Econometric modeling of technical provisions in insurance

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Econometric models of cash-flows applying econometric instruments (e.g. simultaneous equation models SEM, vector autoregression VAR) in life and non-life insurance may provide results that are useful both for individual insurance companies (e.g. the internal models in Solvency II) and for global insurance data (e.g. perspectives for insurance industry in a given country or EU).

The first part of the contribution deals with econometric modeling of the Czech life insurance market by means of the dynamic econometric system of linear simultaneous equations. The model enables to describe and explain technical-actuarial relations among important insurance variables including the technical provisions (technical reserves). From the statistical point of view, capabilities of adjusted residual bootstrapping in the connection with the considered econometric model are analyzed since this technique can solve eventual inaccuracies caused by applying the theoretical asymptotic distribution of residuals (more generally, it can be applied in a broad statistical context, e.g. for the significance testing). The contribution deals also with prognoses and scenario generations (optimistic, pessimistic or randomly generated anticipations) which should be taken into account in practice.

The second part of the contribution deals primarily with non-life technical provisions based on the Czech insurance market data (mainly the provision for outstanding claims and the provision for unearned premium). The resulting model can be used for predicting these technical reserves. Both deterministic and randomly generated scenarios are considered. Such an econometric modeling seems to be useful e.g. for stress testing (i.e. for the insurance regulator) or for the internal models in the framework of Solvency II.