Double Chain Ladder (Martinez-Miranda, Nielsen and Verrall, 2012) demonstrated how the classical chain ladder technique can be broken down into separate components. It was shown that, under certain model assumptions and via one particular estimation technique, it is possible to interpret the classical chain ladder method as a model of the observed number of counts with a build in delay function from a claim is reported until it is paid. The assumptions needed to reproduce the classical chain ladder results are that the delay function is constant across underwriting years and development years and also that the average severity of claims depends only on the underwriting year.

In this paper, we investigate the Double Chain Ladder model further and consider the case when other knowledge is available, focusing on two specific types of prior knowledge. First, we consider prior knowledge on the number of zero claims for each underwriting year. We show that knowledge of zero claims allow us to access the distributional assumptions of the outstanding claims and the cash flows more accurately, although it does not affect the best estimates greatly. In the data study in this paper, the higher quantiles increase when the number of zero claims are known. This reflects the fact that the parameters available for estimating the severity distribution can concentrate on getting the mean and the tail of positive claims right. Knowledge of the number of zero claims has a greater influence on the tail of the distribution, with the result that the tails are fatter in the data study. The second case we study is when there is prior knowledge about the relationship between the development of the claim and its mean severity and we show how this can be incorporated into the Double Chain Ladder framework. Finally, we consider how to use other data which may be available to formulate the assumptions about the prior knowledge in the two cases referred to above. This involves the use of one further triangle of data which contains the number of claim payments.