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Research Fields of Interest

Macroeconomics: Macro-Finance, Firm Dynamics, Monetary Economics

Education

2021–Present **University of Maryland** College Park, MD
Doctor of Philosophy in Economics
Committee: John Haltiwanger (Co-chair), Borağan Aruoba (Co-chair), Thomas Drechsel, Pablo Ottonello

2014–2018 **University of Richmond** Richmond, VA
Bachelor of Science in Mathematical Economics

Experience

2023–Present **US Census Bureau** Suitland, MD
Economist intern

2022–2023 **University of Maryland** College Park, MD
Research Assistant to John Haltiwanger
Census Bureau Special Sworn Status researcher

2018–2021 **Board of Governors of the Federal Reserve** Washington, DC
Research Assistant to Vice Chair Clarida (2020–2021)
Research Assistant (2018–2021)

Summer 2017 **Federal Reserve Bank of Chicago** Chicago, IL
Economic Research Intern

Research (See website for details and updates)

Working Papers

1. **Banks, Sentiments, and Business Cycles**

   Abstract: This paper measures the "animal spirits" of U.S. banks and asks whether they are an important determinant of credit conditions and source of business cycle fluctuations. I first construct a novel semi-structural measure of bank-level sentiment, revealing heterogeneous animal spirits across banks and common dynamics marked by surges in pessimism during crises and excessive optimism during periods of elevated asset prices. I then jointly estimate the contribution of shocks to bank and household sentiment, aggregate demand and supply, financial risk, and monetary policy to fluctuations in macroeconomic conditions using a structural BVAR framework. Bank sentiment shocks explain 38% of the business cycle variation in credit conditions, 10% in output, 22% in prices, and 26% in the policy rate.

2. **Bank Lending Standards and the U.S. Economy** (*R&R at JEDC*)

   Coauthored with Huberto Ennis, Elijah Broadbent, and Horacio Sapriza

   Abstract: The provision of bank credit to firms and households affects macroeconomic performance. We use survey measures of changes in bank lending standards, disaggregated by loan category, to quantify the effect of changes in banks' attitudes toward lending on aggregate output, inflation, and interest rates. Bank lending to businesses is particularly important for macroeconomic outcomes, with peak effects on output of around half a percentage point after four quarters of the initial shock. These effects depend on the stage of the business cycle and the proximity of the short-term interest rate to its effective lower bound. The effects are larger when output is growing below trend and when the interest rate is away from its lower bound. We also find that the response of the economy to lending-standards shocks is asymmetric, with tightening shocks having larger effects on output.

Works in Progress

1. **Monetary Policy, Financial Vulnerabilities, and Macro Risks**

   Coauthored with Andrea Ajello

2. **Uncertainty Shocks and Market Concentration**

Pre-Doctoral Research

1. "Out-of-sample performance of recession probability models" with Francisco Vazquez-Grande, *FEDS Note* (2019)

2. "Combining forecasts: Can machines beat the average?" with Francisco Vazquez-Grande, *SSRN Working Paper* (2020)

3. "Bottom-up leading macroeconomic indicators: An application to non-financial corporate defaults using machine learning" with Horacio Sapriza and Tom Zimmermann, *FEDS Working Paper* (2019)

Conferences and Workshops

2025 DC Area Macro PhD Symposium. Baltimore, MD

2024 Summer Workshop on Money, Banking, Payments, and Finance. Washington, DC

94th Annual Southern Economics Association Meeting. Washington DC

2023 Midwest Macro Meeting. Lubbock, TX

Treasury OFR PhD symposium. Washington, DC

DC Area Macro PhD Symposium. Washington, DC

2022 53rd Annual Conference of the Money, Macro and Finance Society. Canterbury, UK

2019 International Finance and Banking Society Conference. Medellin, Colombia

Awards, Fellowships, & Grants

2025 BSOS Dean's Research Initiative Grant

2024 Economics Department Third Year Paper Prize (second place)

2023 Melville J. Ulmer Graduate Fellowship in Economics (for best second year paper)

2022 Jacob K. Goldhaber Travel Grant

International Conference Student Support Award

2021 University of Maryland Graduate Fellowship

(Federal Reserve Board) Division Director's Award for Excellence

Teaching

Instructor, Intermediate Macroeconomic Theory and Policy, University of Maryland, Summer 2024

Teaching Assistant, Principles of Macroeconomics, University of Richmond, Fall 2017

Professional Activities

Referee for Macroeconomic Dynamics

Organizing committee member for the 2023 and 2024 DC Area Macro PhD Symposiums

Participant in the 2023 Princeton Initiative

Technology

(See GitHub for projects and packages)

Skills

Primary Tools: Git, Julia, LaTeX, Linux, R, SQL

Additional Tools: Matlab, Microsoft Office, Python, SAS, Stata

Software

1. **OOS** for out-of-sample time series forecasting
   The OOS package introduces a structured and automated approach to out-of-sample time series forecasting, a common, important, and subtle task. In many ways, this package is merely a wrapper for the excellent extant time series forecasting routines on CRAN - including both traditional econometric time series models and modern machine learning techniques. However, this package additionally provides a modern and comprehensive set of forecast combination techniques and forecast analysis tools.
   GitHub ∘ Website ∘ CRAN

2. **sovereign** for state-dependent empirical analysis
   The sovereign package introduces a set of tools for state-dependent empirical analysis through both VAR- and local projection-based state-dependent forecasts, impulse response functions, historical decompositions, and forecast error variance decompositions. Tools are also available for the estimation and analysis of Proxy-SVARs.
   GitHub ∘ Website ∘ CRAN