November 2020

Ming Li

Address: Department of Economics
Yale University
New Haven, CT 06520-8268

Telephone: +1 (203) 666-2606

E-mail: ming.li@yale.edu

Web page: www.ming-li.net

Citizenship: China

Fields of Concentration:

Econometrics
Industrial Organization
Economics of Networks

Desired Teaching:

Econometrics, Microeconomics

Comprehensive Examinations Completed:

2017 (Oral): Econometrics, Industrial Organization
2016 (Written): Microeconomics (full mark), Macroeconomics

Dissertation Title: *Essays on Panel and Network Modeling*

Committee:

Professor Donald Andrews (co-chair)
Professor Yuichi Kitamura (co-chair)
Professor Steven Berry

Expected Completion Date: May 2021

Degrees:

Ph.D., Economics, Yale University, 2021 (expected)
M.Phil., Economics, Yale University, 2018
M.A., Economics, Yale University, 2017
M.A., Economics, Peking University, 2013
B.A., Economics, *with distinction*, Peking University, 2010
B.S., Statistics (double major), Peking University, 2010

Fellowships, Honors and Awards:

M. Kemal Ciliz Scholarship, Yale University, 2020–2021
University Dissertation Fellowship, Yale University, 2019–2020
Charles V. Hickox Fellowship, Yale University, 2019–2020
University Fellowship, Yale University, 2015–2020
Frazier Jelke Fellowship, Yale University, 2017–2019
Cowles Foundation Fellowship, Yale University, 2015–2019
Falk Fellowship, Yale University, 2016–2017
Kwok Fellowship, Yale University, 2015–2016
Fengqi Scholarship, Peking University, 2013
First-Class Scholarship, Peking University, 2010–2012
Outstanding Graduates Award, Peking University, 2010
Mingde Scholarship, Peking University, 2006–2010
Top Student in the National College Entrance Exam (Science), Shandong Province, 2006

Teaching Experience:

Teaching assistant for undergraduate and advanced Ph.D. courses at Yale University:
Fall 2019, Econometrics I (Ph.D.), instructed by Prof. Donald Andrews
Fall 2018, Growth and Macroeconomics (UG/G), instructed by Prof. Fabrizio Zilibotti
Spring 2018, Econometrics III (Ph.D.), instructed by Prof. Yuichi Kitamura
Fall 2017, General Microeconomics I (Ph.D.), instructed by Prof. Truman Bewley

Research and Work Experience:

Research Assistant to Prof. Donald Andrews, Yale University, 2019
Research Assistant to Prof. Steven Berry and Prof. Philip Haile, Yale University, 2017
Analyst on the Risk and Quantitative Analysis team, BlackRock Hong Kong, 2013–2015

Working Papers:

"A Time-Varying Endogenous Random Coefficient Model with an Application to Production Functions" (November 2020), *Job Market Paper*

"Robust Semiparametric Estimation in Panel Multinomial Choice Models" with Wayne Yuan Gao (August 2020), under review

"Logical Differencing in Dyadic Network Formation Models with Nontransferable Utilities" with Wayne Yuan Gao and Sheng Xu (July 2020), under review

Work in Progress:

"Inference in a Stationary/Nonstationary Autoregressive Time-Varying-Parameter Model" with Donald Andrews

November 2020

Conference Presentations:

2020: Yale Economics Graduate Summer Workshop; Yale Econometrics Seminar
2019: Young Economist Symposium at Columbia University; International Conference on Game Theory at Stony Brook (Network Theory); Econometric Society Latin American Annual Meeting at BUAP of Mexico

Languages:

Chinese (native), English (fluent)

References

Prof. Donald Andrews
Yale University
Department of Economics
New Haven, CT 06520
PO Box 208281
Phone: (203) 432-3698
donald.andrews@yale.edu

Prof. Yuichi Kitamura
Yale University
Department of Economics
New Haven, CT 06520
PO Box 208281
Phone: (203) 432-3699
yuichi.kitamura@yale.edu

Prof. Steven Berry
Yale University
Department of Economics
New Haven, CT 06520
PO Box 208264
Phone: (203) 432-3556
steven.berry@yale.edu

Teaching Reference:
Prof. Fabrizio Zilibotti
Yale University
Department of Economics
New Haven, CT 06520
PO Box 208268
Phone: (203) 432-9561
fabrizio.zilibotti@yale.edu

Dissertation Abstract

A Time-Varying Endogenous Random Coefficient Model with an Application to Production Functions [Job Market Paper]

Production functions are one of the most fundamental components of economic analysis. Traditional methods that use fixed coefficients linear models rely on an important premise: the output elasticities with respect to each input are the same both across firms and through time. But why would Apple have the same labor elasticity as Sony? Moreover, why would Apple in 1976 when it was founded have an identical capital elasticity as in 2020 during the pandemic?

To address these issues, I propose a random coefficient panel model where the regressors can depend on the time-varying random coefficients in each period, a critical feature in production function estimation. Specifically, I model the random coefficients as unknown and possibly nonlinear functions of a fixed effect of arbitrary dimension and an idiosyncratic shock. One may interpret the individual fixed effect as the managerial capability and the random shock as the R&D

outcome in each period. Then, firms choose inputs optimally by solving a profit maximization problem *after* observing their output elasticities represented by the random coefficients, causing the dependence of the regressors on the time-varying random coefficients.

The time-varying endogeneity through the random coefficients poses significant challenges because of the correlation between input choices and output elasticities in each period generated by the fixed effect and the random shock, both of which are known to the firm but unobservable to the econometrician. To tackle these challenges, I propose a sufficiency argument to control for the fixed effect without parametric assumptions, which enables one to construct a feasible control function for the random shock and subsequently identify the moments of the random coefficients.

More precisely, for identification analysis I first use an exchangeability assumption on the conditional density of the vector of random shocks for all periods given the fixed effect to obtain a sufficient statistic that summarizes all of the time-invariant information about the individual fixed effect of arbitrary dimension. Given this sufficient statistic, the firm's input choice for a specific period does not contain any additional information about the fixed effect. Then, I use the sufficient statistic to construct a feasible control variable which is a one-to-one mapping of the random shock given the sufficient statistic and the fixed effect, and show that one can identify the moments of the random coefficients by exploiting the residual variation in the regressors after conditioning on the sufficient statistic and the feasible control variable.

Based on the identification result, I provide three-step series estimators for the first-order moments of the random coefficients. I derive convergence rates and prove asymptotic normality for the proposed estimators. The new inference results build on existing ones for multi-step series estimators. Next, I conduct a simulation study and find that the proposed method can accurately estimate both the mean and the dispersion of the random coefficients. The latter may be crucial to answering policy-related questions. For example, to what extent is a new labor augmenting technology being diffused across firms?

Finally, I apply the procedure to comprehensive panel data for Chinese manufacturing firms and obtain three main findings. First, I find larger capital, but smaller labor, elasticities than those derived using the method of Olley and Pakes (1996) (OP96). My result is consistent with the literature on factor income shares. Second, there is substantial variation in the output elasticities across firms and periods, leading to a different interpretation of the data and policy implications than in the misallocation literature pioneered by Hsieh and Klenow (2009). Third, the dispersion of the estimated total factor productivity (TFP) is found to be larger than that obtained using OP96's method, caused by a negative correlation between TFP and output elasticities. The results highlight the importance of properly accounting for unobserved heterogeneity and time-varying endogeneity in the data.

Robust Semiparametric Estimation in Panel Multinomial Choice Models, with Wayne Yuan Gao

We propose a simple yet robust method for semiparametric identification and estimation of panel multinomial choice models, where we allow infinite-dimensional fixed effects to enter consumer utilities in an additively nonseparable way, thus incorporating rich forms of unobserved

heterogeneity. Such heterogeneity may take the form of, for example, brand loyalty or responsiveness to subtle flavor and packaging designs, which are hard to quantify but affect consumer choices in complex ways. Our identification strategy exploits the standard notion of multivariate monotonicity in its *contrapositive* form, which provides powerful leverage for converting observable events into identifying restrictions on unknown parameters. Based on our identification result, we construct consistent set (or point) estimators, together with a computational algorithm that adopts a machine learning algorithm and a novel minimization procedure on the spherical-coordinate space. We demonstrate the practical advantages of our method with simulations and an empirical example using the Nielsen data. The results show that our procedure produces estimates that conform well with economic intuition. For example, we find that special in-store displays boost sales not only through a direct promotion effect but also through the attenuation of consumers' price sensitivity.

Logical Differencing in Dyadic Network Formation Models with Nontransferable Utilities, with Wayne Yuan Gao and Sheng Xu

We consider a semiparametric model of dyadic network formation under nontransferable utilities (NTU). NTU frequently arises in social interactions that require bilateral consent. The formation of informal risk-sharing networks among villagers in developing areas, which naturally requires mutual acceptance, is one particularly relevant example of considerable academic and policy interest. However, NTU inherently induces additive non-separability, which makes identification challenging. We show how to identify the parameters of interest without additive separability when networks form under NTU, using a novel method we call "logical differencing." The key idea is to construct events involving the intersection of two mutually exclusive restrictions on the unobserved individual fixed effects based on multivariate monotonicity to cancel them out. Our identification argument is constructive and leads to a consistent estimator. We analyze the finite-sample performance of the estimator via a simulation study. Then, we apply the method to the Nyakatoke risk-sharing network data. The results show that our approach can capture the essence of the network formation process by generating economically intuitive estimates. For instance, we find that the greater the difference in wealth between two households, the lower is the probability they are connected.