NBER ERBC 2019

Mahdi Eghbali
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Advisors:
Professor Anne Villamil (anne-villamil@uiowa.edu)
Professor Amrita Nain (amrita-nain@uiowa.edu)

Mahdi Eghbali

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Education

The University of Iowa, Tippie College of Business
- Ph.D. **Economics** — Expected May 2021
  - Advisor: Professor Anne Villamil
- M.A. Economics — Graduated Dec. 2017

The University of Nebraska Omaha (UNO)
- M.Sc. **Mathematics** — Graduated Augest 2016
- M.Sc. Economics — Graduated May 2015

Yazd University
- B.Sc. Economics — Graduated June 2008

Research & Teaching Interests

Primary: Macroeconomics, Entrepreneurial Finance, Innovation & Entrepreneurship, Entrepreneurial Strategy & Leadership
Secondary: Applied Econometrics, Corporate Finance, Financial Economics

Grants, Scholarships, & Fellowships

The University of Iowa
- Graduate Schollarship — Fall 2016 - present
- Iowa Social Science Research Center (ISRC) Research Grant — Summer 2018

The University of Nebraska Omaha
- Bun Song Lee Scholarship (Outstanding Graduate Student) — Spring 2015
- Nebraska Advantage Scholarship — 2014 -16
- UNO International Students Scholarship — 2014 -15

Teaching Experience & Evidence of Teaching Excellence

The University of Iowa, Department of Economics

Tittle	Course	Semester	Evaluation	Enrolled
Teaching Assistant	Principles of Macroeconomics	Spring 2019	…	…
Teaching Assistant	Principles of Macroeconomics	Fall 2018	5.83/6.00	111
Instructor	Principles of Macroeconomics	Summer 2018	5.65/6.00	33
Teaching Assistant	Principles of Macroeconomics	Spring 2018	5.77/6.00	90
Teaching Assistant	Principles of Macroeconomics	Fall 2017	5.19/6.00	88
Teaching Assistant	Principles of Macroeconomics	Spring 2017	5.47/6.00	93
Teaching Assistant	Principles of Macroeconomics	Fall 2016	n.a.	n.a
Teaching Assistant	Economics and Business Forecasting	Fall 2016	5.09/6.00	26

The University of Nebraska Omaha, Department of Mathematics
- Instructor — Spring 2016
  - College Algebra (Math 1320)
  - Intermediate Algebra (Math 1310)
  - Pre-Intermediate Algebra (Math 1000)

Computer Skills

Python, STATA, SAS, Matlab, Latex

Publications

Books

Author

"Sustainable Development; Basics and Concepts", Eghbali, Mahdi. 2011.
(ISBN: 978-964-04-7366-5 recorded in the National Library and Archives of Iran, www.nlai.ir)

Translate, 2012

"Social Economics, Market Behavior in a Social Environment" Becker, Gary S., Kevin M. Murphy. 2000. The University of Chicago. Harvard University Press. USA.
(ISBN: 978-964-04-8011-3 recorded in the National Library and Archives of Iran, www.nlai.ir)

Professional Entrepreneurial Activities

Founder & owner of VerdiLife LLC — 2016 – present

Entrepreneurial Certification

Wharton School Entrepreneurship Acceleration Program: Scaling your Business — Spring 2019
Venture School, The University of Iowa Regional I-Corps program — Spring 2019
Hawkeye Startups Accelerator, John Pappajohn Entrepreneurial Center (JPEC) — Summer 2018

Entrepreneurial Grants, Awards, & Nominations

- Partnering for Growth Biotech Innovation Showcase & Forum, Top 12 finalists, Ankeny, Iowa, April 30 & May 1, 2019
- Business Model Competition (BMC), Day2, Grand Prize winner, The University of Iowa, March 27th, 2019, $10,000
- Stu Clark Investment Competition, Top 16 finalists, People's Choice for the Logo Competition, University of Manitoba, Winnipeg, Canada, March 8th-9th, 2019
- Southeast Entrepreneurship Conference (SEEC) Pitch Competition, 2nd place team (35 teams), University of Tennessee Chattanooga (UTC), Chattanooga, Tennessee, March 1st -2nd, 2019, $1000
- The Recognizing Research and Innovation Excellence **Student Startup of the Year Award**, The University of Iowa, February 2019
- "Best Business Case" winner, VentureWell E-Team Stage 1 Winter Cohort Program, Boston, Massachusetts, January 10th -12th, 2019
- VentureWell E-Team Stage 1 Winter Cohort Program, Boston, Massachusetts, January 10th -12th, 2019, $5,000
- Hawkeye Pitch-Off Chicago winner, Chicago, Illinois, October 11th, 2018, $2,500
- Hawkeye Pitch-Off Chicago, People's Choice winner, Chicago, Illinois, October 11th, 2018, $500
- 2018 PitchLab Innovation EXPO winner, Cedar Rapids, Iowa, October 10th, 2018, $500
- Top 5 final stage finalist, 2018 John Pappajohn Iowa Entrepreneurial Venture Competition, Ames, Iowa, August 30th, 2018, $5,000
- Student Accelerator Final Pitches, First Prize, The University of Iowa, July 24th, 2018, $2,500
- Student Accelerator Final Pitches, People's Choice, The University of Iowa, July 24th, 2018, $500
- The U.S. Department of Energy (DOE) Cleantech University Prize (Cleantech UP), **Top 23 Cleantech Student Startups**, Rice University, Houston, Texas, June 28th, 2018 (DOE's Cleantech UP 2018 National Competition)

- **Megawatt Venture Competition Sponsored by the Department of Energy (DOE), Grand Prize Winner $50,000**, National Award of CleanTech Student Startup, University of Central Florida (UCF), Orlando, Florida, May 18th, 2018
- International Business Model Competition (IBMC), TOP 16 World Student Startups, Brigham Young University (BYU), Provo, Utah, May 10th -11th, 2018, $3,000
- Phil Student Success Grant, The University of Iowa, April 24th, 2018, $1000
- Pappajohn New Venture Student Business Plan Competition, Grand Prize Winner, Des Moines, Iowa, April 20th, 2018, $5,000
- Business Model Competition (BMC), Day2, The University of Iowa, March 29th, 2018, $3,000
- Global Social Venture Competition (GSVC), TOP 7 Student Startups of the West Regional USA, University of California at Berkeley, March 16th, 2018
- Rose Francis Elevator Pitch Competition, The University of Iowa, November 11th, 2017, $5,000
- Best High Growth Business Model, Day2, The University of Iowa, April 21st, 2017, $1,000
- Frontier Co-op Tippie Impact Competition, The University of Iowa, April 21st, 2017, $2,500
- Business Model Competition (BMC), Day1, The University of Iowa, March 29th, 2017, $500
- Rose Francis Elevator Pitch Competition, Day1, The University of Iowa, November 11th, 2016, $500

References

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Associate Professor Amrita Nain
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Completed PhD Courses

Fundamentals of Microeconomics
Statistics for Economics
Dynamic Programming
Fundamentals of Macroeconomics I
Real Analysis for Economics
General Equilibrium
Fundamentals of Macroeconomics II
Information Economics
Fiscal Policy & Insurance in Macroeconmics
Game Theory
Monetary Economics & Search Theory
Labor Economics
Theoretical Econometrics I
Theoretical Econometrics II
Applied Econometrics
Structural Methods in Econometrics

Research Papers

Work in Progress

The Effectiveness of Federal Grants

This research evaluates the effectiveness of government financing on the likelihood of commercial success of a startup. Many economists believe that direct government support of small businesses can assist countries by providing social benefits and accelerating economic growth and development. A grant is impactful since it empowers the startup to develop new technology and make it a viable investment opportunity by reducing uncertainty. Federal grants have the potential to play a major role and transfer an innovative idea to a positive net present value project which can intrinsically increase the likelihood of going public or getting acquired by bigger firms. In principle, SBIR funds are targeted toward innovative startups, which could not get financing, for example, due to the uncertainty surrounding their innovation's outcome. To the extent that SBIR programs mitigate capital obstacles for entrepreneurs, there should be a relationship between SBIR grants and commercial success in terms of Initial Public Offering (IPO) and Merger and Acquisitions (M&A). This research explores the link between SBIR financing and commercial success of firms.

The Effectiveness of Private versus Public Capital in Encouraging Innovation

(With Professor Amrita Nain)

This work on innovation relates to early financing of innovation. Specifically, we evaluate two sources of financing for innovative start-ups – public and private. Prior empirical evidence shows that small businesses are a key driver of economic growth. Not surprisingly then, the U.S government actively subsidizes R&D expenses of small businesses in a wide variety of sectors such as defense, health, energy, agriculture, etc. One rationale for government support for R&D is that innovative activity is characterized by significant uncertainty and information asymmetry. These frictions along with asset specificity can lead to an underinvestment in innovation by small firms. Another rationale in favor of government subsidies is that private capital does not factor in the social benefits that may arise from innovative products and processes and consequently underinvest in R&D. The focus of our research project is SBIR grants, which are specifically designed to encourage innovation. We compare start-ups that receive SBIR grants for their initial funding with start-ups that obtain a similar amount of early-stage private capital from angel investors or seed-funding focused venture capitalists. Our objective is to compare the relative effectiveness of private capital and public capital in promoting innovation and growth.

Process versus Product Innovation

(With Professor Amrita Nain)

Several studies in financial economics explore the influence of organization structure and the market for corporate control on the quantity of corporate innovative output as well as the value and novelty of the innovative output. Phillips and Zhdanov (2012) argue that an active acquisition market encourages innovation, particularly in small firms. They show that mergers can be used to acquire innovation instead of conducting in-house innovation. Firms' incentive to conduct R&D increases with the probability of being taken over. However, existing theory relating to an industry or product's life cycle draws a distinction between product innovation and process innovation. Empirical research on product and process patents is limited because of the difficulty of classifying patents. USPTO issued more than 300,000 patents in 2017 alone. Reading patent descriptions and classifying a patent as a new product development or a process improvement is a challenging task given the large number of patents issued in the United States each year. We propose to use machine-learning techniques to read all patent claims and use text-analysis methods to classify patents as process innovation or product innovation. Our objective is to improve our understanding of the difference between process and product innovation and testing whether assumptions made in existing theory are valid.

Statement of Research Purpose

This May I will complete my 3rd year as a Ph.D. candidate in Economics at the Tippie College of Business, University of Iowa. Most of my research experience is in entrepreneurial finance to investigate the innovative activities of startups and effective financing of small businesses in the United States. I focus on three research projects that study the government financing, private financing, innovation and commercial exit.

The first research project evaluates the effectiveness of government finance on the likelihood of a startup's commercial success. Many economists believe that direct government support of small businesses can assist countries by providing social benefits and accelerating economic growth and development. A government grant is impactful since it empowers a startup to develop new technology and make it a viable investment opportunity by reducing uncertainty. Federal grants have the potential to play a major role and transfer an innovative idea to a positive net present value project, which can intrinsically increase the likelihood of going public or getting acquired by bigger firms. In principle, SBIR funds are targeted toward innovative startups, which could not get financing, for example, due to the uncertainty surrounding their innovation's outcome. To the extent that SBIR programs mitigate capital obstacles for entrepreneurs, there should be a relationship between SBIR grants and commercial success in terms of Initial Public Offerings (IPO) and Merger and Acquisitions (M&A). This research explores the link between SBIR financing and commercial success of firms.

The second work (with Professor Nain) on innovation relates to early financing of innovation. Specifically, we evaluate two sources of financing for innovative start-ups – public and private. Prior empirical evidence shows that small businesses are a key driver of economic growth. Not surprisingly then, the U.S government actively subsidizes R&D expenses of small businesses in a wide variety of sectors such as defense, health, energy, and agriculture. One rationale for government support for R&D is that innovative activity is characterized by significant uncertainty and information asymmetry. These frictions along with asset specificity can lead to underinvestment in innovation by small firms. Another rationale for government subsidies is that private capital does not factor in the social benefits that may arise from innovative products and processes and consequently leads to underinvestment in R&D. The focus of our research project is SBIR grants, which are specifically designed to encourage innovation. We compare start-ups that receive SBIR grants for their initial funding with start-ups that obtain a similar amount of early-stage private capital from angel investors or seed-funding focused venture capitalists. Our objective is to compare the relative effectiveness of private capital and public capital in promoting innovation and growth.

The third research project focuses on understanding the difference between product and process innovation and the impact of these two types of innovative activity on the mergers and acquisitions

market. Several studies in financial economics explore the influence of organization structure and the market for corporate control on the quantity of corporate innovative output as well as the value and novelty of innovative output. Phillips and Zhdanov (2012) argue that an active acquisition market encourages innovation, particularly for small firms. They show that mergers can be used to acquire innovation instead of conducting in-house innovation. Firms' incentive to conduct R&D increases with the probability of being taken over. However, existing theory relating to an industry or product's life cycle draws a distinction between product innovation and process innovation. Empirical research on product and process patents is limited because of the difficulty of classifying patents. Reading patent descriptions and classifying a patent as a new product development or a process improvement is a challenging task given the large number of patents issued in the United States each year. We propose to use machine-learning techniques to read all patent claims and use text-analysis methods to classify patents as process innovation or product innovation. Our objective is to improve our understanding of the difference between process and product innovation and to test whether assumptions made in existing theory are valid.

To address endogeneity and selection bias, I submitted a research proposal to the Census Bureau to get access to the Longitudinal Business Database (LBD) and Annual Survey of Manufacturers (ASM) databases. This will allow me to use a universal database of businesses and apply a propensity score method to address endogeneity by constructing a control group as counterpart of the treated group.

Together the three projects aim to gather evidence to help improve policy formation in the United States. The research will enable governments to design and modify public policy in a manner that enhances innovation, and small business formation.

Aside from my degree, I have built upon my interest in this field in a number of ways. In October 2016 I launched a startup which allowed me to put theory into practice. I had difficulties raising capital to finance my startup, and I found that financial constraints are a common issue for most young entrepreneurs. To address the issue, I have successfully participated in several state and national competitions to raise capital, which has given me a much more rounded view on the subject.

The ERBC 2019 would provide me with the ideal opportunity to expand my research skills in entrepreneurial finance by learning more about data resources, research initiatives, and to connect with scholars and entrepreneurs with a shared passion for entrepreneurship and innovation.

Sincerely,
Mahdi Eghbali
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THE UNIVERSITY OF IOWA

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April 2, 2019

To Whom It May Concern:

I am writing this letter to recommend Mahdi Eghbali for the NBER Entrepreneurship Research Bootcamp. Mahdi is a doctoral student in our Economics department. I was one of the supervisors of his second-year summer research paper and am able to comment on his research interests, ability and motivation.

Mahdi's primary area of interest is startups and entrepreneurship. In one of his research papers, Mahdi is exploring the impact of government funding on the likelihood of commercial success of a firm. Specifically, he examines whether access to Small Business Innovation Research (SBIR) program increases the likelihood that a firm will successfully go public or be acquired, both of which he considers to be successful outcomes for the entrepreneur. Mahdi shows initiative and commitment in obtaining data needed for his research project. For example, he collected data on firms that received SBIR grants from the U.S. Department of Agriculture (USDA), the U.S. Department of Energy (DOE), and the U.S. Department of Health and Human Services (HHS). He then painstakingly matched the SBIR data with Dun & Bradstreet to obtain financial information about the grant recipients. To assess whether SBIR grants affect commercial success, Mahdi needs a control group of firms that have similar characteristics as the grant recipients. For this data, he is applying to obtain access to Census Bureau's Research Data Center.

In addition to the research on SBIR grants, Mahdi is developing a variety of research questions on topics such as women in entrepreneurship and customer-funded start-ups. Mahdi is also an entrepreneur himself. He is the founder of a company called VerdiLife which commercializes non-polluting technology to convert biomass such as wood waste, manure, and food waste into organic fertilizer and pesticide. His first-hand

experience in competing for state-level and national-level start-up grants for his company should give him a unique perspective on identifying important research questions in entrepreneurship and innovation.

I hope that you will invite Mahdi to this entrepreneurship boot camp. Attending NBER's ERBC will be very helpful for Mahdi. It is an opportunity for him to expand his knowledge about existing literature on entrepreneurship, develop clearer theoretical arguments, and learn to identify and overcome empirical challenges in this area. If you have any questions about this reference letter, please do not hesitate to contact me.



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Brett Maranjian: maranjian@nber.org

March 28, 2019

To the selection committee:

I write to recommend Mahdi Eghbali to the Entrepreneurship Research Boot Camp (ERBC). Mahdi is currently a Ph.D. student at the University of Iowa. He has completed all of his coursework and passed his comprehensive exams and is focused on his dissertation. I will first provide an overview of his research.

The overall theme of Mahdi's research is to analyze determinants of success of firms that received startup grants from the Small Business Innovation Research (SBIR) program. This is a highly competitive program that encourages domestic small businesses to engage in Federal Research/Research and Development with the potential for commercialization. Mahdi focuses on funding from three federal agencies that participate in the SBIR program: the Department of Agriculture, the Department of Energy, and the Department of Health and Human Services.

Mahdi's first project evaluates the effectiveness of government finance in determining how likely a startup is to enjoy commercial success. If SBIR programs mitigate capital obstacles for promising entrepreneurs, then there should be a relationship between SBIR grants and commercial success. Mahdi measures commercial success as an Initial Public Offering or Merger and Acquisition. In the second paper he compares startups that received SBIR grants for their initial funding with startups that received similar amounts of early-stage private capital from angel investors or venture capitalists. The objective is to compare the relative effectiveness of private capital and public capital in promoting innovation and growth. The third project will use machine-learning techniques to read patent claims and use text-analysis methods to classify patents as either process innovation or product innovation. The goal is to improve understanding of the difference between process and product innovation, and thereby the validity of crucial assumptions on which models are based.

Mahdi has accumulated a large and unique data set. He currently is undergoing a background check by the Census Bureau to permit further data matching. I believe that his novel data will allow us to better understand the success and limitations of government intervention in funding startups. This is an important research endeavor.

Mahdi is incredibly passionate about entrepreneurship, which becomes clear immediately. He is a unique candidate for the Entrepreneurship Research Boot Camp because in addition to studying entrepreneurship, Mahdi has founded a firm (VerdiLife). This has given him an unusually strong sense of the "facts on the ground" for entrepreneurs (e.g., the difficulties of raising capital). When I first learned about his startup I was concerned that it might take time away from his research. However, Mahdi has boundless energy and enthusiasm. I believe that he would benefit greatly from the Entrepreneurship Research Boot Camp, and I am confident that he would contribute greatly to the experience of his fellow students.

In conclusion, Mahdi has my strong recommendation for the Entrepreneurship Research Boot Camp. Please let me know if you need any additional information.

Sincerely,

Anne P. Villamil
Professor of Economics and Tippie Fellow
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