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Qualification Summary

Researcher, instructor and teaching assistant with three years of experience teaching economics and statistics, five years of research experience with financial economics and monetary policy in the Iranian Central Bank and the University of California Riverside; two years working closely with clients on insurance, travel sales, and marketing of new products (AAA Insurance Company).

Education

PhD in Economics

University of California, Riverside, (Expected: June 2018)

Job market paper: “Predicting Mortgage Loan Default with Machine Learning Methods”

Thesis: “Essays on Theoretical and Empirical Models of Macroeconomics and Finance”

Fields: Macroeconomic: Theory and Empirical; Time Series Econometrics, Finance, Big Data Analysis with Machine Learning and Other Data Mining Methods.

References

Dr. Marcelle Chauvet (Dissertation advisor)
Professor
Department of Economics
University of California, Riverside
Email: chauvet@ucr.edu

Dr. Aman Ullah
Professor
Department of Economics
University of California, Riverside
Email: aman.ullah@ucr.edu

Dr. Jean Helwege
Professor
Department of Business
University of California, Riverside
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Dr. Vagelis Papalexakis
Assistant Professor
Department of Computer Sciences
University of California, Riverside
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M.Sc. in Economics

Sharif University of Technology, Tehran, Iran (June 2011)

Thesis Topic: Optimal Monetary Policy and Housing Price Using DSGE Models

B.A. in Economics

Shahid Beheshti University, Tehran, Iran (July 2008)

Work Experience

Lecturer

Department of Economics, University of California, Riverside

Courses: 1. Money, Credit and Banking; 2. Stock Market; 3. Intermediate Macroeconomics

Responsibility: I lectured to classrooms of ~200 students from slides I created and adapted based on my experience on students' learning.

Sep. 2014 to present

Teaching Assistant

Department of Economics, University of California, Riverside

Courses: 1. Public Policy; 2. Intermediate Macroeconomics; 3. Introduction to Macroeconomics

Responsibility: I held weekly discussion sections to support and supplement regular lectures, graded all student work (~100 students each quarter), and wrote exam questions.

Sep. 2013 to present

Data Manager

AAA Insurance Company, San Jose, CA

Responsibility: Data analysis and trends, reports to upper management team.

Sep. 2012 to Sep. 2013

Work Experience (cont.)

Research Assistant

Apr 2010 to Aug 2011

Monetary and Banking Research Institution, Tehran, Iran

Advisor: Dr. Farhad Nili

Responsibility: I conducted optimal monetary policy using DSGE models. I extended the model to include oil and housing sectors. Moreover, I found appropriate values for parameter calibration, simulated the model, and advised monetary policy.

Complete Working Papers

“Predicting Mortgage Loan Default with Machine Learning Methods”

Model and Data: Machine learning algorithms, Fannie Mae loan level data from 2000-2015

“Impact of Unconventional Government Policies on Bank Profitability and Risk-Taking”

Model and Data: Dynamic panel model, 2006Q2-2010Q2 for 800 banks

“Optimal Monetary Policy with and Housing Price: A DSGE Model of Iran Economy.”

Master’s Thesis at Sharif University (September 2011)

Model and Data: Dynamic Stochastic general equilibrium model with data from 1970-2010

“Dynamic Conditional Correlation Model with Time Varying Optimal Forecast Combination of Inflation ”

Model and Data: Inflation forecasting using dynamic conditional correlation compared with three models: MA(1), AR(2), and Philips Curve (PC) from 1987Q1-2005Q4

Computer and Data Proficiency

Python: edX certified for introduction to computer science and programming using python. I am using python in my current research on forecasting mortgage loan default using machine learning methods.

R: edX certified for introduction to computer science and programming using R. I am using R in my current research on big data for commercial banks. I use different machine learning toolboxes in R.

Matlab: Various estimation methods (OLS-GMM-MLE). Looping, Using various functions

Stata: Various estimation methods (OLS-GMM-MLE). Looping, Using various functions especially for cross section and panel models.

Data Mining: Graduate courses in computer science department at UC Riverside Fall 2016

Latex

Honors and Awards

Graduate Dissertation Reward, Graduate Division, University of California Riverside Fall 2017

Ph.D. Dean Fellowship, University of California Riverside Fall 2013 to Fall 2014

Full Ph.D. Scholarship, University of California Riverside Fall 2014 - Present

Sharif University of Technology, Master program (full fellowship) Sept 2008 - June 2011

Shahid Beheshti University, Bachelor program (full fellowship) Sept 2004 - July 2008

Ranked 6th among ~10,000 applicants in national exam to enter M.A. Economics program April 2008

Ranked 12th at the Economics’ National Olympiad August 2008

Ranked among the Top 1% in national Undergraduate University Entrance Exam August 2004

Languages

Persian: Native

English: Fluent

Research

“Predicting Mortgage Loan Default with Machine Learning Methods” (Job Market Paper)

This paper applies machine learning algorithms to construct non-parametric, nonlinear predictions of mortgage loan default. I compile a large dataset with over 20 million loan observations from Fannie Mae and Freddie Mac, for the period 2001-2016 at the quarterly frequency. Different machine learning algorithms are applied to predict in sample (training sample), and to forecast out-of-sample (testing data). We find that the forecast performance of nonlinear and non-parametric algorithms are substantially better than the traditional logit model. Additionally, machine learning algorithms allow identification of the predictive power of specific variables. The results indicate that loan age is the most important predictor of loan default before and after the 2008 financial crisis. However, we find that market loan-to-value is the most effective predictor of mortgage loan default during the recent financial crisis. Finally, we use machine learning to formulate risk-based capital stress tests for Fannie Mae and Freddie Mac under different scenarios. We forecast their mortgage credit losses and associated capital needs during the financial crises. The results obtained are more accurate than those from the Federal Housing Enterprise Oversight (FHOO), and other existing stress test studies.

“Impact of Unconventional Monetary Policy on Bank Profitability and Risk-Taking”

With the severity of the 2008 financial crisis, and apparent inefficacy of traditional monetary and fiscal policies, the Federal Reserve together with the U.S. government introduced unconventional policy measures. The Large Scale Asset Purchase (LSAP) and Troubled Asset Relief Program (TARP) are some of these policies introduced by the Federal Reserve and Department of Treasury. While these policies may have been important in preventing a deepening of the financial crisis and laying the foundation for the economic recovery, there were collateral effects on bank profitability. In this paper, we study the impact of both the LSAP and TARP programs on banks' profit and risk taking using a large panel. I consider both LSAP and TARP transactions in the universe of 800 bank holding companies. That is, differently from previous studies, I consider not only long and short interest rates and macroeconomic control variables, but also time varying transactions for each bank. The results indicate that these programs had a positive effect on banks' profit.

“Dynamic Conditional Correlation Model with Time Varying Optimal Forecast Combination of Inflation”

There is a large literature on forecast combination for key economic variables. The idea is to investigate whether combining several models improve the forecasting performance. However, models' forecast performance might change over time or during different phases of the business cycle. This paper considers this possibility and proposes a Dynamic Conditional Correlation model (DCC) to obtain optimal time-varying combination weights. Several models are used to forecast the U.S. inflation, which are combined using time varying weights estimated by the DCC model. We find that the mean square forecast errors (MSFE) obtained from the forecast combination with time varying weights are substantially lower than the MSFE for each model and for constant weights.

“Monetary Policy and Housing Price in the DSGE Model: Evidence from Iranian Economy”

This paper uses a small-scale DSGE model for the economy of Iran to analyze monetary policy. The model is extended to include housing and oil sectors. The model is adapted for the peculiarities of Iran's Central Bank, which uses money supply as a function of oil income and production growth. The reason is that Iran's economy does not have market interest rates (interest rates are fixed and determined annually by the Executive Government). We study the reaction function of the model to technology, oil, and monetary shocks in this specific Iranian monetary policy framework. The results show that monetary shocks has only nominal effect on inflation but not on the real sector such as investment, consumption, or production. Also, positive oil income shocks lead to an increase in inflation instead of an increase in production. That is, the Dutch disease mechanism is found for Iran economy, according to the model. This paper also considers and estimates an optimal monetary policy rule. The results are compared using simulation methods.