ECON 5221:
EMPIRICAL ANALYSIS OF PRODUCTIVITY AND MARKET POWER

Spring 2025
National Taiwan University

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Description This course introduces empirical techniques for measuring firm-level productivity and market power using firm-level panel data. It is divided into two main parts.

Part one covers estimation techniques of production functions, which essentially measure firm-level unobserved productivity. We will explore classic approaches pioneered by Blundell and Bond (*Dynamic Panel Approach*) and Pakes and his followers (*Proxy Variable Approach*), addressing associated econometric challenges. We will then discuss their limitations, along with recent refinements to mitigate the resulting biases.

Part two delves into empirical applications of these techniques to two influential empirical topics:

(1) International Trade and Productivity

(2) The Rise of Firm's Market Power

In (1), we will explore empirical studies on how international trade and productivity go hand in hand at the firm level. In this subpart, students will also learn how measured productivity feeds into large-scale structural models. In (2), we will learn "production function approach" for measuring price markups and wage markdowns, discussing its pros and cons of this approach and recent applications. Students will appreciate how economists can utilize model-implied optimality conditions to estimate firm-level unobserved variables.

Textbook and Reference There is no formal textbook for this course. Refer to the attached reading list.

Econometrics

- All students are expected to have solid understanding of undergraduate-level econometrics. Basic understandings of graduate-level econometrics are brownie points.
- Before chewing the main meat of this course, some basics of the generalized method of moments (GMM) will be covered, which is essential for production function estimation.
- Homework assignments will involve estimating a production function using provided datasets, which requests students to draft their own codes. Relevant MATLAB codes will be covered in class before the assignments are released.

Grading Policy Four components determine your grade: Attendance, in-class presentation, Homework assignments and take-home exam. The relative weights are as follows:

Attendance	20%
In-class Presentation	10%
Homework	40%
Two homework assignments, each accounting for 20%.	
Take-home Exam	30%

In-class Presentation Students are expected to present a well-published paper from the reading list throughout this semester. Presentation times range from 20 to 30 minutes. Students can freely choose which paper they wish to present. The selections are first come, first-served basis. During their presentations, students should emphasize the following aspects of a paper:

1. Research question
2. Empirical approach
3. Key empirical findings
4. Contribution

Course Outline

The schedule below is tentative. Any unexpected changes to the schedule will be announced in-class (as the course proceeds).

Digression - Generalized Method of Moments .....

Measuring Productivity I - Classical Methods: Dynamic Panel vs. Proxy Variable .....

Measuring Productivity II - Recent Refinements .....

Assignment 1 .....

International Trade and Productivity I - Self-selection into Exporting/Importing .....

International Trade and Productivity II - Learning-by-Exporting/Importing .....

Assignment 2 .....

Market Power I - Measuring Price Markups .....

Market Power II - Recent Studies on Price Markups .....

Market Power III - Measuring Wage Markdowns .....

Market Power IV - Recent Studies on Wage Markdowns .....

Take-Home Exam .....(DATE TO BE ADDED)

Reading List

We will cover papers with asterisks ∗∗ throughout this course.

A General Reference .....

- Ackerberg, Benkard, Berry, and Pakes (2007, Handbook of Econometrics), *Econometric Tools for Analyzing Market Outcomes*
- De Loecker and Syverson (2021; Handbook of IO), *An Industrial Organization Perspective on Productivity*
- Verhoogen (2023; Journal of Economic Literature), *Firm-Level Upgrading in Developing Countries*

Measuring Productivity - Classical Methods .....

- ** Blundell and Bond (2000, Econometric Review), *GMM Estimation with persistent panel data*
- ** Olley and Pakes (1996, ECTA), *The dynamics of productivity in the telecommunications equipment industry*
- Levinsohn and Petrin (2003, RESTUD), *Estimating Production Functions Using Inputs to Control for Unobservables*

Measuring Productivity - Recent Refinements .....

- Klette and Griliches (1996, Journal of Applied Econometrics), *The Inconsistency of Common Scale Estimators When Output Prices are Unobserved and Endogenous*
- Foster, Haltinwanger, and Syverson (2008, AER), *Reallocation, Firm Turnover, and Efficiency: Selection on Productivity or Profitability?*
- ** Ackerberg, Cavez, and Frazer (2015, ECTA), *Identification Properties of Recent Production Function Estimators*
- Gandhi, Navarro, and Rivers (2020, JPE), *On the Identification of Gross Output Production Functions*
- Grieco, Li, and Zhang (2016), *Production Function Estimation with Unobserved Input Price Dispersion*
- ** Collard-Wexler and De Loecker (2021, WP), *Productivity and Capital Measurement Error*

International Trade and Productivity .....

- Clerides, Lach, and Tybout (1998, QJE), *Is Learning by Exporting Important? Micro-Dynamic Evidence from Colombia, Mexico, and Morocco*
- Das, Roberts, and Tybout (2007, ECTA), *Market Entry Costs, Producer Heterogeneity, and Export Dynamics*
- ** Kasahara and Rodrigue (2008, JDE), *Does the use of imported intermediates increase productivity? Plant-level evidence*
- Bustos (2011, AER), *Trade Liberalization, Exports, and Technology Upgrading: Evidence on the Impact of MERCOSUR on Argentinian Firms*
- Aw, Roberts, and Xu (2011, AER), *R&D Investment, Exporting, and Productivity Dynamics*
- ** De Loecker (2013, AEJ: Micro), *Detecting Learning by Exporting*
- Halpern, Koren, and Szeidl (2015, AER), *Imported Inputs and Productivity*
- Rho and Rodrigue (2016, IER), *Firm-Level Investment and Export Dynamics*
- Bai, Krishna, and Ma (2017, JIE), *How You Export Matters: Export Mode, Learning and Productivity in China*
- Zhang (2017, EER), *What You Import Matters for Productivity Growth: Experience from Chinese Manufacturing Firms*
- Li (2018, JIE), *A Structural Model of Productivity, Uncertain Demand, and Export Dynamics*
- Garcia-Marin and Voigtländer (2019, JPE), *Exporting and Plant-Level Efficiency Gains: It's in the Measure*
- ** Grieco, Li, and Zhang (2022, RAND), *Input Prices, Productivity, and Trade Dynamics: Long-Run Effects of Liberalization on Chinese Paint Manufacturers*
- Mo, Qiu, Dong, Zhang (2021, JDE), *What You Import Matters for Productivity Growth: Experience from Chinese Manufacturing Firms*
- Maican, Orth, Roberts, and Vuong (2023, JEEA), *The Dynamic Impact of Exporting on Firm R&D Investment*

Measuring Price Markups and Applications .....

- Hall (1986, Brookings Papers on Economic Activity), *Market Structure and Macroeconomic Fluctuations*
- ** De Loecker and Warzynski (2012, AER), *Markups and Firm-Level Export Status*
- De Loecker, Goldberg, Khandelwal and Pavcnik (2016, ECTA), *Prices, Markups, and Trade Retorm*
- ** De Loecker, Eeckhout, and Unger (2020, QJE), *The Rise of Market Power and the Macroeconomic Implications*
- Bond, Hashemi, Kaplan, and Zoch (2021, JME), *Some unpleasant markup arithmetic: Production function elasticities and their estimation from production data*
- ** Raval (2023, RESTUD), *Testing the Production Approach to Markup Estimation*
- De Loecker and Eeckhout (2018, WP), *Global Market Power*
- ** De Loecker and Scott (2022, WP), *Markup Estimation using Production and Demand Data: An Application to the US Brewing Industry*
- De Loecker, Eeckhout, and Mongey (2022, WP), *Quantifying Market Power and Business Dynamism in the Macroeconomy*
- Cairncross, Morrow, Orr, and Rachapalli (2023, WP), *Multi-Product Markups*

Measuring Wage Markdowns and Applications .....

- Mertens (2020, IJIO), *Labor Market Power and the Distorting Effects of International Trade*
- ** Yeh, Macaluso, and Hershbein (2022, AER), *Monopsony in the US Labor Market*
- Rubens (2023, AER), *Market Structure, Oligopsony Power, and Productivity*
- Casacuberta and Gandelman (2023, IJIO), *Wage councils, product markups and wage markdowns: Evidence from Uruguay*
- Morlacco (2020, WP), *Market Power in Input Markets: Theory and Evidence from French Manufacturing*
- Rubens (2024, WP), *Labor Market Power and Factor-Biased Technology Adoption*
- ** Rubens and (2024, WP), *Colluding Against Workers*