

Xavier Milhaud

Born on 2/24/1985 in Aix-en-Provence (France), french

Ph.D. in applied mathematics and fully qualified actuary

Insurance - Finance - Mathematics - IT

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Qualified in CNU sections 06 (management) and 26 (applied mathematics). Board member of the french Institute of Actuaries (IA), jury member at IA.

Current position: assistant professor at University of Lyon 1, France. Affiliated to the Finance and Insurance research lab at ISFA (University of Lyon 1).

RESEARCH ACTIVITIES

Published papers (4):

- ◆ Milhaud X., *Exogenous and endogenous risk factors management to predict surrender behaviours*, ASTIN Bulletin (2013) **43** (3), pp.373-398, doi: 10.1017/asb.2013.2;
- ◆ Loisel S., Milhaud X., *From deterministic to stochastic surrender risk models: impact of correlation crises on economic capital*, European Journal of Operational Research (2011), **214** (2), pp.348-357;
- ◆ Milhaud X., Maume V., Loisel S., *Surrender triggers in Life Insurance: what main features affect the surrender behavior in a classical economic context?*, Bull. Français d'Actuariat (2011), **11** (22), pp.5-48;
- ◆ Milhaud X., Gonon M-P. and Loisel S., *Les comportements de rachat en Assurance Vie en régime de croisière et en période de crise*, Risques (2010), **83**, pp.75-80.

Submitted or in revision papers (2):

- ◆ X. Milhaud, O. Lopez, *Model selection of GLM mixtures with a clustering perspective*;
- ◆ O. Lopez, X. Milhaud, P. Therond, *Consistency of tree-based estimators in censored regression with applications in insurance*.

Working papers (4):

- ◆ F. Barsotti, X. Milhaud, Y. Salhi, *Impact of interest rate movements on policyholders' behaviour in life insurance: contagion effect and massive surrenders*;
- ◆ C. Dutang, X. Milhaud, *Predicting surrenders as a competing risk: the subdistribution approach*;
- ◆ O. Lopez, X. Milhaud, *Combining CART with LASSO techniques for insurance purpose*;
- ◆ O. Lopez, X. Milhaud, P. Therond, *Reserving and claims' predictions with censored CART techniques*.

Main talks:

- ◆ *Prediction of lifetimes by tree-based estimators*, Longevity 11 Conference (Lyon), sept. 2015;
- ◆ *Surrenders in insurance and Solvency II*, Association of Asset & Liabilities Management, march 2015;
- ◆ *Mass lapse scenario, a dynamic contagion process*, Chaire risques systémiques (ACPR), jan. 2015;
- ◆ *Surrenders: risk factors and modelling*, ACPR (french regulator for bank/insurance sectors), nov. 2014;
- ◆ *Tree estimators in censored regression: application to reserving*, EAJ Conference (Vienna), Sept. 2014;
- ◆ *Selection of GLM mixtures with a clustering approach*, MBC² Workshop (Catania), Sept. 2014;
- ◆ *Regression trees and duration models*, summer school of the Institute of Actuaries (Paris), July 2014;
- ◆ *Clustering with mixtures of GLM*, 46th meeting of french statisticians, SFdS (Rennes) June 2014;
- ◆ *Whole life contract lifetime: prediction of lapses*, IME conference (Copenhagen) July 2013;
- ◆ *Surrenders in a competing risks framework, application with the [FG99] model*, AFIR seminar, 06/2013;
- ◆ *Modelling the heterogeneity of surrender behaviours by using GLM mixtures*, AFIR/ASTIN/IAALS Colloquia (Mexico), October 2012.
- ◆ *GLM Mixture to manage the surrender's behaviour modelling*, IME conference (Trieste), June 2011.
- ◆ *Surrender risk in life insurance*, Summer school of the french Institute of Actuaries, July 2010.
- ◆ *Surrenders and copycat behaviours*, SPAAF seminar within the ANR project "AST&RISK", June 2010.
- ◆ *Predictions of surrenders in saving business*, SFdS meeting (french association in statistics), May 2010.
- ◆ *Using copulas in protection and health business*, Sépia seminar (Paris), March 2010.

Distinctions:

- ★ SCOR 2013 Award (best PhD in Actuarial Science);
- ★ Best paper award (IAALS section) in AFIR/ERM-ASTIN/IAALS colloquim (International Actuarial Association conference), Mexico City, october 2012;
- ★ Lloyd's Science of Risk runner-up prize with Stéphane Loisel, november 2011.

Academic (lectures and tutorials):

- ◆ *Credibility theory*, 20h (01/2015), International Univ. of Rabat (Maroc), lecture in Master 2;
- ◆ *Risk Theory*, 4 x 20h (02/2015, 02/2014, 03/2013, 04/2013), at ENSAE ParisTech, lecture in Master 1;
- ◆ *Statistical tools to model lapse risk in insurance*, 4h (03/2012); lecture at University Paris VII in Master 2 MO (hereafter denoted by M2MO);
- ◆ *Non-parametric, semi-parametric and parametric estimation of copulas*; 4h (12/2012, 02/2012) and 6h (03/2011); lecture at Université Paris VII, M2MO;
- ◆ *Introduction to copulas and statistical inference*, 4h (feb. 2010), lecture at University Paris VII (M2MO).
- ◆ *Risk Theory*, 2x6h (april 2013, may 2012), tutorials at ENSAE ParisTech, in Master 1;
- ◆ *Statistical inference*, 4h (november 2012), tutorials at ENSAE ParisTech, Master 1.

Work training in actuarial statistics:

- ◆ *Understanding and modelling the operational risk in finance and insurance*, 14h (to appear), Caritat.
- ◆ *Non-life insurance mathematics: pricing and reserving techniques*, 14h (to appear, june 2015), Caritat.
- ◆ *Statistical tools for analysing Big Data with actuarial applications*, 14h (to appear, june 2015), Caritat.
- ◆ *Pricing methods in non life insurance*, 5x16h (december, october and february 2013, june 2012, october 2012) with Caritat, in various non-life insurance companies (e.g. MAAF, motor insurance department). Program: multivariate descriptive statistics, hierarchical clustering, generalized linear models, credibility theory and applications, individual and collective models in insurance.
- ◆ *Deterministic and stochastic reserving*, 16h (may 2012) at Cofidis bank with Caritat (reserving department). Program: chain ladder, london chain, factorial methods, Mack model, overdispersion, bootstrap techniques, Merz-Wuthrich model.
- ◆ *Using the best open-source statistical software: R*, 16h (may 2012), at Allianz insurance company.

EDUCATION

2013 *Qualification* in CNU sections 26 (applied mathematics) and 06 (management).

Fully qualified actuary and *fellow* of the french Institute of Actuaries;

2009-2012 *Ph.D. thesis in applied mathematics* at University Lyon 1 and AXA Global Life (AGL) (french partnership named "convention CIFRE"). Title: *Model selection in GLM mixtures: an application to surrender risk in life insurance*. Defended on 7/06/2012, members of the jury: Hansjoerg Albrecher (president), Bernard Garel and Denys Pommeret (referees), Stéphane Loisel and Véronique Maume-Deschamps (supervisors), Vincent Lepez (examinator).

2009-2011 *Actuary diploma and Master in actuarial and financial sciences* at Institut de Science Financière et d'Assurances (ISFA, University Lyon 1).

2005-2008 *ENSIMAG engineer* (graduate level school of engineering in computer science and applied mathematics at INP Grenoble) + *Research Master* (finance and actuarial sciences, at ISFA Lyon).

EXPERIENCE AND PROJECTS

Responsible for the actuarial department at ENSAE ParisTech: sept. 2011-august 2015, various tasks:

- ◆ teaching, research and supervision of actuarial memoirs;
- ◆ management of the department, in charge of hiring teachers and selecting students, agenda;
- ◆ organization of actuarial seminars on current hot topics (longevity, long term care, Solvency II, ...);
- ◆ organizing and taking part into Master defenses (member of IA jury, member of ENSAE jury);
- ◆ go-between ENSAE ParisTech and the french Institute of Actuaries, as well as ENSAE ParisTech and insurance companies or banks offering actuarial internships (discuss and validate actuarial works).

Ph.D. thesis : (2009-2011, actuarial department in AGL) implemented an RExcel IT tool to model lapse behaviours in saving business (endowments, general account and unit-linked contracts), integrated the impact of financial markets on policyholders' decisions in Switzerland, USA, Belgium and Spain.

Research memoir: (University Laval, actuarial department; Canada, April-September 2008). *Including temporal trends in credibility models* (Bühlmann-Straub, Hachemeister); contribution to the development of the R package `actuar`. Supervisor: Professor Vincent Goulet.

Global: various skills from AGL experience on different topics in modelling life insurance risks: *long term care, longevity/mortality, critical illness, disability, CAT reinsurance* and *Solvency II* (pillars 1 and 2).

Many projects in finance and insurance around the modelling of financial (jump diffusion processes, greeks) and insurance risks (P&C and Life), dealing with correlation effects and their impact on economic capital. See my personal webpage for more details: <http://www.xaviermilhaud.fr/en/projects.html>.

Statistics and Probability: univariate and multivariate descriptive statistics, inferential statistics, tests, *statistics for finance and insurance*. Probability theory and applications. *Stochastic calculus* and applications, brownian motion, Ito formula. *Correlation* (copulas and common shock models). *Current research interests:* discriminant analysis and clustering, survival analysis, generalized linear models, finite mixture models, model selection, hidden Markov models.

Finance, Insurance: *financial markets; financial theory; corporate finance; risk management* in finance and insurance; accounting principles; ruin theory; stochastic models in *life* and *non life* insurance, *reinsurance* theory. Solvency II principles, pillar 1 and pillar 2 (ORSA).

Numerical methods: finite differences methods, partial derivatives equations, *numerical approximations* (Euler, Crank-Nickolson, Runge-Kutta, ...).

OS / IT languages: Unix, MacOS X, Windows / R, RExcel, VBA, C, Java, SQL, Matlab/Scilab, SAS, L^AT_EX.

OTHERS

Languages: english, spanish and italian (good level), french (mother tongue).

Sports: tennis (best ranking 2/6), football, rugby, badminton, ping-pong, sailing and water-skiing.

Travels: lived 13 years in Africa, lots of trips in Europe and South America.