



CLAIMS RESERVING IN JAPANESE GENERAL INSURANCE

- PART 1 - Estimation of IBNR in Japan

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Content

- System of Chief Actuaries in General Insurance
 - Verification work
 - Involvement work
- Estimation of IBNR
 - Setting the units of estimation
 - Screening
 - Estimation methods
 - Notes regarding estimation



Verification Work

- Appropriateness of policy reserves
- Fairness and equality of policyholders dividends
- Appropriateness of IBNR
- Continuity of operations

Involvement Work

- Calculation method of premium
- Calculation method of policyholders reserves
- Calculation method of policyholders dividends
- Calculation method of policyholders value
- Estimation of reserves for outstanding claims
- Other actuarial matters necessary to discharge chief actuary's duty



Setting the Unit of Estimation

- Product line
 - In automobile line, seperately by coverage
- Direct insurance or reinsurance (accepted)
 - domestic direct, overseas direct,
domestic reinsurance, overseas reinsurance



Screening

- Classification
- Judgement

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Classification

- First Group
 - Long tail and important
- Second Group
 - Long tail and unimportant
- Third Group
 - Short tail

①

②

③



Judgement

- Judgement of long-tail
- Judgement of importance

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Judgement of Long Tail

$$\frac{R_{n-2} + R_{n-1} + R_n}{3} < 0.90$$

$$R_n = \frac{\sum_{i+j=n}^{j=0,1} C_{i,j}}{\sum_{i+j=n} C_{i,j}}$$

$C_{i,j}$ paid loss in accident year i , development year $j(> 0)$

n fiscal year

- If the above condition is satisfied, the unit of estimation is determined to be long tail.

Judgement of Importance

$$\frac{R_{n-2} + R_{n-1} + R_n}{3} < 0.01$$

$$R_n = \frac{\sum_{j \geq 2} C_{i,j}^U}{\sum_U \sum_{i+j=n} C_{i,j}^U}$$

$C_{i,j}^U$ paid loss in accident year i , development year j
for unit of estimation

n fiscal year

- If the above condition is satisfied, the unit of estimation is determined to be important.

Estimation Methods

- ②&③ Estimate by the formula in the attached table of the notice (next page)
- ① Estimate rationally by stochastic methods
 - In the case of ② or ③, it is possible to estimate by stochastic methods.

Formula in the Attached Table of the Notice

- The required accumulation amount a In principle
 - If it is difficult to estimate required accumulation amount a in case of reinsurance accepted or direct insurance overseas, estimate required accumulation amount b
 - The required accumulation amount a
 - estimation method based on deficits of past years
 - The required accumulation amount b
 - estimation method based on incurred losses in past years

Required Accumulation Amount a

$$\frac{R_{n-3} + R_{n-2} + R_{n-1}}{3} \cdot \frac{I_{n-2} + I_{n-1} + I_n}{I_{n-3} + I_{n-2} + I_{n-1}}$$

$$R_n = \sum_{\substack{i+j=n+1 \\ j \geq 1}} pC_{i,j} + \sum_{\substack{i+j=n+1 \\ j \geq 1}} V_{i,j} - \sum_{i+j=n} V_{i,j}$$

$$I_n = pC_{n,0} + V_{n,0}$$

$pC_{i,j}$ paid loss in accident year i , development year j

$V_{i,j}$ standard reserves for outstanding claims
in accident year i , development year j

n fiscal year

Required Accumulation Amount b

$$\frac{R_{n-2} + R_{n-1} + R_n}{3} \cdot \frac{1}{12}$$

$$R_n = \sum_{i+j=n} pC_{i,j} + \sum_{i+j=n} V_{i,j} - \sum_{i+j=n-1} V_{i,j}$$

$pC_{i,j}$ paid loss in accident year i , development year j

$V_{i,j}$ standard reserves for outstanding claims
in accident year i , development year j

n fiscal year

Notes Regarding Estimation

- Cleaning of the data
 - Suitability between data and purpose
 - Appropriateness of term of the data
 - Consistency of the data between last time and this time
 - Analysis of statistical disturbance factor
 - Removal and revision of outliers



Notes Regarding Estimation

- Choice of estimation methods
 - Select among stochastic methods such as the chain ladder method, according to their characteristics
 - Desirable to select and compare several models