



KATHOLIEKE UNIVERSITEIT LEUVEN

Statistics Seminar

Joint organization statistics research groups Faculty of Science and Faculty of Economics and Applied Economics
Leuven Statistics Research Centre (LSTAT)

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“The chain-ladder method: influence analysis, robustification and diagnostic tool”

Thursday November 12, 2009

12:00—13:00

Location: Room B00.05, Department of Mathematics, Celestijnenlaan 200B, Heverlee.
Supporting research project: GOA-project 2007/04

Abstract:

The chain-ladder method is a widely used technique to forecast the reserves that have to be kept regarding claims that are known to exist, but for which the actual size is unknown at the time the reserves have to be set. In practice it can be easily seen that even one outlier can lead to a huge over- or underestimation of the overall reserve when using the chain-ladder method. This indicates that individual claims can be very influential when determining the chain-ladder estimates. In this presentation the effect of contamination is mathematically analyzed by calculating influence functions in the generalized linear model framework corresponding to the chain-ladder method. It is proven that the influence functions are unbounded, confirming the sensitivity of the chain-ladder method to outliers. Robust alternatives are introduced to estimate the future claims reserves in a more outlier resistant way. Finally, based on the influence functions and the robust estimators, a diagnostic tool is presented highlighting the influence of every individual claim on the classical chain-ladder estimates. With this tool it is possible to detect immediately which claims have an abnormally positive or negative influence on the reserve estimates. Further examination of these influential points is then advisable. A study of artificial and real run-off triangles shows the good performance of the robust versions of the chain-ladder method and the diagnostic tool.