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RESEARCH AND INTERESTS

Financial markets regulation, market microstructure, financial intermediation, causal inference.

EXPERIENCE

June 2016–Present: Financial Economist Fellow
Securities and Exchange Commission, Washington, D.C.
[Division of Economic and Risk Analysis](#)

- I study the economic implications of rulemaking on financial markets.
 - I conducted independent research responding to [Commission Interpretation Regarding Automated Quotations Under Regulation NMS](#).¹
 - I conducted independent research responding to [Order Instituting Proceedings to Determine Whether to Approve or Disapprove a Proposed Rule Change to Introduce Bats Market Close, a Closing Match Process for Non-BZX Listed Securities Under New Exchange Rule 11.28](#).²
- I am involved in modernizing the Commission’s technology infrastructure through data science and cloud-computing initiatives.
 - I led the development of the DERA Open Source Analytics Server (R/Python Jupyter Notebook environment with custom environment support).
- I coordinate with SROs to acquire and construct regulatory datasets.
 - FINRA off-exchange trade executions reported to the Trade Reporting Facilities.

EDUCATION

2010–2016 [Rice University](#)

- Ph.D, M.A. [Finance](#). Jones Graduate School of Business.

2006–2010 [University of Washington](#)

- B.S. [Applied and Computational Mathematical Sciences](#).
- B.S. [Economics](#) *Cum Laude*.

WORKING PAPERS

Loan Syndication Networks *with Ioannis Spyridiopoulos*

¹Release No. 34-78102; File No. S7-03-16.

²Release No. 34-81437; File No. SR-BatsBZX-2017-34.

Intentional Access Delays, Market Quality, and Price Discovery: Evidence from IEX Becoming an Exchange

- Covered in the **Wall Street Journal** *Study Finds ‘Speed Bumps’ Help Protect Ordinary Investors*

This paper exploits cross-sectional variation in trading activity and the staggered securities phase-in when the Investors Exchange (IEX) becomes a national securities exchange to study the effects of intentional access delays on market quality and price discovery. Market quality improves after IEX becomes an exchange for securities with high historical IEX market share. Price discovery improves overall, although IEX’s contribution to price discovery remains small. Intermarket Sweep Order activity decreases overall, coinciding with improvements in price discovery. In a second natural experiment where IEX’s ECN goes dark in 28 symbols there is no change in market quality or price discovery. The findings in this paper suggest that protected markets with symmetric speed bumps may be a feasible solution to deemphasize speed in lieu of regulatory intervention.

Does the PIN Model Mis-Identify Private Information and If So, What are our Alternatives? *with Jefferson Duarte, and Lance Young*

- Presented at Rice University (2015), Texas A&M (2015*), Multinational Finance Society Conference (MFS, 2015*) **Best Paper Award**, China International Finance Conference (CICF, 2015*), Society of Financial Econometrics Conference (SoFiE, 2015*), Instituto Tecnológico Autónomo de México Conference (ITAM, 2015*), American Finance Association Conference (AFA, 2016), University of Washington (2016*), University of Virginia (McIntire) (2017*), Southern Methodist University (2017*).
- **Data and Previous Refereed Versions**

We show that the PIN model is no more useful in identifying private-information arrival than simply looking at whether turnover is above average or not. This calls into question PIN as a measure of private information since turnover varies for many reasons unrelated to private-information arrival. We also examine an alternative to the PIN model, the Odders-White and Ready (2008) model. Our tests indicate that measures of private information based on the Odders-White and Ready (2008) model are promising alternatives to PIN.

Credit Be Dammed: The Impact of Banking Deregulation on Economic Growth *with Elizabeth Berger, Alexander Butler, and Morad Zekhnini*

- **Revise and Resubmit Journal of Financial Intermediation**
- Presented at Rice University (2012*), Financial Management Association Conference (FMA 2013), Securities and Exchange Commission (SEC, 2014*), Fordham University (2014*), University of Cincinnati (2014*), University of Kentucky (2014*), Yale School of Management (2015*).

We document a positive effect of financial integration on economic growth. Using US state-by-state financial deregulations, we find that economic growth occurred in states where bank deregulation solved a capital immobility problem. We use a matching method that constructs synthetic counterfactual states to identify the channels that link bank deregulation to financial integration, and thereby to economic growth. Our results reveal a correlation between financial

integration and subsequent banking sector changes including improved bank efficiency, better lending and borrowing rates, and an expansion in loan recipients. We show that financial integration democratizes lending and spurs economic growth.

WORK IN PROGRESS

Information Diffusion in Institutional Investor Networks

POLICY WORK

[Bats Market Close: Off-Exchange Closing Volume and Price Discovery](#)

- First SEC economic analysis to use regulatory audit trail and TRF data.
- Led to NYSE cutting its top tier MOC fees by two-thirds.

We analyze the correlation among closing price discovery and closing price efficiency—two established metrics from the academic finance literature—with off-exchange trading activity at the close. We analyze equity securities trading and quotation data during the first quarter of 2017 to determine the amount of closing auction volume, the amount of off-exchange Market-on-Close (MOC) activity, and estimates of closing price discovery and efficiency.

Tick Size Pilot Program and Market Quality *with Paul Hughes, John Ritter, Patti Vegella, and Hao Zhang*

PROFESSIONAL SERVICE

- SEC Quant Brown Bag co-coordinator (2016–Present)
- DERA Cybersecurity Working Group (2017–Present)
- CICF Hangzhou 2017 discussant
- FMA International 2016 program committee
- FMA Chicago 2013 discussant

SKILLS

Data analysis, financial econometrics, high performance scientific computing, parallel computing, data visualization, causal inference.

Python, SAS, STATA, SQL, R, bash, git

CITIZENSHIP

USA (Born)

REFERENCES

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