

The Impact of Geopolitical Conditions on Global Food Price Volatility: An Empirical Study

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Abstract: *In an increasingly interconnected world, the bread on a family's table is no longer just a product of local soil and rain; it is a hostage to global politics. This research investigates the volatile, non-linear relationship between geopolitical risk and the cost of survival. By synthesizing data from recent conflicts and advanced econometric models, this study identifies a "tipping point"—a GPR threshold of 0.022—beyond which global food security is no longer stable. We explore how political tensions ripple through energy markets and supply chains to drive inflation. Our analysis of the 2022 crisis reveals a staggering 113% surge in wheat prices and a 68% rise in palm oil, reflecting a period where geopolitical friction superseded market logic. The article concludes by interpreting these shifts as a call to action for protecting the world's most vulnerable import-dependent nations.*

Keywords: Geopolitical Risk, Food Security, Human Impact, Supply Chain, Threshold Regression

I. INTRODUCTION

The stability of the global food system was once thought to be a matter of agricultural efficiency and climate resilience. However, recent history has shown that political instability is the "systemic risk" that can override even the best harvests. Geopolitical risk—the realized or perceived threat of conflict and war—has a documented power to dictate food price movements (Saâdaoui et al., 2022). For the average citizen, this isn't just a shift in a graph; it is a direct hit to their purchasing power. This study moves beyond the math to interpret how these risks transmit through the global economy and why certain staple commodities react so violently to the drums of war.

II. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

A. The "Tipping Point" Theory

Modern economics suggests that the impact of geopolitical tension on food is not a steady climb, but a sudden break. Utilizing the dynamic panel threshold model, researchers have identified a specific "tipping point" (Mehibel et al., 2025). When tensions remain low, global markets are remarkably resilient, absorbing shocks through trade diversions. However, once the geopolitical risk index crosses the 0.022 mark, the market enters a "Crisis Zone" where price movements become aggressive and non-linear, making food security a fragile uncertainty (Mehibel et al., 2025).

B. The Volatility Cluster

When political news breaks, it creates what researchers call a "volatility cluster"—a period of sustained market anxiety that lasts far longer than the initial event (Dai et al., 2024). Not all commodities are equal in this storm; secondary data shows that corn and soybeans act as the primary "transmitters" of risk, catching the spark of geopolitical news and spreading price volatility to other grains which act as "receivers" (Goyal et al., 2024; Ren et al., 2025).

III. DATA ANALYSIS AND EMPIRICAL FINDINGS

A. Magnitude of Price Disruptions

The period between 2021 and 2022 served as a stark reminder of how quickly a conflict in one region can inflate the cost of living globally.



TABLE I: THE LIVED REALITY OF PRICE INFLATION (2021-2022)

Commodity	Nominal Increase (%)	Real Impact	Market Observation
Wheat	113%	85%	A direct result of the Black Sea "breadbasket" closure.
Palm Oil	68%	42%	Families turned to palm oil as sunflower supplies vanished.
Corn	54%	31%	Higher costs for animal feed and essential cereals.
Fertilizers	>150%	N/A	The "hidden" driver that sustained high prices.

Source: ([Arndt et al., 2022](#); [Meijl et al., 2023](#))

B. Statistical Threshold Interpretation

The most critical finding for researchers is the identification of the GPR threshold.

Table 2: Interpretation of Geopolitical Risk Thresholds

Commodity	Nominal Price Increase (%)	Real Price Increase (%)	Market Observation
Wheat	113%	85%	Immediate reaction to Black Sea port closures
Palm Oil	68%	42%	Driven by substitution for sunflower oil
Corn	54%	31%	Impacted by fertilizer costs and feed demand
Fertilizers	>150%	N/A	Preceded and sustained food price hikes

([Arndt et al., 2022](#); [Meijl et al., 2023](#))

IV. TRANSMISSION CHANNELS

The "pass-through" of geopolitical conditions into the cost of a household's food basket occurs through four distinct, yet interconnected, channels:

- The Energy-Food Nexus:** Agriculture is highly energy-intensive. Geopolitical conflicts often cause natural gas and crude oil prices to double (Arndt et al., 2022; Goyal et al., 2024). This increases the cost of:
 - o Farm machinery operation.
 - o Processing and packaging.
 - o International shipping and local logistics.
- The Fertilizer Input Channel:** Natural gas is a primary feedstock for nitrogen-based fertilizers. Secondary data shows that fertilizer price growth often precedes food price spikes during geopolitical crises (Arndt et al., 2022). When farmers cannot afford fertilizer, future crop yields drop, creating a secondary "supply shock" months after the initial conflict.
- The Policy and Protectionism Channel:** As global prices rise, governments often react by imposing export bans to secure domestic supply (Meijl et al., 2023). This "beggar-thy-neighbor" policy reduces global availability, further driving up the international price.
- Financialization and Speculation:** Geopolitical risk attracts speculative capital into commodity futures. Corn and soybeans, as high-liquidity assets, see significant price movement based on "perceived" future risk rather than actual current supply (Goyal et al., 2024).



V. INTERPRETATION OF REGIONAL VULNERABILITY

The interpretation of this data suggests that the burden of geopolitical risk is not shared equally. Countries like Egypt and Turkey are identified as highly vulnerable due to their heavy reliance on imported cereals (Dai et al., 2024). For these nations, a spike in GPR index beyond the 0.022 threshold often results in a direct increase in poverty levels, as a larger percentage of household income is diverted to meet basic caloric needs (Arndt et al., 2022; Meijl et al., 2023).

VI. CONCLUSION AND POLICY RECOMMENDATIONS

This study confirms that geopolitical conditions are a central, rather than peripheral, determinant of food price stability. The identification of a 0.022 GPR threshold provides a quantitative early-warning signal for international monitors (Mehibel et al., 2025).

Recommendations:

- **Diversification:** Nations must move away from "single-source" import dependencies (e.g., relying solely on the Black Sea region for wheat).
- **Buffer Stocks:** Developing strategic grain reserves can help "dampen" the shock when GPR exceeds the critical threshold.
- **Input Subsidies:** Governments should focus on stabilizing fertilizer prices to prevent the long-term yield drops that follow geopolitical shocks (Arndt et al., 2022).

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