Yang Bai

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Yang's Dark Theme CV

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Research Interests

Investments, Machine Learning and Big Data in Finance, Mergers and Acquisitions, Regulatory Enforcement

Education and Professional Certification

- **University of Missouri**
  Ph.D. in Finance (Expected: May 2024) *2018-Present*
  - Outstanding Graduate Teaching Award (2020-2021)
  - Outstanding Graduate Research Award (2019-2020)
- **University of Georgia**
  M.Sc. in Statistics & B.Sc. in Mathematics *2013, 2015*
- **Global Association of Risk Professionals**
  Certified Financial Risk Manager (FRM®) *2019*

Job Market Paper

Dissecting Machine Learning Return Predictability: A Classification Approach

Awards: *Crowell Prize (Third Prize) ($2000), 19th Crowell Prize Competition, PanAgora Asset Management, 2021*

Presentations: *SFA (2021), World Finance Conference (2021), 19th Crowell Prize Competition (2021), University of Miami Winter Conference on Machine Learning and Business (2021), AFA Ph.D. Poster Session (2021), University of Missouri (2020)*

Abstract: This paper examines machine learning predictability using classification models and investigates the relation between predictability and stock returns. The classifiers show significant and robust out-of-sample precision in placing stocks into the correct deciles, outperforming their counterpart machine learning regressions. The corresponding long-short portfolios deliver significant economic gains. The classifiers invest more resources in return state transitions with lower information shortage—and excel in predicting return deciles in the center and edges of the transition probability matrix. The classifiers extract information from different firm characteristics. Following Easley and O'Hara (2004), I show that prediction success is negatively related to the future returns at the stock level, controlling for information shortage. Information shortage also reduces the probability of prediction success. Portfolios conditional on information shortage show enhanced performance. A mimicking portfolio based on the shock of prediction precision generates significant α benchmarking against popular factor models.

Working Papers

Assortative Matching in Mergers: Evidence from Skill Demand, with Fred Bereskin, Micah Officer, and Jing Wang

Presentations: *Boca Corporate Finance and Governance Conference (Scheduled), Chapman University (2023)*[1], University of Missouri (2023)*

Abstract: Using job skill requirements from the near universe of online job postings, we show that similar hiring strategies for job skills increase the likelihood of mergers among firms, consistent with assortative matching (i.e., Rhodes-Kropf and Robinson, 2008). Moreover, a firm is more likely to become a target if (1) its skill requirements become more similar to the top skill requirements of its potential acquirer, and (2) it is seeking to hire relatively experienced employees. Following the merger, the combined firm continues hiring in skills that are similar between the two firms. We show that lower search frictions and integration costs lead to increased assortative matching in mergers, consistent with prior theories. Mergers induced by similar skill demand experience more synergies, which largely accrue to the acquirer.

Does the SEC's Enforcement Vary Depending on Boards' Gender Composition?, with Fred Bereskin, Xiaohu Guo, and Miriam Schwartz-Ziv

Awards: *Best Paper Award ($300), Boca Corporate Finance and Governance Conference (2022)*

Presentations: *Conference on Empirical Legal Studies (2023), FMA (2023)*, Boca Corporate Finance and Governance Conference (2022), University of Alabama (2022)*, University of Missouri (2022)*

Abstract: The SEC has limited resources that it can dedicate to investigating firms. Which type of firm is the SEC more likely to suspect of potential wrongdoing? We show that firms receiving a "red flag" for misconduct (e.g. comment letters, restatements, whistleblower reports) are less likely to experience an SEC investigation if they have a large fraction of women directors. These firm are also less likely to experience enforcement by the SEC. We address endogeneity by showing that these results are particularly pronounced when the US government changes to a Democratic administration (which we show is more focused on board gender diversity) from a Republican administration. Results are particularly large among smaller firms for which public information is more limited, and thus, the potential for bias is larger. Our findings imply that regulators' decisions on whether to open an investigation, and the outcomes of these investigations, are influenced by regulators' biases and beliefs on how each gender (of directors) carries out its role.

[1] The asterisk indicates presentation by a coauthor.

Working Papers (Continues)

🔗 **Patrolling the Securities Laws: Towards the SEC's Investigation of Founder-CEO Firms**, with Inder K. Khurana and Ruixiang Wang

Awards: *Semifinalist of the Best Paper Award, FMA (2023)*

Presentations: *Boca Corporate Finance and Governance Conference (Scheduled), FMA (2023)**

Abstract: Founder-CEO firms are associated with smaller discretionary accruals, higher return on assets, lower stock return volatility, and lower likelihood of shareholder litigation relative to non-founder-CEO firms. Yet, we find that founder-CEO firms are 18% more likely than an average firm to be investigated in secrecy by the enforcement division of the Securities and Exchange Commission (SEC). This finding is robust to two instrumental variable regressions and a stacked difference-in-differences design, which alleviate the endogeneity concerns. Our channel analyses support the conjecture that the SEC's interest in founder CEOs is primarily due to their idiosyncratic attributes, such as power, overconfidence, and risk-taking, highlighting the screening aspect of the SEC investigation as opposed to its punitive aspect. Further analyses show that founder CEOs' visibility is positively associated with the likelihood of an SEC investigation against their firms. The SEC's corporation finance division is also more likely to issue comment letters to founder-CEO firms. Overall, our findings are of potential interest to firms and investors interested in learning about SEC investigation risk, regulators concerned about founder-CEO firms, and academics studying SEC surveillance.

🔗 **Short Sellers Are the Vanguards of the SEC Investigation: With Evidence from Controlled Experiment**, with Xiaohu Guo and Ruixiang Wang

Abstract: We study the coordination between short sellers and the Securities Exchange Commission (SEC) in initiating the SEC investigations. Our results confirm that the SEC relies on the short sellers in selecting investigation targets. We establish the causal relation using an experiment, the Pilot Program of Reg SHO (2005-2007) that increased the short-selling interest in randomly selected stocks. During the program, we find that pilot firms' SEC investigation risk surged 2.5%, or 73.5% relative to the average SEC investigation risk in the full sample, and that such effect reverted after the program. Information asymmetry amplifies the SEC's reliance on the short sellers, while information certainty mitigates the reliance. Short-selling interest predicts income-reducing, accounting, and error restatements, reflects poor accounting quality, and anticipates shareholder lawsuits. Consistent with our investigation results, the SEC also issues more comment letters to firms with high short-selling interest.

Work In Progress

🔗 **150 Years of Return Predictability Around the World: A Holistic View Across Assets**

Presentations: *FMA (2023)*

Abstract: Campbell and Shiller (1988b, a) show that $d_t - p_t \approx const. + E[\sum_j \rho^{j-1}(r_{t+j} - \Delta d_{t+j})]$. Therefore, if payout growth is not predictable, the payout-price ratio decides returns and the returns must be predictable. Using 150-year data from 16 developed countries across bond, equity, and housing markets, I study this implication using the payout-price ratios, i.e., coupon price, dividend price, and rent price. None of the 48 country-asset combinations shows consistent in-sample and out-of-sample performance with positive utility gain for the mean-variance investor. However, 14 (5) countries have predictable payout growth in the equity (housing) markets. Cochrane (2008, 2011, 2020) argues that the dividend predictability and the return predictability form a joint hypothesis, and the denial of time series predictability does not hold if we reject the hypothesis that the dividend growth is predictable. Contrary to Cochrane's finding, the VAR simulation using data from all the countries in the past 150 years does not reject the null that the dividend growth is predictable and thus the joint hypothesis test provides weak support to return predictability.

Firm Social Network and the SEC Investigation, with Fred Bereskin and Adam Yore

Brief Introduction: We investigate the influence of firm connections through joint venture and strategic alliance on the SEC's investigation. Firms in the center of the social network face significantly higher SEC investigation risk. Our difference-in-differences analysis confirms the baseline results.

Conference Discussions

Boca Corporate Finance and Governance Conference (2022), FMA (2022), SFA (2021), World Finance Conference (2021), University of Miami Winter Conference on Machine Learning and Business (2021)

Teaching Experience

- **Course Instructor**
  Financial Modeling, University of Missouri *2023-2024*
- **Course Instructor**
  Real Estate Appraisal, University of Missouri *2020-2021*
- **Lab Class Instructor**
  Survey of Business Finance, University of Missouri *2018-2019*

Invited Workshop

- **Society of Financial Econometrics & New York University (Shanghai)**
  SoFiE Summer School: Machine Learning in Finance with Jianqing Fan and Dacheng Xiu *Summer 2021*
- **Machine Learning Summer Schools & National Taiwan University (Taipei)**
  Machine Learning Summer Schools: MLSS 2021 Taipei *Summer 2021*

Industry Experience

- **Assurant**
  Data Scientist — *2015-2017, Atlanta, GA*
- **Industrial and Commercial Bank of China**
  Assistant Client Manager Intern — *Summer 2013, China*
- **Bank of East Asia (Hong Kong)**
  Business Development Intern — *Summer 2010, China*

Other Publications

Bai, Dang, Park, and Lee, 2018, A rolling analysis on the prediction of value at risk with multivariate GARCH and Copula, *Communications for Statistical Applications and Methods*, 25, 605-618.

References

- **Dr. Kuntara Pukthuanthong (Chair)** — *pukthuanthongk@missouri.edu*
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- **Dr. Inder K. Khurana** — *khurana@missouri.edu*
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