Title: Optimal Asset-Liability Management of Issuers of Variable Annuities with Guarantees

Abstract: This article considers the optimal allocation of funds for an insurance company issuing variable annuities with riders such as GMWBs. We set ourselves from the point of view of the managers of this insurance company and the optimization criterion is double. We optimize the utility of the profitability of the scheme, and of the level of asset-liability concordance. For the asset-liability management part of the criterion, we rely on a Redington type immunization where the duration of assets and liabilities should match and the convexity of assets should be as high as possible. Assets are constituted of stocks, bonds and cash and are modeled using diffusions. The problem is solved using Hamilton-Jacobi-Bellman equations. Illustrations and discussions are provided.

First Author: Olivier Le Courtois

Postal Address: EM Lyon Business School. 23, Avenue Guy de Collongue. 69134 Ecully Cedex. France.

Email Addresses: lecourtois@em-lyon.com

Second Author: Krzysztof Ostaszewski

Postal Address: Illinois State University, Center of Actuarial Excellence. Normal, IL 61790-4520, USA.

Email Addresses: krzysio@ilstu.edu

Third Author and **Speaker**: Li SHEN

Postal Address: EM Lyon Business School. 23, Avenue Guy de Collongue. 69134 Ecully Cedex. France.

Email Addresses: shen@em-lyon.com

Phone: 0033-(0)4-7218-2945