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

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1 Introduction

On June 15, 1936, the Chicago Board of Trade (CBoT) banned grain futures options, motivated by concerns over speculation and price manipulation. Despite the intended regulatory benefits, this action disrupted the role of options in risk management and information flow. This study examines the causal impact of the ban on market volatility and hedging effectiveness using a natural experiment framework. Options enhance futures trading by offering hedgers greater flexibility. Without options, risk management becomes less efficient, and futures prices may incorporate new information more slowly (Easley, O'Hara, & Srinivas, 1998). Using a novel dataset comprised of weekly grain futures and spot prices traded at the Chicago Board of Trade (treated group) and London Exchange (control group) collected from *Statistical Bulletins*, *Annual Reports of CBoT* and contemporary newspapers (*The Times*), we test two main hypotheses:

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1. **Options trading stabilizes market volatility:** The ban on options written on CBoT futures contracts is expected to increase the volatility of grain futures prices. We test this using a DiD approach.

2. **Options trading enhances hedging effectiveness:** The absence of options trading is expected to reduce the effectiveness of futures contracts as hedging tools, due to less efficient information flow within the market.
We test this using an event-study approach.

This research contributes to the literature on derivative markets and regulatory policy, providing historical evidence on the role of options trading in market stability. By comparing Chicago and London markets, we aim to isolate the effect of the options ban.

2 Historical Background

Options trading dates back to 16th-century Antwerp and became integral to commodity markets by the 19th century (Barbour, 1950; Gelderblom & Jonker, 2005; Poitras, 2009). In the U.S., options faced criticism from populist movements for fostering speculation (Cowing, 1895). Option contracts, often referred to as "privileges," were criticized for enabling speculation that increased commodity price volatility Mehl (1934). From the late 1890s to the early 1920s, speculation in grains became a major national political issue in the United States. Congress regularly debated *anti-option* bills aimed at curbing *excessive* speculation and targeting organized commodity exchanges, such as the CBoT (Banner, 2017). In the U.S., *anti-options* sentiment intensified after agricultural prices collapsed during the Great Depression. When investigations exposed a wheat market manipulation in 1933 (GFA, 1933), legislators responded with the Commodity Exchange Act of 1936, which banned all commodity options trading (CFTC, 2024). The ban remained in effect until 1981. In contrast, London survived attempts to prohibit options trading, such as Bernards Act (1733) following the South Sea Bubble (Morgan, 1962), offering a suitable control group for this study. While both markets experienced regulatory debates, only the U.S. implemented a ban, providing a unique opportunity to assess its impact.

3 Theoretical Motivation

Easley et al. (1998) argue that options attract informed traders, improving information flow and price discovery. Without options, futures markets may experience:

1. Reduced Leverage: Informed traders lose an efficient tool to exploit their information.

2. Increased Uncertainty: Market makers face higher risks, leading to wider bid-ask spreads.

3. Higher Noise: Concentration of all trading in futures increases market noise.

These mechanisms suggest that the absence of options should lead to noisier and more volatile markets, reducing the predictive power of futures prices. Additionally, the loss of an efficient risk management tool for hedgers further undermines market stability.

4 Data

We collected weekly (Friday-to-Friday) price data for wheat and corn futures from Chicago (treated) and London (control) for 1934-1939. Chicago data came from *Statistical Bulletins and CBoT reports*, while London data were sourced from *The Times* newspaper. All prices were converted to comparable units. We constructed continuous futures price series by rolling over contracts on the first trading day of the delivery month. To ensure comparability, we retained only contracts with matching maturities in both markets. In addition to futures price data, we included spot prices from Chicago to analyze hedging effectiveness before and after the ban.

5 Methodology

5.1 Measures of Market Volatility

We calculate the dynamic volatility of futures prices using an AR(1)-GARCH(1,1) model.[1] GARCH models are widely used in financial time series analysis to capture volatility clustering and persistence often observed in financial data (Bollerslev, 1986). The mean equation is given by:

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

where the futures returns, $R_{i,t}$, are explained by an AR(1) term, i.e., previous week return. The serially uncorrelated errors, $\varepsilon_{i,t}$, are assumed to be normally distributed with mean zero and conditional variance $\sigma^2_{i,t}$, i.e., $\varepsilon_{i,t} \sim N(0, \sigma^2_{i,t})$. The GARCH volatility is measured by the conditional variance of $\varepsilon_{i,t}$ from Equation 1, as follows:

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

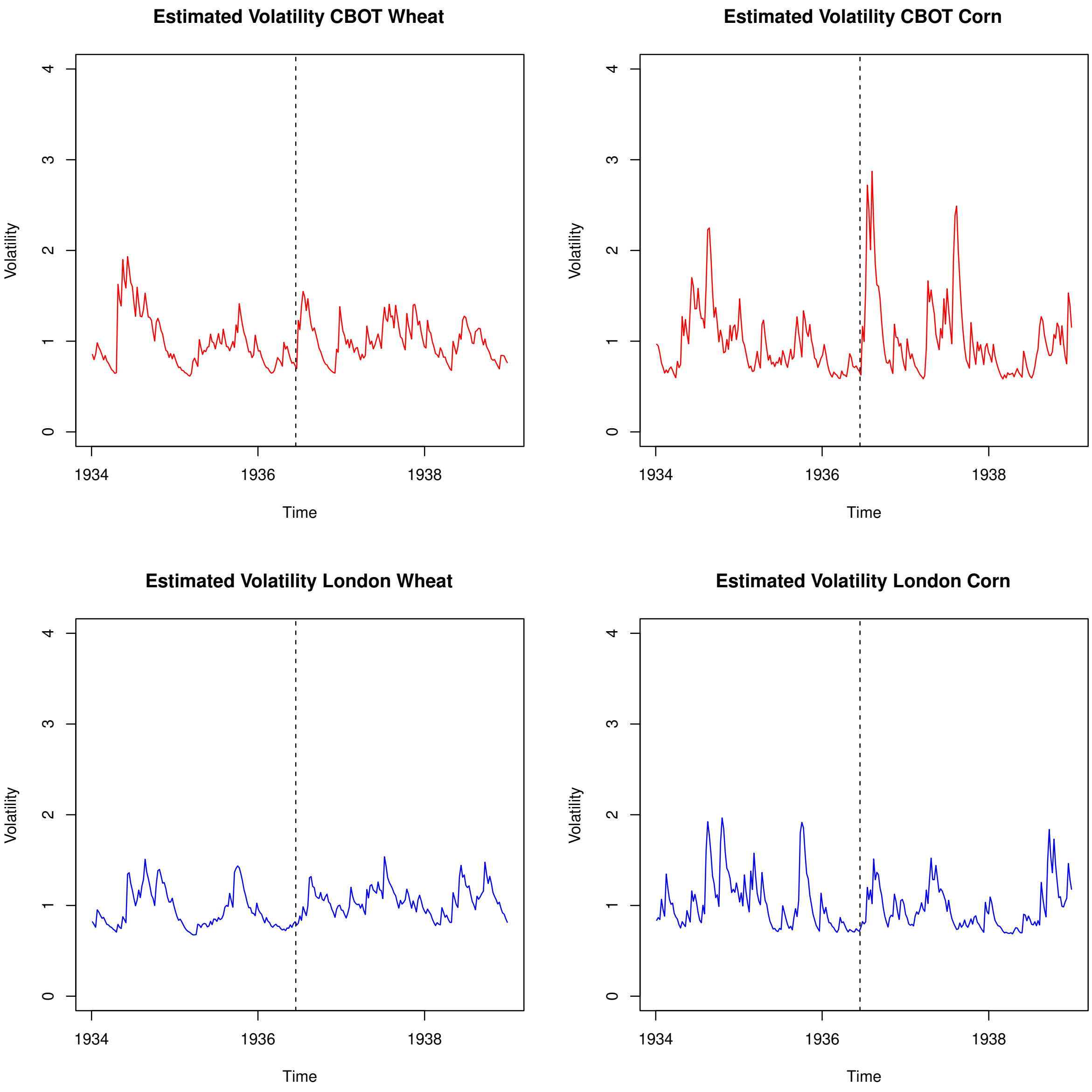
where $\varepsilon^2_{i,t-1}$ are squared unobserved shocks lagged one period, e.g. one week, and $\sigma^2_{i,t-1}$ represents the one period lagged forecast error variance. Parameter γ_1 describes the ARCH effect indicating how strongly the conditional variance reacts to new information arriving in the futures market, whereas γ_2 denotes the GARCH effect, measuring the persistance of volatility shocks. The GARCH volatilities for the four futures series in our sample are displayed in Figure 1.

5.2 Differences-in-Differences (DiD)

To estimate the impact of the ban on volatility, we use a DiD approach. The DiD is a widely used econometric method for evaluating the causal effect of policy changes (Angrist & Pischke, 2009). It computes the difference in outcomes before and after a regulatory change between a treatment group - affected by the change - and a control group - unaffected by the policy change. Our model includes time-fixed and commodity-fixed effects to control for unobserved heterogeneity.

[1] For robustness purposes, we also calculate volatility using the rolling standard deviation of weekly returns and a window of five weeks.

Figure 1: GARCH Volatility.



Note: This figure illustrates the volatility of wheat and corn futures prices, as measured by an AR(1)-GARCH(1,1) model, for both the treatment group (CBoT) and the control group (London). The vertical red line denotes the treatment date (June 15, 1936).

We assume that the volatility of grain futures markets in the non-treatment state, can be explained by the following additive model:

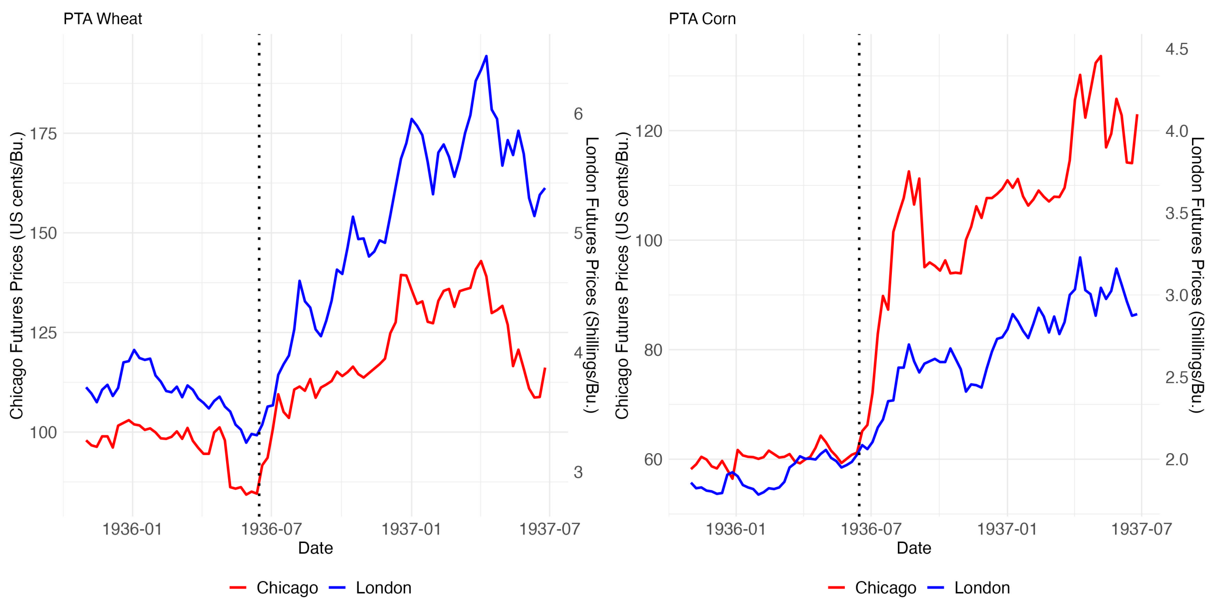
$$E[Volatility_{i,e,t}|i,e,t] = \rho_e + \lambda_t + \alpha_i + z_{i,t} \tag{3}$$

where $Volatility_{i,e,t}$ is the volatility of commodity i (corn or wheat) on exchange e at date t with options trading allowed (i.e., London Exchange). ρ_e captures the differences between trading environments at the Chicago and London exchanges, λ_t are time-fixed effects, α_i are time-invariant commodity-fixed effects, and $z_{i,t}$ are time-varying commodity-specific unobserved shocks. Using the additive model presented in equation 3, we can express observed market volatility as:

$$Volatility_{i,e,t} = \rho_e + \lambda_t + \alpha_i + z_{i,t} + \beta \times Ban + \eta_{i,t} \tag{4}$$

where Ban is a dummy variable that equals one for Chicago markets after the options trading ban and zero otherwise. The parallel trend assumption is visually supported in Figure 2.

Figure 2: Parallel Trend Assumption



Note: This figure illustrates the parallel trend assumption by showing the levels of wheat and corn futures prices for both the treatment group (CBoT) and the control group (London), before and after the treatment (options ban). The vertical red line denotes the treatment date (June 15, 1936).

5.3 Hedging Effectiveness

Hedging effectiveness is measured using the minimum variance (MV) hedge ratio. This approach minimizes portfolio risk, defined as the variance of changes in the value of the hedged portfolio. The intuition behind the MV hedge ratio is as follows: Theoretically, an investor constructs a portfolio consisting of a long position in the spot market and a short position in the futures market. The investor hedges the spot position at proportion h with a futures transaction, where $(1-h)$ represents the unhedged portion of the spot position. The expected return of this portfolio is given by:

$$E[r_p] = E[\Delta s_t] - h \cdot E[\Delta f_t] \tag{5}$$

The variance of the portfolio is given by the weighted variances of the spot and future returns, minus twice their covariance:

$$\sigma_P^2 = \sigma_S^2 + h^2\sigma_F^2 - 2h\sigma_{SF} \tag{6}$$

To minimize the portfolio risk, we take the first derivative with respect to h and set it to zero:

$$h = \frac{cov(\Delta s_t, \Delta f_t)}{var(f_t)} \tag{7}$$

We estimate hedging effectiveness using an OLS framework as follows (Ederington, 1979; Figlewski, 1984):

$$\Delta s_t = \alpha + h\Delta f_t + \epsilon_t \tag{8}$$

Since we are interested in the effects of the options trading ban on hedging effectiveness, we employ an event study approach (Roth, 2022) and modify the above regression as follows:

$$\Delta s_t = \alpha + h_1 \times \Delta f_t + h_2 \times D_t + h_3 \times (D_t \times \Delta f_t) + \epsilon_t \tag{9}$$

where D_t is a dummy variable that equals one for the period after the introduction of the options trading ban (June 15, 1936), and zero otherwise. h_1 captures the hedging effectiveness before the ban, h_2 captures the shift in the mean of Δs_t due to the ban and h_3 is the coefficient of interest, capturing the difference in hedging effectiveness prior and after the ban.

6 Results

6.1 Impact on Volatility

For the short term, we examine three windows in which we vary the observation window from 6 to 18 months: the year 1936 (covering six months before and after the ban), June 1936 to June 1937 (one year before and after the ban), and 1935–1937 (18 months before and after the ban). DiD results are presented in Table 1. In columns (2), (4) and (6) where we used time and commodity fixed effects, the coefficients on *Ban* (0.66, 0.52 and 0.54) are highly statistical significant at 1% level. This indicates that futures market volatility in Chicago, as compared to London, significantly increased in 6-month, 12-month and 18-month windows following the prohibition of options trading, supporting our first hypothesis that options trading stabilizes market volatility by facilitating efficient information flow.

Next, we investigate whether the increase in volatility observed immediately after the ban persisted over the long term. To achieve this, we extend our analysis to two broader windows: 1934–1939 and 1934–1938. The empirical results presented in Table 2 indicate that the ban did not have a significant long-term effect on grain futures volatility. The coefficients on the *Ban* variable drop considerably compared to the short-term analysis, becoming low and statistically insignificant (0.04 and 0.10). This suggests that the initial increase in volatility following the ban was temporary and diminished over time as the Chicago market adjusted. These findings suggest that, although the absence of options trading initially disrupts information flow and increases volatility, market mechanisms such as increased depth and reduced bid-ask spreads eventually restore some level of stability.[2]

[2] All results are robust when employing a TWFE model and using *Rolling* σ^2 as the dependent variable.

Table 1: DiD Regression Results: short-term

	1936		**June 1935–June 1937**		**1935–1937**	
	$GARCH\ \sigma^2$	$GARCH\ \sigma^2$	$GARCH\ \sigma^2$	$GARCH\ \sigma^2$	$GARCH\ \sigma^2$	$GARCH\ \sigma^2$
	(1)	(2)	(3)	(4)	(5)	(6)
$Treated$	0.14^{**}		0.13		0.10	
	(0.06)		(0.09)		(0.08)	
$AfterTreatment$	0.75^{***}		0.32^{***}		0.31^{***}	
	(0.08)		(0.09)		(0.08)	
$Treated \times AfterTreatment$	0.66^{***}	0.66^{***}	0.52^{***}	0.52^{***}	0.54^{***}	0.54^{***}
(Ban)	(0.25)	(0.21)	(0.15)	(0.12)	(0.14)	(0.12)
$Constant$	2.59^{***}	3.07^{***}	3.01^{***}	3.26^{***}	3.02^{***}	3.23^{***}
(ρ_e)	(0.04)	(0.07)	(0.08)	(0.04)	(0.06)	(0.04)
Time FE	NO	YES	NO	YES	NO	YES
Commodity FE	NO	YES	NO	YES	NO	YES
Observations	208	208	540	540	628	628
R^2	0.29	0.64	0.14	0.58	0.15	0.55

$^{*}\ p < 0.10$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$

Note: This table presents short-term results from a DiD regression of futures price volatilities before and after the options trading ban, with comparisons between CBoT and London futures in Columns (2), (4) and (6). Results from the TWFE regression are shown in Columns (1), (3) and (5). Heteroskedasticity robust standard errors are in parentheses.

Table 2: DiD Regression Results: long-term

	1934–1939		1934–1938	
	$GARCH\ \sigma^2$	$GARCH\ \sigma^2$	$GARCH\ \sigma^2$	$GARCH\ \sigma^2$
	(1)	(2)	(3)	(4)
$Treated$	0.27***		0.27***	
	(0.08)		(0.08)	
$AfterTreatment$	-0.01		0.09	
	(0.07)		(0.07)	
$Treated \times AfterTreatment$	0.04	0.04	0.10	0.10
(Ban)	(0.11)	(0.08)	(0.12)	(0.09)
$Constant$	3.23***	3.36***	3.23***	3.41***
(ρ_e)	(0.05)	(0.03)	(0.05)	(0.03)
Time FE	NO	YES	NO	YES
Commodity FE	NO	YES	NO	YES
Observations	1146	1146	1044	1044
R^2	0.02	0.57	0.03	0.55

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Note: This table presents long-term results from a DiD regression of futures price volatilities before and after the options trading ban, with comparisons between CBoT and London futures in Columns (2) and (4). Results from the TWFE regression are shown in Columns (1) and (3). Heteroskedasticity robust standard errors are in parentheses.

6.2 Impact on Hedging Effectiveness

How were hedgers affected by the ban, and to what extent did it impact their ability to manage risk effectively? Table 3 presents the results from our event-study model, where hedging effectiveness is measured in a static framework. Our results indicate that futures markets are generally effective hedges for spot markets, as evidenced by the positive and highly statistically significant coefficients on Δf_t. However, the coefficients on the interaction term $D_t \times \Delta f_t$ are negative and highly significant (-0.175 and -0.180), suggesting that the prohibition of options trading reduced hedging effectiveness in Chicago markets. This decline implies that without options, the futures market became less efficient in incorporating new information, diminishing its utility as a risk management tool.

Table 3: Event Study Regression Results

	Δs_t	
	(1)	(2)
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)
Constant	0.002^{***}	0.004^{**}
	(0.001)	(0.001)
Commodity FE	No	Yes
Monthly FE	No	Yes
Observations	3,756	3,756
R^2	0.097	0.112

*p<0.1; **p<0.05; ***p<0.01

Note: This table shows results from an event study regression on hedging effectiveness in the U.S. before and after the options trading ban. Column (2) includes results with time and commodity fixed effects. Heteroskedasticity robust standard errors are in parentheses.

7 Conclusion

This paper examines how the 1936 options trading ban affected market volatility and hedging in U.S. grain futures markets at the CBoT. Using a Difference-in-Differences approach with weekly data from 1934 to 1939 comparing Chicago to London, we find that while the ban initially increased market volatility by disrupting information flow, this effect was temporary. In contrast, the ban had a lasting adverse impact on hedging effectiveness, as evidenced by a decline in the minimum variance hedge ratio. These findings underscore the role of options trading in stabilizing markets and facilitating effective risk management, highlighting the need for careful regulatory interventions.

References

Angrist, J. D., & Pischke, J.-S. (2009). *Mostly harmless econometrics: An empiricist's companion*. Princeton university press.

Banner, S. (2017). *Speculation: a history of the elusive line between gambling and investment*. Oxford University Press.

Barbour, V. (1950). *Capitalism in amsterdam in the xviith century*. Ann Arbor, University of Michigan Press.

Bollerslev, T. (1986). Generalized Autoregressive Conditional Heteroskedasticity. *Journal of Econometrics*, *31*(3), 307–327.

CFTC. (2024). *Commodity Futures Trading Commision - History of the CFTC.* (Tech. Rep.). (Available online at https://www.cftc.gov/About/HistoryoftheCFTC/history_precftc.html. Last accessed in November 2024.)

Cowing, C. (1895). *Populists, plungers, and progressives: A social history of stock and commodity speculation, 1890-1936*. Princeton University Press (reprinted: 1965, Princeton, Princeton University Press).

Easley, D., O'Hara, M., & Srinivas, P. S. (1998). Option volume and stock prices: Evidence on where informed traders trade. *The Journal of Finance*, *53*(2), 431–465.

Ederington, L. H. (1979). The hedging performance of the new futures markets. *The journal of finance*, *34*(1), 157–170.

Figlewski, S. (1984). Hedging performance and basis risk in stock index futures. *The Journal of Finance*, *39*(3), 657–669.

Gelderblom, O., & Jonker, J. (2005). Amsterdam as the cradle of modern futures trading and options trading, 1550-1650. In *The origins of value; goetzmann, w., rouwenhorst l.* (pp. 189–206). Oxford, Oxford University Press, Chapter 11.

GFA, G. F. A. (1933). *Annual report*. Washington D.C.: Government Printing Office.

Mehl, P. (1934). *Trading in privileges on the chicago board of trade* (No. 323). US

Department of Agriculture.

Morgan, T. W., V. (1962). *The stock exchange.* New York, St. Martins.

Poitras, G. (2009). From antwerp to chicago: the history of exchange traded derivative security contracts. *Revue d'Histoire des Sciences Humaines*, *20*(1), 11–50.

Roth, J. (2022). Pretest with caution: Event-study estimates after testing for parallel trends. *American Economic Review: Insights*, *4*(3), 305–322.