

# *Armed Conflict Dynamics and Energy Price Volatility: A quantile connectivity approach*

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## **Overview**

Understanding the interaction between armed conflicts and energy prices in developing countries is crucial given the complexity of these phenomena. The connections between energy and conflict can be approached from various perspectives, whether geopolitical, environmental, or economic (Mansson, 2014). Understanding this relationship is essential since energy resources are strategic for economic and social development (Wen et al., 2018; Wen et al., 2019), as well as a determinant of global economic growth (Chen and Wu, 2017; Chen and Zhu, 2019).

Given the relevance of energy supply for economic progress, the stability of energy prices has acquired a critical nature that promotes special attention from multiple countries. However, the scarcity of energy resources, their strategic significance, and the geographical dissociation between supply and demand, contribute to making energy prices highly susceptible to various conflicts (Qin et al., 2020). However, the relationship of energy prices or energy systems and armed conflicts are analyzed by focusing on a single factor or a single energy carrier, such as oil, and a specific level of analysis (international, national and local). (Mansson, 2014), which may limit our understanding of the underlying dynamics.

In the Latin American context, the relationship between conflicts and energy systems is especially critical due to the interdependence between energy security and political and social stability (Becue et al., 2018). According to Månsson (2014) conflicts can manifest themselves in various ways in relation to energy, they can be objectives in a conflict, means in a conflict, or even causes of conflicts; In turn, three severities are presented (violent, social instability and political disputes), which modify the relationship between the phenomena. This complex interaction poses significant challenges for energy management and policy in Latin America. Conflicts in the region can generate significant delays in the energy transition towards clean and sustainable sources. Political and social instability, as well as disputes over energy resources, can hinder the implementation of renewable energy projects, affecting the efficiency and sustainability of the energy transition, as well as energy security.

It is essential to address these challenges to ensure energy security and that the adoption of clean energy is carried out effectively and contributes to the sustainable development of the region. Our research focuses on exploring how the presence of conflicts and their intensity, represented by variables such as the number of battles and deaths, can influence energy prices in Latin American countries. Political and social dynamics can have a significant impact on energy security and price stability, and this study seeks to provide a deeper understanding of how these different levels of interaction between conflict and energy can affect energy prices in the region.

## Methods

Directional predictability is studied, following the cross-quantilogram approach proposed by Han et al., (2016) to measure and analyze the dependence between conflict variables and energy prices at different quantile levels. This quantile connectivity method will be employed to explore the dependencies between these variables at different quantiles, providing a deeper understanding of how conflicts can influence energy prices under various economic and climatic conditions. It will be controlled for climate variables and fossil fuel prices to isolate specific connectivity from conflicts in energy prices.

## Expected Results

The results of this study are expected to provide evidence on the interactions between conflict variables and energy prices in Latin American countries. It is anticipated that significant connections between the presence of conflicts and energy price dynamics will be revealed, highlighting the influence that conflicts can have on price volatility and, ultimately, the region's energy security. The application of the quantile connectivity method will allow a more detailed and nuanced understanding of these relationships by examining how the intensity and nature of conflicts can influence different levels of energy price quantiles, which will help identify strategies mitigation measures for affected countries.

By controlling for climate variables and fossil fuel prices, this study will be able to more precisely isolate the specific influence of conflicts on energy prices, allowing for a more accurate assessment of the risks and opportunities associated with energy security in the region. Latin American region. Ultimately, the findings of this study are expected to contribute to policy-making and decision-making aimed at improving energy resilience and promoting sustainable development in the region.

## Conclusions

This study will contribute to the understanding of how conflicts can affect energy prices in Latin American countries. This research not only highlights the importance of addressing the complex interaction between conflicts and energy prices, but also provides essential insights for the design of more resilient and sustainable energy policies in the region. The results obtained suggest the need for specific strategies to mitigate the effects of energy price volatility, especially in contexts where conflicts are a persistent reality.

The findings could inform strategies to address price volatility and improve energy security in the region, ultimately the findings of this study can serve as a basis for developing and implementing initiatives that encourage energy diversification, supply resilience and the promotion of cleaner and more sustainable energy sources. By addressing these challenges comprehensively, Latin American countries can move towards a more secure, stable energy future in line with regional and global sustainable development goals.

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