Identification and Estimation of Production Function
with Unobserved Heterogeneity

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Abstract

This paper examines non-parametric identifiability of production function when production functions are heterogenous across firms beyond Hicks-neutral technology terms. Using a finite mixture specification to capture unobserved heterogeneity in production technology, we shows that production function for each unobserved type is non-parametrically identified under regularity conditions. We estimate a random coefficients production function using the panel data of Japanese publicly-traded manufacturing firms and compare it with the estimate of production function with fixed coefficients estimated by the method of Gandhi, Navarro, and Rivers (2013). Our estimates for random coefficients production function suggest that there exists substantial heterogeneity in production function coefficients beyond Hicks neutral term across firms within narrowly defined industry.

1 Introduction

Estimation of production function is one of the most important topics in empirical economics. Understanding how the input is related to the output is a fundamental issue in empirical industrial organization (see, for example, Ackerberg, Benkard, Berry, and Pakes, 2007). In empirical trade and macroeconomics, researchers are often interested in estimating production function to obtain a measure of total factor productivity to examine the effect of trade policy on productivity and

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