

FIRM INNOVATION AND PRODUCTIVITY

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This module covers empirical models and estimation techniques of the supply side of firm decision making. These models and its related empirical strategy have been used in Industrial Organization/Productivity, International Trade/Development, Strategy, and Finance/Macro. Some of the papers can serve as the building blocks of a more ambitious research project, while some have the potential of being further extended to bring important insights for future research. The broad topics we will cover include (1) Measurement of Firm Heterogeneity (2) Endogenous Decisions of Technological Change (3) Market Structure, Innovation, and Industry Dynamics (4) Firm Dynamics and Product Market Friction (Asymmetric Information).

Course Syllabus

I. The Measurement of Producer Heterogeneity

Production function estimation

- *Blundell, R. and Bond, S., “GMM Estimation With Persistent Panel Data: An Application to Production Functions”, *Econometric Review*
- *Olley, S. and Pakes, A., “The Dynamics of Productivity in the Telecommunications Equipment Industry”, *Econometrica*, 64 (6), 1996, 1263-1297
- Levinsohn, J. and Petrin, A., “Estimation Production Functions using Inputs to Control for Unobservables”, *Review of Economic Studies*, 2003, 317-342
- *Akerberg, D., Caves, K. and Frazer, G., “Structural Identification of Production Functions”, *Econometrica*, 2016

Cost function

- *Fabrizio et al, “Do Markets Reduce Costs? Assessing the Impact of Regulatory Restructuring on US Electric Generation Efficiency”, *AER*
- Caves, D., Christensen, L., and Diewert, E., “The Economic Theory of Index Numbers and The Measurement of Input, Output, and Productivity”, *Econometrica*
- *Gandhi A., Navarro S., Rivers D., "On the Identification of Gross Output Production Functions", *JPE*

Demand and Markups

- Klette. T. and Griliches, Z., “The Inconsistency of Common Scale Estimators When Output Prices are Unobserved and Endogenous”, *Journal of Applied Econometrics*, 11(4), 1996, 343-361
- *De Loecker, J., “Product Differentiation, Multi-Product Firms, and Structural Estimation of Productivity”, *Econometrica*,
- Foster, L., Haltiwanger, J., and Syverson, C., “Relocation, Firm Turnover, and Efficiency: Selection on Productivity or Profitability”, *AER*
- Roberts, Xu, Fan, and Zhang, “The Role of Firm Factors in Demand, Cost, and Export Market Selection for Chinese Footwear Producers”, *Review of Economic Studies*

II. Endogenous Decisions: Managerial Practice, LBD, and R&D

Overview

- Griliches, Z., "R&D and Productivity: The Econometric Evidence", 1998
- Syverson, C., "What Determines Productivity", JEL, 2011

Learning by Doing

- Thompson, P., "Learning by Doing" (Handbook of the Economics of Innovation)
- *Benkard, L., "Learning and Forgetting: The Dynamics of Aircraft Production AER, 2000
- Irwin and Klenow, "Learning by Doing Spillovers in the Semi-conductor Industry", JPE, 1994
- *Kellogg, R., "Learning-by-Drilling: Inter-firm Learning and Relationship Persistence in the Texas Oilpatch", QJE

Endogenous R&D

- *Aw, Roberts, and Xu, "R&D, Exporting, and Productivity Dynamics", AER, 2011
- *Doraszelski, U. and Jaumandreu, J., "R&D and Productivity: Estimating Production Functions When Productivity Is Endogenous", Review of Economic Studies
- *Peters et al, "Estimating Dynamic R&D Choice: An Analysis of Costs and Long-Run Benefits", RAND

Managerial Practice

- Bloom and Van Reenen., "Measuring and Explaining Management Practices Across Firms and Countries", QJE 2007

III. Market Structure, Innovation, and Industry Dynamics

- *Jovanovic, B., "Selection and the Evolution of Industry", Econometrica
- Dunne, T., Roberts, M. and Samuelson, L., "The Growth and Failure of U.S. Manufacturing Plants", QJE
- *Hopenhayn, H., "Entry, Exit, and Firm Dynamics in Long Run Equilibrium", Econometrica, 1992, 1127-1150
- Aw., Chung, and Roberts, "Productivity, Output, and Failure: A Comparison of Taiwanese and Korean Manufacturers", EJ, 2003
- "A Framework for Applied Dynamic Analysis in IO", The Handbook of Industrial Organization (i.e. Ericson and Pakes model)
- Background Reading: Aghion and Griffith (2008), "Competition and Growth"
- Vives (2008), "Competitive Pressure and Innovation", JIndE
- *Aghion, Harris, Howitt, Vickers (2001), "Competition, Imitation, and Growth with Step-by-Step Innovation." Review of Economic Studies, 68:467-492
- *Besanko et al, "Learning-by-Doing, Organizational Forgetting, and Industry Dynamics", Econometrica
- *Goettler, R., and Gordon, B., "Does AMD Spur Intel to Innovate More?", JPE

IV. A Few Other Optional Topics

Route I: Product Market Friction and Firm Growth: Experimental Approach

Background

- Parente and Prescott, “Barriers to Technology Adoption and Development”, JPE
- Hsieh and Klenow, "The Life Cycle of Plants in India and Mexico", QJE, 2014

Technology Adoption and Diffusion

- *Udry, C., and Conley, T., “Learning About A New Technology: Pineapple in Ghana”, AER
- *Atkin et al, “Organizational Barriers to Technology Adoption: Evidence from Soccer-Ball Producers in Pakistan”, QJE

Product Market Friction and Business Networks

- *Atkin et al, “Exporting and Firm Performance: Evidence from a Randomized Trial”, QJE
- Cai, J. and Seidl A., "Inter-firm Relationships and Business Growth" , QJE

Route II: Innovation Policy and Patents

Background of Patents and Patent Policy

- Background Reading: Brownyn Hall (2007), “Patents and Patent Policy”

Patenting and Renewal Decision

- Background Reading: Tirole (The Theory of Industrial Organization 1988)
- *Pakes, A., “Patents as Options: Some Estimates of the Value of Holding European Patent Stocks”, *Econometrica*, 54, 755-84, 1986
- Serrano, C., “Estimating the Gains from Trade in Market for Innovation”, IER

Patent Citations, Valuation, and Knowledge Spillover

- *Hall, Jaffe, and Trajtenburg, “Market Value and Patent Citations”, *Rand*, 2005
- *Jaffe, A.B. “Technological Opportunity and Spillovers of R&D: Evidence from Firms’ Patents, Profits, and Marke Value.” *American Economic Review*, Vol. 76 (1986)
- Bloom, Schankerman, and Van Reenen, “Identifying Technology Spillovers and Product Market Rivalry”, *Econometrica*
- Manresa, “Estimating the Structure of Social Interactions Using Panel Data" (20 min presentation)

Intellectual Property Protection in Developing Countries

- Background: Eaton and Kortum, “Trade in Ideas: Patenting and Productivity in the OECD”
- *Background: Grossman, Gene M. and Edwin L.-C. Lai. "International Protection Of Intellectual Property," *American Economic Review*, 2004
- Goldberg, P., “Intellectual Property Rights Protection in Developing Countries: The Case of Pharmaceuticals”
- *Chaudhuri, S., P. Goldberg and P. Jia (2006), "Estimating the Effects of Global Patent Protection in Pharmaceuticals: A Case Study of Quinolones in India, " *American Economic Review*, Dec. 2006, pp. 1477-1513