Lukas Rueda

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Summary

Quantitative Economist and Researcher (M.A., STEM) specializing in econometric modeling, time-series forecasting, and statistical analysis. Expert in leveraging Python to conduct rigorous data analysis, build predictive models, and synthesize complex financial datasets into actionable investment insights. Adept at bridging the gap between quantitative theory and practical application, utilizing a deep understanding of market dynamics to support equity valuation, risk assessment, and portfolio strategy.

Experience

Hunter College — New York, NY
Economics Tutor — Aug 2024 - Present

- Developed and taught a comprehensive curriculum on linear econometrics, guiding students through Ordinary Least Squares (OLS), BLUE estimators, and the statistical properties of normal distributions to improve quantitative literacy.
- Tutored advanced students in non-linear modeling and time-series analysis, utilizing Python to demonstrate stationarity testing, normalization techniques, and Poisson distribution applications for real-world data.
- Facilitated student research by mentoring them through hypothesis formulation and data interpretation, resulting in a 100% improvement in the accuracy of their financial analysis projects.

Principles of Sovereignty LLC — New York, NY
Futures Trader — Jan 2021 - Aug 2024

- Engineered proprietary Python algorithms from scratch to calculate real-time volume profiles, identifying statistical edge in Opening Range Breakouts (ORB) based on profile shapes (B, P, b) to validate directional market hypotheses.
- Executed discretionary futures trades based on quantitative microstructure analysis, maintaining a strict 2:1 risk-reward ratio and capping capital exposure at 1% per position to minimize drawdown risk.
- Managed trading operations as a formal business enterprise, conducting daily, weekly, and monthly P&L retrospectives to optimize strategy performance and ensure strict adherence to risk management protocols.

ObsessVR — New York, NY
Product Manager — Jan 2020 - Jan 2021

- Collaborated directly with retail clients to translate virtual store concepts into actionable technical specifications, documenting over 100+ requirements via Jira to ensure 100% alignment with engineering development goals.
- Spearheaded the design and launch of an internal GUI for 3D model editing, empowering non-technical staff to execute content updates independently and reducing engineering dependency by 25%.
- Managed the end-to-end product lifecycle for pandemic-era virtual retail deployments, coordinating cross-functional teams to deliver 20+ custom store environments on schedule and increasing client adoption rates.

GUESST — New York. NY
Project Manager — Nov 2018 - Jan 2020

- Directed a remote engineering team of 4 developers across Eastern Europe, implementing Agile project management methodologies to streamline sprint planning and reduce feature delivery time by 30%.
- Architected and deployed a proprietary swipe-based matchmaking algorithm connecting retail owners with brands, automating a previously manual curation process and saving the marketing team 20+ hours per week.
- Performed on-site operational audits in brick-and-mortar locations to identify workflow bottlenecks, translating real-world inefficiencies into software solutions that increased store owner retention by 15%.

Education

Hunter College — Masters of Arts (STEM Designated) • 3.67
Economics — New York, NY • Jan 2024 - Dec 2025

Skidmore College — Bachelors of Science • 3.81
Mathematics — Saratoga Springs, NY • Sept 2014 - May 2018

Projects

LSTM Forecasting of Bitcoin Implied Volatility: Regime-Aware Architecture

- **Research Question**: Differenced LSTM models achieved $R^2 = 0.997$ but collapsed to naive persistence, masking zero predictive skill. Root cause: 32% regime shift (DVOL mean 69→48) between training and test periods destroyed model generalization during crises when forecasting matters most.
- **Solution**: Jump-aware LSTM with rolling window normalization (720h adaptive) + Lee-Mykland jump detection (7,278 jumps, 19.2% data across 39,472 hourly samples). 2x weighted loss for jumps; 11 core features (NVRV, DVOL-RV spread, volume, active addresses).
- **Results**: R^2=0.800, RMSE=2.86, MAE=2.04 (298% > rolling baseline R^2=0.201). Jump-aware: 78% MAE improvement vs persistence. VaR backtesting passes 95%/99% Kupiec tests. Crisis periods only 10% worse than normal—ideal for Treasury liquidity risk limits and reserve yield optimization.

https://github.com/lrud/THESIS

Robust Machine Learning Framework for High-Kurtosis Financial Time Series

- **Problem**: ES futures exhibit extreme kurtosis and fat tails causing neural network gradient explosions and collapses. Non-stationarity and market microstructure effects make standard architectures unstable.
- **Solution**: Implemented robust infrastructure: rank-based target transformation (percentile scaling), adaptive Huber loss, layer normalization, residual connections, gradient clipping. Engineered 19 features with temporal validation (momentum 1d/3d/5d, volume ratios, volatility regimes, RSI-14, MACD, ATR, VWAP deviations). Processed 1.14M samples; ultra-conservative architecture (1,013 parameters) proven as maximum stable capacity for this data.
- **Results**: 100% training stability (zero NaN failures), loss convergence (train: 0.1289, validation: 0.1387), gradient control (avg norm: 0.0127). 56.64% directional accuracy; $R^2 = 0.69$ validation. Production-ready with unit tests, version control. Demonstrates robust ML methodology for fat-tailed data—directly applicable to systematic equity screening and volatility forecasting in high-beta sectors (digital assets, fintech, emerging markets).

https://github.com/lrud/FUTURES_NN

Skills

Core
Market Research, Strategic Analysis, Quantitative Analysis, Economic Research, Data Analysis, Cross-Sector Analysis, Market Themes, Research

Technical
Python, Pandas, NumPy, Scikit-Learn, Statistical Modeling, Time-Series Analysis, Data Visualization, Excel, Quantitative Methods, Financial Modeling

Domain
Macroeconomics, Market Dynamics, Asset Classes, Capital Markets, Private Equity, Financial Markets, Economic Indicators, Industry Analysis