



Postgraduate Seminar Series

IIRM Research Findings Seminar– Overprecision in Peer-to-Peer Insurance Risk Pools: A Formal Analysis of Cognitive Bias Effects on Risk Sharing

- **Date:** Thursday, 2 April 2026
- **Time:** 10:00 AM – 11:30 AM
- **Venue:** SEK 210
- **Presenter:** Mr. ZHANG Heling, MPhil Student of IIRM
- **Language:** English

Abstract: By pooling risks among participants with heterogeneous loss exposures, peer-to-peer (P2P) insurance has emerged as a decentralized risk-sharing arrangement that can provide cost-effective coverage while relying heavily on members' subjective assessments of uncertainty. This study examines, from a theoretical perspective, how overprecision distorts the functioning of P2P insurance. In particular, I investigate how individuals' tendency to underestimate the variance of uncertain outcomes affects their participation decisions, the performance of risk-sharing rules, and the distribution of welfare across members. Building on a mathematical framework with biased variance perception, I show that overprecision systematically distorts the standard covariance-based allocation mechanism and leads to non-trivial changes in both first-order and second-order stochastic dominance relations under identifiable conditions. I further derive an exact expression for the resulting change in mean squared error, which provides a tractable measure of efficiency loss under misperceived risk. The analysis reveals that overprecision may initially create the appearance of improved allocation performance, because biased beliefs compress perceived uncertainty and make contributions seem better aligned with expected losses. However, this apparent gain is only illusory. Once evaluated against true risk, overprecision weakens the quality of pooling, amplifies misallocation, and reduces the effectiveness of decentralized insurance arrangements. These distortions are especially severe for participants facing relatively high volatility, implying that behavioral biases can systematically undermine both efficiency and equity in P2P insurance markets.

All are welcome

Contact:

For any inquiries, please contact us at hkibs@ln.edu.hk or call us at 2616-8374.