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FE570-WS

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FE570 – Project Proposal

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Project Title: Empirical Analysis of Equity Market Microstructure: Liquidity, Volatility, and Informed Trading Signals

Project Summary:

This project aims to undertake a comprehensive empirical analysis of market microstructure through the lens of tick-level equity data. The objective is to glean insights into liquidity dynamics, volatility estimation, and the probability of informed trading within the financial markets. Using high-frequency Trade and Quote (TAQ) data obtained from Refinitiv, we will clean, process, and reformat this data to suit analysis needs. The study will offer valuable perspectives to market participants and policymakers about the underlying mechanics of price formation and transaction costs in modern electronic markets.

Objectives:

1. To acquire and process tick-level dataset from Refinitiv using Hanlon Lab's Google Form request tool.
2. To clean and structure the dataset in the TAQ format for efficient analysis.
3. To perform liquidity analysis by computing spread measures in defined time buckets and study intra-day liquidity patterns.
4. To estimate the volatility of securities using intraday data points.
5. To calculate the probability of informed trading (PIN) to identify potential asymmetric information distribution in the market.

Methodology:

Data Acquisition and Preparation:

- Request tick-level data from Hanlon Lab for the desired securities or market index.

- Perform data cleaning to remove any inconsistencies or errors in the dataset.

- Organize the clean data into TAQ format, ensuring alignment with analysis tools and techniques.

Liquidity Analysis:

- Compute liquidity measures including the quoted spread, effective spread, and realized spread across different time intervals (1-minute, 5-minute, 30-minute, etc.).

- Analyze the intra-day liquidity patterns to understand how liquidity varies throughout the trading day.

Volatility Estimation:

- Apply various models to estimate the intraday volatility, such as the realized volatility and the Garman-Klass volatility estimator.

- Study the impact of macroeconomic announcements, news events, and other market conditions on intraday volatility.

Probability of Informed Trading (PIN) Estimation:

- Use the Easley and O'Hara (1987) model to estimate the probability of informed trading.

- Analyze the variations in PIN values across different times of the day and in response to specific market events.

Expected Outcomes:

The analysis is expected to produce the following outcomes:

- A refined dataset in TAQ format ready for rigorous empirical analysis.

- Detailed liquidity profiles of the studied securities or indices, revealing the nuances of market behavior throughout the trading day.

- Volatility patterns that could be critical for risk management and trading strategies.

- An informed trading probability assessment that could indicate the presence of asymmetric information in the market.

Timeline:

- Week 1-2: Data request and acquisition
- Week 3-4: Data cleaning and organization
- Week 5-8: Liquidity and volatility analysis
- Week 9-10: Estimation of the probability of informed trading
- Week 11-12: Data interpretation, report writing, and presentation preparation

Conclusion:

This project will contribute significantly to the understanding of market microstructure, especially in the realm of liquidity, volatility, and information asymmetry. The insights derived from the analysis could be highly valuable for traders, investors, regulatory bodies, and scholars studying financial markets.