Digital Economics and AI Tutorial
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Dear Selection Committee,

I am Luka Vulicevic, a third-year PhD student in Finance at the Rady School of Management, University of California, San Diego, writing to apply for the 2027 Digital Economics and AI Tutorial. My research sits at the intersection of three areas: large language models (LLMs), asset pricing, and the financial economics of artificial intelligence. Below, I will describe my papers in more detail and how the tutorial can help me in my pursuit of a job market paper.

I entered my PhD with a background in computer science and immediately applied it to the study of LLMs in finance. In Engelberg, Manela, Mullins, and Vulicevic (2025), we introduce Entity Neutering, a methodology to eliminate lookahead bias in LLM-based research without forgoing state-of-the-art models, a key limitation of alternative methods such as He, Lv, Manela, and Wu (2025). The paper was presented at the NBER Summer Institute 2025 Asset Pricing session and later received a dual-submission invitation to the *Review of Financial Studies*. I also released an open-source Python package on PyPI so that any researcher can apply Entity Neutering in as few as three lines of code.

More recently, I leveraged insights from LLM training to study *complexity* in asset pricing. In Timmermann and Vulicevic (2026), we estimate scaling laws in return prediction—stable power law relationships between model performance and training compute, first introduced by a team at OpenAI—and show that return prediction problems in finance obey such laws. We find well-fitted scaling laws across a wide range of asset pricing settings, characterizing both the limits of predictability and the rate at which forecast performance improves with compute. The paper develops an estimation framework, a class of hypothesis tests, and applies both to the cross-section and market return prediction.

These two projects define the first two years of my PhD: a methodological contribution followed by a broad asset pricing application. This year, I use LLM outages as a natural experiment to study how AI availability causally affects market efficiency. In Lu, Xu, and Vulicevic (2026), we exploit plausibly exogenous outages at major LLM providers[1] and show that LLM availability eliminates the well-studied post-news return drift anomaly. The effect also grows with outage severity, indicating that LLMs act on the intensive as well as the extensive margin. Because LLM supply is highly concentrated, these outages create a new market fragility: a single point of failure in market-wide information processing.

These three papers form the first three chapters of my dissertation, titled "Four Essays on the

[1] Specifically, OpenAI, Anthropic, and Google. We are still working on adding outages from DeepSeek, xAI, and others.

Financial Economics of Artificial Intelligence." The fourth essay[2] studies how artificial intelligence replaces human decision making in financial model building and portfolio construction. Using unique telemetry data on hedge funds and market makers from CoreWeave, I plan to measure these effects at the institution level. My committee currently includes Allan Timmermann (co-chair), Joseph Engelberg (co-chair), William Mullins, and James Hamilton, whose joint expertise in forecasting, asset pricing, and econometrics will guide my analysis. The Digital Economics and AI Tutorial would complement this guidance and substantially improve my ability to design and execute the project.

Sincerely,

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References

Joseph Engelberg, Asaf Manela, William Mullins, and Luka Vulicevic. Entity neutering. *Available at SSRN*, 2025.

Songrun He, Linying Lv, Asaf Manela, and Jimmy Wu. Chronologically consistent large language models. *arXiv preprint arXiv:2502.21206*, 2025.

Runjing Lu, Yongxin Xu, and Luka Vulicevic. Do LLMs make markets more efficient? *Available at SSRN*, 2026.

Allan Timmermann and Luka Vulicevic. Compute, complexity, and the scaling laws of return predictability. *Available at SSRN*, 2026.

[2]Which I hope turns into my job market paper