Abstract for the general public

The Variance Risk Premium (VRP) embodies a crucial financial concept reflecting the differential between the market's expectation of future variance, as implied by option prices, and the actual realized variance. This disparity is not merely a statistical artifact but encapsulates compensation for investors bearing volatility risk. The dynamics of VRP are deeply intertwined with underlying market mechanisms, risk attitudes, and the broader macroeconomic environment. A thorough analysis of VRP offers the potential to reveal a detailed understanding of market sentiment, price formation, investors' risk aversion, and the complex structure of financial markets.

The importance of studying VRP goes beyond its basic definition. Firstly, it acts as a barometer of market sentiment, where a higher VRP often denotes heightened market uncertainty or fear, providing a real-time gauge of investor sentiment and risk perceptions. Secondly, the predictive power of VRP regarding future market volatility has been acknowledged to outperform other market-based indicators like implied volatility, thus offering a more accurate lens through which market expectations can be discerned.

Furthermore, the VRP holds wider implications in the realms of asset pricing and portfolio management. It is suggested to have a connection with the equity premium and can play a crucial role in crafting optimized portfolios by facilitating improved risk-return trade-offs. The interplay of VRP with other key financial concepts and its reaction to macroeconomic changes offer a rich area for both academic research and practical implementation.

This research is designed to broaden the scope of knowledge regarding the VRP by exploring its predictive power in forecasting market risk measures. The study is unique in its approach and makes significant contributions in many areas. This work examines the VRP over shorter time frames, particularly emphasizing the increasing trend of trading in zero days to expiry options. This aspect is especially pertinent given the dynamic nature of modern financial markets. Moreover, the study applies the cross-sectional analysis of individual stocks. This approach represents a shift from the conventional focus on index options and the VIX index. By exploring this new dimension, the study offers a more comprehensive view of the VRP's implications across different market segments.

The study's applications are diverse and substantial. They include modeling expected returns, estimating tail risk measures, evaluating the influence of attention and sentiment on the VRP, and analyzing the VRP's role in the cryptocurrency market. These application areas are crucial for understanding the VRP's multifaceted impact on financial markets. Additionally, the research is strengthened by the use of advanced machine learning and artificial intelligence techniques. By integrating these innovative methodologies, the study aims to provide a deeper understanding of the VRP. This approach is expected to shed new light on the complex dynamics of financial markets, enhancing the predictive capabilities and strategic insights for market participants.