Yun Seo Choi
Department of Economics
Washington University in St. Louis
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(+1) 314-760-5362

February 6, 2025

Kevin Bryan
Ina Ganguli
Kyle Myers

Dear Members of the Selection Committee,

I am excited to apply for NBER Innovation Research Boot Camp, as it offers a unique opportunity to engage with leading experts in innovation, productivity, and AI. My research on productivity slowdown, particularly its connection to ICT patents, aligns closely with the boot camp's focus, and I believe it will provide valuable support in advancing my work.

The boot camp will help refine my current work while broadening my understanding of other topics in innovation, such as human capital, entrepreneurship, and AI. I am eager to collaborate with fellow researchers and integrate the knowledge gained to advance both my ongoing projects and future research endeavors.

Thank you for considering my application.

Sincerely,
Yun Seo Choi

Letter of Recommendation Writer
Yongseok Shin
Professor of Economics
Washington University in St. Louis

YUN SEO CHOI

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Department of Economics Washington University in St. Louis
MSC 1208-228-308 One Brookings Drive, St. Louis, MO 63130-4899

EDUCATION

Washington University in St. Louis, St Louis, MO, USA
PhD in Economics 2022 - Present

University of Toronto, Toronto, ON, Canada
Master of Arts in Economics 2021-2022

Sogang University, Seoul, Korea
Master of Arts in Economics (Attended) 2020-2021
Bachelor of Arts in Economics 2016-2020
Graduation with Magna Cum Laude

Catholic University of America, DC, USA
Exchange student in Economics 2017

RESEARCH INTERESTS

- Innovation and Growth
- Macroeconomics

WORK IN PROGRESS

"ICT Patents and Productivity Slowdown"

TEACHING EXPERIENCE

Lecturer, Washington University in St. Louis
Introduction to Microeconomics (Guest lecturer) *FL*2024

Teaching Assistant, Washington University in St. Louis
Introduction to Macroeconomics *SP*2025
Introduction to Microeconomics *FL*2024
Money and Banking *SP*2024
Quantitative Methods in Economics I (PhD course) *FL*2023

Teaching Assistant, University of Toronto
Principles of Macroeconomics *SP*2022
Principles of Microeconomics *FL*2021

Teaching Assistant, Sogang University
Behavioral Economics *SP*2021
Microeconomics *SP*2021
Advanced Microeconomics (Master course) *FL*2020

AWARDS AND HONORS

Washington University in St. Louis
University Fellowship 2022-Present

University of Toronto
TA Scholarship 2021-2022

Sogang University
TA Scholarship 2020-2021

SKILLS

Programming	Python, STATA, LATEX
Language	Korean (Native), English (Fluent), Japanese (Basic)

The United States has experienced a notable slowdown in productivity growth since the early 2000s across both aggregate and sectoral levels (Bloom, Jones, and Van Reenen, 2020). My research focuses on understanding this slowdown, particularly the role of ICT (Information and Communication Technology) patents in driving uniform innovations that decouple patent growth from productivity gains.

ICT's general-purpose nature allows it to be applied across industries, generating multiple patents from a single technological foundation. However, many of these patents are essentially identical, stemming from the same core innovation. A single ICT breakthrough often generates multiple related patents with similar, incremental improvements rather than distinct advancements. As these uniform improvements are repeatedly applied, their contribution to aggregate productivity diminishes, limiting overall growth despite the rising number of patents.

ICT's scalability and universality further amplify this effect by concentrating innovation within large firms. These firms can integrate uniform innovations across diverse product lines at minimal cost, creating a competitive advantage and fostering a cycle that prioritizes incremental improvements over transformative breakthroughs, perpetuating slower productivity growth. To explore this mechanism empirically, my research will analyze how ICT patents are applied across technologies and their role in promoting patent uniformity, leveraging patent classification codes and text analytics to assess ICT's broader influence on innovation and productivity. Based on the empirical findings, I plan to build an economic model to further investigate the implications of ICT-driven uniformity on productivity growth.

NBER Innovation Research Boot Camp will be invaluable for my research due to the participation of renowned scholars specializing in various topics of innovation. Experts like Chad Jones and John Van Reenen, known for their work in productivity and innovation, can provide key insights to help refine my research on how ICT influences market power and productivity slowdown. Additionally, the boot camp will help me broaden my understanding of ICT's deep ties to AI. I am particularly interested in whether ICT should be viewed as an extension of AI or as a distinct general-purpose technology, and how AI's predictive capabilities can be incorporated into models. While I have not yet initiated concrete AI research, this bootcamp will provide valuable insights, potentially shaping future research directions.

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Washington University in St. Louis

Office of the University Registrar

Record Of: **Choi, Yun Seo**
Student ID Number: 510425

Current Programs Of Study:
PH.D. IN ECONOMICS

Transcript Issued 01/30/2025 To:

RECIPIENT AS DESIGNATED BY STUDENT

Fall Semester 2022				
MACROECONOMICS I	ECON	L11 501	3.0	A+
MICROECONOMICS I	ECON	L11 503	3.0	A+
QUANTITATIVE METHODS IN ECONOMICS I	ECON	L11 511	3.0	A+
APPLIED ECONOMETRICS	ECON	L11 5161	3.0	A-
Spring Semester 2023				
MACROECONOMICS II	ECON	L11 502	3.0	A-
MICROECONOMICS II	ECON	L11 504	3.0	A-
QUANTITATIVE METHODS IN ECONOMICS II	ECON	L11 512	3.0	A-
PRESENTATION SKILLS FOR ACADEMIC & PROFESSIONAL SETTINGS	ELP	U15 170	2.0	B+
Fall Semester 2023				
ECONOMICS OF INDUSTRIAL ORGANIZATION I	ECON	L11 555	3.0	A
ECONOMIC GROWTH	ECON	L11 572	3.0	I
QUANTITATIVE MACROECONOMIC THEORY	ECON	L11 5725	3.0	B
MENTORED TEACHING EXPERIENCE	GSAS	LGS 600	0	S
Spring Semester 2024				
ECONOMIC GROWTH	ECON	L11 572	3.0	A
INTERNATIONAL MACROECONOMICS	ECON	L11 578	3.0	A-
MENTORED TEACHING EXPERIENCE	GSAS	LGS 600	0	S
ADVANCED RESEARCH WRITING INSTITUTE	ELP	U15 350	3.0	A
Fall Semester 2024				
ADVANCED MICROECONOMETRICS	ECON	L11 5141	3.0	B+
SEMINAR IN DYNAMIC ECONOMICS	ECON	L11 589	1.5	A+
MENTORED TEACHING EXPERIENCE	GSAS	LGS 600	0	S
FULL-TIME GRADUATE RESEARCH/STUDY	GSAS	LGS 9000	0	S
Spring Semester 2025				
SEMINAR IN DYNAMIC ECONOMICS	ECON	L11 589	1.5	
THE MACROECONOMICS OF LABOR MARKETS	ECON	L11 8420	3.0	
MENTORED TEACHING EXPERIENCE	GSAS	LGS 600	0	
FULL-TIME GRADUATE RESEARCH/STUDY	GSAS	LGS 9000	0	

********** **END OF TRANSCRIPT** **********

Keri A. Disch, University Registrar

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Washington University in St. Louis

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Degrees conferred by Washington University and current programs of study appear on the first page of the transcript. The Degrees Awarded section lists the date of award, the specific degree(s) awarded and the major field(s) of study.

Courses in which the student enrolled while at Washington University are listed in chronological order by semester, each on a separate line beginning with the course title followed by the academic department abbreviation, course number, credit hours, and grade.

Honors, awards, administrative actions, and transfer credit are listed at the end of the document under "Distinctions, Prizes and Awards" and "Remarks".

Course Numbering System
In general course numbers indicate the following academic levels: courses 100-199 = first-year; 200-299 = sophomore; 300-399 = junior; 400-500 = senior and graduate level; 501 and above primarily graduate level. The language of instruction is English unless the course curriculum is foreign language acquisition.

Unit of Credit/Calendar
Most schools at Washington University follow a fifteen-week semester calendar in which one hour of instruction per week equals one unit of credit. Several graduate programs in the School of Medicine and several master's programs in the School of Law follow a year-long academic calendar. The Doctor of Medicine program uses clock hours instead of credit hours.

Academic and Disciplinary Notations
Students are understood to be in good academic standing unless stated otherwise. Suspension or expulsion, i.e. the temporary or permanent removal from student status, may result from poor academic performance or a finding of misconduct.

Grading Systems
Most schools within Washington University employ the grading and point values in the Standard column below. Other grading rubrics currently in use are listed separately. See www.registrar.wustl.edu for earlier grading scales, notably for the School of Law, Engineering prior to 2010, Social Work prior to 2009 and MBA programs prior to 1998. Some programs do not display GPA information on the transcript. Cumulative GPA and units may not fully describe the status of students enrolled in dual degree programs, particularly those from schools using different grading scales. Consult the specific school or program for additional information.

Rating	Grade	Standard Points	Social Work
Superior	A+/A	4	4
	A-	3.7	3.7
	B+	3.3	3.3
Good	B	3	3
	B-	2.7	2.7
	C+	2.3	2.3
Average	C	2	2
	C-	1.7	1.7
	D+	1.3	0
Passing	D	1	0
	D-	0.7	0
Failing	F	0	0

Grade	Law Values (Effective Class of 2013)
A+	4.00-4.30
A	3.76-3.94
A-	3.58-3.70
B+	3.34-3.52
B	3.16-3.28
B-	3.04-3.10
C+	2.92-2.98
C	2.80-2.86
D	2.74
F	2.50-2.68

Additional Grade Notations

AUD	Audit	NC/NCR/NCR#	No Credit
CIP	Course in Progress	NP	No Pass
CR/CR#	Credit	P/P#	Pass
E	Unusually High Distinction	PW	Permitted to Withdraw
F/F#	Fail	R	Course Repeated
H	Honors	RW	Required to Withdraw
HP	High Pass	RX	Reexamined in course
I	Incomplete	S	Satisfactory
IP	In Progress	U	Unsatisfactory
L	Successful Audit	W	Withdrawal
LP	Low Pass	X	No Exam Taken
N	No Grade Reported	Z	Unsuccessful Audit

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February 6, 2025

Dear Colleague:

I am writing in enthusiastic support of Yun Seo Choi's application to the NBER Innovation Research Boot Camp. Yun Seo is a third-year economics PhD student at Washington University in St. Louis and is one of the top students in her cohort. What is truly remarkable is that she consistently achieved near-perfect scores in all subjects in her first year: microeconomics, macroeconomics, econometrics, and quantitative methods. I was hopeful that she would choose to conduct research in macroeconomics, and it is now clear that she has done so, much to the delight of our macro faculty.

Yun Seo is currently researching a new productivity paradox: the declining rate of productivity growth despite increasing R&D investment and patent activities. Her hypothesis is that specialization across research fields leads to more patents that are narrower in scope, with each patent or new technology contributing to a smaller part of the economy. This is a very promising research idea, and she has conducted preliminary data work that supports her hypothesis.

Yun Seo is an impressive student with great research potential, displaying a keen interest in R&D, innovation, firm dynamics, and productivity growth. She will benefit greatly from the Boot Camp and subsequently contribute to the broader innovation and growth literature. Your decision to offer her a slot in the Boot Camp will yield a high return. Please feel free to contact me if you have any further questions about her many talents.

Sincerely,

Yongseok Shin
Douglass C. North Distinguished Professor of Economics
Washington University in St. Louis