

Spillover Effect of Climate Policy Uncertainty, Global Climate Risk and Energy Price Index in Major Countries Based on Quantile VAR

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Abstract

Global climate risk primarily stems from the rise in CO₂ concentrations due to the use of fossil fuels, which in turn leads to more frequent occurrences of climate phenomena such as El Niño. National climate policies are influenced by current global climate risks and also have reciprocal effects on these risks. This paper incorporates climate policy uncertainty in major global countries, global climate risk, and energy prices into a unified analytical framework. Using a quantile vector autoregression model, the study examines the spillover characteristics among these variables from both "frequency domain" and "time domain" perspectives, focusing on various quantile points as well as short-term and long-term effects. The empirical results indicate that: 1) At all quantile points, climate policy uncertainty in China and Germany shows a significant overall spillover effect on other countries and global climate risk, with the spillover from U.S. climate policy being lower than that from China. 2) In the short term, global climate risk exhibits higher spillover effects at lower quantile points, with stronger spillover effects from China, Germany, and the natural gas market; in the long term, major countries' climate policy uncertainty and natural gas show net spillover characteristics, while global climate risk shows net spill-in characteristics, indicating that over the long term, national climate policies influence global climate risk. 3) At lower quantile points, global CO₂ concentrations exhibit spillover effects to national climate policies and energy markets in the short term, while the SOI index shows spill-in characteristics; in the long term, national climate policy uncertainty significantly affects global climate risk and energy markets. 4) At higher quantile points, climate risk exhibits clear net spillover characteristics in the short term; national climate policy uncertainty generates significant long-term spillover effects, impacting global climate risk and energy market prices.

Keywords

Climate Policy Uncertainty, Quantile Vector Autoregression, Global Climate Risk, Frequency Domain Analysis, Time Domain Analysis