Yoshiki Ando
University of Pennsylvania
Perelman Center for Political Science and Economics
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Philadelphia, PA 19104
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January 21, 2023

Dear Professors Bryan, Ganguli, and Myers,

I am a fifth year PhD student at the University of Pennsylvania with research interests in economic growth and innovation. I learned about the NBER Innovation Research Boot Camp from my advisor Professor Jeremy Greenwood, who is writing my recommendation letter.

I am excited about this boot camp because the topics closely align with my current projects on venture capital, technology adoption, and a neoclassical growth model. I have taken advanced courses at Penn on macroeconomics, econometrics, and empirical microeconomics. This experience enables me to conduct rigorous empirical analysis and construct models to explain empirical facts. I hope that lectures on innovation in this workshop will help me better understand the institutional background and questions of interest in the field. In addition, I am excited to build a community of researchers in the same field and exchange thoughts on each other's work.

Thank you very much for your consideration,

Yoshiki Ando

YOSHIKI ANDO

yando@sas.upenn.edu

Last Update: January 21, 2023

EDUCATION

PhD Candidate in Economics, University of Pennsylvania — 2018 - 2024 (expected)

Master of Arts in Economics, University of Tokyo — 2016 - 2018

Bachelor of Arts in Economics, University of Tokyo — 2012 - 2016

RESEARCH FIELDS

Macroeconomics, Economic Growth, Innovation

EXPERIENCE

Research Assistance

2020 - 2022	Prof. Dirk Krueger (University of Pennsylvania) Theoretical modeling and computer programming for a project: "Neoclassical Growth with Long-Term One-Sided Commitment Contract"
2021, 2022	Prof. Jeremy Greenwood (University of Pennsylvania) Proofreading of a research paper
2022	Prof. Urban Jermann (University of Pennsylvania, Wharton School) Proofreading of a research paper
2017	Prof. Kenichi Ueda (University of Tokyo) Helping prepare lecture notes on macro contract theory (graduate level)

Teaching Assistance

2023	Numerical Methods for Macroeconomists	by Prof. Jeremy Greenwood (Univerisity of Pennsylvania)
2022	Economics of Family	by Prof. Jeremy Greenwood (Univerisity of Pennsylvania)
2017	Macroeconomics II (graduate)	by Prof. Kosuke Aoki (University of Tokyo)
2017	Macroeconomics I (graduate)	by Prof. Ryo Jinnai (University of Tokyo)

Relevant Positions

2022 - present	Special Sworn Status to the US Census data
2021	Summer Intern at the International Monetary Fund

AWARDS AND FELLOWSHIPS

2021-2022	Xingmei Graduate Fellow 2021-2022 (University of Pennsylvania)
2019	Certificate of Distinction for the Best Performance in the Preliminary Examination in Macroeconomics (University of Pennsylvania)
2018 - 2020	Japan-IMF Scholarship Program
2018	JSPS Research Fellowships for Young Scientists

THESIS COMMITTEE

Jeremy Greenwood
Professor of Economics
University of Pennsylvania

Dirk Krueger
Professor of Economics
University of Pennsylvania

Sergio Salgado
Assistant Professor of Finance
Wharton School,
University of Pennsylvania

WORK IN PROGRESS

"Dynamics of High-Growth Young Firms and the Role of Venture Capitalists"

"One-Sided Limited Commitment and Aggregate Productivity Risk"
with Dirk Krüger and Harald Uhlig

SERVICE

2020 - 2021	SASgov representative of the economics department
2020	Young Economists Symposium, Co-organizer

Referee:
Young Economists Symposium (2020, 2021, 2022), Macroeconomic Dynamics

COMPUTATIONAL SKILLS

Julia, Matlab, Stata, R

DOCTORAL COURSEWORK

Microeconomic Theory I	Prof. Steven Matthews, Prof. Andrew Postlewaite
Microeconomic Theory II	Prof. Yuichi Yamamoto
Macroeconomic Theory I	Prof. Dirk Krueger, Prof. Jesus Fernandez-Villaverde
Macroeconomic Theory II	Prof. Jeremy Greenwood, Prof. Jose-Victor Rios-Rull
Econometrics I	Prof. Frank Schorfheide
Econometrics II	Prof. Francis Diebold
Econometrics III	Prof. Petra Todd
Econometrics IV	Prof. Frank Schorfheide, Prof. Francis Diebold
Empirical Industrial Organization	Prof. Aviv Nevo
Intro Macro Household Heterogeneity	Prof. Dirk Krueger
Quant Macro-Economic Theory	Prof. Jesus Fernandez-Villaverde
Economic Growth	Prof. Jeremy Greenwood
Search Theory and Application	Dr. Benjamin Lester (Philadelphia Fed)
International Macroeconomics	Prof. Enrique Mendoza
Macro Financial Friction	Prof. Harold Cole
Empirical Methods in Corporate Finance (audit)	Prof. Michael Roberts
Topics in Macro (audit)	Prof. Iourii Manovskii
Topics In Quant Macro (observer)	Prof. Joachim Hubmer

2023 NBER Innovation Boot Camp Essay

Yoshiki Ando (University of Pennsylvania)

My research agenda is to explore the sources of economic growth and innovation with quantitative macroeconomic models. I have been working on three projects about venture capital, technology adoption, and a neoclassical growth model with a limited-commitment constraint. This workshop will be a perfect opportunity for me to polish my understanding of the economics of innovation in a systematic way and to interact with peer scholars and exchange ideas.

In a project, "Dynamics of High-Growth Young Firms and the Role of Venture Capitalists," I study how venture capitalists help startups achieve high growth. I analyze the US Census data and document that VC-backed firms are more likely to become high-growth firms in their early life and keep their substantial growth in their later life than non-VC-equity-backed firms and bank-backed firms. Along the way, I have conducted a name and address matching between the Census data and external VC datasets and plan to document the contribution of VC-backed firms to the US economic growth. In order to understand the mechanisms behind the substantial growth of VC-backed firms and to conduct policy experiments, I construct a model in which firms with heterogeneous growth potential seek external finance from a bank, non-VC equity, or VC to make upfront investments. Default costs of bank finance and flotation costs of equity finance govern the tradeoff. High-potential firms desiring large external funding will face high bank-loan rates due to the costs of default in case the firms fail to realize their potential. VC investors differ from non-VC-equity investors in providing advice to improve the chance of realizing the growth potential in exchange for a larger equity stake. The model is calibrated with the US data, and the role of VCs is quantified. I am working on extending the model to account for the screening effect of VCs. In the end, the impact of growth policies, such as subsidies for equity investment on startups, will be assessed.

I have been working on a joint project with Emin Dinlersoz and Jeremy Greenwood that explores the adoption of new technologies and the role of VCs. In the Annual Business Survey (2018) conducted by the US Census Bureau, more than 850,000 firms are asked about the adoption of advanced technologies, such as artificial intelligence and robotics. We examine the relationship between technology adoption and VC-backing status and plan to investigate the sources of the relationship.

In a project "One-Sided Limited Commitment and Aggregate Productivity Risk", a joint work with Dirk Krüger and Harald Uhlig, we study a neoclassical growth model with idiosyncratic income risk and aggregate productivity risk in which risk sharing is endogenously constrained by one-sided limited commitment. Households can trade a full set of contingent claims that pay off depending on both idiosyncratic and aggregate risk, but limited commitment rules out that households sell these assets short. The model results, under suitable restrictions of the parameters of the model, in partial consumption insurance in equilibrium. With log-utility and idiosyncratic income shocks taking two values one of which is zero (e.g., employment and unemployment) we show that the equilibrium can be characterized in closed form, despite the fact that it features a non-degenerate consumption- and wealth distribution. We use this feature of the model to study, analytically, inequality over the business cycle and asset pricing.

THE UNIVERSITY OF PENNSYLVANIA

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To Whom it May Concern

January 21, 2023

Re: Yoshiki Ando

Dear Colleague:

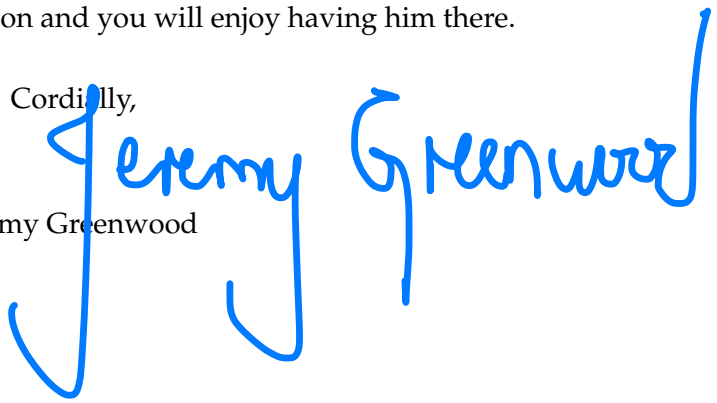
I *enthusiastically and strongly* recommend Yoshiki Ando for the 2023 Innovation Research Boot Camp at the NBER. Yoshiki is by far the best student in his year at Penn. He has done extremely well in all of his courses and won an award for being the best student on the macro prelim exam. Yoshiki's research focuses on the interaction between innovation in the economy and venture capital.

In particular, he is building a structural model of the matching process between entrepreneurs with ideas and venture capitalists. In his model venture capitalists identify promising ideas, nurture them through the incubation period, and fund them. Both entrepreneurs and venture capitalists differ by quality in his setting. And, Yoshiki studies the matching process between the parties. Some startups will match with angels, others with banks, and others still with venture capitalists. One of his goals is to see whether such a structural model can replicate the pattern of financing for high growth firms in the United States; in particular, the fractions of high growth firms using angel, bank, and venture capitalist financing. When this is done he can then use his model, which is general equilibrium in nature, to address various policy questions such as the taxation of startups and its implications for economic growth. Yoshiki is estimating his model using US Census data. Dr. Emin Dinlersoz, Principal Economist at the Center for Economic Studies at the US Census Bureau, is helping to advise him on this aspect

of his work. Emin is a specialist on firm dynamics and, in particular, early firm formation. To date there are very few *macro* models of venture capital. So, his research is innovative with potentially a big payoff. Yoshiki is also investigating the relationship between venture capital and the adoption of high tech by firms, for example artifical intelligence. In the US Census data, VC-backed firms have a higher proclivity to adopt such technologies relative to non-VC-funded firms.

To conclude, Yoshiki Ando would be an *excellent* choice for the 2023 Innovation Research Boot Camp at the NBER. His research interests closely align with goals of the Boot Camp so this would be an invaluable experience for him. He is a very sweet person and you will enjoy having him there.

Cordially,



Jeremy Greenwood