THE UNIVERSITY OF CHICAGO | **DEPARTMENT OF STATISTICS**

Master's Thesis Presentation

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Abstract

The volatility skew surface captures systematic differences in option prices across strikes and expiration dates, reflecting deviations from log-normal return assumptions implied by standard option pricing models. This surface is known to be "sticky," in the sense that its dynamics depend not only on contemporaneous movements in the underlying asset but also on the current shape of the surface. One important dimension of the surface is the term structure, which describes how options of the same strike are priced across different expiration dates.

Using SPX options data sampled at five-minute intervals from October 1, 2025 to December 1, 2025, along with contemporaneous underlying index prices, this thesis studies the intraday dynamics of term-structure skew. Local regression models are estimated to relate changes in term-structure skew to underlying price movements across intraday trading regimes.

The results show that changes in the volatility term structure are strongly related to movements in the underlying index, providing clear evidence of intraday skew sticki-ness. While skew stickiness is present throughout the trading day, its magnitude varies systematically across intraday periods, with the strongest sensitivity observed early in the day and gradually weakening toward the close. A formal hypothesis test rejects the null of equal intraday sensitivities, indicating statistically significant time-of-day het-erogeneity, though the differences are moderate and vary smoothly across the trading day.