ABSTRACT

Title of the paper: The uncertainties of the chain ladder reserves revisited
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Key words:
claims reserving, distribution free chain-ladder model, Bayesian chain-ladder model, conditional mean square error of prediction, ultimate run-off uncertainty, one-year run-off uncertainties, Mack's formula, Wuethrich-Merz formulae, cost of capital loading.

Purpose of your paper:
Accurate claims reserves are essential for an insurance company. If non-life insurance companies went bankrupt, insufficient claims reserves were mostly one of the main reason. The reserve risk is the biggest insurance risk in solvency II. For evaluate this risk it is not sufficient to know how to find best estimates for the reserves, one needs also to know how accurate these reserve estimates ar.
In this paper we study the uncertainty of the CL-reserving method. It might very well be possible that the results in this paper will have an impact of the future calculation of the cost of capital loading in solvency II and might lead to an increase of capital required in solvency II.

Abstract:
Chain ladder (CL) is still one of the most popular and most used reserving method for the insurance practice. In 1993 Mack presented the distribution-free CL-model and derived a formula for the uncertainty of the CL-reserves, which refers to the ultimate run-off uncertainty. For solvency purposes one also needs estimators for the one-year run-off uncertainty of the next accounting year (reserve risk) as well as for the one-year run-off uncertainties of future accounting years until final development (cost of capital loading).

In a recent paper (2014) Merz and Wüthrich derived formulas for all these different kinds of CL reserve-uncertainties based on a specific Bayesian-CL model. However the Bayesian-CL model and the distribution free CL-model of Mack are different pairs of shoes. Thus we can't be sure whether the formulae found in this paper are also appropriate for the distribution free CL-model.

In this paper we derive the different kinds of CL uncertainties strictly within the framework of the distribution-free CL model of Mack. By doing so, we gain more insight into the differences between the two model approaches. But the main advantage is that a) the derivation of the one year reserve risks becomes much simpler than in Merz-Wüthrich, b) the formula for the reserve risk for the total over all accident years becomes much simpler, for the one-year reserve risk as well as for the ultimate reserve risk, and c) one can see behind the formulas, as they have an intuitive and easily understandable interpretation.