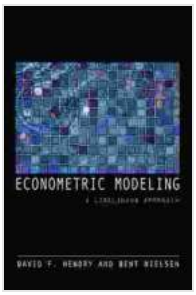
Econometric Modeling: A Comprehensive Guide to the Likelihood Approach



Econometric Modeling: A Likelihood Approach

by David F. Hendry

★★★★★ 5 out of 5

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Econometric modeling is a powerful tool for economic analysis. It allows researchers to build and test models of economic relationships, and to use these models to make predictions and draw inferences. The likelihood approach is one of the most common and versatile methods for econometric modeling.

The likelihood approach is based on the idea of maximizing the probability of observing the data that has been collected. This is done by finding the values of the model parameters that make the probability of the data as large as possible. The resulting parameter values are known as the maximum likelihood estimates.

The likelihood approach can be used to estimate the parameters of any type of econometric model. However, it is particularly well-suited for models that are based on probability distributions. This is because the likelihood function can be written as a product of the probability densities of the individual observations.

Foundations of the Likelihood Approach

The likelihood function is a function of the model parameters that gives the probability of observing the data that has been collected. The likelihood function is typically written as:

$$L(\theta \mid y) = \prod_{i=1}^{n} f(y_i \mid \theta)$$

where:

* θ is the vector of model parameters * y is the vector of observed data * $f(y_i \mid \theta)$ is the probability density function of the i-th observation

The maximum likelihood estimate of the model parameters is the value of θ that maximizes the likelihood function. This can be done using a variety of numerical optimization techniques.

Once the maximum likelihood estimates have been obtained, they can be used to make inferences about the population from which the data was collected. This can be done using a variety of statistical methods, such as hypothesis testing and confidence interval estimation.

Applications of the Likelihood Approach

The likelihood approach can be used to estimate the parameters of a wide variety of econometric models. Some of the most common applications of the likelihood approach include:

* Linear regression * Logistic regression * Probit regression * Poisson regression * Negative binomial regression * Multinomial regression

The likelihood approach can also be used to estimate the parameters of more complex models, such as:

* Time series models * Panel data models * Nonlinear models

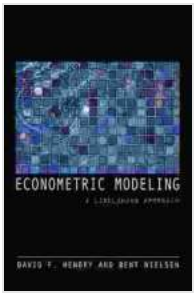
Extensions of the Likelihood Approach

The likelihood approach can be extended in a number of ways to accommodate more complex models and data structures. Some of the most common extensions of the likelihood approach include:

* Generalized linear models * Mixed effects models * Bayesian models

These extensions allow the likelihood approach to be used to estimate the parameters of a wide range of econometric models, including models with non-linear relationships, missing data, and hierarchical data structures.

The likelihood approach is a powerful and versatile method for econometric modeling. It can be used to estimate the parameters of a wide variety of models, and to make inferences about the population from which the data was collected. The likelihood approach is also extensible, and can be adapted to accommodate more complex models and data structures.



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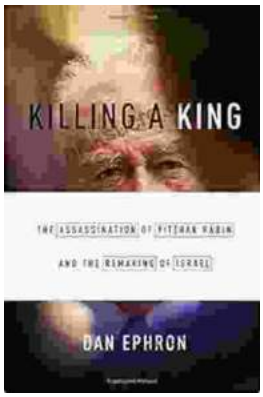

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