

**Mini-Course, Tel Aviv University (Spring 2021)**  
**Methods and Applications of Productivity Measurement**

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**Short description:** In this mini-course we study econometric methods for estimating production functions and productivity, and selected empirical applications of these methods. Students will read journal articles that develop and apply these techniques, in order to supplement my lectures. Questions covered in the course include: What are the stylized facts of productivity growth and its sources? What are the classical and modern techniques for estimating production functions and productivity, and what are the advantages and limitations of each techniques? How does market power affect the estimation of production functions and measurement of productivity? What determines TFP growth: human capital, physical capital, R&D and knowledge spill-overs?

**Lectures:** 6 two-hour lectures. In addition, I will offer up to 2 one-hour sessions for open discussion of papers and topics, depending on demand. This is designed to give you an opportunity to think about research directions you might pursue in your PhD studies, for students planning to continue.

When you are reading the papers, think about the following questions as a way to distil your understanding and get lost in the details:

- Why you think the paper is important, or not?
- What are the main features of the empirical model and key findings?
- What are the main strengths and/or weaknesses of the paper?
- What are possible extensions or directions for future research that you think would be interesting and what kind of data would you need to develop an identification strategy?

Readings with two stars are required. Those with one star are recommended. Other papers provide more empirical examples for those interested.

**Lecture 1: Stylised facts for modelling productivity and dangers of misattributing its origins**

\*\*Bartelsman, Eric and Mark Doms (2000), "Understanding Productivity: Lessons from Longitudinal Microdata," *Journal of Economic Literature*, 38(1): 569- 594

\*Foster, Lucia, Thomas Haltiwanger and C.J. Krizan (2001), "Aggregate Productivity Growth: Lessons from Microeconomic Evidence," in *New Developments in Productivity Analysis*, ed. by Charles Hulten, Edwin Dean and Michael Harper (Chicago: University of Chicago Press)

\*Jorgenson, Dale and Zvi Griliches (1967), "The Explanation of Productivity Change," *Review of Economic Studies*, 34(3): 249-283

**Lecture 2. Traditional methods of estimating production functions**

\*\*Griliches, Zvi and Jaques Mairesse (1998), "Production functions: The Search for Identification," Chapter 19 in Zvi Griliches, *Practicing Econometrics: Essays in Method and Application* (Edward Elgar Publishing, 1998): 383-411

\*\*Klette, Tor and Zvi Griliches (1996), "The Inconsistency of Common Scale Estimators when Output Prices are Unobserved and Endogenous", *Journal of Applied Econometrics*, 11(4): 343-61

\*Blundell, Richard and Stephen Bond (2000), "GMM Estimation with Persistent Panel Data: An Application to Production Functions," *Econometric Reviews*, 19(3): 321-340

#### **Lecture 3-4: Modern methods for estimating production functions**

\*\*Olley, Steven and Ariel Pakes (1996), "The Dynamics of Productivity in the Telecommunications Equipment Industry", *Econometrica*, 64: 1263-1297

\*Levinsohn, James and Amil Petrin (2003), "Estimating Production Functions Using Inputs to Control for Unobservables," *Review of Economic Studies*, 70: 317-341

\*\*Akerberg, Daniel, Kevin Caves and Garth Frazer (2015), "Identification Properties of Recent Production Function Estimators," *Econometrica* 83(2): 2411-51

#### **Lecture 5: Productivity dynamics with applications to trade policy reforms**

\*\*Pavcnik, Nina (2002), "Trade Liberalization, Exit, and Productivity Improvements: Evidence from Chilean Plants", *Review of Economic Studies*, 69(1): 245-76

\*\*De Loecker, Jan (2011), "Product Differentiation, Multi-Product Firms and Estimating the Impact of Trade Liberalization on Productivity," *Econometrica*, 79(5): 1407-1451

Amiti, Mary and Jozef Konings (2007), "Trade Liberalization, Intermediate Inputs, and Productivity: Evidence from Indonesia," *American Economic Review*, 97(5): 1611-1638

Shor, Adriana (2004), "Heterogeneous productivity response to tariff reduction. Evidence from Brazilian manufacturing firms," *Journal of Development Economics*, 75(2): 373-396

#### **Lecture 6: R&D, knowledge spillovers and productivity**

\*\*Griliches, Zvi (1986), "Productivity, R&D and Basic Research at the Firm Level in the 1970's," *American Economic Review*, 76(1): 141-154

\*Griliches, Zvi and Frank Lichtenberg (1984), "Interindustry Technology Flows and Productivity Growth, 66(2): 324-329

\*\*Griliches, Zvi (1992), "The Search for R&D Spillovers," *Scandinavian Journal of Economics*, 94: 529-547

\*\*Bloom, Nick, Mark Schankerman, and John Van Reenen, "Identifying Technology Spillovers and Product Market Rivalry," *Econometrica*, 81 (2013): 1347-1393

\*Jaffe, Adam, Manuel Trajtenberg and Rebecca Henderson (1993), "Localization of Knowledge Spillovers," *Quarterly Journal of Economics*, 577-598

\*Belenzon, Sharon and Mark Schankerman (2013), "Spreading the Word: Geography, Policy and Knowledge Spillovers," *Review of Economics and Statistics*, 95(3): 884-903