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Parametric Approach for Reserve Liability Estimate in Mortgage Insurance

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Abstract : Chain Ladder (CL) method, Expected Loss Ratio (ELR) method and Bornhuetter-Ferguson (BF) method, in addition to more complex transition-rate modeling, are commonly used actuarial reserving methods in general insurance. There is limited published research about their relative performance in the context of Mortgage Insurance (MI). In our experience, these traditional techniques pose unique challenges and do not provide stable claim estimates for medium to longer term liabilities. The relative strengths and weaknesses among various alternative approaches revolve around: stability in the recent loss development pattern, sufficiency and reliability of loss development data, and agreement/disagreement between reported losses to date and ultimate loss estimate. CL method results in volatile reserve estimates, especially for accident periods with little development experience. The ELR method breaks down especially when ultimate loss ratios are not stable and predictable. While the BF method provides a good tradeoff between the loss development approach (CL) and ELR, the approach generates claim development and ultimate reserves that are disconnected from the ever-to-date (ETD) development experience for some accident years that have more development experience. Further, BF is based on subjective a priori assumption. The fundamental shortcoming of these methods is their inability to model exogenous factors, like the economy, which impact various cohorts at the same chronological time but at staggered points along their life-time development. This paper proposes an alternative approach of parametrizing the loss development curve and using logistic regression to generate the ultimate loss estimate for each homogeneous group (accident year or delinquency period). The methodology was tested on an actual MI claim development dataset where various cohorts followed a sigmoidal trend, but levels varied substantially depending upon the economic and operational conditions during the development period spanning over many years. The proposed approach provides the ability to indirectly incorporate such exogenous factors and produce more stable loss forecasts for reserving purposes as compared to the traditional CL and BF methods.

Keywords : actuarial loss reserving techniques, logistic regression, parametric function, volatility
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