Contents

- Choosing a Procedure for Binary Logistic Regression Models 1
- **Logistic Regression 3**

To Obtain a Logistic Regression Analysis 4
Logistic Regression Set Rule 5
Logistic Regression Define Categorical Variables 5
Logistic Regression Save New Variables 6
Logistic Regression Options 7
LOGISTIC REGRESSION Command Additional Features 8

3 Multinomial Logistic Regression 9

To Obtain a Multinomial Logistic Regression 10

Multinomial Logistic Regression Models 11

Multinomial Logistic Regression Statistics 12

Multinomial Logistic Regression Convergence Criteria 13

NOMREG Command Additional Features 14

Probit Analysis 15

To Obtain a Probit Analysis 16
Probit Analysis Define Range 17
Probit Analysis Options 17
PROBIT Command Additional Features 18

Nonlinear Regression 19

To Obtain a Nonlinear Regression Analysis 20
Conditional Logic (Nonlinear Regression) 20
Nonlinear Regression Parameters 21
Nonlinear Regression Common Models 22
Nonlinear Regression Loss Function 23
Nonlinear Regression Parameter Constraints 24
Nonlinear Regression Save New Variables 24
Nonlinear Regression Options 25
Interpreting Nonlinear Regression Results 26
NLR Command Additional Features 26

6 Weight Estimation 27

To Obtain a Weight Estimation Analysis 28
Weight Estimation Options 29
WLS Command Additional Features 29

Two-Stage Least-Squares Regression 31

To Obtain a Two-Stage Least-Squares Regression Analysis 32
Two-Stage Least-Squares Regression Options 33
2SLS Command Additional Features 33

8 Logistic Regression Analysis Examples 35

The Logistic Regression Model 36
An Example 37
Coefficients for the Logistic Model 38
Interpreting the Regression Coefficients 40
Assessing the Goodness of Fit of the Model 42
Categorical Variables 47
Interaction Terms 50
Selecting Predictor Variables 50
Diagnostic Methods 55
Another Look at Model Fit 59

9 Multinomial Logistic Regression Examples 63

The Logit Model 64

Baseline Logit Example 64

Parameter Estimates 66

Likelihood-Ratio Test 69

Calculating Predicted Probabilities and Expected Frequencies 71

Classification Table 73

Goodness-of-Fit Tests 73

Examining the Residuals 75

Pseudo R² Measures 75

Correcting for Overdispersion 76

Matched Case-Control Studies 76

The Model 77

Creating the Difference Variables 77

Examining the Results 79

Probit Analysis Examples 81

Probit and Logit Response Models 81

An Example 82

Comparing Several Groups 85

Comparing Relative Potencies of the Agents 87

Estimating the Natural Response Rate 89

More than One Stimulus Variable 89

Nonlinear Regression Examples 91

What Is a Nonlinear Model? 91

Transforming Nonlinear Models 92

Intrinsically Nonlinear Models 93

Fitting the Logistic Population Growth Model 93

Estimating Starting Values 98

Computational Problems 100

Additional Nonlinear Regression Options 100

Weighted Least-Squares Regression Examples 101

An Example 101

Estimating the Weights from Replicates 103

Estimating Weights from a Variable 103

The WLS Solutions 105

Diagnostics from the Linear Regression Procedure 106

Two-Stage Least-Squares Regression Examples 109

The Artichoke Data 109

The Demand-Price-Income Economic Model 110
Estimation with Ordinary Least Squares 110
Feedback and Correlated Errors 111

Two-Stage Least Squares 112

Strategy 114

Stage 1: Estimating Price 114

Stage 2: Estimating the Model 116

The 2-Stage Least Squares Procedure 116

Syntax Reference 119

Introduction 121

A Few Useful Terms 121

Syntax Diagrams 121

Syntax Rules 122

LOGISTIC REGRESSION 124

NOMREG 138

NLR 144

PROBIT 160

2SLS 169

WLS 173

Appendix

Categorical Variable Coding Schemes 179

Deviation 179

Simple 180

Helmert 181

Difference 181

Polynomial 182

Repeated 182

Special 183

Indicator 184

Bibliography 185

Subject Index 189

Syntax Index 197