

Economics with Calculus
Michael C Lovell
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Review by
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This is a very clever pedagogical treatment of economics, particularly at the university undergraduate level, but it might even serve as an interesting textbook in high school (secondary education level) teaching where calculus is now taught in advance of university level enrollment.

On reading this lively and interesting account, it makes me think back to a period almost 70 years ago when the mathematical treatment of economic analysis was just beginning to be introduced in economics teaching, but not at the level of standard textbooks (called “Principles”) for students just beginning their acquaintance with economics. It was then rare to find a mathematics textbook that chose elasticity formulations of supply or demand functions as examples. Paul Douglas, with Charles Cobb, was using marginal productivity concepts in realistic measurement of production functions, although not at the textbook level.

Michael Lovell, however “covers the waterfront”. He begins in an interesting way that implicitly corrects for narrow American teaching by usually misleading the students to think that we live in a self-contained closed economy. Michael Lovell goes into an international path at the outset. This does not have much to do, in an essential way, with mathematical analysis, but eventually in later chapters he does a proper mathematical

examination of economic efficiency, gains from trade, and contract curve analysis, that falls right into place with a bit of calculus.

He develops the laws of production, supply and demand, optimization, theory of the firm, price determination, income distribution, macroeconomics, economic policy, economic dynamics, growth theory, and economic development. His examples in all these subjects hold the reader's interests.

Calculus and bits of other kinds of mathematical analysis are used alongside verbal explanation. This is all a fine start for the modern economist-to-be. What is needed, for a second step, is explanation of linear algebra concepts (some matrix theory), some set theory, differential (difference) equations, and ready-made applications for the next step into input-output analysis, general equilibrium, probability, and econometrics.

There will surely be increasing student interest in financial econometrics, especially in business schools, and that will need some more specialized mathematics to cover risk management and portfolio structure.

The economics of distribution is taken up by Michael Lovell, but not in terms of processes that generate economic distributions, but Lorenz curves, Gini coefficients and important macroeconomic ratios of basic income or wealth data are all presented. Government programs dealing with transfer payments, taxes and poverty rates are discussed – leading into a more general treatment of macroeconomics.

Although the mathematics of the theory of the firm and technology are worked out for the simple case, such as log-linear or Cobb-Douglas functions, I found his more appropriate presentation of an S-shaped production function to be potentially more

fruitful, even if he did not explicitly take up the more complicated mathematical functions involved.

The book covers much ground in economics with limited mathematical treatment, but there are a number of misprints and technical statements that are not as straightforward as is implied. For example, p.181, “The Stone-Geary utility function yields a demand function that is linear in prices and incomes, which facilitates its estimation from empirical data by econometric techniques.” The demand system is linear either in relative prices and real income or in nominal prices and income (with different stochastic specifications in each case), but it is not linear in the parameters. Estimation is not quite simple, if the nonlinearity in parameters is taken into account. Printing errors: p. 39 fn 12, 67, 97, 107, 124, 133, 667. Alfred Kahn did not “focus on the geometric series”. It was Richard Kahn. All these slippages or confusions can readily be corrected. There are more, but there is no doubt that this book will serve mathematically for beginning students very well, maybe convincing many that economics is their subject.

It is a pity that Michael Lovell did not provide a meaningful explanation of econometric models with probability calculations, dynamic cycles or long term growth, together with the adequate applications to macroeconomics.