

Brief Curriculum Vitae - Emmanuel Haven
January 2023

Webpages

- **Google Knowledge Panel: ‘Emmanuel Haven’**
- **Wikipedia page:** https://en.wikipedia.org/wiki/Emmanuel_Haven
- **Wikipedia page (Quantum economics):**
https://en.wikipedia.org/wiki/Quantum_economics
- **Wikipedia page (Quantum social science):**
https://en.wikipedia.org/wiki/Quantum_social_science
- **NASA/ADS – Harvard University:**
<https://ui.adsabs.harvard.edu/search/q=haven%2C%20Emmanuel&sort=date%20desc%2C%20bibcode%20desc&p =0>
- **Google Scholar:**
<https://scholar.google.ca/citations?user=aDvCOKEAAAAJ&hl=en&oi=ao>

QUALIFICATIONS

- BA (Economics), McGill University (Canada)
- MA (Economics), McGill University (Montreal, Canada)
- Ph.D. (Finance), John Molson School of Business, Concordia University (Montreal, Canada)

EMPLOYMENT HISTORY

- Full Professor and ‘Dr. Alex Faseruk Chair in Financial Management’ at the Faculty of Business Administration, Memorial University: September 2017 – present
- Full Professor (Personal Chair) at the University of Leicester (UK): March 2008 – August 2017
- Reader (Associate Professor) in finance at the University of Leicester (UK): April 1 2007 – March 2008
- Senior Lecturer (Associate Professor) in finance at the University of Essex (UK) : 2003- April 2007
- Lecturer (Assistant Professor) in finance at the University of Essex (UK) : August 2000- 2003

RELEVANT ADMINISTRATIVE TASKS

- Director of the Interdisciplinary PH.D program at Memorial University (since 2018):
<https://www.mun.ca/idphd/current-students/>
- Director of the newly created IQSCS center at Memorial University. IQSCS is a research centre for quantum social and cognitive science:
<https://www.mun.ca/business/centres-and-engagement/centre-for-quantum-social-and-cognitive-science/cqscs-organizational-structure/>
- Member of the board of the International Center for Mathematical Modelling (ICMM) at Linnaeus University (Sweden).

EDITORIAL BOARD MEMBER

- Co-editor in chief of *Quantum Economics and Finance*: <https://us.sagepub.com/hi/nam/quantum-economics-and-finance/journal203837#editorial-board>
- Academic Editor at: PLOS One: <https://journals.plos.org/plosone/>
- Co-Editor at: *Economics: The Open-Access, Open-Assessment Journal*: <https://www.degruyter.com/journal/key/ECON/html>
- Member of the editorial board of *Quantum Reports*: <https://www.mdpi.com/journal/quantumrep/editors>

PUBLICATIONS

I. Books

1. Haven, E.; Athalaye, V. (2024). *Quantum models for economics and finance*. Cambridge University Press (forthcoming)
2. Chakraborti, A.; Haven, E.; Patra, S.; Singh, N. (2023) - Editors of the Book: *Quantum decision theory and complexity modelling in Economics and Public Policy*. This book will appear in the series: 'New Economics Windows Series' (Eds.: Alan Kirman; Thomas Lux et al.). Springer – Nature (forthcoming)
3. Plotnitsky, A.; Haven, E. (2023) - Editors of the Book: *The Quantum-Like Revolution: Festschrift in Honour of Professor Andrei Khrennikov*. With a foreword from Anton Zeilinger – 2022 Nobel Prize Winner in Physics: Springer – Nature
4. Haven, E.; Khrennikov, A. (2017). *The Palgrave Handbook of Quantum Models in Social Science*. Palgrave MacMillan Handbook Series.
5. Haven, E.; Khrennikov, A.; Robinson, T. (2017). *A First Course in Applying Quantum Physics to Social Science*. World Scientific (formerly Imperial College Press).
6. Haven, E.; Molyneux, Ph. ; Wilson, J.; Fedotov, S.; Duygun, M. (2016). *The Handbook of Post Crisis Financial Modelling*. Palgrave MacMillan Handbook Series.
7. Haven, E.; Khrennikov, A. (2013). *Quantum Social Science*. Cambridge University Press – Cambridge (UK).

8. d'Ariano, M.; Fei, S.M.; Haven, E.; Hiesmayr, B.; Jaeger, G.; Khrennikov, A.; Larsson, J.A. (Editors) (2012). *Foundations of Probability and Physics – 6*. American Institute of Physics Proceedings; 1424.

II. Journal publications

Selected Refereed Journal Articles (ranked in order of topic)

1. Hosseini, R.; Tajik, S.; Lai, Z.; Jamali, T.; Haven, E.; Jafari, R. (2023). Quantum Nohmian-inspired potential to model non-Gaussian time series and its applications in financial markets. *Entropy*, 25(7), 1061-
2. Athyalye, V.; Haven, E. (2023). Causal viewpoint and ensemble interpretation: from physics to social sciences. *Philosophical Transactions of the Royal Society A*. Volume 381. Issue 2252. 20220279
3. Ardalankia, J. ; Askari, J.; Sheykhali, S.; Haven, E.; Jafari, G. (2021). Mapping coupled time series onto a complex network. *EPL – Institute of Physics*, 132, 58002.
4. Ardalankia, J.; Osoolian, M.; Haven, E.; Jafari, R. (2020). Scaling Features of Price-Volume Cross Correlation. *Physica A*, 549, 124111.
5. Khaksar, H.; Haven, E.; Nasiri, S, Jafari, G. (2021). Using the quantum potential in elementary portfolio management: some initial ideas. *Entropy*. 23 (2) 180. <https://doi.org/10.3390/e23020180>.
6. Namaki, A.; Raezi, R.; Ardalankia, J.; Hedayatifar, L.; Hosseiny, A.; Haven, E.; Jafari, G. (2021). Analysis of the global banking network by Random Matrix Theory. *Frontiers in Physics*. doi.org/10.3389/phys.2020.586561.
7. Moreira, C., Haven, E., Sozzo, S., Wichert, A. (2018). Process mining with real world financial loan applications: Improving inference on incomplete event logs. *PLOS ONE*: <https://doi.org/10.1371/journal.pone.0207806>.
8. Haven, E. (2019). Quantum mechanical pragmatic rules and social science. In: Festschrift in Honour of Dr. Henry Stapp (Eds: A. de Barros; C. de Montemayor (San Francisco State U.); S. Klein; C. Cochran (UC Berkeley); P. Bob (Charles U.)). *Activitas Nervosa Superior* 61 (1-2); pp. 83-85. Springer Nature.
9. Haven, E. (2019). Quantum Mechanics and Consciousness: Some Views from a Novice. In: Quanta and Mind (Eds: A. de Barros; C. de Montemayor (San Francisco State U.)). *Synthese Library: Studies in Epistemology, Logic, Methodology, and Philosophy of Science*; pp. 141-150. Springer Nature.
10. Aerts, D., Haven, E. & Sozzo, S. (2018). A proposal to extend expected utility in a quantum probabilistic framework. *Economic Theory*, (65, 1079-1109).

11. Guest Editor for special issue in *Journal of Mathematical Economics*: Haven, E., Khrennikov, A., Ma, C. & Sozzo, S. (2018). Quantum Probability Theory and its Economic Applications. *Journal of Mathematical Economics*, (78, 1-198).
12. Haven, E.; Khrennikov, A. (2017). Statistical and subjective interpretations of probability in quantum-like models of cognition and decision making. *Journal of Mathematical Psychology*, 74 (82-91).
13. Haven, E.; Khrennikov, A. (2017). The use of action functionals within the quantum-like paradigm. *Journal of Mathematical Psychology*, 78 (13-23).
14. Haven, E., Sozzo, S. (2016). A Generalized Probability Framework to Model Economic Agents' Decisions under Uncertainty. *International Review of Financial Analysis*, 47 (297-303).
15. Haven, E.; Liu, X.; Shen, L. (2012). 'De-noising Option Prices with the Wavelet Method'. *European Journal of Operational Research*, 222 (104-112).
16. Stradi, B.; Haven, E. (2010). 'The use of interval arithmetic in solving a nonlinear rational expectation based multiperiod output-inflation process model: the case of the IN/GB method'. *European Journal of Operational Research*, 203 (1) (222-229).
17. Khrennikov, A.; Haven, E. (2009). 'Quantum mechanics and violations of the sure-thing principle: the use of probability interference and other concepts'. *Journal of Mathematical Psychology*, 53 (5) (378-388).
18. Haven, E.; Ma, C. ; Liu, H.; Shen, L. (2009). 'Revealing the implied risk-neutral MGF with the wavelet method'. *Journal of Economic Dynamics and Control*, 33 (3) (692-709).
19. Haven, E. (2008). 'Private Information and the 'Information function''. *Theory and Decision*, 64 (2-3) (193-228).
20. Stradi, B. Haven, E. (2005). 'Optimal Investment Strategy via Interval Arithmetic'. *International Journal of Theoretical and Applied Finance*, 8 (185-206).
21. Robinson, T., Haven, E. & Fry, A. (2017). Quantum counting: operator methods for discrete population dynamics with applications to cell division. *Progress in Biophysics and Molecular Biology*, 130 (106-119).
22. Shen, C. and E. Haven (2017). Using Empirical Data to Estimate Potential Functions in Commodity Markets: Some Initial Results. *International Journal of Theoretical Physics*; 56; 4092-4104.
23. Haven, E. Khrennikov, A. (2017). Editors of the Special Issue: 'Applications of Quantum Mechanical Techniques to Areas Outside of Quantum Mechanics.' *Frontiers in Physics*.

24. Haven, E. (2016). Links between fluid mechanics and quantum mechanics: a model for information in economics? *Philosophical Transactions of the Royal Society A*. In special Issue: “Quantum Foundations: information approach.” (G.M. d’Ariano and A. Khrennikov; Eds.). 374: 20150237.
25. Bagarello, F. , Haven, E. (2016). First Results on Applying a non-linear Effect Formalism to Alliances between Political Parties and Buy and Sell Dynamics. *Physica A*, 444 (403-414).
26. Haven , E; Khrennikov, A. (2015). Editors of the special issue: ‘Selected Papers from the Fields Institute Conference (University of Toronto) ‘Quantum Probability and the Mathematical Modelling of Decision Making’’. *Philosophical Transactions of the Royal Society A*. Volume 374. Issue 2058. With an Editorial from David Garner, FRS – Editor-in-Chief of *Philosophical Transactions of the Royal Society A*.
27. Robinson, T., Haven, E. (2015), Quantization and quantum-like phenomena: a number amplitude approach. *International Journal of Theoretical Physics*, 54(12) (4576–4590).
28. Bagarello, F.; Haven, E. (2015) ‘Towards a formalization of a two traders market with information exchange’. *Physica Scripta*. 90 015203. This article was chosen as an 'IOP Select Article'.
29. Haven, E. (2015). Potential functions and the characterization of economics-based information. *Foundations of Physics*, 45(10) (1394-1406).
30. Caraini, P.; Haven, E. (2015) ‘Evidence of Multifractality from CEE Exchange Rates against Euro’. *Physica A*, 419 (395-407).
31. Khrennikova, P.; Haven, E; Khrennikov, A. (2014) ‘An application of the theory of open quantum systems to model the dynamics of party governance in the US Political System’. *International Journal of Theoretical Physics*, 53 (4) (1346-1360).
32. Bagarello, F.; Haven, E. (2014) ‘The role of information in a two traders market’. *Physica A*, 404 (224-233).
33. Caraianni, P.; Haven, E. (2013) ‘The role of recurrence plots in characterizing the output-unemployment relationship: an analysis’. *PLoS ONE*, 8(2): e56767-e56767.
34. Haven, E.; Khrennikov, A. (2013). ‘Quantum-Like Tunnelling and Levels of Arbitrage’. *International Journal of Theoretical Physics*, 52 (4083-4099).
35. Haven, E. (2011) ‘Ito’s Lemma with Quantum Calculus: Some Implications’. *Foundations of Physics*, 41(3), 529-537.
36. Aerts, D.; d’Hooghe, B.; Haven, E. (2010). ‘Quantum Experimental Data in Psychology and Economics.’ *International Journal of Theoretical Physics*, 49(12) (2971-2990).

37. Ishio, H.; Haven, E. (2009). 'Information in asset pricing: a wave function approach'. *Annalen der Physik*, 18(1) (33-44).
38. Haven, E. (2008). 'The Variation of Financial Arbitrage via the Use of an Information Wave Function'. *International Journal of Theoretical Physics*, 47 (193-199).
39. Haven, E. (2006). 'Pilot-wave theory and financial option pricing'. *International Journal of Theoretical Physics*, 44 (11) (1957-1962).
40. Haven, E. (2010). 'The Blackwell and Dubins Theorem and Rényi's Amount of Information Measure: Some Applications'. *Acta Applicandae Mathematicae*, 109 (3) (743-757).
41. Haven, E. (2005). 'Analytical solutions to the backward Kolmogorov PDE via an adiabatic approximation to the Schrödinger PDE'. *Journal of Mathematical Analysis and Applications*, 311 (439-444).
42. Haven, E. (2002). 'Fuzzy Interval and Semi-Orders'. *European Journal of Operational Research* 139, 302-316.
43. Haven E. (2005). 'Emergence of Fuzzy Preference for Risk in a Birkhoff-von Neumann Logics Environment'. *Fuzzy Sets and Systems* 153(1), 29-43.
44. Haven E. (2005). 'The financial relevance of fuzzy stochastic dominance: a brief note'. *Fuzzy Sets and Systems* 152 (3), 467-473.

III. Journal Special Issues

1. Poudel, R.; Haven, E.; Gunes, U.; Georgiev, G.; Zhang, H. (2023). Thermodynamics 2.0: Bridging the Natural and Social Science. Special issue in *Philosophical Transactions of the Royal Society A*: <https://royalsocietypublishing.org/journal/rsta>
2. Chichilnisky, G.; Eisenberger, P.; Haven, E.; Khrennikov, A. (2021). The close connection between Economics and Quantum Theory: a topological exploration. Special Issue in *Quantum Reports*. https://www.mdpi.com/journal/quantumrep/special_issues/quantumrep_EconomicsandQuantumTheory
3. Jafari, G.; Ausloos, M.; Haven, E.; Saakian, D. (2021). The paradigm of complexity and the real data of socio-economy. Special issue in *Frontiers in Physics*.
4. Surov, I.; Haven, E.; beim Graben, P.; Sozzo, S.; Moreira, C. (2021). Predictive Modeling of Cognition and Behavior on Quantum Principles. Special issue in *Frontiers in Psychology*.

IV. Popular media (2020)

1. Haven, E.; Khrennikov, A. (2020). Invited contribution to comment on a recent Nature paper. Live Science Network: <https://www.livescience.com>
2. Haven, E.; Khrennikov, A. (2013). How the rule of quantum mechanics can help make sense of complex social systems. *New Scientist*. July 6 Issue, 26-27.
3. Haven, E.; Khrennikov, A. (2013). Quantum mechanica en de sociale wetenschappen, *New Scientist* (Dutch Version). September 2013 Issue, 80-81.

CONFERENCE LEADERSHIP

- Co-organizer with G. Chichilnisky of the workshop: Applications of topology to quantum theory and behavioral economics at the Fields Institute – University of Toronto (March 2023)
- Main organizer (with Andrei Khrennikov; Jerome Busemeyer; Arkady Plotnitsky; Ehti Dzhafarov and Emmanuel Pothos) of the conference “Quantum Probability and the Mathematical Modelling of Decision Making” at the Fields Institute – University of Toronto (March 2015): <http://www.fields.utoronto.ca/programs/scientific/14-15/quantumprobability/>
- Co-organizer (with Sandro Sozzo) of the 13th Biennial IQSA conference (July 11-15 – 2016) at the University of Leicester.
- Main organizer of the 7th ‘Quantum Interaction’ conference (University of Leicester), with the participation of Edward Nelson (Princeton University) and Samson Abramsky (Oxford University) (July 2013)
- Co-organizer (with Mike Oaksford) of a special symposium on quantum probability in social science (held at Brown University, USA, August 4-6, 2016). See: <http://sites.clps.brown.edu/ict2016/>

RESEARCH GRANTS

- ESRC Research Grant: Seminar Funding: Financial Modelling Post-2008: Where Next? £18,000 with Prof. Wilson (St. Andrews University); Prof. Molyneux (Bangor University); Prof. Fedotov (University of Manchester) and Dr. Fethi (University of Leicester).
- Funding award of Euro 236,000 (+/-: \$CAN 350,000) from the Fund for Scientific Research (Fonds voor Wetenschappelijk Onderzoek, Government of Flanders, Belgium) with Professor Diederik Aerts (Free University of Brussels, Belgium) and Professor Bart D'Hooghe (Free University of Brussels, Belgium) for funding on a four year project which aims “to develop and test a general economic theory for financial option pricing based on the mathematical formalisms of quantum mechanics and to model a socio-economic system incorporating its emergent, contextual and non-deterministic aspects”. January 1 – 2008 until December 31 – 2011.
- With Dr. Hiromu Ishio (Nagoya University, Japan), we were awarded £3,000 from the **Daiwa Anglo-Japanese Foundation** for the funding of a reciprocal visit between Japan and the UK “to collaborate on research linking quantum physics and finance leading to a

new joint project in financial engineering for practical applications.” August 2008-March 2009.

- Awarded Funding (with Dr. P. Caraini – Romanian Academy - Romania) from the “British Academy” of £7,000 (Visiting Scholars Scheme) for funding of the visit of Dr. Petre Caraini to work with Emmanuel Haven on a project entitled: “*Non linear modelling of macroeconomic dynamics in Central and Eastern European Economies*”. August 2010 – November 2010.
- British Academy Award (about £1100) for an exchange visit to the Romanian Academy, Bucharest. 2006.

OTHER ACADEMIC ACTIVITIES

→ **Ad-hoc refereeing:** (publishers are mentioned in brackets):

International Journal of Theoretical and Applied Finance (World Scientific); *Quantitative Finance* (Taylor and Francis); *European Journal of Operational Research* (Elsevier); *Oxford University Press*; *Princeton University Press*; *International Journal of Theoretical Physics* (Springer); *Theoretical and Mathematical Physics* (Springer); *Fuzzy Sets and Systems* (Elsevier); *Physica A* (Elsevier); *Reports on Mathematical Physics* (Pergamon and Elsevier); *Knowledge and Information Systems* (Springer); *IEEE Transactions on Systems, Man and Cybernetics*; *Journal of Physics: Conference Proceedings* (Institute of Physics); *Physics Letters A* (Elsevier); *Information Sciences* (Elsevier); *Journal of Multivariate Analysis* (Elsevier); *Physical Review E* (American Physical Society); *European Journal of Finance*; *Applied Mathematics Letters* (Elsevier); *Computers and Mathematics with Applications* (Elsevier); *Mind and Matter* (Imprint Academic); *Computational Economics* (Springer); *Physical Review Letters* (American Physical Society); *Journal of Banking and Finance* (Elsevier); *Complexity* (J. Wiley); *Journal of the Operational Research Society* (Palgrave MacMillan); *Computational Economics* (Springer); *SIAM Journal of Applied Mathematics*; *Europhysics Letters* (Institute of Physics); *PLOS ONE*; *Annals of Operations Research* (Springer); *Journal of Mathematical Psychology* (Elsevier); *PNAS*; *Applied Numerical Mathematics* (Elsevier) *and other journals.*

→ **Ad-hoc grant Reviewer for**

1. NSERC
2. Multiple grant applications from the ESRC (Economics and Social Sciences Research Council – UK) – including a review on a very large grant assessment of in excess of £ 1 million.
3. NSF (National Science Foundation) (USA)
4. Fulbright visiting scholar programme
5. Management Committee Substitute Member of COST Action MP0801 (Physics of Competition and Conflict); European Science Foundation.
6. Fund for Scientific Research (FWO) (Belgium)
7. Leverhulme Trust

→ **Invited speaker at:**

- Invited panel member at “The Future of Finance’ Conference (Panel 7); Jindal Conference on Applications on quantum modelling and complexity theory to economics

and public policy (Dr. Naresh Singh and Dr. Sudip Patra organizers); Invited speaker at the Winer Memorial Lecture – Purdue University (USA); Fudan University (China); Imperial College (Mathematical Finance); City University (London) – Department of Psychology; Universita di Palermo (Italy); Institute for Mathematical Behavioral Sciences; University of California – Irvine (USA); Oxford University (Oxford University Computing Laboratory). Invited speaker at the 12th International Conference of the Econometric Society of Thailand and the Second International Econometric Conference of Vietnam.