

# **S. Borağan Aruoba**

## **Curriculum Vitae**

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### **Contact Information**

University of Maryland  
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### **Education**

Ph.D., Economics, Department of Economics, University of Pennsylvania, 2004

Dissertation Title: “Data Uncertainty: Empirical Evidence, General-Equilibrium Implications and Hedging Strategies”

Dissertation Committee: Francis X. Diebold (chair), Jesus Fernandez-Villaverde, Dirk Krueger and Frank Schorfheide

A.M. (Master of Arts), Economics, Department of Economics, University of Pennsylvania, 2002

B.A., Economics, Department of Economics, Boğaziçi University (Turkey), 1999

### **Professional Positions**

University of Maryland, Department of Economics

Professor, August 2017 – present.

Associate Professor (with tenure), August 2011 – August 2017.

Assistant Professor, August 2004 – August 2011.

## **Short-Term Visits, Editorial Activity, Consulting and Other Affiliations**

International Journal of Central Banking, Co-Editor, October 2016-present

Conference on Research in Income and Wealth, Member, January 2016-present

Journal of Monetary Economics, Associate Editor, January 2014-present

Federal Reserve Bank of Philadelphia, Real-Time Data Center, Visiting Scholar, 2008 – present.

“María de Maeztu” Visiting Professor, CEMFI, Madrid, September-December 2019

Visiting Professor, Centre for Macroeconomics, London School of Economics, July-August 2019

International Economic Review, Associate Editor, January 2014-January 2017

Journal of Money, Credit and Banking, Associate Editor, July 2011-October 2016.

The World Bank, Development Prospects Group, Consultant, 2014-2015.

Federal Reserve Bank of Minneapolis, Consultant, June 2011-December 2013

Einaudi Institute for Economics and Finance, Visiting Scholar, *Rome*, June 2010.

The World Bank, IDA, Consultant, May-June 2010.

Federal Reserve Bank of St. Louis, Visiting Scholar, November 2009.

Federal Reserve Bank of Minneapolis, Institute for Empirical Macroeconomics, Visiting Scholar, June 2009

## **Published Articles in Refereed Journals**

1. “SVARs With Occasionally-Binding Constraints” (with F. Schorfheide, M. Mlikota and S. Villalvazo-Martin), **Journal of Econometrics**, accepted.
2. “Piecewise Linear Approximations and Filtering for DSGE Models with Occasionally-Binding Constraints” (with P. Cuba-Borda, K. Higa-Flores, F. Schorfheide and S. Villalvazo-Martin), **Review of Economic Dynamics**, accepted.
3. “Institutions, Tax Evasion and Optimal Policy”, **Journal of Monetary Economics**, 2021, 118, 212-229.
4. “Term Structures of Inflation Expectations and Real Interest Rates”, **Journal of Business and Economic Statistics**, 2020, 38(3), 542-553.
5. “A Structural Model of Electoral Accountability” (with A. Drazen and R. Vlaicu), **International Economic Review**, 2019, 60(2), 517-545.
6. “Macroeconomic Dynamics Near the ZLB: A Tale of Two Countries” (with P. Cuba-Borda and F. Schorfheide), **Review of Economic Studies**, 2018, 85, 87-118.

7. “Assessing DSGE Model Nonlinearities” (with L. Bocola and F. Schorfheide), **Journal of Economic Dynamics and Control**, 2017, 83, 34-54.
8. “Homework in Monetary Economics: Inflation, Home Production and Production of Homes” (with M.A. Davis and R. Wright), **Review of Economic Dynamics**, 2016, 21, 105-124.
9. “Improving GDP Measurement: A Measurement Error Perspective” (with F.X. Diebold, J. Nalewaik, F. Schorfheide and D. Song), **Journal of Econometrics**, 2016, 191(2), 384-397.
10. “A Comparison of Programming Languages in Macroeconomics” (with J. Fernandez-Villaverde), **Journal of Economic Dynamics and Control**, 2015, 58, 265-273.
11. “A Real Economic Activity Indicator for Turkey” (with C. Sarikaya), **Central Bank Review**, 2013, 13, 15-29.
12. “Money, Search and Business Cycles,” **International Economic Review**, 2011, 52(3), 935-959.
13. “Money and Capital” (with C. J. Waller and R. D. Wright), **Journal of Monetary Economics**, 2011, 58, 98-116.
14. “Sticky Prices Versus Monetary Frictions: An Estimation of Policy Trade-offs” (with F. Schorfheide), **American Economic Journal: Macroeconomics**, 2011, 3, 60-90.
15. “Optimal Fiscal and Monetary Policy when Money is Essential” (with S. K. Chugh), **Journal of Economic Theory**, 2010, 145(5), 1618-1647.
16. “Real-Time Measurement of Business Conditions” (with F. X. Diebold and C. Scotti), **Journal of Business and Economic Statistics**, 2009, 27(4), 417-427 (lead article).
17. “Data Revisions are not Well-Behaved,” **Journal of Money, Credit and Banking**, 2008, 40(2-3), 319-340.
18. “Bargaining and the Value of Money” (with G. Rocheteau and C. J. Waller), **Journal of Monetary Economics**, 2007, 54(8), 2636-2655.
19. “Comparing Solution Methods for Dynamic Equilibrium Economies” (with J. Fernandez-Villaverde and J. F. Rubio-Ramirez), **Journal of Economic Dynamics and Control**, 2006, 30(12), 2477-2508.
20. “The Macroeconomy and the Yield Curve: A Dynamic Latent Factor Approach” (with F. X. Diebold, and G. D. Rudebusch), **Journal of Econometrics**, 2006, 131(1-2), 309-338.
21. “Moving Holidays and Seasonal Adjustment: The Case of Turkey” (with C. E. Alper), **Review of Middle East Economics and Finance**, 2004, 2(3), 203-209.
22. “Search, Money and Capital: A Neoclassical Dichotomy” (with R. D. Wright), **Journal of Money Credit and Banking**, 2003, 35(6), 1085-1105.

## Other Publications

23. “Inflation During and After the Zero Lower Bound” (with F. Schorfheide), **2015 Jackson Hole Symposium Volume**, Federal Reserve Bank of Kansas City, 2016, 359-436.
24. “Improving GDP Measurement: A Forecast Combination Perspective” (with F.X. Diebold, J. Nalewaik, F. Schorfheide and D. Song), **Recent Advances and Future Directions in Causality, Prediction, and Specification Analysis: Essays in Honor of Halbert L. White Jr** (X. Chen and N. Swanson eds.), 2012, Springer, 1-26.
25. “Globalization, the Business Cycle, and Macroeconomic Monitoring” (with F. X. Diebold, M. A. Kose and M. Terrones), **NBER International Seminar on Macroeconomics**, 2011, 245-286.
26. “Real-Time Macroeconomic Monitoring: Real Activity, Inflation, and Interactions” (with F. X. Diebold), **American Economic Review Papers and Proceedings**, 2010, 100(2), 20-24.
27. “Book Review of Time Series Analysis by State Space Models by Durbin and Koopman” (with S. D. Campbell), **Journal of the American Statistical Association**, March 2003, 98, 461.
28. “Deseasonalizing Turkish Macroeconomic Data: A Caveat to Applied Researchers in Turkey” (with C. E. Alper), **Istanbul Stock Exchange Review**, 2001, 5(18), 33-52, 255-256.

## Work in Progress

29. “Reconciling Narrative and High-Frequency Identification of Monetary Policy Shocks: A Machine Learning Approach” (with T. Drechsel), 2020
30. “Pricing under Distress” (with A. Fernandez, E. Pasten and F. Saffie), 2020
31. “Financial Frictions and Business Cycles” (with P. Cuba-Borda and F. Schorfheide), 2020
32. “How Big is the Wealth Effect? Decomposing the Response of Consumption to House Prices” (with R. Elul and S. Kalemli-Ozcan), 2017

## Permanent Working Papers

33. “An Estimated Search-Based Monetary DSGE Model with Liquid Capital” (with F. Schorfheide), 2010.

## Invited Presentations

### Conferences and Workshops (including discussions)

- 2019 Society of Economic Dynamics, the Day-Ahead Conference, Federal Reserve Bank of St. Louis

- 2018 NBER-Federal Reserve Bank of Chicago Workshop on Methods and Applications for Dynamic Stochastic General Equilibrium Models
- 2017 Housing-Urban-Labor-Macro Conference, Federal Reserve Bank of Philadelphia; NBER-Federal Reserve Bank of Philadelphia Workshop on Methods and Applications for Dynamic Stochastic General Equilibrium Models
- 2016 NBER-Federal Reserve Bank of Chicago Workshop on Methods and Applications for Dynamic Stochastic General Equilibrium Models; Federal Reserve Bank of Cleveland Conference on Inflation: Drivers and Dynamics
- 2015 IMF Sixteenth Jacques Polak Annual Research Conference
- 2014 NBER-Federal Reserve Bank of Chicago Workshop on Methods and Applications for Dynamic Stochastic General Equilibrium Models; Federal Reserve Bank of Philadelphia Conference on Real-Time Data Analysis, Methods and Applications
- 2013 Conference on Macroeconomics: Understanding Low Growth, *Bank of England and Centre for Macroeconomics, London*; New York Area Monetary Policy Workshop, *Federal Reserve Bank of New York*
- 2011 Winter Workshop in Economics, *Istanbul*; Wisconsin Banking Conference; The Macroeconomics of Financial Market Imperfections and Housing Markets, *Jerusalem*
- 2010 Wisconsin Banking Conference; NBER- Federal Reserve Bank of Atlanta Workshop on Methods and Applications for Dynamic Stochastic General Equilibrium Models; NBER Summer Institute, Macro Perspectives Workshop; Annual Meeting of the Society for Economic Dynamics, *Montreal*; NBER International Seminar on Macroeconomics Conference, *Amsterdam*; Conference in Honor of Ken Burdett, *University of Essex*; Philadelphia Workshop on Monetary and Macroeconomics
- 2009 Winter Workshop in Economics, *Istanbul*; NBER- Federal Reserve Bank of Philadelphia Workshop on Methods and Applications for Dynamic Stochastic General Equilibrium Models; Chicago Fed Workshop on Money, Banking, Payment and Finance; Annual Meeting of the Society for Economic Dynamics, *Istanbul*; UC Riverside Conference on Business Cycles; Philadelphia Workshop on Monetary and Macroeconomics; Macroeconomic Dynamics Conference, *St. Louis*; North American Winter Meetings of the Econometric Society, *San Francisco*.
- 2008 NBER Summer Institute, Monetary Economics Workshop, *Cambridge*; Annual Meeting of Society for Economic Dynamics, *Cambridge*; Conference on Money, Credit, and Policy, *St. Louis*; Midwest Macro Meeting, *Philadelphia*; Annual Meeting of the American Economic Association, *New Orleans*; North American Winter Meetings of the Econometric Society, *New Orleans*.
- 2007 Workshop on Methods and Applications for Dynamic Stochastic General Equilibrium Models, *Federal Reserve Bank of Cleveland*; CIRANO Workshop on Macroeconomic

- Forecasting, Analysis and Policy with Data Revisions, *Montreal*; Annual Meeting of Society for Economic Dynamics, *Prague*; Workshop on Optimal Monetary Policy and Central Bank Communication, *Lugano*; Real-Time Data Analysis and Methods in Economics, *Federal Reserve Bank of Philadelphia*; Philadelphia Workshop on Monetary and Macroeconomics.
- 2006 Annual Meeting of the Canadian Macro Study Group, *Montreal*; Workshop on Money, Banking and Payments, *Federal Reserve Bank of Cleveland*; Annual Meeting of the American Economic Association, *Boston*; North American Winter Meetings of the Econometric Society, *Boston*.
- 2005 New York Area Monetary Policy Workshop, *Federal Reserve Bank of New York*; CIRANO Workshop on Macroeconomic Forecasting, Analysis and Policy with Data Revisions, *Montreal*; Econometric Society World Congress, *London*; Workshop on Money, Banking and Payments, *Federal Reserve Bank of Cleveland*; NBER Summer Institute, Economic Fluctuations and Growth Working Group on Impulse and Propagation Mechanisms, *Cambridge*; Annual Meeting of Society for Economic Dynamics, *Budapest*; CEPR Conference, Needed: A Real Time Database for the Euro-Area, *Brussels*; Midwest Macro Conference, *Iowa City*.
- 2004 NBER Monetary Economics Program Meeting, *Cambridge*; Seng Conference on Money, Banking and Economic Development, *University of Notre Dame*; Workshop on Money, Banking and Payments, *Federal Reserve Bank of Cleveland*; Annual Meeting of Society for Economic Dynamics, *Florence*; Annual Meeting of Society of Computational Economics, *Amsterdam*; CIREQ-CIRANO Conference on Macroeconomics and Finance, *Montreal*.
- 2003 Interuniversity Student Conference, *Columbia University*; Annual Meeting of Society for Economic Dynamics, *Paris*; Annual Meeting of Society of Computational Economics, *Seattle*

Seminars (excluding the junior job market)

- 2020 Federal Reserve Board
- 2019 London School of Economics; University of Warwick; University College London; Danmarks Nationalbank; CEMFI, Madrid; Federal Reserve Board; Inter-American Development Bank
- 2018 Federal Reserve Bank of Philadelphia; Federal Reserve Bank of Dallas; University of Virginia
- 2017 University of Texas at Austin; Georgetown University
- 2016 University of Delaware; Florida State University
- 2015 Bank of Canada; Drexel University; Federal Reserve Bank of New York
- 2014 Joint World Bank-IMF Research Department Seminar; Federal Reserve Bank of Chicago; Boston College, Texas A&M University
- 2013 Federal Reserve Bank of Kansas City; Federal Reserve Bank of Richmond
- 2012 Federal Reserve Board; University of Wisconsin-Madison; Federal Reserve Bank of Chicago;

- 2011 Federal Reserve Bank of Philadelphia; Google Inc; Bank of Canada; University of Western Ontario
- 2010 Southern Methodist University; Queen’s University; Central Bank of the Republic of Turkey; Einaudi Institute for Economics and Finance, *Rome*; Research Department, The World Bank; University of California, Irvine; University of California, Los Angeles; University of California, Santa Barbara; University of California, San Diego; University of Houston / Rice University, Federal Reserve Board
- 2009 Bureau of Economic Analysis, Federal Reserve Bank of Philadelphia, Federal Reserve Bank of St. Louis, University at Albany, International Monetary Fund, Federal Reserve Bank of Atlanta
- 2008 Federal Reserve Bank of Richmond
- 2007 University of Notre Dame, Simon Fraser University, University of British Columbia, George Washington University, Duke University
- 2006 Federal Reserve Bank of Philadelphia, Bureau of Economic Analysis, Federal Reserve Bank of St. Louis, Federal Reserve Board
- 2005 Federal Reserve Bank of Atlanta, Bogazici University
- 2004 Sabanci University, Koc University

**Grants**

National Science Foundation Grant (2019-2022): “Piecewise Linear Approximations for DSGE Models With Occasionally-Binding Constraints: Solution, Estimation, Model Evaluation, and Applications” (co-PI with Frank Schorfheide)

National Science Foundation Grant (2014-2017): “Monetary DSGE Models at the Zero Lower Bound: Policy Analysis and Economic Inference” (co-PI with Frank Schorfheide)

University of Maryland, College of Behavioral and Social Sciences, Dean’s Research Initiative Award (co-PI with Luminita Stevens) (2014-2015)

National Science Foundation Grant (2011-2013): “Monetary DSGE Models: Advances in Theoretical Modelling and Econometric Analysis” (co-PI with Frank Schorfheide)

University of Maryland General Research Board Summer Award (2005)

## **Honors and Awards**

Excellence in Refereeing Award, *American Economic Review* (2013, 2014)

Departmental Teaching Award (2007, 2010 Spring, 2010 Fall), Department of Economics, University of Maryland

Geewax, Terker & Company Prizes in Investment Research, Honorable Mention for "The Macroeconomy and the Yield Curve: A Dynamic Latent Factor Approach" (2004)

Best Student Paper Award, Society of Computational Economics (2004)

Maloof Family Dissertation Fellowship (2003-2004)

University of Pennsylvania Fellowships (1999-2000 and 2003)

Demir Demirgil Award (1999)

(Awarded each year to the undergraduate student ranked as 1<sup>st</sup> in the graduating class, Department of Economics, Boğaziçi University)

## **Teaching**

### University of Maryland

Intermediate Macroeconomic Theory and Policy (Undergraduate)

Macroeconomic Models and Forecasting (Undergraduate)

Macroeconomic Analysis II (Graduate)

Advanced Macroeconomics I (Graduate)

Advanced Macroeconomics II – Monetary Economics (Graduate)

Quantitative Methods in Macroeconomics (Graduate)

### University of Pennsylvania

Statistics for Economists, Econometrics, Introductory Macroeconomics

## **PhD Students Advised**

### Chair or Co-Chair

Gonzalo Garcia (expected 2021)

Donggyu Lee (expected 2021)

Joonkyu Choi (2018, First job: Federal Reserve Board)

John Leon-Diaz (2017, First job: Inter-American Development Bank)



Yiqun (Gloria) Chen (2016, First job: Congressional Budget Office)  
Dun (Calvin) Jia (2016, First job: Renmin University Hanqing Institute)  
Camilo Morales-Jimenez (2016 First job: Federal Reserve Board)  
Pablo Cuba-Borda (2015, First job: Federal Reserve Board)  
Shu Lin Wee (2014, First job: Carnegie Mellon University)  
Sushant Acharya (2013, First job: Federal Reserve Bank of New York)  
Alan Finkelstein Shapiro (2013, First job: Universidad de Los Andes, Colombia)  
Elif Ture (2013, First job: International Monetary Fund)  
Yasin Mimir (2012, First job: Central Bank of the Republic of Turkey, Research Department)  
Salih Fendoglu (2012, First job: Central Bank of the Republic of Turkey, Research Department)  
Daniel Hernaiz (2011, First job: Inter-American Development Bank)  
Jeta Menkulasi (2010, First job: International Monetary Fund)  
Committee Member  
Laura (Yi) Zhao (2020, First job: Bank of Canada)  
Seth Murray (2020, First job: Federal Reserve Board)  
Rodrigo Heresi (2019, First job: Inter-American Development Bank)  
Xing Hong (2019, First job: Dimensional Fund Advisors)  
Hsuan Yu (2019, First job: Central Bank, Republic of China)  
G. Jacob Blackwood (2018, First job: Amherst College)  
Hidehiko Matsumoto (2018, First job: Bank of Japan)  
Jonathan Kreamer (2015, First job: Florida State University)  
Ryan Decker (2015, First job: Federal Reserve Board)  
Leland Crane (2014, First job: Federal Reserve Board)  
Didem Tuzemen (2011, First job: Federal Reserve Bank of Kansas City)  
Ethan Ilzetzki (2009, First job: London School of Economics)  
Eugénio Pinto (2006, First job: Federal Reserve Board)  
Bora Durdu (2006, First job: Congressional Budget Office)

## **Professional Activities**

*Co-organizer* of the NBER Dynamic Equilibrium Models Group Summer Institute Meeting (2013-present)

*Scientific Committee Member*, IAAE 2015, Thessaloniki, IAAE 2017, Sapporo, IAEE 2018, Montreal, IAEE 2019, Cyprus.

*Member* of American Economic Association, Econometric Society

*Referee* for AEJ: Macroeconomics, American Economic Review, Bank of England Monetary Analysis Working Paper series, B.E. Journals in Macroeconomics, Canadian Journal of Economics, Computational Economics, Econometrica, Econometrics Journal, Economic Inquiry, Economic Journal, Economics Letters, Economica, Economics Bulletin, Emerging Market Finance and Trade, Empirical Economics, European Economic Review, International Economic Review, International Journal of Central Banking, International Journal of Forecasting, IMF Economic Review, Journal of the American Statistical Association, Journal of Applied Econometrics, Journal of Business and Economic Statistics, Journal of Business Cycle Measurement and Analysis, Journal of Econometrics, Journal of Economic Dynamics and Control, Journal of Economic Theory, Journal of Empirical Finance, Journal of the European Economic Association, Journal of Financial Econometrics, Journal of Financial Economics, Journal of Financial Intermediation, Journal of Forecasting, Journal of International Economics, Journal of Monetary Economics, Journal of Money Credit and Banking, Journal of Public Economics, Macroeconomic Dynamics, Oxford Bulletin of Economics and Statistics, Quantitative Economics, Reserve Bank of New Zealand Discussion Paper Series, Review of Economic Dynamics, Review of Economics and Statistics, Review of Economic Studies.

*Reviewer for* National Science Foundation and Social Sciences and Humanities Research Council of Canada

## **University of Maryland Service**

Department of Economics, Director of Graduate Admissions (2011-2012 AY – present)

Department of Economics, Executive Committee Member (2011-2012 AY, 2012-2013 AY, 2016-2017 AY, 2017-2018 AY, 2020-2021 AY)

Department of Economics, Committee for Recruitment and Appointment of Assistant Professors (2017-2018 AY)

University of Maryland, Kirwan Faculty Research and Scholarship Prize Selection Committee (2014, 2015, 2016)

Banneker/Key Scholarship Selection Committee (2011)

Department of Economics, Graduate Admissions Committee Member (2005-2006 AY through 2010-2011 AY)

College of Behavioral and Social Sciences, Website Redesign Committee (2008)

Department of Economics, Undergraduate Studies Committee (2004-2005 AY / 2005-2006 AY)

Department of Economics, Committee for Recruitment and Appointment of Associate Professors and Professors (2004-2005 AY / 2005-2006 AY / 2007-2008 AY / 2015-2016 AY / 2016-2017 AY)