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January 31, 2024

NBER Innovation Research Boot Camp
Cambridge, MA

To Whom It May Concern:

I am writing to express my enthusiasm for the NBER Innovation Research Boot Camp. I am a Ph.D. candidate in Economics at the University of Wisconsin-Madison, expected to graduate in the summer of 2024. My research agenda sits at the intersection of the economics of innovation, labor economics, and economic growth. I combine administrative data, macro theory, computational tools, and machine-learning techniques to understand the inventor labor market and how the labor market interacts with innovation in driving economic growth.

In my job market paper, "Worker Mobility, Knowledge Diffusion, and Non-Compete Contracts," I study how endogenous worker mobility affects inter-firm knowledge diffusion, innovation, and economic growth. I propose a framework combining endogenous growth and on-the-job search. Firms grow knowledge by in-house innovation and by poaching workers. Knowledge is nonrival, leading to underinvestment in innovation. Non-compete contracts address this underinvestment by allowing innovating firms to enforce buyout payments when they lose workers. However, they discourage diffusion by deterring firm entry. Linking patent records to matched employer-employee administrative data at the U.S. Census Bureau, I document that inventors diffuse knowledge across firms and are compensated for knowledge diffusion. Constructing novel micro-level data with machine learning and natural language processing tools, I find non-compete contracts are associated with increased innovation expenditure and decreased worker mobility. I calibrate my theoretical model to match the empirical results. Knowledge diffusion, through the channel of worker mobility, accounts for 4% of the TFP growth rate and 9% of welfare. Optimal regulation of non-compete contracts balances the innovation-diffusion tradeoff. This paper is the start of a larger research agenda interested in exploring what determines the productivity, compensation, and (mis)allocation of inventors.

I am also interested in the interaction between labor market and human capital. The paper "Strategic Restraint: When do Human-Capital-Intensive Companies Choose (Not) to Use Noncompete Agreements?" studies how noncompete agreements (NCAs) affect firm-level outcomes such as the attraction and retention of human capital. We analyze a unique survey dataset to examine the heterogeneity in the firms' actual use of NCAs conditional on industry and state. We find that the nonuse of NCAs is more common among firms that rely more heavily on talent and are also not industry leaders, and such firms are more likely not to use NCAs to attract skilled employees. The paper "Teachers' Labor Market and Student Outcomes" studies how teacher personnel policies can affect the types of individuals who enter and stay in teaching and the corresponding student outcomes. We develop and estimate a structural model of individuals' college major choices and life-cycle occupational choices jointly with an explicit formulation of an education production function. We combine data from existing surveys, administrative data, and our own surveys to identify the model. We will use our estimated model to conduct a series of counterfactual policy experiments to examine the cost-effectiveness of various policies on the teachers' labor market.

I have been fascinated by the economics of innovation and innovation policy. I am committed to this research area and aspire to combine micro data and macro theory to understand the inventor labor market and the role of inventors in innovation and economic growth. My job market paper has significantly benefited from seminal works and discussions with esteemed scholars affiliated with this program. I am excited about the opportunity to learn from and interact with the preeminent minds in innovation research during the NBER Innovation Research Boot Camp.

As part of my application, I am including my CV and essay. Links and abstracts to my papers can be found on my website: https://www.jingnanliu.com. You should also receive letters of recommendation from my advisor, professor John Kennan. Thank you for your kind consideration of my application.

Sincerely,

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University of Wisconsin-Madison

Jingnan Liu

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Education

University of Wisconsin - Madison
Ph.D. in Economics — 2024 (Expected)
Committee: John Kennan (co-chair), Rasmus Lentz (co-chair), Dean Corbae

Renmin University of China
B.A. in Economics — 2015
Exchange student: University of Hong Kong

Research Interests

Macroeconomics · Labor Economics · Economic Growth · Firm Dynamics · Innovation

Working Papers

"Worker Mobility, Knowledge Diffusion, and Non-Compete Contracts" — *Job Market Paper*

"Strategic Restraint: When do Human-Capital-Intensive Companies Choose (Not) to Use Noncompete Agreements?" with Martin Ganco, Haifeng Wang & Shotaro Yamaguchi
– *3rd round / minor revise and resubmit at Strategic Management Journal*

"Regional Policy Spillovers and Complementarity in the Great Lockdown" with Xiaodong Fan & Chao He

"Signals and Human Capital in Admission Tournament"

Work in Progress

"Teachers' Labor Market and Student Outcomes" with Chao Fu, Christopher Taber & Matthew Wiswall

"Domestic Outsourcing and its Relation to Firm Size" with Rosemary Kaiser

Teaching Experience

Head Teaching Assistant, ECON 102 Principles of Macroeconomics (undergraduate)	Spring 2023
Teaching Assistant, ECON 704 Economics (graduate)	Fall 2022
Research Mentor, Summer Research Group (graduate)	Summer 2022
Teaching Assistant, ECON 102 Principles of Macroeconomics (undergraduate)	Fall 2018, Spring 2018
Teaching Assistant, ECON 101 Principles of Microeconomics (undergraduate)	Fall 2017

Research Experience

Special Sworn Status Researcher, U.S. Census Bureau	2022 - Present
Research Assistant, UW-Madison (for Prof. Jenna Nobles)	2019 - 2022
Project Assistant, UW-Madison (for Profs. Ananth Seshadri & Christopher Taber)	2019

Awards and Honors

David Edwin Davies Dissertation Fellowship	2023
Juli Plant Grainger Teaching Excellence Scholarship	2023
Department Travel Fund	2023
Susan Jane Blake Kocin Scholarship	2021
Juli Plant Grainger Summer Research Scholarship	2019

Conferences and Seminars

Midwest Macroeconomics Meetings, Minnesota-Wisconsin International/Macro Workshop	2023
Strategic Management Society Annual Conference	2021

Miscellaneous

Security Clearance: U.S. Census Bureau Special Sworn Status

Programming: Julia, MATLAB, Stata, Python, SAS

References

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Essay

My research agenda sits at the intersection of the economics of innovation, labor economics, and economic growth. I combine administrative data, macro theory, computational tools, and machine-learning techniques to understand the inventor labor market and how the labor market interacts with innovation in driving economic growth.

In my job market paper, "Worker Mobility, Knowledge Diffusion, and Non-Compete Contracts," I study how endogenous worker mobility affects inter-firm knowledge diffusion, innovation, and economic growth. I propose a framework combining endogenous growth with on-the-job search in the labor market. Firms grow knowledge by in-house innovation and hiring workers externally. Without mobility restrictions, there is underinvestment in innovation because knowledge is nonrival. Non-compete contracts address such underinvestment but discourage diffusion. I solve for market equilibrium as well as optimal allocation. Empirically, I link patent inventors to matched employer-employee administrative data at the U.S. Census Bureau and document that inventors diffuse knowledge across firms and are compensated for knowledge diffusion. Constructing novel micro-level data using machine learning techniques, I find non-compete contracts to be positively associated with innovation but negatively associated with worker mobility. In the calibrated model, knowledge diffusion through worker mobility accounts for 4% of the TFP growth rate and 9% of welfare. The optimal regulation of non-compete contracts balances the innovation-diffusion tradeoff. This paper is the start of a larger research agenda interested in exploring what determines the productivity, compensation, and (mis)allocation of inventors.

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THE UNIVERSITY of WISCONSIN MADISON

February 1, 2024

RE: Jane Liu

I write to very strongly recommend Jane Liu for the Innovation Research Boot Camp. She is a very gifted economist who works on topics in macroeconomics and labor economics. Rasmus Lentz and I are her main advisors, and I've had extensive contact with her work, as a student in the graduate labor course, and as a regular participant in the labor economics workshop, so I have a lot of information. She is intellectually ambitious, and she has the potential to have a highly successful career.

Liu's job-market paper started out as an analysis of the prevalence of non-compete contracts in the labor market for executives. It has developed into a full-blown analysis of how knowledge about production techniques is transmitted from one firm to another when workers who possess such knowledge change jobs. The analysis in done in the context of a sophisticated macroeconomic model, focusing on the extent to which contractual arraignments achieve efficient outcomes, from the point of view of the contracting parties, and more broadly from a social point of view. Workers make contact with competing employers at random, and when a contact between a worker and a potential employer is made, the worker moves to the new firm if (and only if) the joint continuation value in the new firm exceeds the joint value in the old firm. This process is familiar from the work of Postel-Vinay and Robin, for example. What is new in Liu's model is that knowledge is embodied in workers, but not exclusively: a worker may transmit knowledge to a new firm, but not at the expense of the old firm, meaning that there may be a jump

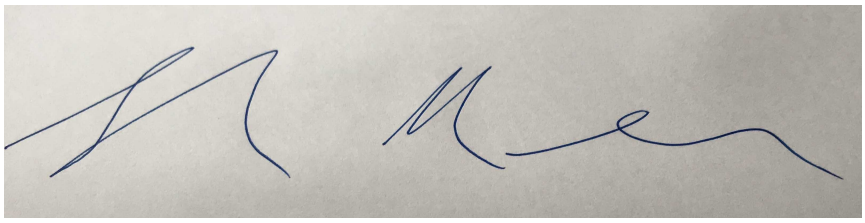
in productivity at the new firm, but productivity at the old firm is as it was.

This is a truly impressive piece of work. There is an extremely careful analysis of an elegant model, and an empirical application using original data sets that have not been used before, and finally an analysis of the extent to which regulation of non-compete agreements can enhance the growth rate of productivity, by affecting the allocation of the surplus generated when new job matches are formed. When finished, the paper surely belongs in a top-5 journal.

Wisconsin has had a succession of very good PhD students in labor economics, including Minseon Park (Michigan), Garrett Anstreicher (Nebraska), Joanna Venator (Boston College), Shoya Ichimaru (Hitotsubashi), Siha Lee (McMaster), Mark Colas (Oregon), Suphanit Piyapromdee (UCL), Rebecca Lessem (Carnegie), Limor Golan (Carnegie/WashU), Shintaro Yamaguchi (McMaster/Tokyo), Luke Davis (Michigan/Haas), Kate Antonovics (San Diego), Eric French (Chicago Fed/UCL/Cambridge) and Peter Arcidiacono (Duke). Liu fits comfortably in this group, judging by what she has done so far compared with what they had done at the same stage. Her work is entirely independent – in particular the topics she is working on are far removed from anything I've worked on; she came up with the questions, and my role as an advisor consists of merely asking her to explain what she is doing, and making occasional suggestions. In terms of raw talent, she is one of the best students I've worked with.

In short, Liu is very smart, and very hard-working, and very ambitious. She knows how to work with models, and how to work with data, and how to make credible connections between the models and the data. She is an accomplished teacher. She is also a very collegial person with broad skills and interests who will be an active and creative participant in any academic environment. I recommend her most enthusiastically, and with no reservation.

Sincerely,



John Kennan
Juli Plant Grainger Distinguished Chair in Economics
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