THE UNIVERSITY OF CHICAGO | DEPARTMENT OF STATISTICS

# Master's Thesis Presentation

Nick Bourdeau
Department of Statistics
The University of Chicago

## "Information-Theoretic Feature Discovery and Forecasting of US Yield Curve Movements"

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Abstract

Identifying where predictive information about yield movements is concentrated along the US Treasury yield curve and how it shifts over time can help reveal which rate signals offer the most promise from an investment or trading standpoint. Building on this idea, information-theoretic methods can provide a systematic way to measure how information is distributed across different tenors and to identify which characteristics of the yield curve are most predictive. Mutual information quantifies nonlinear relationships and highlights the most explanatory signals, while a dynamic rolling-window framework tracks how those relationships change over time. Gaussian mixture and hidden Markov models provide regime context by learning how the shape of the curve varies across periods of differing volatility. Lastly, Bayesian and ensemble variants quantify uncertainty and assess model robustness. The results show that predictability is modest, but mutual information consistently identifies the most informative regions of the curve, particularly for slope signals. These findings offer an interpretable view of how relationships within the yield curve evolve over time and demonstrate the practical value of an information-based approach.

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