



Essential Statistics in Business and Economics, 3rd edition

Doane and Seward

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Overall Changes to the 3rd edition

Many changes were motivated by advice from reviewers and users of the textbook. Besides hundreds of small edits, these changes were common to most chapters:

- **New end-of-chapter *Software Supplements*** (MegaStat, Minitab) to allow more focus on Excel within chapters.
- **Closer exercise compatibility** with *Connect*, *SmartBook*, and *LearnSmart*.
- **Updated *Related Readings* and *Web Sources*** for students who want to “dive deeper.”
- **Revised *LearningStats* demonstrations** to illustrate concepts beyond what is possible in a textbook (e.g., simulations).
- **Updated test bank** (with more feedback) and updated/expanded *Big Data Sets*.
- Improved illustrations, figures, and tables.

Chapter-by-Chapter Changes

Chapter 1—Overview of Statistics

- New Mini Cases (e.g., analytics in business, predicting airfares, GM ignition switches).
- More discussion of using statistics in business, working in teams, and jobs for data scientists.
- Leaner discussion of critical thinking and a new exercise on critical thinking.
- Updated ***Related Reading*** references.

Chapter 2—Data Collection

- Reorganized learning objectives to give more focus on testable topics.
- Improved discussion of binning in frequency distributions
- Revised treatment of variables, data types, and measurement levels.
- Reorganized presentation of samples, populations, and sampling methods,
- New Mini Cases (e.g., Super Bowl audiences).
- New, revised, and updated exercises (e.g., housing starts, lightning deaths).
- Revised explanation of data collection methods, sources of error.
- New discussion of reliability, validity, and survey software.
- Updated *Web Data Sources*, *Related Reading*, and *LearningStats* demos.

Chapter 3—Describing Data Visually

- More efficient treatment of key topics and examples.
- Updated screenshots and advice for Excel charts, histograms, pivot tables, scatter plots.
- Moved *MegaStat* and Minitab screenshots to end-of-chapter *Software Supplement*.
- New, revised, and updated exercises (e.g., stock prices, web browsers, TV sales).
- Updated *Related Reading* references.

Chapter 4—Descriptive Statistics

- Streamlined discussion of main concepts.
- Updated Excel screenshots for descriptive statistics.
- Moved *MegaStat* and Minitab screenshots to end-of-chapter *Software Supplement*.
- New, revised, and updated exercises (e.g., asset turnover ratios, stock prices, skewness, kurtosis, consumer expenditure, z-scores, quartiles, grouped data) and many revised data sets.
- New and updated Mini Cases (e.g., U.S. presidents' ages, car defects over time).
- Reorganized and expanded section on covariance and correlation.
- A new statistic for measuring skewness when only summarized data are available.
- New decision diagram to guide student choice of statistics and graphs.

Chapter 5—Probability

- Revised example of defining compound events.
- Revised Mini Cases (e.g., women-owned companies, Bayes Theorem).
- New, updated, and revised exercises (e.g., free eBay shipping, YouTube videos, online sales, credit card use, flight delays).

Chapter 6—Discrete Probability Distributions

- Reorganized learning objectives to give more focus on testable topics.
- Improved topic placement on how to recognize each type of distribution.
- Updated Excel screenshots and menus.
- New, revised, and updated exercises (e.g., music festival tickets, inner tube rentals).

Chapter 7—Continuous Probability Distributions

- Reorganized learning objectives to give more control by testable topic.
- Revised discussion of expected value and variance.
- New, revised, and updated exercises (e.g., bus arrivals, heart rates, power surges, defect rates, expected value).
- New exercises on using Excel functions.
- Updated Excel screenshots and instructions.
- New illustration of exponential distribution families and middle areas.

Chapter 8—Sampling Distributions and Estimation

- Reorganized learning objectives to give more focus on testable topics.
- Major rewrite of sections on Central Limit Theorem, sampling error, estimation, confidence intervals for proportions and standard error.
- Improved and streamlined discussion of finite population correction.
- Updated Excel screenshots and functions.
- Moved *MegaStat* and Minitab examples to end-of-chapter *Software Supplement*.
- New, revised, and updated exercises.
- Three new *LearningStats* demonstrations.

Chapter 9—One-Sample Hypothesis Tests

- Reorganized sections on Type I and Type II error, decision rules, and p-values).
- Updated Excel screenshots and improved confidence interval figure.
- Revised and updated examples (e.g., using software to reduce retail fraud).
- Moved *MegaStat* and Minitab examples to end-of-chapter *Software Supplement*.
- Excel functions for tests of proportions when normality cannot be assumed.

Chapter 10—Two-Sample Hypothesis Tests

- Simplified learning objectives to match content more closely.
- Updated Excel screenshots and instructions.
- Moved *MegaStat* and Minitab examples to end-of-chapter *Software Supplement*.
- More emphasis on the question of whether or not sample sizes must be equal.
- Improved notation for tests of two proportions and *F* tests.
- New graphic for Excel *F* tests and corresponding Excel functions.
- New, revised, and updated exercises (e.g., paired *t* tests).

Chapter 11—Analysis of Variance

- Improved notation and graphics to illustrate one-factor ANOVA (e.g., manufacturing defect rates).
- Updated Excel screenshots and illustrations to emphasize Excel's capabilities.
- Moved *MegaStat* and Minitab examples to end-of-chapter *Software Supplement*.
- Added an alternative formula for Hartley's test.
- Improved discussion of Tukey tests.
- Optional section on Kruskal-Wallis test as alternative to ANOVA.

- Clarified instructions on exercises to improve compatibility with *Connect*.

Chapter 12—Simple Regression

- Reorganized learning objectives to give more focus on testable topic.
- Expanded discussion on the difference between association and cause and effect.
- Updated Excel screenshots and illustrations to focus on Excel's capabilities.
- Moved *MegaStat* and Minitab examples to end-of-chapter *Software Supplement*.
- More explanation of interpreting the intercept.
- Improved residual illustrations and new graphic on heteroscedasticity patterns.
- Boxed comments on prediction interval width and unusual observations.
- New, revised, and updated exercises (e.g., outliers, leverage, SAT scores, vehicle MPG, home values).
- New section on logistic regression with a new logit data set and interpretive exercise.
- Updated *Related Reading* and one new *Learning Stats* demonstration (correlation).

Chapter 13—Multiple Regression

- Greater emphasis on Excel, with most *MegaStat* and Minitab references moved to end-of-chapter *Software Supplement*.
- Page xix Improved distinction between confidence intervals and prediction intervals.
- Expanded discussion of multiplicative models and interaction effects.
- New graphic on heteroscedasticity patterns.
- Improved discussion of unusual observations.
- New section on logistic regression with several predictors (complementing [Chapter 12](#)).
- Expanded discussion of stepwise regression.
- Revised exercise instructions for compatibility with *Connect*[®].
- Updated *Related Reading* and *LearningStats*.

Chapter 14—Chi-Square Tests

- Reorganized learning objectives to align with concepts and *Connect*[®].
- Updated screenshots, more Excel emphasis.
- New graphics for GOF tests.
- Streamlined discussion of topics (e.g., binning for normal GOF tests) and new graphics for ECDF tests.
- New, revised, and updated data sets (e.g., Kentucky Derby, national league runs, U.S. presidents' ages).
- Updated *Related Reading* references.