

Accepted Manuscript

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PII: S0167-6687(16)30231-1

DOI: <http://dx.doi.org/10.1016/j.insmatheco.2016.11.002>

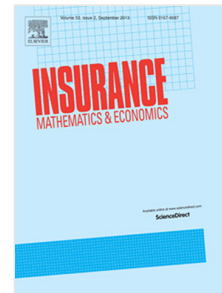
Reference: INSUMA 2298

To appear in: *Insurance: Mathematics and Economics*

Received date: June 2016

Revised date: October 2016

Accepted date: 8 November 2016



Please cite this article as: de Andrés-Sánchez, J., González-Vila Puchades, L., The valuation of life contingencies: A symmetrical triangular fuzzy approximation. *Insurance: Mathematics and Economics* (2016), <http://dx.doi.org/10.1016/j.insmatheco.2016.11.002>

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THE VALUATION OF LIFE CONTINGENCIES: A SYMMETRICAL TRIANGULAR FUZZY APPROXIMATION¹

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ABSTRACT

This paper extends the framework for the valuation of life insurance policies and annuities by Andrés-Sánchez and González-Vila (2012, 2014) in two ways. First, we allow various uncertain magnitudes to be estimated by means of fuzzy numbers. This applies not only to interest rates but also to the amounts to be paid out by the insurance company. Second, the use of symmetrical triangular fuzzy numbers allows us to obtain expressions for the pricing of life contingencies and their variability that are closely linked to standard financial and actuarial mathematics. Moreover, they are relatively straightforward to compute and understand from a standard actuarial point of view.

JEL classification codes: G22, C63

KEYWORDS: Life contingency pricing, fuzzy numbers, fuzzy random variables, fuzzy financial mathematics.

1. INTRODUCTION

Stochastic techniques are, beyond doubt, at the core of actuarial mathematics. However, in insurance decision-making problems, as well as in other areas related to economics and finance, much of the information is imprecise and vague, or relies heavily on subjective judgements and, so, it is not clearly measurable. For such information, the use of fuzzy set theory (FST) can represent a suitable alternative and/or a supplementary way to that of pure statistical methods as has been shown in De Witt (1982), Lemaire (1990), Ostaszewski (1993), Cummins and Derrig (1997), Andrés-Sánchez and Terceño (2003) and Shapiro (2004).

¹ The authors acknowledge the useful comments of anonymous referees.

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