



**31 May - 03 June 2016**  
at  
**ISEG- Lisbon School of Economics  
and Management**

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## SUBMISSION FORM

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Title of Paper / Presentation / Session to appear in program: \_\_\_\_\_

**Non-Life methodologies applied to lapse rate modeling**

Author/s: \_\_\_\_\_

1. **Salma Jamal** 2. \_\_\_\_\_

3. \_\_\_\_\_ 4. \_\_\_\_\_

What will your final submission be? Presentation and Paper  Presentation Only

If selected, what level of knowledge will delegates attending your session require? (please select only) one

No prior knowledge  General industry knowledge assumed  Technical/specific industry knowledge assumed

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## ABSTRACT

(TITLE OF PAPER / PRESENTATION TO APPEAR IN PROGRAM)

**Non-Life methodologies applied to lapse rate modeling**

*(Name of Author/s)*

**Salma Jamal**

**Key words:**

Missing Data imputation, Discriminating criteria, Analysis Factor of Mixed Data, Regression trees, Neural networks, Bagging, Boosting

**Purpose of your paper:**

The application of Non-Life methods to Savings data in order to model the structural component of lapse rates.

**Abstract:**

In Europe, as part of the new regulatory framework Solvency II, insurers have to compute their reserves in a Best Estimate way. Indeed, reserves have to reflect exactly the risks to which their portfolios are exposed to. In Life Insurance, among these risks, the one of lapse carries substantial financial issues for insurers and sparked, de facto, the interest of actuaries.

However, it seems delicate to find unanimous conclusions about the factors that leads to redeem its Life Insurance contract. Although some of them are inescapable, each insurer's data condition its policyholders sensitivity to the lapse risk.

In this paper we present a study which focused on modeling the structural component of the lapse risk thanks to Non-Life methodologies. Our aim was to highlight, in the case of Individual Savings contracts, the contributory drivers to the lapse decision. To reach such a purpose, we relied on large and heterogeneous data and selected appropriate methods, usually used in the Non-Life field, to analyze the carried information : for missing data imputation, portfolio description and lapse rates analysis. For the description step, we used Factor Analysis of Mixed Data (FAMD) which detects linear relationships between heterogeneous factors without altering their nature. Then, we modeled the lapse rate thanks to regression trees (CART) and neural networks (MLP). These models were aggregated with Bagging and Boosting methods before being applied to a recent database, as a validation step.

Finally, a synthesis explains, in the context of this paper, the contribution of each analyzed method, suggesting improvement ways for potential future works and clarifying the limits of the methods used.

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