

SAEED SHAKER

CONTACT

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RESEARCH INTEREST

Macro/Monetary Economics
Financial Economics
Machine Learning in Economics
Quantitative/Computational Economics
Economic Development

EDUCATION

The Ohio State University Ph.D., Economics, 2021	Columbus, OH
East Carolina University M.S., Econometrics and Quantitative Economics, 2015	Greenville, NC
Tarbiat Modares University M.S., Industrial Engineering, 2010	Tehran, Iran
University of Tabriz B.S., Mathematics, 2008	Tabriz, Iran

WORK EXPERIENCE

Big Data Federation Data Scientist	San Jose, CA Oct 2021 - present
Upstart Data Science Intern	Columbus, OH Jun 2021 - Sep 2021

SKILLS

Programming

Python, R, SQL, MATLAB, HTML, C, STATA, SAS

Economic Research

Time-Series Analysis (ARMA, GARCH), A/B Testing, Causal Analysis (RDD, Diff-in-Diff), DSGE Modeling, VAR, Solving DSGE Models in Continuous Time, Back-testing, Non-linear Systems Optimization, Optimal Control Theory

Data Analysis

Pandas, NumPy, SciPy, Scikit-Learn, Visualization (Matplotlib, Plotly, Altair), Data Engineering

Machine Learning

Neural Networks (CNN, RNN, LSTM), TensorFlow, XGBoost, Random Forest, K-means, SVM, Gradient Descent, Naive Bayes, PySpark, Unsupervised Learning (Clustering, PCA), NLP, Linear Discriminant Analysis

Technology/Industry Knowledge

AWS (S3, EC2, Redshift), Github, Financial Modeling, Forecasting, Risk Modeling, Investment Strategy, Portfolio Management, Financial Services, Credit Risk Analysis, Online Ad Auctions, Pricing, Fraud Detection, Anomaly Detection

RESEARCH PAPERS

Job Market Paper

Financial Frictions and Productivity Losses: Importance of Default-Led Heterogeneity in Collateral and Loan Rates (download)

Working Papers

Impact of Entry Costs on Aggregate Productivity: Financial Development Matters (download)

Entry Barriers in a Two-Sector economy with Perfect and Imperfect Financial Markets (download)

Firm Entry and Exit in Continuous Time (download)

Relative Importance of Employment and Investment Frictions and Their Interactions (draft available upon request)

Publication

A Comprehensive Evaluation of Value-at-Risk Models and a Comparison of Their Performance in Emerging Markets, (2018), with Mohsen Seyghali and Solmaz Poorabbas, *Journal of Risk Model Validation* (link to paper)

Work in Progress

Size-Dependent Financing and Aggregate Productivity (*with Abolfazl Setayesh*)

Property Rights and Capital Misallocation

FELLOWSHIPS, AWARDS AND HONORS

University Fellowship, Graduate School, Ohio State University Spring 2021

Departmental Citation in Teaching Excellence 2019

Journal of Money, Credit and Banking Fellowship 2015-2016

Tehran Stock Exchange Organization's Thesis Award 2011

CONFERENCE PRESENTATIONS/INVITATIONS

Midwest Economics Association, 84th Annual Meeting, Evanston, IL, USA 2020

Conference on Probability Theory and its Applications, Athens, Greece 2014

International Conference on Econometrics and Application, Sanandaj, Iran 2012

TEACHING EXPERIENCE

Independent Teaching

Elementary Econometrics (download syllabus) Summer 2019, Summer 2020

Teaching Assistant and Recitation Leader

Intermediate Microeconomics Fall 2016, Spring 2018

Intermediate Macroeconomics Fall 2018

Health Economics Fall 2019

Principles of Microeconomics Spring 2017, Spring 2019, Fall 2020

OTHER PROFESSIONAL ACTIVITIES

Research fellow, AEA summer program at Michigan State University Summer 2017

Reviewer for: American Journal of Applied Mathematics 2020

Financial Economist, Egtesad Modaber Kish, Tehran, Iran 2011-2014

PRE-PH.D. RESEARCH PAPERS

Measuring Exchange Rate Fluctuations Risk Using the Value-at-Risk, with Parastoo Mohammadi, *Journal of Applied Finance & Banking*, 2012

Exponentially Declining Weighted Bootstrapping as an Alternative Value-at-Risk Measurement Technique, with GholamReza Keshavarz Haddad, *Working paper, Sharif University of Technology*, 2017

REFERENCES

Professor Aubhik Khan

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Professor Julia Thomas

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Financial Frictions and Productivity Losses: Importance of Default-Led Heterogeneity in Collateral and Loan Rates(Job Market Paper: [latest version here](#))

I develop a model of entrepreneurship with default to quantitatively analyze the impact of financial frictions on total factor productivity (TFP). Default risk justifies the need for collateral. Entrepreneurs are charged higher loan rates if the value of their collateral is low, which favors the wealthy over the poor, regardless of their talent, and discourages poor individuals from self-financing to start or expand their businesses. The close link between deposit rates and loan rates, in most models, is broken. Consistent with empirical evidence, my model can generate a weak self-financing motive while allowing for a highly persistent individual productivity, a challenge for existing models of financial frictions.

Financial frictions in my model stem from three different sources: limited enforceability related to the recovery rate of collateral by financial intermediaries; informational frictions related to inefficiencies in financial intermediaries' evaluation of entrepreneurs' default risks; and frictions related to entrepreneurs' expectations of future loan terms. I use machine learning classification techniques to solve the problem financial intermediaries face evaluating entrepreneurs' default risks. My analysis shows sizeable losses from financial frictions, more than 40% in TFP losses for the U.S. if we were to replace its financial markets with a poorly functioning one. Large TFP losses arise as there is amplification between the three sources of financial friction. Without default and heterogeneity in collateral and loan rates, my model would function similarly to a neo-classical model, and there would be a small impact of financial frictions with only a 7% loss in TFP.

Impact of Entry Costs on Aggregate Productivity: Financial Development Matters[\(download\)](#)

This paper revisits the question: what is the impact of entry costs on cross-country differences in output and total factor productivity (TFP)? I argue that for the countries with low levels of financial development, the answer is the conventional one in the literature, that higher entry costs cause misallocation of productive factors and lower TFP. However, for countries with reasonably high levels of financial development, the conventional answer does not hold. Motivated by observations on cross-country data, I propose a new theory on the impact of entry costs on TFP. In my mechanism, two competing forces affect TFP when entry cost changes: A wealth-based selection force and a productivity-based selection force. This makes TFP a hump-shaped function of entry costs. Entry costs are not inherently bad for TFP if their target is to deter low productivity individuals from starting businesses. I develop an analytically tractable model of firm dynamics with entry barriers and financial frictions and derive the sufficient conditions for the impact of entry cost on TFP in both wealth- and productivity-based selection phases.

Firm Entry and Exit in Continuous Time[\(download\)](#)

In this paper, I develop and analyze a model of firms' entry and exit in a continuous-time setting. I build my analysis based on Hopenhayn (1992) firm dynamics framework and use the continuous-time structure to solve the model. Solving the model in continuous-time brings in many advantages, such as lower computational cost and the model's tractability. However, there are some challenges too. One of the major challenges is to have entry cost in the model, i.e., to obtain a Hamilton-Jacobi-Bellman equation that incorporates the entry cost. I use a form of exit cost as the future value of the entry cost to avoid this problem. To do so, I have to keep track of the firms' age distribution in addition to the distribution of the shocks, which makes my model richer than Hopenhayn's (1992). To solve for the joint stationary distribution of the firms, I introduce a simple process for aging and obtain the Kolmogorov forward equation using the age and shock processes. Another important contribution of this paper is to introduce a way to deal with the Kolmogorov equation in two states with discontinuity and combine them into one equation that governs the state of the economy. The results obtained in this paper are in line with those reported in Hopenhayn (1992). However, the methods, tools, and the way of approaching the model differs depending on whether I solve the model in discrete or continuous time. The tools and procedures developed in this paper can easily be extended to other optimal stopping time problems.

Entry Barriers in a Two-Sector economy with Perfect and Imperfect Financial Markets [\(download\)](#)

In this paper, I analyze the impact of entry barriers on a two-sector economy with perfect and imperfect financial markets. The literature suggests that higher barriers to entry would hurt the economy through occupational and factor misallocation. However, a separate analysis of economies with nearly perfect and imperfect financial

markets shows that these results only hold for the economies with imperfect financial structures. In the economies with near-perfect financial markets, the entry barriers have almost no impact or may positively impact output or total factor productivity (TFP). This study shows that higher entry costs would hurt the productivity of the sector with high concentration, i.e., with large-scale firms, and would benefit the more competitive sector, i.e., with many small firms. As a result, the entry barriers might help or hurt economies depending on their sector/industry structure. To analyze the dynamics of entry barriers and their impact on TFP, I develop an entrepreneurship model in continuous time with two sectors in the presence of both financial and physical frictions. My analysis suggests that higher entry barriers would help the economies with a relatively high share of the small-scaled sector and vice versa.

Relative Importance of Employment and Investment Frictions and Their Interactions (draft available)

In this paper, I develop a model of firm dynamics in a continuous-time setting to analyze the impact of factor adjustment costs on aggregate productivity. The model includes both employment and investment frictions. I have used general forms of adjustment costs for both factors, including fixed, quadratic, and partial irreversibility components. I analyze these frictions' impact, both separately and jointly on total factor productivity (TFP). My analysis suggests that there is a threshold for both capital and labor adjustment costs above which the TFP becomes insensitive to the changes in adjustment costs. Another important result is that, when we analyze the impact of capital adjustment costs on TFP, it suffices to have only investment friction in the model, and adding labor frictions seem to have almost no impact on the results. However, both frictions in the model are crucial when we analyze the impact of labor adjustment costs on TFP. This means that analyses done in the literature using only labor adjustment costs are likely to over/under-estimate these frictions' impact on TFP.

WORK IN PROGRESS

Size-Dependent Financing and Aggregate Productivity (with Abolfazl Setayesh)

Access to financing is more challenging for small businesses, as they do not have sufficient collateral to pledge for better loan terms. Government policies that favor small businesses are widespread across countries. Motivated by cross-country observations on size-dependent business financing, we develop a hypothesis that size-dependent policies can help or hurt output and total factor productivity (TFP). Too much favoring of either small or large businesses would impede economic development prospects. Potential entrants generally start with small size firms and then expand their businesses if they are highly productive. Favoring large firms would create losses in the extensive margin as it means lower expected returns for potential entrants. On the other hand, favoring small businesses generates losses in the intensive margin because it distorts the resources away from highly productive large businesses and populates the economy with many, perhaps low productivity, small businesses. A corollary to our analysis is that size-dependent policies are more effective in financially underdeveloped countries where small businesses are financially in a more disadvantaged position. However, in financially developed countries, these policies are not as effective, or they may even backfire. Our theory can explain the opposing views in the literature regarding the effect of size-dependent policies, where both losses and gains are documented related to such policies.

Property Rights and Capital Misallocation

Using firm-level cross country data, I document evidence on differences in valuation of collateral by firms and financial intermediaries. This valuation gap is related to property rights and varies across countries. It is a source of financial frictions, which would create capital misallocation. If firms' valuation is much greater than financial intermediaries', it might deter firms from getting loans as they may lose their valuable collateral upon default. On the other hand, a small valuation difference would mean more desirable loan terms that would encourage financing. Using a model of entrepreneurship with both financial and physical frictions, I will quantitatively analyze the impact of improvements in property rights on firms' financing and investment decisions and economic development. Firms can use capital as collateral to access financing. The valuation difference in my model arises from capital adjustment costs, which take the form of partial irreversibility. The difference between sale and re-purchase cost of capital makes capital more valuable for firms than for financial intermediaries and creates the collateral valuation gap. My preliminary analysis shows that property rights improvements have significant implications on firms' financing and economic development.