

Essentials *of*  
Econometrics



# Essentials *of* Econometrics

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J. EDWARD TAYLOR

*with* Aaron Smith *and* Abbie Turiansky



Berkeley, California

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## Preface

It was Winter Quarter 2012. The imaginary scent of pepper spray still permeated the air around the Occupy tents on the UC Davis Quad. I gritted my teeth and told the campus bookstore to order up 125 copies of an undergraduate econometrics textbook at \$150 a shot. (That's a gross of \$18,750 just from my class.)

Over dinner that night, my 20-year-old son, Sebastian, just back from occupying the Port of Oakland, said he spent \$180 on a new edition calculus text required for his course. My 16-year-old son, Julian, exclaimed: "That's obscene." Sebastian responded, "You're right. Basic calculus hasn't changed in decades. You don't need new editions to learn calculus."

Before dinner was over, my two kids ambushed me and made me promise never, ever, to assign an expensive textbook to my students again.

"So, what do you want me to do then, write one?" I asked them.

"Exactly," they answered in unison. "I mean, you've been teaching this stuff for, what, twenty years, Dad?" Julian added.

"And get a good title for it," my wife, Peri, added.

The next day, RebelText was born.

What's RebelText?

First, it's affordable. It costs as little as one-fifth the price of a normal textbook. Second, it's concise. It covers what I can hope to get through in a quarter-long course (but wish I had a semester to do). Third, it's compact. Being both affordable and compact, you can carry it around with you. Write in it. Don't worry about keeping the pages clean, because at this price there's no need to resell it after the class is through (or worry about whether there's still a market for your edition).

The price of a RebelText goes mostly to cover the costs of printing, student assistance, and research to keep the series going. That's why it's so low. No mega-profits for presses, always pushing for a new edition to spoil the resale market. This RebelText will naturally evolve as needed to keep pace with the field, but there will never be a new edition just for profits' sake.

## Who Should Have this Book?

When I sat down to write *Essentials of Econometrics*, I wanted a compact teaching book for an upper-division undergraduate econometrics class. That is primarily what this is. The undergraduate textbooks out there not only are very expensive; I have found them not to be particularly good at teaching econometrics, and every year students complain about this in their evaluations. The knowledge in this book should poise any undergraduate for further study or to venture out into the real world with the essential econometric concepts and tools, and then some.

As the book took shape my vision for it got bigger. I found myself wishing I'd had something like it while I was a graduate student, as a companion for my Ph.D econometrics text. Graduate econometrics texts are indispensable, but they are references more than teaching tools. I wanted a book that offered a fresh overview of the classical model that can help grad students get a feel for the subject and put their graduate econometrics tomes into perspective.

## Aaron and Abbie

That's where Aaron and Abbie came in.

Aaron Smith is, simply put, one of the best applied econometricians around. His door is the one I knock on when I need a clear, understandable, and imaginative explanation of hard econometric problems. Aaron combed through every line of this book and fundamentally changed the way some of the material is presented. For example, I was taught that the

validity of an econometric model depends on getting the “true” model right. That always bothered me, because we never see the true model or process that generated the data we see, so how can we be sure? And if we can’t, then of what use is econometrics? Aaron is responsible for statements like this one, which you will find in Chapter 1:

*We’re unlikely to ever discover that process completely, but we can use our economic data, theory and statistics to learn something about it. Even if we don’t discover every detail of the data generating process, we can find regularities embedded in it.*

He really needs to write a book around this idea. In the meantime, he imbues this one with a practical perspective on how to use econometric tools to learn something about the world, while bringing an exacting econometrician’s eye to the methods presented in it.

Abbie Turiansky had just finished her stellar first year in our Ph.D program when I invited her to work with me on this book. Her job was to make sure everything is understandable to upper-division undergraduate students *and* make this a readable companion to introductory graduate-level texts. Her student’s eye helps make this different from almost any textbook you’ll come across. And when it comes to editing, growing up with an English professor at the dinner table didn’t hurt!

## How to Use RebelText

RebelText was created to teach as efficiently as possible. Students need to learn the essentials of the subject. They do not want to wade through thick textbooks in order to locate what they need, constantly wondering what will and won’t be on the next test. Because it is so concise, there is no reason *not* to read and study every word of RebelText econometrics. All of it could be on the test. Master it, and you will be well positioned to go out and use econometrics in the real world. You can think of this book as presenting the best practices and state-of-the-art methods for doing intermediate econometric work. By mastering this book, you’ll

also have the conceptual and intuitive grounding you need in order to move on to higher-level econometrics courses. You'll probably find yourself referring back to it from time to time, so keep it on your shelf!

## Using RebelText.org and Contributing to RebelText

RebelText comes with its own living website: [rebeltext.org](http://rebeltext.org). There, you'll



find online appendices with all the data sets included in this book, sample programs, problem sets, interesting links, and other items of interest. Updated homework questions often are used as an excuse for printing new editions of textbooks.

The way I see it, that's what websites are for. When my colleagues and I use RebelText, this website becomes a center of class activity.

If you are teaching with RebelText, consider contributing your ideas about novel uses of our book and website, interesting data sets, programs, and projects. To find out how, visit [rebeltext.org](http://rebeltext.org) and click on "contributing to RebelText."

## About the Authors

Ed loves teaching economics, especially microeconomics, econometrics, and economic development. He's been doing it for about 25 years now at UC Davis, where he is a professor in the Agricultural and Resource Economics Department. He's also done a lot of economics research; at last count he had published about 136 articles, book chapters, and books on topics ranging from international trade reforms to ecotourism, immigration, and rural poverty. He co-edits the *American Journal of Agricultural Economics* and is listed in *Who's Who in Economics* as one of the world's most cited economists. He has worked on projects with the United Nations, the World Bank, the Organization for Economic Cooperation and Development, and the Inter-American Development Bank, as well as with foreign governments, including those of Mexico,

Honduras, Canada, and China. He is working on a book called *Beyond Experiments: Simulation Methods for Impact Evaluation*, which will present a new approach to doing impact evaluation and cost-benefit analysis. You can learn more about Ed at his website: <http://jetaylor.ucdavis.edu>.

Aaron Smith's first real job was teaching econometrics (not counting working on the family farm; he grew up on in New Zealand). In 1994, just before heading off to graduate school, he taught an econometrics class much like the one you'll take using this book. It was a scary and invigorating experience – he must have enjoyed it because he's still doing it all these years later! He is currently an Associate Professor of Agricultural and Resource Economics at the UC Davis, where he has been since 2001 after earning his Ph.D in Economics from UC San Diego. When not teaching, he does research on prices and trading in commodity and financial derivatives markets. Recent project topics include identifying which traders in commodity futures markets seem to know where prices are headed, estimating how the recent growth in the use of ethanol made from corn as an ingredient in gasoline has affected food and gas prices, and understanding commodity booms and busts. You can learn more about Aaron at his website: <http://asmith.ucdavis.edu>.

Abbie is a Ph.D student in the UC Davis Department of Agricultural and Resource Economics. Her passion is development and environmental economics, and her past research has included the effects of conservation incentives on environmental awareness in Bolivia and small-scale agricultural water management in Nepal and Colombia. She enjoys making difficult concepts as easy as possible to understand and talking with non-economists about economics.

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