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great by
deeds, not by
birth"
-Chanakya

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**Strategic Pricing and Supply Chain Resilience under Geopolitical Disruptions:
A Bilevel Analysis of the Crude Oil Market**

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Strategic Pricing and Supply Chain Resilience under Geopolitical Disruptions: A Bilevel Analysis of the Crude Oil Market

Abstract:

Geopolitical conflicts fundamentally reshape global supply chains, particularly in energy markets where upstream concentration and downstream dependency create asymmetric power structures ripe for strategic exploitation. This study develops a bilevel Stackelberg optimization model to analyze strategic interactions between crude oil producers and downstream refiners under war-induced disruptions, using the March 2026 Iran–US–Israel conflict as a critical empirical context. The model captures a leader–follower structure where producers set prices while refiners respond through quantity decisions under capacity and cost constraints. Closed-form solutions characterize equilibrium price, output, and profit distribution, revealing that geopolitical shocks amplify upstream dominance, increase equilibrium prices by 15–40%, and reduce system-wide efficiency by constraining downstream responsiveness. We derive five testable hypotheses linking disruption intensity to pricing power, profit asymmetry, and supply contraction, subsequently validated against observed market behavior during the Strait of Hormuz crisis. The findings demonstrate that the 2026 conflict has generated the largest supply disruption in modern oil market history, with approximately 20 million barrels per day of oil and petroleum products effectively halted (Columbia Center on Global Energy Policy, 2026). The analysis contributes to strategic management and sustainability literature by integrating game theory with supply chain resilience under extreme events, offering policy implications for diversification, strategic reserves, and regulatory intervention to mitigate systemic risk in an era of deep crisis.

Keywords: Stackelberg Game; Bilevel Optimization; Supply Chain Disruption; Geopolitical Risk; Energy Markets; Sustainability; Strait of Hormuz



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