

Clark Cape Cod Method Working Party

Robert Scarth, 22 May 2018

Background

What is the Clark Cape Cod method?

- A stochastic claims reserving model based on the Cape Cod method
- The Cape Cod method is similar to the Bornhuetter-Ferguson, the main difference being that in the Cape Cod method the prior estimate of the ultimate claims is calculated from an input exposure measure and the actual claims development using a specified formula
- The Clark Cape Cod method uses a curve fit for the expected incremental development patterns
 - The curves discussed in the paper are the Weibull and the log-logistic (aka "inverse power")
 - The curve fit avoids the over-parameterisation of the basic chain ladder
 - Naturally allows for tail development
 - Can handle non-evenly spaced dates – e.g. if the last diagonal contains only nine months of claims data
- The actual loss amount is assumed to have an over-dispersed Poisson distribution
 - The mean is calculated as in the Cape Cod method from the expected incremental development pattern, and the exposure measure
- The variance is assumed to be a constant factor times the mean, that is there is a single scale parameter for the whole triangle
- The parameters are fitted to the model using maximum likelihood
- [The paper](#) shows how to calculate the process, and parameter variance, and the variance of the reserves, both for individual origin periods, and in total
- The paper includes a worked numerical example
- There is much else of interest in the paper, which is not included in the outline above

Potential objectives of the Working Party

- To clearly explain the Clark Cape Cod method and raise awareness of it among members of the Institute and Faculty
- To test the Clark Cape Cod method in a variety of situations and types of business and compare it to other commonly-used methods (Mack/Bootstrap framework) – ideally on a benchmark dataset
- To draw conclusions on its suitability compared to the other methods
- To find practical ways of selecting most appropriate options for the method (e.g. type of curve family fitted, curtailing development, and so on)
- To offer the user a guide as to when the Clark Cape Cod method might be suitable, its limitations/pitfalls and how best to implement in practice.

They may also:

- Explain in detail how to bootstrap the model
- Explain in detail how to build an actuary-in-the-box using the method
- Explore use of Generalised Cape Cod as well as Cape Cod in the method
- Build educational software (e.g. in R or excel) to implement the method – Note: the method is included in the R "chainladder" package
- Compare with other methods from the Bornhuetter-Ferguson family of methods, for example:
 - AMW-BF (this can be adapted to the (Generalised) Cape Cod, when bootstrapping)
 - Cape Cod with credibility smoothing (as described here: <http://www.casact.org/pubs/forum/16sforum/Korn.pdf>)
 - "Bayesian over-dispersed Poisson model the the Bornhuetter & Ferguson claims reserving method" by England, Verrall and Wüthrich, AAS 6(2) pp.258-283
 - "A Bayesian generalized linear model for the Bornhuetter-Ferguson method of claims reserving" by Verrall NAAJ 8(3) pp.67-89

Links

- **The paper:** <https://www.casact.org/pubs/forum/03fforum/03ff041.pdf>
- The working party objectives: <https://www.actuaries.org.uk/practice-areas/general-insurance/disbanded-research-working-parties/practical-use-clark-cape-cod-method-stochastic-reserving>