



TITLE: DEFINING A POSTERIORI DISTRIBUTION OF A LONG-TERM RATE STRUCTURE (A MIXED AND EMPIRICAL APPROACH BASED ON FISHER'S FORMULA)

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Key words: Long-Term Rate Structure, GARCH model, Long term inflation, Real rates

Purpose of your paper: To provide a sound methodology to estimate real long-term rates using Fisher's formula.

Synopsis: As actuaries, our calculations are considered to be of public use. It is because of this that, within our processes, local and international regulations are in force. Some have been set within a multidisciplinary team that includes actuaries, while in others actuaries do not form part of the discussion, although the topics being covered do affect its practice. Another fact, is that some topics are left out (or not discussed in a thorough manner), given that the conditions under which these would apply correspond to a limited number of cases, which are commonly associated to economic environments. This creates loopholes that, unless properly discussed, can give place to multiple interpretations and/or practices. Thus, making it difficult for sound peer-reviewing processes to take place. The purpose of this paper is to provide the reader with a procedure for estimating a long-term rate structure based in a nominal rate of return (which we shall denote by R), assuming Fisher's formula, disclosing the nominal rate in its main components: a real rate and an expected long term inflation. Its setting is in an economic environment for which a yield curved cannot be properly calculated, giving the lack of data and that Government Bonds are not emitted on a regular basis. The algorithm used is divided in two phases. During the first phase, the historical series of the country's consumer price index (cpi) monthly variation is used in order to get the best estimate from a GARCH(p,q) model. The second, uses the results of the previous phase, in order to establish a series of Markov Chains, by calculating a random number from a normal distribution where its mean equals the result of the previous month and its standard deviation is the model's (unconditional) standard deviation, conditioned in a way that the estimated future average annual cpi variation falls within the range $(0,R)$.

Note: If you are not presenting a paper for this Colloquium, please include as much detail as possible in your Synopsis (maximum three pages) to enable delegates to prepare for your session.