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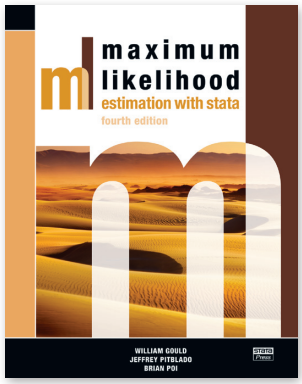
Maximum Likelihood Estimation with Stata, Fourth Edition



By William Gould, Jeffrey Pitblado, and Brian Poi

Publisher: Stata Press
Copyright: 2010
ISBN-13: 978-1-59718-078-8
Pages: 352; paperback
Price: **$54.00**

For more details or to order, visit us online at
stata-press.com/books/maximum-likelihood-estimation-stata.

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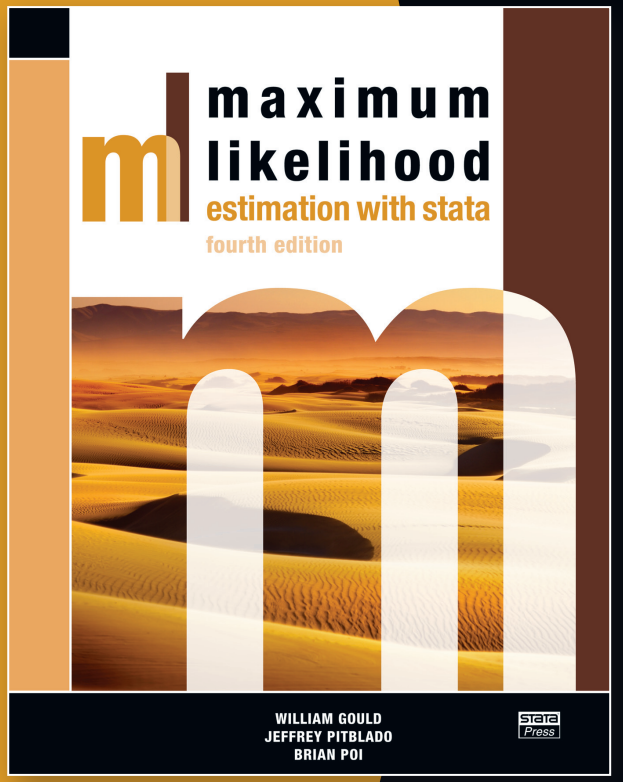

About the authors

William Gould is President of StataCorp and heads the technical development of Stata. Gould is also the architect of Mata, Stata's matrix programming language. Jeff Pitblado is Director of Statistical Software at StataCorp. Pitblado has played a leading role in the development of **ml**: he added the ability of **ml** to work with survey data and wrote the current implementation of **ml** in Mata. Brian Poi is Senior Economist at StataCorp. On the software development side, he has written a variety of econometric estimators in Stata.

The book's audience

- Stata programmers writing their own commands
- Applied users implementing the latest statistical methods
- Researchers developing new likelihood-based estimators
- Users wanting to learn Stata and Mata programming by example

What's new in this edition

- Reflects features added in recent versions of Stata's **ml** command
  - » Four types of likelihood evaluators
  - » Improved syntax and function calling conventions
  - » New methods for handling scores
- Illustrates the use of Mata to write likelihood-evaluator programs
- Shows how to incorporate factor-variable notation
- Spells out how to make evaluators work with survey data

Comment from the Stata technical group

Maximum Likelihood Estimation with Stata, Fourth Edition is the essential reference and guide for researchers in all disciplines who wish to write maximum likelihood (ML) estimators in Stata. Beyond providing comprehensive coverage of Stata's **ml** command for writing ML estimators, the book presents an overview of the underpinnings of maximum likelihood and how to think about ML estimation.

The book shows you how to take full advantage of the **ml** command's noteworthy features:

- linear constraints
- four optimization algorithms (Newton–Raphson, DFP, BFGS, and BHHH)
- observed information matrix (OIM) variance estimator
- outer product of gradients (OPG) variance estimator
- Huber/White/sandwich robust variance estimator
- cluster–robust variance estimator
- complete and automatic support for survey data analysis
- direct support of evaluator functions written in Mata

When appropriate options are used, many of these features are provided automatically by **ml** and require no special programming or intervention by the researcher writing the estimator.

The fourth edition has been updated to include new features introduced in recent versions of Stata. Such features include new methods for handling scores, more consistent arguments for likelihood-evaluator programs, and support for likelihood evaluators written in Mata (Stata's matrix programming language). The authors illustrate how to write your estimation command so that it fully supports factor-variable notation and the **svy** prefix for estimation with survey data. They have also restructured the chapters that introduce **ml** in a way that allows you to begin working with **ml** faster. This edition is essential for anyone using Stata 12.

In the final chapter, the authors illustrate the major steps required to get from log-likelihood function to fully operational estimation command. This is done using several different models: logit and probit, linear regression, Weibull regression, the Cox proportional hazards model, random-effects regression, and seemingly unrelated regression.

The authors provide extensive advice for developing your own estimation commands. With a little care and the help of this book, users will be able to write their own estimation commands—commands that look and behave just like the official estimation commands in Stata.

Whether you want to fit a special ML estimator for your own research or wish to write a general-purpose ML estimator for others to use, you need this book.