ADVANCED ALPHA ADVISERS, LLC-

Research Note
(Informational – Not Investment Advice)

When Oil Went Negative-April 20, 2020
Date: August 24, 2026
Author: George Criezis, Research Associate

Executive Summary

On April 20, 2020, the West Texas Intermediate (WTI) crude oil futures contract for delivery in May 2020 traded for the first time in history at negative prices, trading as low as -$40.32/b.[1] Falling $55.90 in a single day, traders holding the expiring contracts were forced to pay buyers to take the oil off their hands rather than accept physical delivery. The massive price plummet wiped out long positions, generated millions of dollars in profits for short sellers, and created the largest calendar spread in history before prices recovered the following day into positive territory.

And the reaction?
Storage bottlenecks forced liquidation. Liquidity dried up completely in front-month contracts. Extreme bid-ask spreads led to multi-dollar price gaps.

Major equity indices sell-offs on growth fears. Volatile intraday rebounds as later-dated energy contracts stabilized. Influx of capital into US treasuries and into the dollar while currencies of energy-exporting nations faced intense selling pressure.

The risk takeaway:
Violent dislocations of financial futures tied to physical delivery when physical infrastructure reaches capacity.

Risk systems must account for non-linear tail-risk events, including negative pricing mechanisms resulting from rule changes. Margins rapidly escalated during severe demand shocks.

1. The Chain Reaction

March 2020, a COVID-19 pandemic allowed global lockdowns and travel restrictions, slashing oil demands.

[1] U.S. Congressional Research Service, IN11354, "Crude Oil Futures Prices Turn Negative" (Apr. 22, 2020); U.S. Energy Information Administration, "Low liquidity and limited available storage pushed WTI crude oil futures prices below zero," Today in Energy (Apr. 27, 2020).

U.S. refinery inputs fell 20% between March 13 and May 8, 2020, to 13.1 million barrels per day.[2] Lowest since 2008.

Then, second week of March, OPEC talks with Russia collapsed to raise oil production to unprecedented levels.[3] The response? Saudi Arabia launched a price war, discounting crude and pumping 12.3 million barrels per day.[4] Russia reaction: boost oil output as well to lesser extent.

CME Rule & System Changes
April 8, 2020, CME Clearing announced a formal plan to allow negative underlying prices for energy contracts and switched options pricing from Black-Scholes to Bachelier model (which handles negative values)[5]

Why? COVID-19 demand drop threatened to fill Cushing storage capacity. CME introduced changes to prevent systems halts and ensure contracts can accurately reflect physical delivery economics if holding oil became a liability.

By April 20, Cushing, Oklahoma's storage hub was at 83% capacity, with 27 million barrels of crude in excess.[6] Physical storage was virtually unavailable.

So why did oil go negative?

Excess supply with nowhere to go. Financial traders may have been forced to take delivery. Taking physical delivery with no leased storage leads to massive demurrage fees, pipeline penalties, and logistics far higher than paying -$37/barrel to get out of the position by contract expiration, April 21, 2020.

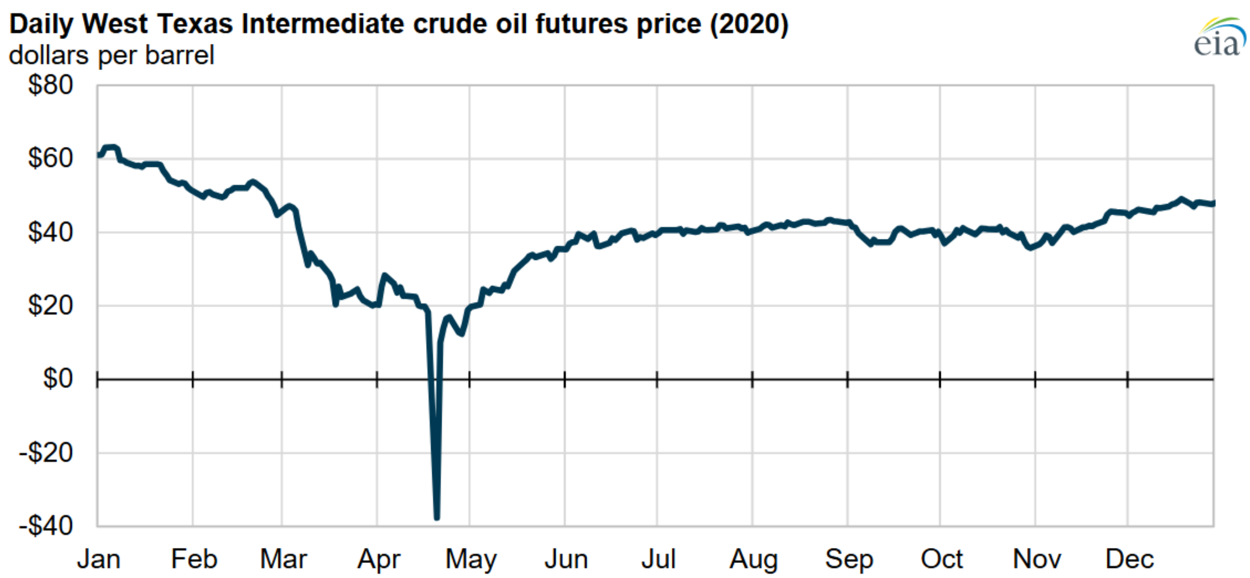
---

[2] U.S. Energy Information Administration, "Crude oil prices briefly traded below $0 in spring 2020 but have since been mostly flat," Today in Energy.
[3] Federal Reserve Bank of Dallas, Lutz Kilian, "How the Saudi Decision to Launch a Price War Is Reshaping the Global Oil Market," Dallas Fed Economics (Apr. 2, 2020).
[4] Baker Institute for Public Policy, Rice University, "Price War and Pandemic: The Oil Market Reaction" (Apr. 2020).
[5] CME Group, Clearing Advisory #20-152, "CME Clearing Plan to Address the Potential of a Negative Underlying in Certain Energy Options Contracts" (Apr. 8, 2020); Clearing Advisory #20-171, "Switch to Bachelier Options Pricing Model" (Apr. 21, 2020).
[6] U.S. Energy Information Administration, "Crude oil prices briefly traded below $0 in spring 2020 but have since been mostly flat," Today in Energy.

2. Market Reaction

A. Price Action

Unparalleled sub-zero territory in front-month May 2020 contract. Dropped $55.90 in a single trading session to intraday low of -$40.32. Concentrated on April 20 and early April 21 ahead of contract expiration. Next-month June remained positive.



Source: U.S. Energy Information Administration, New York Mercantile Exchange (NYMEX)
Note: Prices reflect front-month (contract with the earliest delivery date) futures prices.

B. Volatility

Implied volatility (IV) exploded as Black-Scholes standard percentage-volatility metrics broke down under zero-bound pricing. Short-term historical volatility surge. Long-term IV remained elevated but structurally a bump. Switch to the Bachelier model for options.

C. Cross-Asset Impact

S&P500 fell ~1.8% led by steep sell-off in Energy (XLE).[7] Systematic growth concerns and counterparty risk.

U.S. 10-Year Treasuries yield fell ~ 5 bps while high-yield energy corporate credit spreads widened on default concerns.

Commodity linked currencies sharply declined against safe-haven currencies like the USD and JPY.

---

[7] CNN Business, "Stocks sink as US oil prices fall below $0 a barrel," live markets coverage (Apr. 20, 2020).

Heavy selling pressure leaned into physical spot crude markets, while non-energy commodities largely faced uncorrelated price action.

3. Market Structure Observations

Final hours before expiration on April 20, market depth vanished. Order books thinned. Bid-ask spreads widened. Sell orders caused violent price downturn to -$37.63.

Algorithmic trading systems lacked logic for unprecedented negative numbers. Failed to quote properly, froze, or created improper risk triggers.

Retail brokerages were impacted. Platforms couldn't handle negative quotes or execute stop-losses below zero. Retail traders held long positions in negative territory. Brokers incurred hundreds of millions in covering account balances for clients.[8]

Retail ETFs, like US Oil Fund, held massive, long positions in the May contract that had to be sold before expiration before physical delivery. USO completed most of its roll into the June contract.[9] Other ETFs and index funds were forced sellers in a market with almost no buyers.

4. Systematic Strategy Considerations

Holding positions into final days of physically settled contracts can lead to delivery squeeze exposure. Rolling positions early mitigate forced liquidation risks in thinning markets.

Standard risk models often assume execution at market prices. Order book depth can evaporate near expiration in physically settled contracts.

Pre-2020 Value-at-Risk (VAR) models assumed price floor of $0.00. Rule changes and unprecedented tail events break historical assumptions.

7. Conclusion

Events such as negative oil market pricing demonstrate how quickly market conditions can shift under geopolitical or macro stress. These environments highlight the importance of understanding volatility dynamics, liquidity conditions, and evolving correlations across asset classes.

---

[8] U.S. Commodity Futures Trading Commission, "CFTC Orders Interactive Brokers LLC to Pay a $1.75 Million Penalty for Supervision Failures," Press Release No. 8432-21 (Sept. 28, 2021).

[9] CNBC, "Oil ETF, USO, dumps plunging June oil contract as Cramer says hedge funds are going for the kill" (Apr. 27, 2020).

Since the event, the CME has made strategic developments to combat futures correlating issues:

CME updated its systems and option pricing models, so platforms won't crash under negative territory again.

Tighter broker rules were implemented, forcing traders out of expiring contracts early, preventing retail investors from being stuck with physical delivery while imposing stricter margin requirements during volatile periods.

Smaller, alternative contracts were released for traders seeking cash settlement (e.g. Micro WTI contracts and cash-settled 10-barrel micro products). This allows financial traders to keep away from physical delivery contracts and mitigate the developments of events such as April 20, 2020.

Data Sources

1. Congressional Research Service (CRS), IN11354, "Crude Oil Futures Prices Turn Negative," April 22, 2020. https://www.congress.gov/crs_external_products/IN/PDF/IN11354/IN11354.4.pdf
2. U.S. Energy Information Administration (EIA), "Low liquidity and limited available storage pushed WTI crude oil futures prices below zero," Today in Energy, April 27, 2020. https://www.eia.gov/todayinenergy/detail.php?id=43495
3. U.S. Energy Information Administration (EIA), "Crude oil prices briefly traded below $0 in spring 2020 but have since been mostly flat," Today in Energy. https://www.eia.gov/todayinenergy/detail.php?id=46336
4. Federal Reserve Bank of Dallas, Lutz Kilian, "How the Saudi Decision to Launch a Price War Is Reshaping the Global Oil Market," Dallas Fed Economics, April 2, 2020. https://www.dallasfed.org/research/economics/2020/0402
5. Baker Institute for Public Policy, Rice University, "Price War and Pandemic: The Oil Market Reaction," April 2020. https://www.bakerinstitute.org/research/price-war-and-pandemic-oil-market-reaction
6. CME Group, Clearing Advisory #20-152, "CME Clearing Plan to Address the Potential of a Negative Underlying in Certain Energy Options Contracts," April 8, 2020; and Clearing Advisory #20-171, "Switch to Bachelier Options Pricing Model," April 21, 2020. https://www.cmegroup.com/notices/clearing/2020/04/Chadv20-171.html
7. CNN Business, "Stocks sink as US oil prices fall below $0 a barrel," live markets coverage, April 20, 2020. https://www.cnn.com/business/live-news/stock-market-news-042020

8. U.S. Commodity Futures Trading Commission (CFTC), "CFTC Orders Interactive Brokers LLC to Pay a $1.75 Million Penalty for Supervision Failures," Press Release No. 8432-21, September 28, 2021. https://www.cftc.gov/PressRoom/PressReleases/8432-21
9. CNBC, "Oil ETF, USO, dumps plunging June oil contract as Cramer says hedge funds are going for the kill," April 27, 2020. https://www.cnbc.com/2020/04/27/oil-etf-uso-dumps-plunging-june-oil-contract-as-cramer-says-hedge-funds-are-going-for-the-kill.html

Disclosures

Informational Use Only

This material is for informational and educational purposes only and does not constitute investment advice, an offer to sell, or a solicitation to buy any security, futures contract, or investment product.

No Representation of Results

Any discussion of market behavior or trading approaches is illustrative in nature and does not represent actual trading results or any specific account.

Risk Disclosure

Futures and options trading involves substantial risk of loss and is not suitable for all investors. Past performance is not necessarily indicative of future results.

Author Status

The author is a research associate and is not a registered investment advisor or commodity trading advisor representative.