

# Contents

<b>Preface</b> .....	vii
<b>Notes to Readers</b> .....	xiii
<b>1 Getting Started</b> .....	1
1.1 Starting RExcel with the RExcel Icon .....	1
1.2 Starting RExcel from a Running Excel Window .....	3
1.2.1 Starting RExcel from a Running Excel 2007 Window .....	3
1.2.2 Starting RExcel from a Running Excel 2003 Window .....	5
1.3 Starting R Commander Without Excel .....	7
1.4 Window Arrangement .....	10
1.5 Graphics History .....	10
1.6 Quitting RExcel .....	11
<b>2 Using RExcel and R Commander</b> .....	13
2.1 Appearance .....	13
2.2 The Dataset and Model Menus .....	22
2.3 R Console .....	32
2.4 R Commander Window .....	34
2.5 R Help Files .....	35
2.6 Messages from R, Rcmdr, or Excel .....	35
<b>3 Getting Data into R</b> .....	37
3.1 Example Datasets .....	37
3.2 Named Columns of Data .....	40
3.3 Unnamed Columns of Data .....	46
3.4 Numeric Columns and Factor Columns .....	49
3.5 Multiple Numeric Columns, One per Factor Level .....	52
3.6 Transferring Data from R to Excel .....	57
3.7 Other Input Formats, Including ASCII Text Files .....	60

- 4 Normal and *t* Distributions** . . . . . 61
  - 4.1 Accessing R Functions with the Rcmdr Menus . . . . . 61
  - 4.2 Accessing R Functions from Within Excel Cells . . . . . 66
  - 4.3 Graphical Displays of the Standard Normal Distribution . . . . . 69
  - 4.4 Significance Level, Rejection Region, and Type I Error . . . . . 71
  - 4.5 Type II Error and Power . . . . . 74
  - 4.6 Displaying Graphs . . . . . 79
  
- 5 Normal and *t* Workbook** . . . . . 81
  - 5.1 Standard Normal and *t* Distributions . . . . . 81
  - 5.2 Relation Between  $\alpha$  and  $z$  . . . . . 86
  - 5.3 Normal Tests, Type II Error, and Power . . . . . 87
  - 5.4 Significance, Rejection Region, and Power—Continued . . . . . 91
  - 5.5 How Does the Normal and *t* Workbook Work? . . . . . 95
    - 5.5.1 Input Fields . . . . . 95
    - 5.5.2 Display Parameters . . . . . 96
    - 5.5.3 Numerical Output . . . . . 96
  - 5.6 Confidence Intervals . . . . . 97
    - 5.6.1 Algebra . . . . . 97
    - 5.6.2 Workbook . . . . . 98
  - 5.7 Scaling to Keep Constant Area . . . . . 99
  - 5.8 Normal Approximation to the Binomial . . . . . 102
  
- 6 *t*-Tests** . . . . . 105
  - 6.1 Data—Canned Vegetables . . . . . 106
    - 6.1.1 Plot the Data . . . . . 109
      - 6.1.1.1 Histogram . . . . . 109
      - 6.1.1.2 Dotplot . . . . . 111
      - 6.1.1.3 Boxplot . . . . . 113
    - 6.1.2 Calculate the *t*-Test . . . . . 115
    - 6.1.3 Plot the *t*-Test . . . . . 117
  - 6.2 Data—Heights . . . . . 121
    - 6.2.1 Plots . . . . . 124
      - 6.2.1.1 Scatterplots . . . . . 124
      - 6.2.1.2 Dotplots . . . . . 126
      - 6.2.1.3 Boxplots . . . . . 127
      - 6.2.1.4 Bar Graph for Frequencies . . . . . 128
    - 6.2.2 Summary Statistics . . . . . 129
    - 6.2.3 Subsetting the Data for Males . . . . . 130
    - 6.2.4 One-Sample *t*-Test for Males . . . . . 136
    - 6.2.5 Two-Sample *t*-Test Comparing Males and Females . . . . . 139
  - 6.3 Matched Pairs *t*-Test . . . . . 144
  - 6.4 Confidence Interval Plot . . . . . 152
    - 6.4.1 Confidence Intervals with the normal and *t* Worksheet . . . . . 152

- 6.4.2 Confidence Intervals with the Plot [normal|t] hypotheses or Confidence Intervals...  
 Menus ..... 154
- 6.5 Hypothesis Plot and Confidence Interval Plot from Summary Information ..... 155
  - 6.5.1 Hypothesis Plots with the Plot hypotheses and Confidence Intervals Menu and Workbook ..... 155
  - 6.5.2 Hypothesis Plot ..... 156
  - 6.5.3 Confidence Interval Plot ..... 158
- 6.6 Alternate Styles for the Calculation of Confidence Intervals ..... 160
  - 6.6.1 Recommended Style ..... 160
  - 6.6.2 Not Recommended Style ..... 163
- 7 One-Way ANOVA ..... 165**
  - 7.1 Data ..... 165
  - 7.2 Plots ..... 168
    - 7.2.1 Dotplot ..... 168
    - 7.2.2 Boxplot ..... 170
  - 7.3 ANOVA Specification ..... 172
  - 7.4 ANOVA Table and *F*-Test ..... 174
  - 7.5 Table of Means ..... 178
  - 7.6 Multiple Comparisons ..... 179
  - 7.7 Mean–Mean Multiple Comparisons Plot ..... 182
  - 7.8 Linear Contrasts ..... 187
- 8 Simple Linear Regression ..... 193**
  - 8.1 Least-Squares Regression with RExcel/Rcmdr ..... 194
  - 8.2 Scatterplot ..... 197
  - 8.3 Linear Regression Analysis ..... 200
  - 8.4 Residuals Analysis ..... 204
  - 8.5 Confidence Bands and Prediction Bands ..... 209
- 9 What Is Least Squares? ..... 213**
  - 9.1 Minimizing the Sum of Squares ..... 213
  - 9.2 Hat Diagonals and Leverage ..... 223
  - 9.3 Residuals and Leverage ..... 229
  - 9.4 Reset the Workbook to the Values in the Text ..... 233
- 10 Multiple Regression—Two *X*-Variables ..... 235**
  - 10.1 The Multiple Regression Model ..... 235
  - 10.2 Example ..... 236
  - 10.3 Specify and Fit Several Linear Models ..... 243
  - 10.4 Graphical Comparison of Models ..... 247
    - 10.4.1 Plot Residuals ~ Fitted ..... 250
    - 10.4.2 Rescale Plots for Ease of Comparison ..... 252
    - 10.4.3 Lattice Plots with Coordinated Scales ..... 254

10.4.4	Stacking with the Right-Click Menu	255
10.4.5	Menu and Dialog Box for Lattice Plot	261
10.5	ANOVA Table	263
10.6	Confidence Intervals and Prediction Intervals	265
<b>11</b>	<b>Polynomial Regression</b>	<b>269</b>
11.1	Regression on a Quadratic Function of $X$	269
11.2	Linear Fit	274
11.3	Quadratic Fit	278
11.4	Plot of Squared Residuals	283
<b>12</b>	<b>Multiple Regression—Three or More <math>X</math>-Variables</b>	<b>285</b>
12.1	Shoe Sizes of Austrian Students	286
12.2	Plots	293
12.3	Regression Analysis	300
12.4	Basic Diagnostic Plots	304
12.5	Confidence Intervals	305
<b>13</b>	<b>Contingency Tables and the Chi-Square Test</b>	<b>309</b>
13.1	Gender and Smoking	310
13.1.1	Two-Way Table Chi-Square Test	310
13.1.2	Two-Sample Proportions Test	312
13.2	German and Math Grades	318
<b>A</b>	<b>Installation of RExcel</b>	<b>323</b>
A.1	Basic Installation Procedures	323
A.2	Supported Excel Versions	324
A.3	Download and Installation of R and RExcel for MS Windows	324
A.3.1	Preparation	325
A.3.2	An Ancient Previous Version of RExcel Must Be Uninstalled	325
A.3.3	Installation	326
A.4	Installing RExcel for MS Windows When R Is Already Installed	327
A.5	Upgrade an Existing R Installation	328
A.6	R and Rcmdr Without Excel—Windows, Macintosh, Linux	329
A.6.1	Install the Rcmdr, HH, and RcmdrPlugin.HH packages	329
A.6.2	Use the R Commander Directly	329
A.6.3	Data Input	329
A.7	R and Open Office	330
A.8	License for statconnDCOM	330
A.9	Digital Certificate	330
<b>B</b>	<b>Nuisances—Installation, Startup, or Execution</b>	<b>333</b>
B.1	Installation	333
B.2	Startup	334
B.3	Execution	334

Contents	xxv
<b>References</b> .....	339
<b>Index</b> .....	341



<http://www.springer.com/978-1-4419-0051-7>

R Through Excel

A Spreadsheet Interface for Statistics, Data Analysis,  
and Graphics

Heiberger, R.M.; Neuwirth, E.

2009, XXIV, 344 p. 300 illus. in color., Softcover

ISBN: 978-1-4419-0051-7