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Transportation Research Forum

Book Review: [Statistical and Econometric Methods for Transportation Data Analysis](#)

Book Author(s): Simon Washington, Matthew G. Karlaftis, and Fred Mannering

Review Author(s): William F. Huneke

Source: *Journal of the Transportation Research Forum*, Vol. 43, No. 2 (Fall 2004), pp. 189-190

Published by: Transportation Research Forum

Stable URL: <http://www.trforum.org/journal>

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Book Reviews

Washington, Simon, Karlaftis, Matthew G., and Mannering, Fred, *Statistical and Econometric Methods for Transportation Data Analysis*. Boca Raton, FL, and Hants, UK: Chapman & Hall/CRC, 2003. ISBN 1-58053-160-1.

Methods for Transportation Data Analysis

by William F. Huneke

Simon P. Washington, Matthew G. Karlaftis and Fred L. Mannering have produced a very fine reference book for transportation analysts, particularly statisticians. Their book's strength is that it covers a wide range of statistical techniques that should interest transportation analysts. It also provides examples showing how the techniques are applied in a transportation setting. *Methods for Transportation Data Analysis* also provides good references for further study or exploration. However, this book is not for the novice or casual reader.

Although *Methods for Transportation Data Analysis* provides an appendix on statistical fundamentals, this appendix would not suffice for anyone who has not had a statistics or econometrics course. It is merely a refresher. The book is a bit cryptic at times, limiting its usefulness as a text or reference book. For example, *Methods for Transportation Data Analysis* presents a good discussion of the null hypothesis and hypothesis testing and explains why large samples are more definitive. However, a novice statistician could not start with the example that follows this discussion. The book presents an Indiana road's example that is sloppy – the example has 99 degrees of freedom, it's not 99 degrees of freedom but 100 that is read off Table c-3. Also, is it a two-tailed test or a right-tailed test? One benefit for the novice or experienced statistician is the second appendix, which follows the first appendix on statistical

fundamentals. This glossary is a very nice feature of the book.

One reason why this reviewer concludes that *Methods for Transportation Data Analysis* is a better reference than textbook is that it does not provide any problems with solutions for the student to work through. Having problems and solutions helps students determine if they have a real understanding of the material presented. The authors suggest that their data sets can be obtained at the publisher's Web site. This might provide some hands-on learning. If the reader had access to the data sets, the reader could replicate what the authors did or try variations. However, when this reviewer went to the Web site, it was not a simple navigation. The link provided went to the publisher's general Web site. A more direct link would be better.

Examples drawn from practical analysis of transportation situations are the book's real strength. The discussion of non-parametric methods was greatly facilitated by examples. The book also provides a good example of an Ogive plot, which works very well. The book could be strengthened with more such examples. On the page after the Ogive plot, the authors present an abstract box plot. A practical example of a box plot would help readers, particularly since data presentation is often important to the successful communication of analysis results. In another instance where additional examples would have

facilitated learning, Chapter 4 has six sections and two examples. The chapter could have used one or two more examples. When Section 4.6 says that Box-Cox transformations can evaluate whether a model's functional form is appropriate, it would have been nice to have an example showing how Box-Cox worked with real data. It would also have been more helpful if the relatively long, theoretical discussion of regression analysis was illustrated with some examples.

If *Methods for Transportation Data Analysis* has a shortcoming as a reference, it is its casual attitude toward data torture. Statistical references and texts should stress that good data analysis starts with a robust theory. Otherwise the analyst could mine data and find seemingly interesting results that are transitory. The discussion on testing linearity assumptions indicates how dropping variables can improve results. The authors might have stressed more that the basic problem is functional form: The analyst should go back to the theoretical underpinnings of his or her analysis and not simply drop variables. Chapter 8's discussion of latent variables is also a bit slack on data torture. The authors

should stress that to ensure that you get robust results, it is necessary to repeat the analysis with new data once the data structure and original analysis are complete, and maybe revisit the analysis a few years later. The text at the top of page 201 is a good reminder of this, but it comes eight pages into the chapter. A book like this, which could be well used as a reference, should have disclaimers well positioned at the beginning of sections and chapters so that it is not misused.

For the professional transportation statistician or econometrician, *Methods for Transportation Data Analysis* is an excellent resource. Its breadth of coverage and practical examples are handy. If a data analyst finds a statistical technique being used with which he or she is unfamiliar, this book is a good starting point. It provides a general background discussion, often an applied example, and references to other works on the topic. *Methods for Transportation Data Analysis* would be a good addition to any resource library serving the needs of transportation analysts using statistical or econometric techniques.

William F. Huneke has 22 years experience in management consulting, economics, information systems, business analysis and teaching in the commercial and government sectors. Huneke is Chief of the Section of Economics of the Surface Transportation Board and works on regulatory issues affecting the railroad industry. He also teaches graduate business courses at the University of Maryland, College of Business and Management. He has a Ph.D. from the University of Virginia and a BA from Swarthmore College.