An Experience Rating Approach to Insurer Projected Loss Ratios
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(Long) Abstract: The traditional approach to Property/Casualty rate indications starts with a methodology that uses internal data to forecast the Ultimate Loss Ratio, losses making up about half of the expenses. For parties that are external to the insurer, this approach to forecasting a key component of future profitability is impractical as they generally do not have access to the data. External parties that are tasked with solvency surveillance, stock pricing, bond pricing, reinsurance underwriting, etc. need a Loss Ratio forecasting approach that relies on publicly available data.

Using publicly available information, that is, National Association of Insurance Commissioners Schedule P of the statutory financial statements from 1992 to 2010, we develop by line of business forecasts of the relativity to the industry Loss Ratio. To develop these forecasts, we use a weighted regression methodology that incorporates key ideas from fixed-effects regression, instrumental variables regression, credibility theory, as well as a flexible covariance structure for residuals. From fixed-effects regression (Frees, Longitudinal and panel data: analysis and applications in the social sciences 2004, 51), we borrow the idea that the forecasts incorporate a (weighted) average of past results. From instrumental variables regression (Frees, Meyers and Cummings, Predictive Modeling of Multi-Peril Homeowners 2011, 3), we borrow the idea that other lines of business can share result-drivers in common, like similar strategies, similar clients or similar perils. From credibility theory, we borrow the idea that rating values vary by size of individual. We also use a Toeplitz, or Moving Average, intra-insurer/line of business structure for residuals over time (Frees, Longitudinal and panel data: analysis and applications in the social sciences 2004, 281).

In line with more traditional experience rating methodologies, the forecasted relativities can be thought of as a modifier to a base rate, which is here the forecast of the by line industry Loss Ratio. These forecasts can reflect outlooks concerning the economy as a whole, the softness/hardness of the market, etc.

Preliminary results indicate that the proposed approach of using lagged relativities from insurer own and other lines of business can provide adequate fits for many lines of business and for the combined results of the insurer as a whole. For solvency surveillance usage, we recommend that a regulator or a rating agency supplement the model with measured rate changes so as to better anticipate large changes in the Loss Ratio than are not due to smooth changes.