

# Tianyao Deng

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## Education

<b>University of North Carolina at Chapel Hill</b>	Aug 2020 -- May 2026 (Expected)
Ph.D. in Economics   Focus: Financial Econometrics, Time Series, Volatility, Correlation	
<b>University of California, Berkeley</b>	Aug 2017 -- May 2019
B.A. in Economics   GPA: 3.778/4.0 ( <i>with Distinction, top 10%</i> )	
<b>Santa Monica College</b>	Aug 2015 -- May 2017
Transfer program   GPA: 4.0/4.0	

## Experience

<b>University of North Carolina at Chapel Hill</b>	Aug 2020 -- present
Graduate Researcher & Teaching Assistant   Econometrics, Time Series	
<ul style="list-style-type: none"><li>Built reproducible pipelines in Python for high-frequency equity data, from cleaning and feature construction to paper-ready reporting.</li><li>Implemented and validated dependence/time-series models (robust correlation estimators; score-driven/GAS dynamics) with out-of-sample and robustness protocols.</li><li>Optimized computations for scale (vectorization, memory-aware design; avoided pairwise <math>O(N^2)</math> constructions where possible) and automated diagnostics.</li><li>Communicated results through working papers and presentations; wrote clean, documented research code for reuse and extension.</li></ul>	

## Research & Quantitative Projects

- Intraday Dynamics of Market Correlation and Impact of Macroeconomic Announcements (Job Market Paper)*
  - Built a high-frequency panel for S&P 500 constituents using NASDAQ TAQ trade prices; sampled 1-second prices and constructed 15-minute returns with rolling windows across 7:00am--7:00pm ET (2009--2023).
  - Proposed an average quadrant-correlation measure with a pair-free estimator; measured intraday term structure and macro-announcement effects via event-study tests and robustness checks.
- A Score-Driven Model for Market Correlation (work in progress)*
  - Designed a score-driven (GAS) model for intraday correlation dynamics with stable unconstrained parameterization and transforms back to valid correlation space.
  - Implemented likelihood/score updates and MLE calibration with numerical safeguards; built diagnostics for fit, stability, and forecasting performance.
- Intraday Price Discovery of Bitcoin between Binance U.S. and Coinbase (2023)*
  - Cleaned and aligned minute-level BTC prices across venues (May 2018--Apr 2020; 731 days), including quote-currency harmonization and outlier handling.
  - Implemented cointegration/VECM price discovery (Information Share; Component Share) and estimated intraday leadership via time-of-day subsamples and smoothing.

## Skills

**Tools:** Python (NumPy, pandas, SciPy), SQL, R, Linux, L<sup>A</sup>T<sub>E</sub>X

**Quantitative Methods:** time series, econometrics, forecasting, score-driven (GAS) model, state-space representation, high-dimensional covariance/correlation, PCA/factor, optimization

**Finance:** market microstructure, high-frequency data, volatility/correlation, portfolio/factor analysis

**Languages:** Chinese (Mandarin and Cantonese), English