



**ESTIMATION OF IBNR CLAIMS RESERVES USING
CHAIN LADDER METHOD AND GENERALIZED
LINEAR MODEL (GLM) WITH OVER-DISPERSED
POISSON (ODP) DISTRIBUTION**

UNDERGRADUATE THESIS

Submitted as one of the requirements to obtain

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PLAGIARISM REPORT

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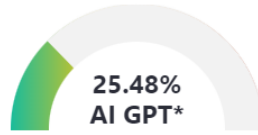
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ABSTRACT

Within the insurance industry, the calculation of reserves for predicting fund allocation becomes highly prominent, as companies must do it accurately to settle future claims. Consequently, insurance firms enhance financial security, ensuring sufficient resources are available to meet obligations, particularly during periods of increased claims activity. This research discusses the calculation of claim reserve estimates using Chain Ladder (CL) method and the Generalized Linear Model (GLM) with Over-Dispersed Poisson (ODP) distribution. Leveraging the simplicity of the CL for baseline projections and the flexibility of GLMs for refining estimates based on additional predictors. Both models yield estimation results for the run-off triangle, illustrating the expected development of claims over a specific period. The case study used in this research involves Auto data from 2010 to 2019 at Zurich Insurance Company in the North America region. The results of calculations using the CL method and GLM with the ODP approach give the same results. Estimates using the ODP approach provide a confidence interval between USD 1,479,610 and USD 1,480,253. The prediction error with MAPE results is the same for both CL and GLM method which is 42,81%. Based on these results, it can be concluded that insurance companies can use the GLM method as a method that provides confidence intervals for making insurance decisions in providing claims reserves.

Keywords: *Incurred But Not Reported (IBNR), Claim Reserves, General Insurances, Chain Ladder Method, Generalized Linear Model, Over-Dispersed Poisson*

ABSTRAK

Dalam industri asuransi, perhitungan cadangan untuk memprediksi alokasi dana adalah hal yang sangat penting, karena perusahaan harus melakukannya dengan akurat untuk menyelesaikan klaim di masa depan. Akibatnya, perusahaan asuransi perlu meningkatkan keamanan finansial mereka, memastikan mereka memiliki sumber daya yang cukup untuk memenuhi kewajiban mereka, terutama selama periode peningkatan aktivitas klaim. Penelitian ini membahas perhitungan estimasi cadangan klaim menggunakan metode *Chain Ladder (CL)* dan *Generalized Linear Model (GLM)* dengan distribusi *Over-Dispersed Poisson (ODP)*. Memanfaatkan kesederhanaan *CL* untuk proyeksi dasar dan fleksibilitas *GLM* untuk memperbaiki estimasi berdasarkan prediktor tambahan. Kedua model menghasilkan hasil estimasi untuk *run-off triangle*, menggambarkan perkembangan klaim yang diharapkan selama periode tertentu. Studi kasus yang digunakan dalam penelitian ini melibatkan data *Auto* dari tahun 2010 hingga 2019 di *Zurich Insurance Company* di wilayah Amerika Utara. Hasil perhitungan dengan menggunakan metode *CL* dan *GLM* dengan pendekatan *ODP* memberikan hasil yang sama. Estimasi menggunakan pendekatan *ODP* memberikan interval selang kepercayaan antara USD 1,479,610 dan USD 1,480,253. Kesalahan prediksi dengan hasil MAPE sama untuk metode *CL* dan *GLM* yaitu sebesar 42,81%. Berdasarkan hasil tersebut, dapat disimpulkan bahwa perusahaan asuransi dapat menggunakan metode *GLM* sebagai metode yang menyediakan interval keyakinan untuk pengambilan keputusan asuransi dalam menyediakan cadangan klaim.

Kata Kunci: *Incurred But Not Reported (IBNR), Cadangan Klaim, Asuransi Umum, Metode Chain Ladder, Generalized Linear Model, Over-Dispersed Poisson*

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