

Jeremiah Manuel Bejarano

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Financial Data Scientist and Research Economist specializing in developing and maintaining reproducible data pipelines and analytics. Develops advanced data visualizations and statistical/machine learning models to identify systemic risks. Experienced team supervisor who leads cross-functional research projects that deliver actionable intelligence to FSOC and member agencies.

Research Fields

Primary: Financial economics, financial stability

Secondary: Short-term funding markets, intermediary asset pricing

Experience

Research Economist, Office of Financial Research (OR-53/GS-13) Aug 2, 2021-present U.S. Department of the Treasury

40 hrs/week

- **Created and implemented the OFR ChartBase, supporting the OFR Annual Report.** The OFR ChartBase is a web-based software catalog with associated Python package that manages a collection of analytical data pipelines for use in creating charts for the OFR Annual Report. As technical architect and project lead, I designed and developed the full stack solution that enables automated data refreshing, centralized code sharing, and streamlined chart production. I currently oversee many critical data visualization pipelines for the OFR Annual Report following staff departures, maintaining continuity of essential reporting functions. Senior management estimates \$300,000+ annual cost savings from this platform, which has been adopted across multiple OFR divisions and is being considered for FSOC-wide deployment. Led cross-functional implementation involving over 40 team members and closely oversaw a group of analysts and researchers as they built the data pipelines that populated the ChartBase.
- **Manage and maintain critical data processing pipelines for the OFR's non-centrally cleared bilateral (NCCB) repo data collection.** I independently lead daily operation of data cleaning processes that ensure data integrity and quality control for this essential financial market monitoring program. I helped design and implement complex statistical analytics to monitor repo market conditions and develop code that will deliver processed data to FSOC and its member agencies. Serve as the technical lead responsible for maintaining multiple codebases supporting this regulatory data collection (88 FR 1154 [Jan 9, 2023] and 89 FR 37091 [May 6, 2024]).
- **I lead OFR's Short-Term Funding Working Group,** providing direction and advice to a team performing research that focuses on financial stability within short-term funding markets. (Co-leader since March 2022, sole leader since June 2023). Within this role, I lead a cross-divisional effort to audit and enhance OFR's public-facing short-term funding monitor (including training new members of the data science team). We submitted recommendations which are scheduled to be implemented later this year.
- **Led a major update of the OFR's public-facing Financial Stress Index (FSI) risk monitor.** I designed a revised statistical/machine learning methodology that would allow the FSI to seamlessly transition from the old LIBOR-based rates to the new replacement rates. I wrote the code to power this monitor and brought together the operations and technology teams to implement this update. I published a white paper ([OFR Working Paper 23-07](#)) and contributed to publicity efforts. In 2022 the FSI was featured in an Editor's Choice article in the Financial Times. I currently serve as the subject matter expert for this monitor and maintain its daily execution.

Lecturer, Financial Mathematics (Full-Stack Quantitative Finance) **Jan 6-Mar 15, 2025**

The University of Chicago

15 hrs/week

- I made large revisions to a previous [course I developed](#). This course emphasizes building analytical data pipelines, from data extraction and cleaning to exploratory analysis, visualization, and modeling, and finally, publication and deployment and the tools behind it: build automation, dependency management, unit testing, the command-line environment, shell scripting, Git for version control, and GitHub for team collaboration. The course is teaches these topics through a series of statistical and machine learning applications to finance.
- Supervised nearly 40 students work on their final projects over the course of the quarter as developed their own reproducible data pipelines using examples from quantitative finance.

Lecturer, Financial Mathematics (Data Science Tools for Finance) **Jan 3-Mar 9, 2024**

The University of Chicago

15 hrs/week

- Proposed and developed a [new course](#) focused on a core set of practical computing tools and techniques common within data science and quantitative finance, with a special emphasis on those necessary to build reproducible and scalable workflows (e.g., reproducible analytical pipelines). The course is geared to prepare students to independently produce reproducible statistical and machine learning projects applied to financial economics.
- Supervised 19 teams (4-5 students each) over the course of the quarter as they completed individualized final projects in which they replicated results from well-known papers within the academic finance literature.

Lecturer, Financial Mathematics (August Review)

The University of Chicago

3 hrs/week

Jul 30-Aug 9, 2024 and

Jul 25-Aug 15, 2023 and

Aug 5-26, 2022

- Taught a review course on Python programming for data science and finance.

Teaching Assistant & Faculty Advisor, Financial Mathematics

The University of Chicago

2 hrs/week

Mar 20-Jun 3, 2023

and Oct 28-Dec 31, 2022

- Met with a small group of master's students once a week to advise on applying their training from university courses to carry out an applied research project in financial mathematics.
- Served as teaching assistant for fixed income and fixed income derivatives class.

PhD Researcher, Department of Economics

The University of Chicago

40 hrs/week

Jun 22, 2015-Jun 9, 2021

- Conducted original research on macroeconomic networks and their implications for asset markets.
- Participated in asset pricing and macroeconomics research workshops. Presented my research and provided feedback to other researchers.

College Lecturer, Department of Economics

The University of Chicago

20 hrs/week

Mar 1-Jun 15, 2018 & 2019

- Independently developed and taught a new course (Computational Methods in Economics/ECON 21410) to advanced undergraduate students in a classroom setting twice weekly and managed a teaching assistant.
- Received extremely positive feedback and won an undergraduate teaching award in June 2019.

Teaching Assistant

Oct 1-Dec 31, 2015-2019

The University of Chicago

10 hrs/week

- Served as teaching assistant for 16 undergraduate, master's, and MBA courses across five academic years, including:
 - FINM 36700: Portfolio Theory and Risk Management I (MA)
 - FINM 35000: Topics in Economics (MA)
 - STAT 32940: Multivariate Data Analysis via Matrix Decomposition (MA)
 - BUSF 35001: Introductory Finance (MBA)
 - BUSX 35880: Portfolio Management (MBA)
 - ECON 21000: Econometrics (undergraduate)

Research Assistant

Oct 1, 2010-Sep 30, 2013

Brigham Young University

15 hrs/week

- Collected data, contributed to the development of the underlying economic model, and wrote software to implement the solution of a model of optimal sales and income taxation in a heterogeneous agent model.
- Assisted with research on an economic model of moral hazard within hedge funds. Reviewed and summarized relevant academic literature and helped plan out development of the economic model.

Education

The University of Chicago

Sep 30, 2013-Jun 12, 2021

PhD in Economics (June 2021)

MA in Economics (June 2016)

Thesis Title: [*"Essays in Macroeconomics and Finance"*](#)

Brigham Young University

Sep 1, 2006-Aug 15, 2013

BA in Economics

BS in Mathematics

Honors, Scholarships, and Fellowships

Beryl W. Sprinkle PhD Fellowship, 2018-2019

Undergraduate Teaching Award, 2019

PhD Research Support Grant, Fama-Miller Center for Research in Finance, 2016

National Science Foundation Graduate Research Fellowship, Honorable Mention, 2013-14

University of Chicago Social Sciences Fellowship, 2013-2018

Skills and Certifications

Skills

- Programming and Software Tools: Python (NumPy, Pandas, SciPy, Matplotlib, Jupyter), R, SQL, Git/GitHub, Parallel Computing (SLURM, HPC), Bash
- Statistical & Data Science: Statistical Modeling, Causal Inference, Feature Engineering, Machine Learning, Exploratory Data Analysis
- Finance & Economics: Financial Economics, Financial Stability, Short-term Funding Markets, Asset Pricing, Quantitative Finance

Certifications

- Databricks University Alliance Faculty (Jan 16, 2025) Credential ID: 129988334
 - Certification for proficiency with Databricks, an enterprise-grade platform for large-scale data engineering and collaborative data science

Volunteer Experience

Full-Time Service Missionary

Jan 2007-Feb 2009

The Church of Jesus Christ of Latter-Day Saints
Zagreb, Croatia

Works in Progress

“The Intraday Characteristics of Repo Rate Spikes”

with Luke Olson (OFR)

Leveraging unique regulatory repo data, we provide insights into the causes and dynamics of the repo rate volatility of 2019. By analyzing the intraday evolution of rates across different repo market segments, we shed new light on the roles of intraday liquidity constraints (e.g., balance sheet constraints and resolution requirements), market segmentation, and information transmission in driving extreme rate movements. Our findings contribute to the ongoing debate about the structure of repo markets and have important implications for monetary policy implementation and financial stability in an era of seemingly abundant reserves.

“The Role of Funding Segmentation on Arbitrage Spreads”

with Adrien d'Avernas (Stockholm School of Economics) and Quentin Vandeweyer (University of Chicago Booth School of Business)

Since the gradual roll-on of post-crisis regulation in the 2010's, many arbitrage spreads, or bases, have opened up or widened. Examples include the Treasury cash-futures, CDS-Bond, or cross-currency bases. In this paper, we investigate how hedge funds, as the least-constrained institutions, have taken advantage of these opportunities but are nevertheless constrained in their ability to fully arbitrage away these spreads due to constraints on the ability of their creditors to fund the trades. Furthermore, we test the hypothesis that the low correlation among arbitrage spreads is due to segmentation across the funding markets for these trades. To explore these hypotheses, we use regulatory Form PF filings to identify funds with exposures to each trade and construct a trade-dealer-time panel based on these exposures. We then propose a shift-share instrument to identify the effect of credit supply shocks on each trade.

“Intermediation Chains in the Market for Repurchase Agreements”

with Ehsan Azarmsa (University of Illinois Chicago) and Jian Li (Columbia Business School)

The U.S. repurchase agreement (repo) market is a crucial source of funding and collateral for many market participants. The Federal Reserve estimates the size of the repo market has reached \$4.6 trillion. In a world where collateral is scarce, reuse and rehypothecation of collateral serves to enhance the underlying market's liquidity, among other benefits. On the other hand, it also increases inter-connectedness and potentially market fragility by creating long "collateral chains", which have the potential to propagate and amplify negative shocks. In this project, we aim to document the length of these collateral chains within repo markets and to understand the underlying factors that determine their length. We aim to understand how chain length varies over time and across asset classes. After first documenting the empirical facts, we build a model and provide a framework for thinking about the trade-offs between liquidity, efficiency, and fragility.

"Characterizing the Role of Dividend Dynamics in the Term Structure of Equity Risk Premia"

Chapter 1 of [Dissertation](#)

I characterize the relationship between dividend dynamics and the term structure of equity risk premia. Within a class of log-linear asset pricing models, I show that the risk exposure associated with dividend futures is equal to the impulse response function of dividends and that the average slope of the term structure depends on the relationship between the permanent and transitory components of dividends. Going beyond the class of log-linear models, I then explore the consequences of adding a transitory, mean-reverting component to dividend dynamics within several classic asset pricing models, such as the extended consumption capital asset pricing model and an external habits model. Recent empirical evidence suggests that the term structure of equity may be downward sloping on average, which is at odds with the traditional specification of many common asset pricing models. I show that this potential discrepancy can be reconciled by adjusting cash flow growth dynamics in the proposed way.

"Sectoral Shifts, Production Networks, and the Term Structure of Equity"

Chapter 2 of [Dissertation](#)

I argue that the term structure of equity as characterized by expected holding period returns on dividend strips can be used as a diagnostic to evaluate the quantity dynamics that arise in a macroeconomic model. For instance, as shown in the first chapter, the risk exposures associated with dividend futures are equal to the impulse responses of aggregate consumption with respect to the underlying shocks. As an application, I derive the asset pricing implications of a multi-sector production network model and use this to shed light on the relative importance of idiosyncratic and aggregate total factor productivity (TFP) shocks. Though aggregate TFP in the U.S. over the last 60 years has grown approximately 1.4 percent annually, these gains have been dispersed across individual sectors, with some sectors even seeing substantial declines. This dispersion is either the result of idiosyncratic sectoral shocks or aggregate shocks that shift the composition of the economy without necessarily affecting long-run aggregate output. Decomposing the contribution of each shock to this term structure of equity, I show that the shift shocks contribute to a downward sloping term structure of equity while others contribute to an upward sloping term structure. Thus, imposing a downward sloping term structure in this model amounts to putting a lower bound on the contribution of aggregate shifts relative to other shocks.

Working Papers

"The Transition to Alternative Reference Rates in the OFR Financial Stress Index" (2023)

[OFR Working Paper 23-07](#)

The OFR Financial Stress Index (OFR FSI) is a daily market-based snapshot of stress in global financial markets that is constructed from 33 financial market variables. As of the time of writing, seven of these variables rely on obsolete reference rates. Since its inception, the OFR FSI was intended to allow for the periodic replacement of obsolete variables as the need arises. In this paper, I introduce replacements for these seven obsolete variables, and I make explicit the procedure with which the OFR FSI incorporates these new variables. Furthermore, I demonstrate generally that this replacement procedure produces an index with the following desirable properties: (1) the index is a weighted sum of the presently included variables; (2) removed variables no longer directly affect the index, and newly included variables do not modify historical values of the index; (3) the index uses all available historical data on the newly included variables to train the model; and (4) the volatility of the index is roughly comparable before and after the replacement

“A Big Data Approach to Optimal Sales Taxation”

with Christian Baker, Richard W. Evans, Kenneth L. Judd, and Kerk L. Phillips. [NBER Working Paper # 20130](#) (inactive)