

On estimation of insurance risk parameters by combining local regression and distribution fitting ideas

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Abstract

Premium estimation is one of the key problems in non-life insurance. The classical approach of dividing portfolio into homogeneous subclasses and finding the premiums in all those subclasses is well known. The obvious drawback of this approach is that there is no guarantee that the premiums in close classes are also close, which is especially severe problem if some classifying variables are continuously varying. Such situation may cause certain price shock for insureds moving from one class to another (consider, e.g., age as one classifying variable). Obviously, regression-type models are in that sense more dynamic and avoid the forementioned problem. On the other hand, it is hard to specify the form of suitable regression functions, and simple choices of such functions usually have undesirable effects by implicitly implying that risk behaviour of clients corresponding to one region of values of regression variables contain information about the risk behaviour of clients corresponding to a very different region of the same variables. Usually, this is not a reasonable assumption and such effects should be avoided. This argumentation leads us to certain local approximation models. More precisely, we combine the distribution fitting ideas with local regression approach for estimating the distribution parameters. As a result, we propose a certain semiparametric model for estimating the risk parameters for each new client. A case study with real vehicle casco insurance dataset is included, the results obtained by proposed method are compared with the results obtained by using some more conventional methods.

Keywords: premium estimation, local regression, distribution fitting