



Statistics and Actuarial Science Seminar

Title: Risk significance versus statistical significance: an epistemology of quantitative risk

Speaker: Hirbod Assa (UCD)

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Location: N0.20 – Science North

Abstract: Statistics is a discipline with an epistemology of its own: it takes data as its object, reasons about sampling uncertainty, and issues a verdict, statistical significance, that licenses an empirical claim. Quantitative risk management has inherited this verdict wholesale, yet the uncertainty that defeats risk governance is not sampling error but challenge uncertainty: whether a conclusion survives the rival models, calibration windows and stress scenarios a competent reviewer could demand it withstand. This talk develops a modal-epistemic framework in which a risk conclusion is evaluated across a population of admissible “possible worlds” under an institutional evidence relation, and is risk-significant when it is endorsed, when it survives every admissible challenge, rather than merely when a single-model test rejects a null. The framework supplies two registers (assurance-grade K and precautionary working-commitment B), a vocabulary of governance diagnostics built around the Moorean condition “the risk obtains but we cannot endorse that it does,” an importance measure (pivotality) that localises fragility, and a collapse theorem for extreme risks. The central result for a statistical audience is that statistical significance is itself an instance of this machinery: a level- test is an endorsement operator over a population of resampled datasets, rejection is a failure of endorsement at the observed sample, and the p-value is a graded endorsement value — so the two verdicts are one logic over

two populations, and are logically independent. I illustrate both verdicts on real SP 500 tail-loss data, with Kupiec and Christoffersen backtests, exhibiting a statistically decisive model failure that reports no breach and a fragile breach that an admissible challenger overturns. No background beyond hypothesis testing is assumed.