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BEYOND LECTURES: INSIGHTS FROM BUSINESS DISCIPLINES (REFLECTIONS, TRANSFORMATIONS, AND THE HUMAN SIDE OF TEACHING)

FACULTY OF BUSINESS AND MANAGEMENT
UiTM CAWANGAN JOHOR

Beyond Lectures: Insights from Business Discipline-

(Reflections, Transformations, and the Human Side of Teaching)

Chief Editor
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REFLECTIONS ON BASIC ECONOMETRICS: CHALLENGES, STRATEGIES, AND INSIGHTS

Tan Yan Ling, Nurulashikin Romli, Jannah Munirah Mohd Noor

Introduction

Econometrics is the bridge between economic theory, mathematics, and statistics, allowing economists to work with real-world data. According to Gujarati and Porter (2009), econometrics is "economic measurement", with the use of statistical techniques and mathematical models on economic data to test the economic theory empirically. Generally, it combines economic theory, mathematical economics and statistical inference to provide numerical values for parameters, moving beyond qualitative relationships to quantitative analysis.

Most fields use econometrics to look at data, test ideas, and make decisions based on facts. It aids in market, pricing, and risk forecasting in the fields of business and finance. It also measures inequality and facilitates better resource allocation in relation to economic development and public policy. It is also vital in environmental, labour, and urban economics to study sustainability, employment, and the housing market to enable effective planning and policy.

However, teaching basic econometrics can be challenging. Students have to learn theory, mathematical formulations, statistical reasoning and practical approaches simultaneously. In contrast to theoretical economics, econometrics focuses on applying abstract theoretical concepts to actual data, interpreting results and evaluating the strength and validity of the evidence obtained. In its simplest form, econometrics uses real data to measure relationships. Accordingly, Table 1 presents the examples of econometrics applications in economics, finance, and management fields.

Over the years, teaching of econometrics has placed emphasis on the need to have a holistic pedagogical approach that integrates theory, mathematics, statistics and applied methodology. Nevertheless, students often have issues with creating a logical connection between an economic speculation and its empirical confirmation by the use of data, regression models and statistical deductions. Observations reveal some misunderstandings in the areas of hypothesis testing, estimation techniques, and regression coefficient interpretation.

Challenges

Educators often face several inherent challenges in teaching basic econometrics. This involves [a] conceptual abstraction (He & Liu, 2020): The most common foundational concepts that many students have problems with are the stochastic error term, assumptions of the classical linear regression model, multicollinearity, heteroscedasticity and autocorrelation; [b] mathematical rigor: Econometrics is extensively based on algebra, calculus, and probability theory. The derivations of estimators, calculations of variance and hypothesis testing formulas may be difficult for students with lower mathematical backgrounds; [c] statistical interpretation: p-values, confidence intervals and t-statistics may be difficult to understand. The wrong interpretation can cause students to draw inaccurate conclusions; [d] bridging theory to practice: Students still cannot understand how the results of regression can be used to answer the questions of the real-world economy, even after they have learned the formulas. Such a disconnect between theory and empirical use tends to decrease learning motivation; [e] technological integration: Contemporary econometrics requires familiarity with statistical software like R, Stata, Eviews or Python. It is daunting to teach econometric theory and software simultaneously; [f] student engagement: Econometrics courses are usually packed with information, and this overload can make the students disengaged when the only teaching method is lectures. Therefore, it is important to address these challenges by reflecting on the

teaching strategies, methods for improving comprehension and integrating practical examples into econometrics instruction.

Field	Objective	Theory Used	Historical data	Econometrics approach	Method	Interpretation
Economics	To measure the responsiveness of quantity demanded to a change in price.	Law of Demand	Price and sales data	QD = a + b*P + e	SR	For every 1 RM increase in price, 20 kg less is bought
	To examine how consumer expenditure varies with changes in income.	Consumption Theory	Household income and spending data	Consumption = a + b*Income + e	SR	People spend 10% of their additional income on groceries
Finance	To estimate the sensitivity of stock returns to movements in market returns and interest rates.	Capital Asset Pricing Model	Historical stock and market index returns	Ri = a + b*Rm + e	SR	Stock rises 1.5% for every 1% increase in market return
	To assess the effect of economic factors on investment performance	Efficient Market Hypothesis	Stock returns and central bank interest rate data	Ri = a + b1*Rm + b2*I + e	MR	1% increase in interest rates reduces stock return by 0.10%
Management	To assess the effect of training programs on employee performance.	Human Capital Theory	Training hours and sales	Sales = a + b*TrainingHours + e	SR	Each additional hour of training increases sales by 5 units
	To determine the influence of incentives on employee performance.	Motivation Theory	Employee bonus and output records	Output = a + b*Bonus + e	SR	A 10 RM bonus increases output by 2 units

Table 1: Examples of Econometrics Applications in Economics, Finance, and Management Fields

Notes: SR = Simple Regression, MR = Multiple Regression

Objectives

The overall objectives of the reflective work are [a] reflect on teaching methods by examining methods of teaching econometrics, mathematical derivations, statistical foundations and applied techniques; [b] improve conceptual knowledge by providing insights for students to understand methods that assist them in understanding complex econometric concepts and their mathematical or statistical backgrounds; [c] bridge theory and practice by showing how economic theory can be used when solving empirical problems with real or simulated data; [d] test teaching tools through the efficiency of using teaching aids, such as AI-assisted material, software demonstrations and graphical representations; and [e] develop critical thinking

abilities by asking students to critically interpret the results of regression and interpret them in terms of economics.

Approaches and strategies

Several approaches and strategies can be used to analyze effective teaching practices in basic econometrics. The former approach is active involvement and experiential learning through emphasis on student engagement, hands-on problem-solving and application of theory to practice. This approach is connected to the classroom observation strategy that enables the instructor to evaluate the level of student engagement and participation by observing students in lectures, tutorials and laboratories. For example, observe students' ability to interpret a regression slope or residual plot during class. The advantage of this strategy is that the educator can identify learning gaps, modify the teaching, and enhance interaction. The alternative strategy in this approach is Problem-Based Learning (PBL). PBL is to implement theory in real data and to formulate problem-solving skills. It is implemented by providing datasets including questions, and then students formulate hypotheses, perform regressions, and interpret results. An example is estimating the impact of training hours on sales using a dataset. This type of teaching is beneficial because it helps students to think critically, links theory and practice, and enhances retention.

The second approach is technology-enhanced and visual learning (Dang, 2025). This can be achieved by combining the strategies of software integration, graphical and mathematical illustrations and AI-assisted drafting. The purpose of applying statistical software, visual tools and AI-assisted content is to make abstract econometric concepts more concrete and interactive. These can be executed by employing R, Stata, EViews, or Python software (Llorent-Jurado & Ordaz Sanz, 2026). This method gets students ready for real-world situations by having them focus on interpretation instead of manual calculation. On the other hand, graphical and mathematical illustrations can be applied by visualizing abstract concepts and reinforcing theory, using step-by-step derivations, plots of regression lines and residuals. For instance, a scatterplot of sales versus training hours with a regression line also can be used for making further comparison. Subsequently, this enables students to make abstract concepts tangible, reinforces understanding and links theory and intuition. By using this strategy, the educators can save preparation time, provide varied examples and customize difficulty.

The final approach is associated with ongoing feedback and reflective practice, by discovering gaps in student learning, adapting instruction and improving teaching through reflection. The feedback mechanisms are fulfilled by identifying understanding gaps and evaluating teaching effectiveness through surveys, questionnaires, discussions, and analyzing patterns of misunderstanding. The example is surveying students' confidence in interpreting p-values. This strategy can be used to provide continuous improvement, tailored teaching, and student engagement. Furthermore, there is reflective journaling, which entails documenting teaching experiences to enhance teaching. The instructors will be able to maintain observations in the classroom, challenges and students' responses. The educator observes that students have difficulties in interpreting dummy variable coefficients and prepares additional examples for the following session. The method supports educators and instructors in their ongoing growth and improvement of teaching methods over time. In sum, these approaches and strategies are core to overcoming challenges.

Findings

Through years of teaching basic econometrics, several key reflections emerged. Firstly, engagement through active, blended, collaborative and iterative learning (Cladera, 2024). This is because active and experiential learning can enhance understanding directly. Active engagement and interaction with both theory and practice optimizes student learning. Visualization, step-by-step derivations, hands-on problem solving, iterative feedback and

collaborative exercises all reinforce comprehension and confidence. For example, plotting regression lines and residuals alongside algebraic formulas can enhance comprehension. Problem-solving sessions, software exercises and hands-on analysis of datasets help students internalize concepts better than passive lecture formats. Continuous feedback on regression exercises, hypothesis testing, and statistical interpretation strengthens student confidence and reduces misunderstandings. Group exercises, peer review of regression outputs and class discussions improve critical thinking and help students articulate and defend their interpretations.

Secondly, integrating theory, data and tools for practical relevance. This is because connecting theory to practice can make learning relevant. Linking theoretical econometric concepts to real data and applied software exercises helps students appreciate practical relevance. Software skills and AI tools can support this learning, but they must complement, not replace for conceptual understanding. For instance, connecting theoretical econometric assumptions to observable patterns in real data such as testing for multicollinearity using variance inflation factors, can help students see practical relevance. Familiarity with statistical software enhances learning, but instructors must carefully balance teaching software mechanics and econometric theory. Overemphasis on coding or commands may distract from conceptual understanding. AI-generated examples and problem set help save time and provide diversity in exercises. However, the educator's guidance remains crucial to ensure accuracy, interpretability and alignment with learning objectives.
Lastly, tailored support to overcome learning challenges. This implies that addressing student challenges involves structured support. For instance, students with poor mathematical or statistical foundations often experience problems with derivations and assumptions. Therefore, targeted tutorials, guided exercises and structured learning approaches are necessary to help these students build competence and confidence.

Conclusion and Recommendations

This reflection explores the practice of teaching in econometrics with a particular focus on methods that promote student learning and studying. One of the most significant problems is that students are more likely to experience difficulties in abstract derivations, model assumptions, and balancing software use with conceptual learning, particularly students with a lower quantitative background. The purpose of this reflection is to identify effective strategies that facilitate the ability to make a connection between theory and practice and contribute to the needs of various students. The practices cover a combination of visualization, active learning activities, application to real-world data, group activities, feedback loops and software and AI implementation. These findings indicate that active and experiential learning, practical relevance and customized support are important contributors to learning in econometric studies in terms of understanding, confidence and critical thinking.
The consideration of teaching basic econometrics highlights the role of integrated and student-focused pedagogy. Key suggestions are that educators should combine theory, visualization, and practice, using graphical representations and mathematical derivations, using real datasets and case studies, and maintain a balance between software and theory. In addition, educators can promote active, collaborative, and reflective learning by fostering practical problem solving and peer learning, relying on discussions and group work, and maintaining reflective practice while adapting based on feedback. To keep track with the current technology world, educators can apply AI in teaching, including the use of AI to generate examples and exercises with educator oversight, to ensure alignment with learning objectives, and acknowledge AI assistance transparently.

By adopting these recommendations, educators can enhance student engagement with basic econometrics and ensure that students not only understand the mathematical and statistical models but can also apply them to solve real-life economic questions.

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