4.522968198 -4.753531114 1.802816901 -
1.424287856 3.656189865 4.045475702 5.182667799 -1.25 -29.62962963 -58.33333333 -50
8.7 0.144585817 0.825704922 14.53488372 14.89361702 -3.637746118 -4.523037903 -4.424374071 1.514301739 -
0.975243811 3.656189865 4.045475702 5.182667799 -0.417101147 -26.92307692 -50 -41.66666667
1.02 0.251300983 0.61547562 7.514776245 6 -3.277365192 -3.547513891 -4.001845231 2.025886325 2.148887183
2.798982188 3.47979395 3.772003353 1.921024546 -20.83333333 -37.5 -30
-3.02 -0.000744275 0.348105503 6.554555085 7.547169811 -2.887953923 -2.834124586 -3.527152087 2.198421646
2.619414484 2.798982188 3.47979395 3.772003353 2.383531961 -13.63636364 -50 -37.5
4.42 -0.002234887 0.271999549 5.067083496 5.555555556 -2.878292875 -2.572997976 -3.511441447 2.6032824
3.981264637 2.798982188 3.47979395 3.772003353 3.391684902 -15 -40 -28.57142857
```

Appendix C.16

Total 2002 Significant SAS and data files

```
Filename f5 'total_2002.data';
Data one;
 infile f5;
 input y x1 x2 x3 x4 x5 x6 x7 x8 x9 x10 x11 x12 x13 x14 x15 x16;
 proc REG lp;
   model y=x13;
   plot residual.*x13;
   plot residual.*obs.;
   title 'Residual Plots - Total 2002';
run;

-8.29 -0.501852
-5.56 -0.657921
-8.93 -1.257364
2.33 -1.761544
-2.69 -2.023976
-5.79 -2.664210
1.95 -3.073558
-6.76 -3.439295
8.7 -3.703418
1.02 -4.395138
-3.02 -4.994567
4.42 -5.228297
```