Jeremiah Manuel Bejarano

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Researcher with expertise in the intersection of macroeconomics and asset pricing, with a specialization in short-term funding markets. Passionate about technology-driven solutions that increase reproducibility, reusability, and collaboration in research.

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

- **Led a major update of the OFR's high-profile Financial Stress Index (FSI) risk monitor.** Due to the cessation of LIBOR and the fact that several of the financial market variables upon which the FSI relied were based on LIBOR, the FSI was at risk of becoming obsolete. I communicated these issues and recommended a solution to OFR senior management. I designed and implemented a revised statistical methodology that would allow the FSI to seamlessly transition from the old LIBOR-based rates to the new replacement rates. Together with team members from IT and data products, I implemented my solution. In parallel with implementation, I authored a white paper and fact sheet and contributed to other publicity efforts. In 2022 the FSI was featured in an Editor's Choice article in the Financial Times.
- **Leading the technical aspect of implementing a shared "Chart Base" across the OFR.** In order to speed up the processes associated with preparing charts for publication (e.g., legal review and quality control), to reduce duplication of work across teams, and to improve collaboration across teams, I proposed a centralized set of automatically-updating charts and derived datasets and a uniform, modular system for contributing to this chart base. I designed this "chart base" and the system used to contribute to it using the principles of reproducible analytical pipelines. The implementation of this chart base is ongoing and involves over 40 team members.
- **Leading 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)
- **Led a cross-divisional effort to audit and enhance the OFR's Short-Term Funding Monitor (STFM).** I identified areas of improvement in the STFM and formed and led a cross-divisional task group to investigate (including training new members of the data science team). We submitted a technical report and recommendations, which are scheduled to be implemented next year.

Lecturer, Financial Mathematics (August Review)   **Jul 30-Aug 9, 2024 and**
The University of Chicago   **Jul 25-Aug 15, 2023 and**
3 hrs/week   **Aug 5-26, 2022**

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

Lecturer, Financial Mathematics (Full-Stack Quantitative Finance)   **Jan 3-Mar 9, 2024**
The University of Chicago
15 hrs/week
- Proposed and developed a [new course](#) (originally called "Data Science Tools for Finance") 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).
- 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.

Faculty Advisor, Financial Mathematics   **Oct 28-Dec 31, 2022**
The University of Chicago   **Mar 20-Jun 3, 2023**
0.5 hrs/week
- 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.

College Lecturer, Department of Economics   **Mar 1-Jun 15, 2018 & 2019**
The University of Chicago
20 hrs/week
- 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

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

Volunteer Experience

Full-Time Service Missionary   **Jan 2007-Feb 2009**
The Church of Jesus Christ of Latter-Day Saints
Zagreb, Croatia

Skills

Programming Languages

- Python (10+ years)
- R, Matlab, SQL

Data Manipulation and Analysis

- Pandas and Polars
- NumPy/SciPy

Big Data Technologies

- Presto/Trino
- PySpark (basic)
- Apache Hive (basic)

Version Control

- Git
- GitHub

High-Performance Computing

- SLURM Workload Manager
- GNU Parallel

Statistics/Econometrics

- Multivariate Time Series
- Regression Analysis
- Maximum likelihood estimators
- Dynamic Programming

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)