Does Options Trading Matter for Risk Management? Insights from the 1936 Options Ban on Futures Markets

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Motivation

Implications of Options Trading for Risk Management:

1. **Direct Impact:** Key hedging tool.
2. **Indirect Impact:** Enhances the efficient incorporation of new information by futures markets (Easley, O'Hara, & Srinivas, 1998).

Underlying Mechanism:

- Options attract informed traders due to their leverage and signaling properties.
- Options trading volumes serve as early indicators of new information.
- When **options trading** is **banned**:
  - Futures markets lack leverage, limiting informed traders.
  - Market makers face greater uncertainty, increasing transaction costs.

Hypotheses

Option trading activity likely endogenous to commodity-level characteristics
⇒ Use Ban as **Natural Experiment**

1. Options Trading Stabilizes Market Volatility

- Expectation: The ban on options increases the volatility of grain futures prices.
- Methodology: Difference-in-Differences (DiD) approach (Angrist & Pischke, 2009).

2. Options Trading Enhances Hedging Effectiveness

- Expectation: Post-ban, hedging effectiveness in futures markets decreases.
- Methodology: Event-Study approach (Roth, 2022).

Related Literature

- **Volatility and Option Pricing** (Ball & Torous, 1986; Black & Scholes, 1973; Brenner, Courtadon, & Subrahmanyam, 1985; Ramaswamy & Sundaresan, 1985).
- **Information Flow** in options markets (Easley et al., 1998; Johnson & So, 2012; Pan & Poteshman, 2006; Roll, Schwartz, & Subrahmanyam, 2010).
- **Options as Hedging Tools** (Biais & Hillion, 1994; Frank, Irwin, Pfeiffer, & Curtis, 1989; Ross, 1976).
- **Speculation in Derivatives Markets** (Duvel & Hoffman, 1927; Iorgulescu & Pütz, 2024; Irwin, 1937; Kang, Rouwenhorst, & Tang, 2020; Kim, 2015; Manera, Nicolini, & Vignati, 2016).
- **Derivative Market Bans** (Beber & Pagano, 2013; Brunnermeier & Oehmke, 2014).

Anti-Option Era in the U.S.: What Led to the 1936 Ban?

- **Populist and Agrarian Movements:** Criticized speculative trading practices, viewing options as destabilizing (Cowing, 1895).
- **Failed Legislative Attempts:** Multiple bills aimed to curb options speculation but were unsuccessful (Markham, 1987).
- **1933 Wheat Market Manipulation:** Manipulative trading led to plummeting wheat futures prices, prompting regulatory scrutiny (GFA, 1933).
- **Commodity Exchange Act (1936):** Enacted to **prohibit all** commodity options trading, addressing fraud and excessive speculation (CFTC, 2024).

Data (1934-1939)

Treated Group - US Futures Markets (CBoT)

- **Group:** US (CBoT) corn and wheat futures impacted by the 1936 options trading ban.
- **Source:** Daily spot and futures prices from the *Annual Reports of the Board of Trade of the City of Chicago*.

Control Group - London Futures Markets

- **Group:** London corn and wheat futures unaffected by the 1936 ban.
- **Source:** Weekly futures prices from historical records of *The Times*.

Matching

- Maturity Matching: Align maturities of corn and wheat futures contracts between CBoT and London markets.
- Temporal Matching: Use Friday-to-Friday observations to ensure comparability.
- Continuous Series Construction: Implement a rolling mechanism to track the contract closest to maturity and switch on the first day of the maturity month.

Measures of Market Volatility

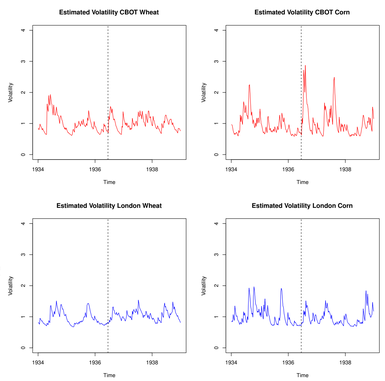
GARCH Model:

$$R_{i,t} = \beta_0 + \beta_1 R_{i,t-1} + \varepsilon_{i,t}$$

$$\sigma^2_{i,t} = \gamma_0 + \gamma_1 \varepsilon^2_{i,t-1} + \gamma_2 \sigma^2_{i,t-1}$$

Rolling (5 week window) volatility:

$$Rolling\ \sigma^2_{i,t} = \left(\sqrt{\tfrac{1}{s-1}\textstyle\sum_{j=t-s+1}^{t}(R_{i,j} - \overline{R}_{i,t})^2}\right)^2$$



Identification Strategy

Difference-in-Differences (DiD) Approach

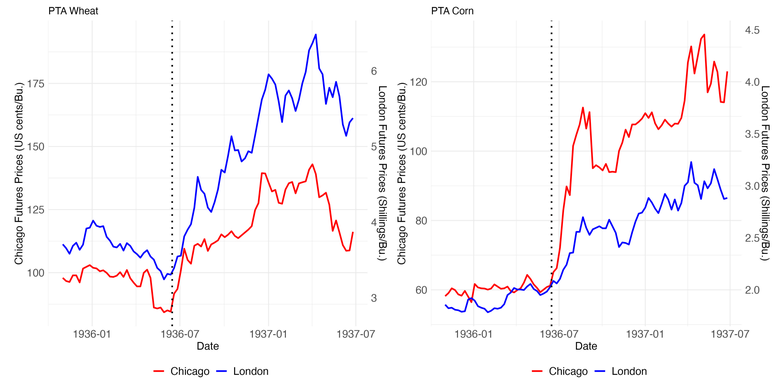
- To what extent did the options trading ban, effective as of June 15, 1936, affect the volatility of the underlying futures markets?
- Controls for time-invariant differences and common trends between groups.

$$E[Volatility_{i,e,t}|i,e,t] = \rho_e + \lambda_t + \alpha_i + \epsilon_{i,t}$$

$$Volatility_{i,e,t} = \rho_e + \lambda_t + \alpha_i + \epsilon_{i,t} + \beta \times Ban + \eta_{i,t}$$

Parallel Trends Assumption (PTA)

$$\text{DID} = (\rho_e - \rho_e + \lambda_{t=after} - \lambda_{t=before} + \alpha_i - \alpha_i + \epsilon_{i,t=after} - \epsilon_{i,t=before} + \beta) - (\rho_e - \rho_e + \lambda_{t=after} - \lambda_{t=before} + \alpha_j - \alpha_j + \epsilon_{j,t=after} - \epsilon_{j,t=before})$$



Market Volatility Results

Difference-in-Differences Model: $Volatility_{i,e,t} = \rho_e + \lambda_t + \alpha_i + \beta \times Ban + \eta_{i,t}$

	Short-term	Long-term
Treated × AfterTreatment (β)	0.42***	0.05
	(0.13)	(0.09)
Constant (ρ_e)	3.38***	3.33***
	(0.03)	(0.03)
Time FE	YES	YES
Commodity FE	YES	YES
Observations	836	1146
R-squared	0.56	0.55

- **Short-term**: The options trading ban significantly increased market volatility (0.42***), indicating a direct destabilizing effect.
- **Long-term**: The impact on volatility diminishes over time and becomes statistically insignificant.
- Results are **robust** when using *Rolling* σ^2.
  ⇒ Options Trading Stabilizes Market Volatility

Hedging Effectiveness Results

Event Study: $\Delta s_t = \alpha + h_1 \Delta f_t + h_2 D_t + h_3 (D_t \times \Delta f_t) + \epsilon_t$

Δf_t	0.418***	0.419***
	(0.042)	(0.042)
D_t	-0.004***	-0.004***
	(0.001)	(0.001)
$D_t \times \Delta f_t$	-0.175**	-0.180**
	(0.082)	(0.081)
Commodity FE	NO	YES
	NO	YES
Observations	3,756	3,756
R-squared	0.097	0.112

- **Hedging Effectiveness** $h = \frac{Cov(\Delta s_t, \Delta f_t)}{Var(\Delta f_t)}$
- Futures markets provide a good hedge for cash market position (0.418*** and 0.419***).
- However, **post-ban**, hedging effectiveness significantly decreases (-0.175** and -0.180**), indicating disrupted information flow.
  ⇒ Options Trading Enhances Hedging Effectiveness

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