

Hirbod Assa

Curriculum Vitae

Institute for Risk and Uncertainty
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Personal

Citizen of Canada and Iran, Married, One child

Current Positions

- 2017-now* **Head of Consultancy**, Department of Mathematics at University of Liverpool
- 2013-now* **Lecturer**, Institute for financial and actuarial mathematics (IFAM) & Institute for risk and uncertainty, University of Liverpool.

Past Positions

- 2016-2017* **Program Director**, M.Sc. Financial Mathematics at University of Liverpool
- 2015-2016* **Deputy Program Director**, M.Sc. Financial Mathematics at University of Liverpool
- 2013- 2015* **Deputy Program Director**, B.Sc. Mathematics with Finance at University of Liverpool
- 2013* **Part-Time Faculty Member**, Department of Economics, Concordia University.
- 2012* **Part-Time Faculty Member**, Department of Economics, Concordia University.

Education and qualifications

- 2016* **Fellow**, of the Higher Education Academy in the UK.
- 2013* **Ph.D. in Economics**, Concordia University.
Hedging and pricing in incomplete markets: theory and applications.
Supervisor: Nikolay Gospodinov (Federal Reserve Bank of Atlanta).
- 2011* **Ph.D. in Mathematics**, Université de Montréal.
Thesis title: On Some Aspects of Coherent Risk Measures and Their Applications.
Supervisor: Bruno Remillard (HEC Montreal).
- 2010* **Princeton University**, Department of Operational Research and Financial Engineering (ORFE), Visiting Ph.D.
- 2009* **University Carlos III of Madrid**, Department of Business Administration, Visiting Ph.D.

2004 **M.Sc. in Mathematics**, Sharif University of Technology.

2001 **B.Sc. in Mathematics**, Sharif University of Technology.

Research Interest

General: Financial Engineering and Actuarial Sciences, Econometrics and Economics, Machine learning, Risk Management, Re-insurance, Commodity Market, Agricultural Insurance, Economic Scenario Generators

Papers

- 2018 *Market consistent valuations in imperfect markets.*, to appear *Decisions in Economics and Finance* (with Nikolay Gospodinov)
- 2018 *Preferences over all random variables: Incompatibility of convexity and continuity*, *Journal of Mathematical Economics*, Volume 75, March 2018, Pages 71-83 (with Alexander Zimper)
- 2018 *Designing sound deposit insurances* *Journal of Computational and Applied Mathematics*, Volume 327, 1 January 2018, Pages 226-242 (with Okhrati, R.)
- 2017 *Claims Reserving with a Stochastic Vector Projection*, *The North American Actuarial Journal*, Volume 22, 2018 - Issue 1, Pages 22-39 (with Portugal L., Pantelous, A.A.)
- 2017 *Modeling frost losses: application to pricing frost insurances*, *The North American Actuarial Journal*, Volume 22, 2018 - Issue 1, Pages 137-159 (with Wang M., Pantelous, A.A.)
- 2017 *Representation and approximation of convex dynamic risk measures with respect to strong-weak topologies*, *Stochastic Analysis and Applications*, Volume 35, Issue 4, pp 604-614, (with Okhrati, R.)
- 2017 *Robust Approach to Hedging and Pricing in Imperfect Markets*, *Risks* 2017, 5(3), 36 (with Gospodinov, N.)
- 2016 *Joint game and Compatibility*. *Economic Theory*, 61 (1). pp. 91-113. (with Eliston, S., Lehrer, E.)
- 2016 *Robust stability, stabilization and H-infinity control for premium-reserve models in a Markovian regime switching discrete time framework*, *ASTIN Bulletin*, Volume 46, Issue 3 September 2016 , pp. 747-778 (with Pantelous A., Yang, L.)
- 2016 *Modeling and Pricing of Catastrophe Risk Bonds with a Temperature-Based Agricultural Application*. *Quantitative Finance* Volume 16, Issue 12, pp 1949-1959 (with Karagiannis N., Pantelous, A. A., Turvey C.)
- 2016 *Natural Risk Measures*. *Mathematics and Financial Economics*, Volume 10, Issue 4, pp 441-456
- 2016 *Financial engineering in pricing agricultural derivatives based on demand and volatility*. *Agricultural Finance Review*, Vol. 76 Iss: 1, pp.42 - 53

- 2016 *Marginal Indemnification Formulation for Optimal Reinsurances*, Insurance: Mathematics and Economics, 67. pp. 65-76. (with Chengguo W., Shengchao Z., Ken Seng T.)
- 2016 *On the Capital Allocation Problem for a New Coherent Risk Measure in Collective Risk Theory*, Risks, 4(3), 30; (with Firouzi, H.O., Morales, M.)
- 2015 *A financial engineering approach to pricing agricultural insurances*, Agricultural Finance Review, 2015 ,Vol.75 Iss 1
- 2015 *On Optimal Reinsurance Policy with Distortion Risk Measures and Premiums*, Insurance: Mathematics and Economics Volume 61, March 2015, Pages 70–75
- 2015 *Trade-off between robust risk measurement and market principles*. to appear in Journal of Optimization Theory and Application, Volume 166, Issue 1 (2015), Page 306-320
- 2015 *Risk Management Under a Prudential Policy* Decisions in Economics and Finance, Volume 38, Issue 2, pp 217-230, 2015
- 2014 *A hedging approach to insurance company solvency*. Vulnerability, Uncertainty, and Risk @ Quantification, Mitigation, and Management. ASCE. pp. 1245-1253, 2014
- 2013 *Hedging, Pareto Optimality, and Good Deals* Journal of Optimization Theory and Applications, Volume 157, Issue 3, pp 900-917, 2013 (with Karai. K. M.)
- 2011 *Good Deals and compatible modification of risk and pricing rules a regulatory treatment*. Mathematics and Financial Economics, 4:253–268, 2011. (with Balbás, A.)
- 2011 *Lebesgue Property of Risk Measures for Bounded Càdlàg Processes and Applications* Methods and Applications of Analysis. Vol.18 No. 3. pp. 335-350, 2011.
- 2010 *Risk Measures on the Space of Infinite Sequences*. Mathematics and Financial Economics, Vol. 2, No. 4., pp. 253-275, 2010. (with Morales, M.)
- 2006 *Blow-Up and Non-global Solution for a Family of Nonlinear Higher Ordered Evolution Problems* Iranian Journal of Mathematical Sciences and Informatics Vol. 1, No. 2, pp. 9-30, 2006. (with Hesaraki, M. Moameni, A.)
- 2005 *Nonexistence of Solution for Higher Order Evolution Equations and Inequalities* Methods and Applications of Analysis Vol. 12, No. 1, pp. 1-18, 2005. (with Hesaraki, M.)

Federal reserve working papers:

- 2014 *Hedging and Pricing in Imperfect Markets under Non-Convexity*, Federal Reserve Bank of Atlanta Research Paper Serie, Working Paper 2014-13 August 2014s (with Gospodinov, N.)
- 2013 *A Staggered Pricing Approach to Modeling Speculative Storage: Implications For Commodity Prices Dynamics.*, Federal Reserve Bank of Atlanta Research Paper Series, Working Paper 2013-8 September 2013 (with Dobouse, A., Gospodinov, N.)

Submitted and preprints:

- *A free-arbitrage machine learning quadratic approach to parametrize implied volatility in a risk management problem* (with Badamchizade, and Pouralizadeh)
- *Risk Sharing for Individual Risks In Reinsurance Market.*, Insurance: Mathematics and Economics
- *Inf-convolution in risk sharing problems*
- *Fractional Integration and Hurst exponent in future and index commodity prices* (with Turvey, C.G. , Wang, M.)
- *An Optimal Control Approach to Optimal Reciprocal Reinsurance Policy*
- *How efficient is efficient hedging?* (with Mallahi, K. and Okhrati, R.)

Grants and Honors

During Position at Liverpool:

- 2017-2018* **PI, HEIF** (Higher Education Innovation Fund, to develop an impact case with AOX Ltd) (**1,000 pound**).
- 2016-2018* **PI, IFSID** (Institut de la finance structurée et des instruments dérivés de Montréal) "*How do economic variables affect the pricing of agricultural commodity derivatives and insurance?*" (Co-PI: Gabriel Power (Laval University), Philippe Grégoire (Laval University), Financière agricole du Québec- Développement international) (**\$50,000**).
- 2015-2017* **PI, SOA** (Society of Actuaries 2015 Individual Grant), "*Agricultural Insurance and Reinsurance*" (Co-PI: Athanasios Panthelous) (**\$15000**).
- 2014* **Balvir Singh Medal**, Concordia University, For outstanding achievement in PhD, Economics.

During PhD:

- 2012-2015* **FQRSC**, (The government of Quebec research grant) Doctoral Research Grant (**\$60,000**).
- 2011* **Nominated for Best PhD Thesis**, University of Montreal, PhD, Mathematics.
- 2009-2010* **IFM2 Doctoral Research Award**, Institute of financial mathematics of Montreal (**IFM2**) (**\$20,000**).
- 2007-2009* **ISM Doctoral Research Grant** , Institut des sciences mathématiques (**ISM**) (**\$24,000**).
- 2005-2009* **Bourse d'excellence, Doctoral Research Grant**, University of Montreal (**\$21,000**).

Consultancy, Employability and industrial partners

AOX Pricing "Stable" and providing consultancy service. AOX is a UK-based company which aims to develop a product called "Stable" to protect the UK farmers' businesses against agricultural market volatility.

- AlgoLib* *Acting as the Scientific Adviser.* On machine learning and pricing the UK farmers insurances.
- FADQDI* *Studying agricultural re-insurances.* Working with La Financière Agricole du Quebec, Développement International (FADQDI) for pricing yield insurances and exploring the possibility of introducing reinsurance contracts for their products sold in Mali and Haiti.
- MAXIS GBN* *Placement.* 6 paid internship in *Reinsurance & Reporting* and *Underwriting* was secured for the students at the University of Liverpool at MAXIS Global Benefits Network.

Invited Talks and Organizing Sessions

- 2018 *Monetary preferences on large spaces*, MAF 2018, Madrid, Spain.
- 2018 *Risk management on large spaces* University of Manchester, Manchester, UK.
- 2017 *Panel Organizer and Moderator on Big Data in Agricultural Insurances.* SCOR headquarter, Paris, France.
- 2017 *Insurance and finance: new problems, new directions.* Earth Science Department, Western University, Canada.
- 2017 *Insurances on Commodities.* Actuarial Science Department Seminars, University of Waterloo, Canada.
- 2016 *Market consistent valuation in imperfect markets.* HEC Lausanne, Switzerland.
- 2015 *Market sub-consistent valuation* S3RI, University of Southampton, UK.
- 2015 *Pricing catastrophe bonds: application to agricultural risk management* Concordia University, Montreal, Canada
- 2015 *Market sub-consistent valuation* Quantact, University of Montreal, Canada
- 2015 *Market consistent and sub-consistent valuation* WatRISQ Seminar, University of Waterloo, Canada

Supervision: Ph.D.

- Graduated* *Simon Wang*, Topic: On some aspects of quantitative risk management: theoretical and empirical implications for agricultural goods, *currently CEO of AlgoLib*
- Graduated* *Dr. Lin Yang*, Co-supervision, *currently assistant professor at Xi'an Jiaotong-Liverpool University*
- Thesis submitted* *Natalie Chen*, Optimal Reinsurance Strategies under Distortion Risk Measures
- Thesis submitted* *Luís Portugal*, Topic: Stochastic Claim Reserving in Insurance with Regression Model, *currently Managing Director of Grupo ACTUARIAL*
- Current* *Tianyuan Ni*, Time series and machine learning: analysis of commodity and insurance

Supervision: M.Sc.

- 2017 *Qiong Wang* , Implied Volatility with Machine Learning Approach
- 2017 *Cong L* , Yield Insurance in Agriculture Market
- 2016 *Mashael Algoulity* , Investigating Clustering in the Prices of Agricultural Commodities
- 2016 *Mengqi Zhou* , Quantifying Healthcare Industry Adverse Disruptors
- 2016 *Zhu Chenkun* , Estimating ARFIMA model Parameter d from Different
- 2016 *Zhiyuan Qian*, An empirical market consistent evaluator
- 2015 *Jiamei Lin*, A Study on Stylized Facts of Commodity Returns
- 2015 *Emily Goodier*, The Numerical computation of Efficient Frontiers for future scenarios with VaR and CVaR measures
- 2015 *Weiqing Kong*, The Comparison of Efficient Hedging and Super-hedging in Incomplete Market measures
- 2015 *Ya Gao*, Constant Elastic Volatility models and the commodity prices
- 2014 *Wang Lu*, On the Efficiency of the Efficient Hedging
- 2014 *Lin Zhang*, Constant Elastic Volatility models and the commodity prices
- 2013 *Huiyu Wang*, How efficient is the efficient hedging in a Heston Market
- 2013 *Yun Li*, Bubbles in agricultural markets
- 2013 *Yiwe Zuo*, Topic: Speculation and insurance in agricultural finance

Teaching

- 2017& 18 Quantitative risk management, University of Liverpool.
- 2017 & 18 Stochastic modeling in finance, University of Liverpool.
- 2014-18 Numerical analysis for financial mathematics, University of Liverpool.
- 2014 Stochastic analysis and its applications, University of Liverpool.
- 2013 Intermediate macroeconomics II, Concordia University.
- 2012 Introduction to microeconomics, Concordia University.

Professional Activities, Experiences and Organizing

- 2014-now **Advisory Board**, Agricultural Finance Review
- 2014-now **Founder and Chair**, FINACT-IRAN
- 2017 **Scientific Committee**, International Agricultural Risk, Finance and Insurance Conference (IARFIC), 2017, SCOR headquarter, Paris.
- 2017 **Conference Chair**, Forth, FINACT-IRAN Workshop in Financial Mathematics and Actuarial Sciences, IPM, Tehran, Iran.
- 2016 **Conference Chair**, Third FINACT-IRAN Workshop in Financial Mathematics and Actuarial Sciences, IPM, Tehran, Iran.

- 2016 **Management Chair Committee**, QFRA Workshop in Quantitative Finance and Risk Analysis, Rhodes, Greece.
- 2015 **Conference Chair**, Second FINACT-IRAN Workshop in Financial Mathematics and Actuarial Sciences, IPM, Tehran, Iran.
- 2015 **Organizing Committee**, IME 2015, Insurance: Mathematics and Economics Congress, Liverpool, The United Kingdom.
- 2015 **Management Chair Committee**, QFRA Workshop in Quantitative Finance and Risk Analysis, Santorini, Greece.
- 2014 **Conference Chair**, First FINACT-IRAN Workshop in Financial Mathematics and Actuarial Sciences, IPM, Tehran, Iran.

Professional Computer Skills

Working with Matlab, Latex.

Language Skills

Persian Mother tongue

English Fluent

French Intermediate