Does climate change cause an increase in insurance claims and premia? A global time series study

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Abstract

Climate change describes the variation in the long term average weather conditions which in turn occasionally produces climate extreme values leading to a higher frequency and severity of major weather events. For property and casualty insurers, such events may lead to a higher number of costly claims, which impacts their profitability. However, by employing appropriate precautionary measures in Risk Management and underwriting, insurance companies react in this changing situation. Hence, we discovered a need to provide research-based evidence that supports the reaction of insurance companies and to also establish a need to intensify their reactions and help insurance regulatory authorities to reflect climate change appropriately in their requirements. While the ability to model and investigate global climate data and insurance performance indicators to establish empirical relationships without producing spurious results is a non-trivial task, this study investigates the causal relationship between global climate change and insurance industry performance between 1993–2019. Our assumption is that climate change has a negative impact on the insurance industry. This assumption is tested using econometric time series analysis methods including unit root tests, correlation, Granger cointegration and causality tests. Cointegration between climatic variables and insurance performance indicators such as claims and premia is confirmed. While our results also suggest that a long term rise in global temperatures negatively affects the global insurance business with a severe effect noticeable for claims and premia in Europe and Oceania as revealed by the Granger causality test results.

Keywords: Insurance; Claims; Premiums; Climate change; Global temperature; Correlation; Granger cointegration; Granger causality.