**Cover Letter**

Editor-in-Chief

Dear Editor,

Please find our manuscript “Unified Theory of Luck–Unluck: Axioms, Representation, and Applied Forecasting.” We propose an axiomatic framework with a full representation theorem (uniqueness up to increasing transforms), generalization guarantees (PAC-Bayes under β-mixing), robust ERM via Catoni/Orlicz for heavy tails, and applied demonstrations in sports (football), finance (equities), gaming (roulette, slots), and lotteries. We provide preregistration, calibration analyses, power analysis, and a complete reproducibility bundle.

We believe this work will interest readers in forecasting, decision and information theory, sports analytics, and quantitative finance.

Funding: none. Conflicts of interest: none.

Sincerely,

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**Highlights**

- Unified axiomatic theory of luck–unluck with a complete representation theorem.

- Two canonical heads (logistic/multiplicative) proven order-equivalent; collapse boundary and monotonicity axioms verified.

- Generalization under dependence: PAC-Bayes with β-mixing ULLN; optional sampling/Doob arguments for dynamic collapse.

- Robust ERM: Catoni/Orlicz heavy-tail treatment with practical spreadsheet-friendly surrogate.

- Applications: football (calibration & DM/HAC), equities (SPX/AAPL), roulette (house-edge & ruin), slots (volatility), lottery (jackpot probability).

- Reproducibility: templates, notebook, figures, OSF prereg template, and Zenodo-ready metadata.