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PRINCETON UNIVERSITY

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Department of Economics & Bendheim Center for Finance, Princeton University Julis Romo Rabinowitz Building Princeton, NJ 08544

Graduate Studies

Princeton University, 2015 to present

Ph.D. Candidate in Economics

Thesis Title: "Essays on the Impact of Institutional Investors on Asset Prices"

Expected Completion Date: June 2022

Princeton University, M.A., Economics, 2017

References

Professor Motohiro Yogo
Department of Economics
Bendheim Center for Finance
Princeton University
(609) 258-4467, myogo@princeton.edu

Professor Wei Xiong
Department of Economics
Bendheim Center for Finance
Princeton University
(609) 258-0282, wxiong@princeton.edu

Professor Markus Brunnermeier Department of Economics Bendheim Center for Finance Princeton University markus@princeton.edu

Undergraduate Studies

University of Bonn, B.S., Economics, 2015 Summa Cum Laude, Rank: 1/378

Research & Teaching Fields

Primary Field: Finance, Empirical Asset Pricing

Secondary Fields: Market Microstructure, Applied Machine Learning

Teaching Experience

Princeton University, Teaching Assistant

Fall 2017 ECO342, Money & Banking, with Professor Markus Brunnermeier

Fall 2017, 2018, 2019 ECO464/FIN519, Corporate Restructuring, with Professor O. Griffith Sexton

Princeton University, Advisor for Undergraduate Research

2017 to present Junior Independent Work, advisor for undergraduate research, with Professors

Will Dobbie, Christopher Neilson, Adrien Matray, and Jonathan Payne

University of Bonn, Undergraduate Teaching Assistant

Spring 2013 Corporate Finance, with Professor Hendrik Hakenes

German Red Cross, High School Teacher, Koforidua, Ghana

Fall 2011 Computer Science, International Youth Voluntary Service Program (IJFD)

Research Experience & Other Employment

| Summer 2018 | Ph.D. Research Intern at Bundesbank (German Central Bank) |
|-------------|---|
| Summer 2017 | Visiting Researcher at Bundesbank |
| Summer 2013 | Consulting Intern at Ernst & Young (EY), Germany |

Professional Activities

Referee for Econometrica, The Review of Economic Studies

Honors & Awards

| 2021 2019 - 2020 2015 - 2021 | The Ben Bernanke Prize in Financial and Monetary Economics Griswold Center for Economic Policy Studies Fellowship Princeton University Graduate Fellowship |
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| 2015 - 2017 | German National Academic Foundation Fellowship |
| 2013 - 2014 | Cusanuswerk Foundation Fellowship |
| 2013 - 2014 | University of Bonn Exchange Program Scholarship |
| 2012 - 2015 | Konrad Adenauer Foundation Fellowship |
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Research Papers

"Interacting Anomalies," with K. Müller, more results and data on the project website

An extensive literature studies interactions of stock market anomalies using double-sorted portfolios. But given hundreds of known candidate anomalies, examining selected interactions is subject to a data mining critique. In this paper, we conduct a comprehensive analysis of all possible double-sorted portfolios constructed from 102 underlying anomalies. We find hundreds of statistically significant anomaly interactions, even after accounting for multiple hypothesis testing. An out-of-sample trading strategy that invests in the top backward-looking double-sort strategy generates equal-weighted (value-weighted) monthly average returns of 4% (2.7%) at an annualized Sharpe ratio of 2 (1.38), on par with state-of-the-art anomaly-based machine learning strategies.

"HFT and Price Informativeness," with J. Gider and C. Westheide

We study how the informativeness of stock prices changes with the presence of high-frequency trading (HFT). Our estimate is based on the staggered start of HFT participation in a panel of international exchanges. With HFT presence, market prices are a less reliable predictor of future cash flows and investment, even more so for longer horizons. Further, firm-level idiosyncratic volatility decreases, and the holdings and trades by institutional investors deviate less from the market-capitalization weighted portfolio as a benchmark. Our results document that the informativeness of prices decreases subsequent to the start of HFT. These findings are consistent with theoretical models of HFTs ability to anticipate informed order flow, resulting in decreased incentives to acquire fundamental information.

"Identifying the Price Impact of Fire Sales Using High-Frequency Surprise Mutual Fund Flows"

This paper proposes a new method to isolate a plausibly exogenous component of mutual fund flows to estimate the price impact of fire sales. The method addresses a potential reverse causality problem: instead of mutual fund outflows inducing fire sales, which drive down prices, poor stock returns reduce mutual fund returns, which in turn trigger outflows. The solution is to construct a new instrument from high-frequency surprise flows. Using surprise flows to reexamine important findings in the literature, I find equity markets are deeper and less distortive than suggested.

"Payout-Induced Trading, Asset Demand Elasticities, and Market Feedback Effects"

This paper uses the reinvestment of corporate payouts by financial institutions as a nonfundamental shock to asset prices to estimate the slope of the demand curve for stocks and the real effects of stock returns on corporate financing and investment. Exploiting the separation of announcement and payment at the daily frequency, I find dividends in particular generate payment date price pressure but no announcement date news spillover effects, suggesting that dividend-induced trading is plausibly exogenous to fundamentals. Using dividend-induced trading as a natural experiment for stock returns, I estimate an asset demand elasticity of 1.25 and document a releveraging market feedback effect on investment, where firms respond to an exogenous stock price increase by issuing debt and use the funds to invest.

Research Papers in Progress

"How to Increase the Liquidity and Stability of Financial Markets?," with P. Tremacoldi-Rossi The Ben Bernanke Prize in Financial and Monetary Economics

Using unique, full-depth, message-level trade and quote data from the Brazilian stock exchange that reveal market participants' identities, and exploiting two rich market maker programs as natural experiments, this paper studies the behavior of algorithmic market makers and its implications for asset prices and market quality. First, we find that in normal times exchanges can increase market quality by encouraging voluntary liquidity provision. In contrast, imposing tight liquidity provision requirements constrains market makers and can decrease market quality. In crisis, however, we find that voluntary liquidity providers withdraw and mandatory intermediaries become the liquidity providers of last resort. This suggests that the optimal approach may combine incentives with requirements that only bind in crisis. Second, we show that market makers' cross-asset hedging behavior causes excess co-movement of returns, liquidity, and volume. This suggests exchanges should assign many stocks to each market maker to prevent excess co-movement.

"Cryptocurrencies, Return Chasing, and Return Predictability," with S. Nagel and Z. Wang We combine the full information from the BTC blockchain with addresses of real entities and address clustering algorithms to construct a partially deanonymized BTC transaction history. We find that unsophisticated investors chase past BTC returns and that BTC purchases of sophisticated investors predict BTC returns.

"Risk and Return in the Residential Real Estate Market," with M. Büchner and B. Kelly Using proprietary data from Zillow containing the universe of US real estate transactions from 1996 to 2020, we examine the cross-section of property-level returns. First, even after accounting for multiple hypothesis testing, we find many property characteristics predict returns. These include signals mirroring well-known anomalies in the stock market, such as value, size, momentum, long-term return reversal, and profitability. In addition, there are real estate-specific predictors: home age, the return realized by the last owner, local income per capita, housing supply growth, property taxes, and variables related to idiosyncratic risks. Second, observable factor models fail to price real estate assets. However, instrumented principle component analysis (IPCA) overcomes this issue: a model with two latent risk factors explains the cross-section of housing returns. Finally, using machine learning techniques, we

document that real estate returns are highly predictable. Out-of-sample, houses in the top decile of predicted returns outperform homes in the bottom decile by around 10% annually, even after holding

"Real Estate Investing, Climate Risk, and Inequality"

location, time, and size constant to account for investors' constraints.

This paper examines who bears climate risk via real estate holdings. I measure climate risk exposure as the expected annual loss to buildings using census-tract level climate risk data from FEMA. Further, I combine proprietary data from Zillow containing the universe of US real estate transactions from 1996 to 2020 with HMDA data which allows me to observe demographic information of buyers and sellers. This allows me to answer three questions: Who is most exposed to climate risks? How do real estate investors respond to climate change news? And how do asset prices react to climate change news? I find the top of the top of the wealth distribution is most exposed to climate risks. However, in response to climate change news, the wealthy disproportionately sell exposed homes. These sales are absorbed by firms. Lastly, prices of exposed homes decline after climate change news.

"Predicting Financial Crises: a Comprehensive Assessment," with L. Liu and K. Müller We provide a comprehensive evaluation of which variables are reliable predictors of financial crises. We evaluate thousands of candidate predictors and a large set of predictive models and find that variables related to credit, external imbalances, and macroeconomic conditions have robust forecasting ability out-of-sample.

Skills & Interests

Software Python, Stata, LATEX, big data (Dask), machine learning (Tensorflow, Scikit-learn),

blockchain analysis (BlockSci)

Languages German (native), French (proficient)

Interests Scuba diving, rock climbing, kiteboarding, golf, soccer, virtual reality, traveling