

Title: Regime-Switching Approaches for Dynamic Risk and Dependence Modeling of Insurance Claim Frequency and Severity

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Abstract

Insurance markets are increasingly characterized by nonlinear dynamics, structural breaks, and volatility shifts that challenge traditional models. This study introduces advanced regime-switching approaches to more accurately capture these complexities in both claim severity and claim frequency. For severity modeling, the Local Gaussian Correlation (LGC) framework is integrated with Hidden Markov Models (LGC-HMM) to examine localized and regime-dependent dependence structures using data from Kenya and Norway. For frequency modeling, a Regime-Switching Integer-Valued Generalized Autoregressive Conditional Heteroskedasticity (RS-INGARCH) model is applied to weekly motor insurance claim counts from Uganda. Empirical results demonstrate that both LGC-HMM and RS-INGARCH outperform classical single-regime and copula-based models, particularly in capturing asymmetries, tail behavior, and structural shifts. These findings highlight the value of regime-switching techniques for improving solvency monitoring, forecasting accuracy, and risk-based decision-making in insurance markets.