ISSN: 1987-6521, E-ISSN: 2346-7541
JUNE 2023 VOLUME 60 ISSUE 02
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BLACK SEA
SCIENTIFIC JOURNAL OF ACADEMIC RESEARCH

ECONOMETRIC ANALYSIS: THE BASIC INTRODUCTION OF THEORY, METHODS AND APPLICATIONS

Mike Simon
Department of Economics, University of Cape Town, Cape Town, South Africa
Email: simon.mike@hotmail.com

Received: 11-May-2023, Manuscript No. BSSJAR- 23- 98390; **Editor assigned**: 15-May-2023, PreQC No. BSSJAR- 23-98390 (PQ); **Reviewed:** 29-May-2023, QC No. BSSJAR- 23-98390; **Revised:** 05-Jun-2023, Manuscript No. BSSJAR- 23-98390 (R); **Published:** 12-Jun-2023, DOI: 10.36962/GBSSJAR/60.2.002

ABOUT THE STUDY

Econometrics is the use of statistical tools to economic data in order to give economic connections empirical substance. It is, more exactly, "the quantitative analysis of actual economic phenomena based on the concurrent development of theory and observation, linked by appropriate inference methods." According to an introductory economics textbook, econometrics allows economists to "sift through mountains of data to extract simple relationships." Jan Tinbergen is one of econometrics' two founding fathers. Ragnar Frisch, the other, originated the phrase in the meaning that it is now used. The multiple linear regression model is a fundamental econometric method. Econometric theory evaluates and develops econometric procedures using statistical theory and mathematical statistics. Econometricians seek estimators with applicable statistical qualities, such as unbiasedness, efficiency, and consistency. Applied econometrics evaluates economic theories, develops econometric models, analyses economic history, and forecasts using theoretical econometrics and real-world data.

Theory

Econometric theory evaluates and develops econometric procedures using statistical theory and mathematical statistics. Econometricians seek estimators with applicable statistical qualities, such as unbiasedness, efficiency, and consistency. An estimate is unbiased if its anticipated value is the parameter's actual value, consistent if it converges to the real value as the sample size increases and efficient if the estimator has a lower standard error than other unbiased estimators for a given sample size. Ordinary Least Squares (OLS) is a popular estimation method because it delivers the BLUE or "Best Linear Unbiased Estimator" under Gauss-Markov assumptions. Different estimate procedures, such as maximum likelihood estimation, generalised method of moments, or generalised least squares, are utilised when these assumptions are broken or different statistical features are sought. Those who prefer Bayesian statistics over traditional, classical or "frequentist" techniques advocate for estimators that integrate prior beliefs.

Methods

Applied econometrics evaluates economic theories, develops econometric models, analyses economic history and forecasts using theoretical econometrics and real-world data.

Econometrics may employ normal statistical models to investigate economic issues, however this is most typically done with observational data rather than controlled trials. In this regard, the design of econometric observational research is comparable to that of other observational sciences such as astronomy, epidemiology, sociology, and political science. The study protocol guides the analysis of data from an observational study, while exploratory data analysis may be valuable for creating new hypotheses. Economics frequently examines equations and inequalities, such as supply and demand, which are assumed to be in equilibrium. As a result, econometrics has developed methods for identifying and estimating simultaneous equations models. These procedures are similar to those used in other branches of research, such as system identification in systems analysis and control theory. Such approaches may enable researchers to estimate models and study their empirical implications

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without having to actively manipulate the system. Regression analysis is a fundamental statistical tool used by econometricians. Because economists rarely have access to controlled trials, regression procedures are essential in econometrics. The most easily available data is usually retrospective. Retrospective analysis of observational data, on the other hand, may be prone to omitted-variable bias, reverse causality, or other constraints that call the causal interpretation of the correlations into question. In the absence of controlled trials, econometricians frequently seek enlightening natural experiments or use quasi-experimental approaches to derive believable causal inferences. Regression discontinuity design, instrumental variables, and difference-in-differences are among the approaches used.

Applications

Econometrics is a vital tool for economists and policy makers to analyze and predict economic phenomena. It enables them to quantify the relationship between different variables and make informed decisions based on empirical evidence. Some common applications of econometrics include forecasting economic growth, assessing the impact of policies and regulations, measuring the effectiveness of marketing campaigns, and evaluating the performance of financial instruments. Econometric models can also be used to test economic theories and hypotheses, such as the relationship between income and consumption or the impact of education on earnings. Overall, econometrics plays a crucial role in understanding and shaping the modern economy.

Citation: Simon M. (2023). Econometric Analysis: The Basic Introduction of Theory, Methods and Applications. GBSSJAR. 60(2), 1-2. DOI: 10.36962/GBSSJAR/60.2.002