

# Searching for Market Asymmetries: Case of Oil

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# Searching for Market Asymmetries: Case of Oil

**Price: The Maturity Curve, not just Spot**

**Volume and Open Interest: Looking for Changing Patterns**

**Implied Volatility: A Variety of Perspectives**

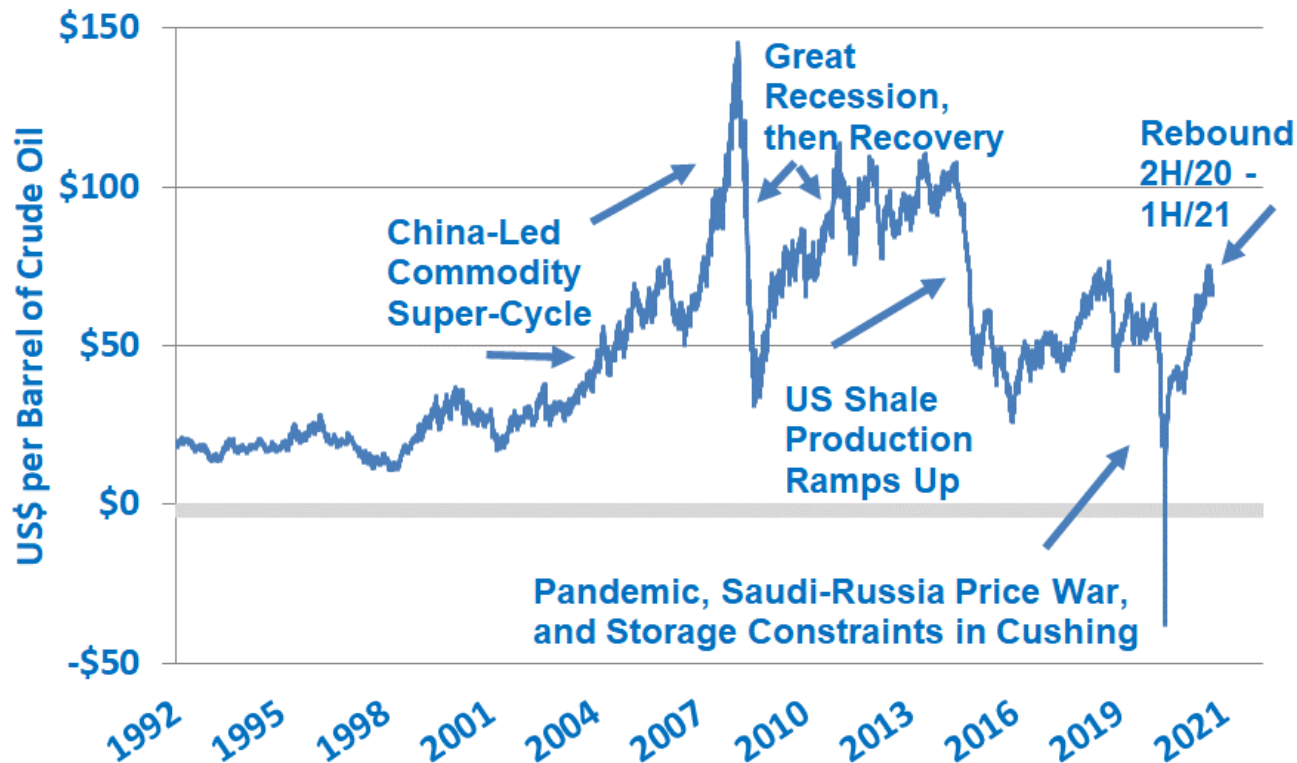
**Sentiment: Constructing Hypothetical Risk-Return Distributions**

**Commodity Super-Cycle? What is happening in other markets**

**Future Research Ideas**

# Price: The Maturity Curve, not just Spot

# WTI Crude Oil Spot Price

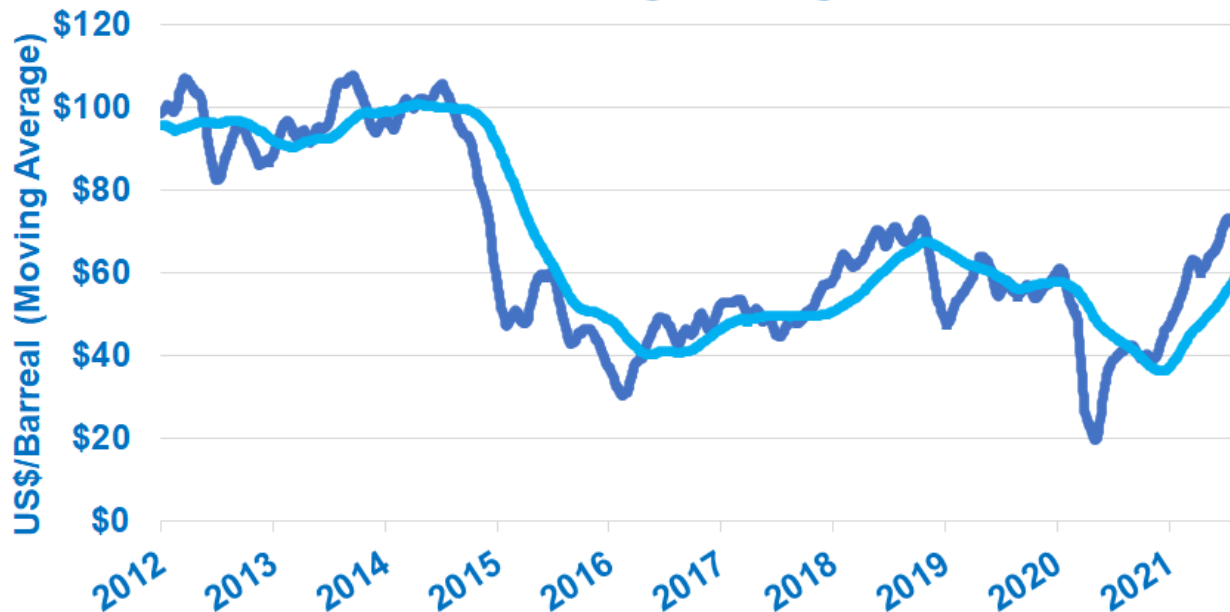


**Appreciating  
the events  
that move  
markets.**

Chart Created by CME Group Economics.  
Source: Bloomberg Professional (WTI = USCRWTIC).

## WTI Oil: 20-Day versus 200-Day Price Moving Average

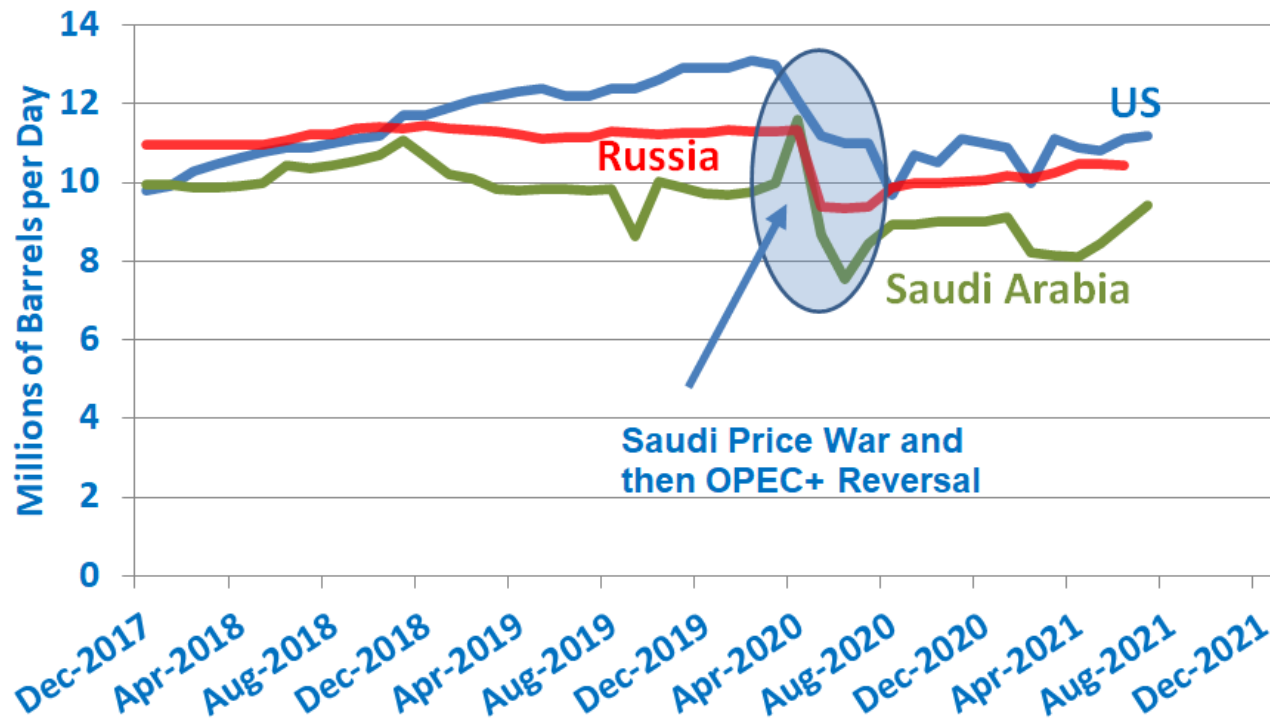
**Stepping  
back and  
studying the  
broad trends.**



Source: CME Market Sentiment Meter (CLLO).

— 20-Day Price Moving Average — 200-Day Price Moving Average

# U.S., Russian, Saudi Arabian Oil Production



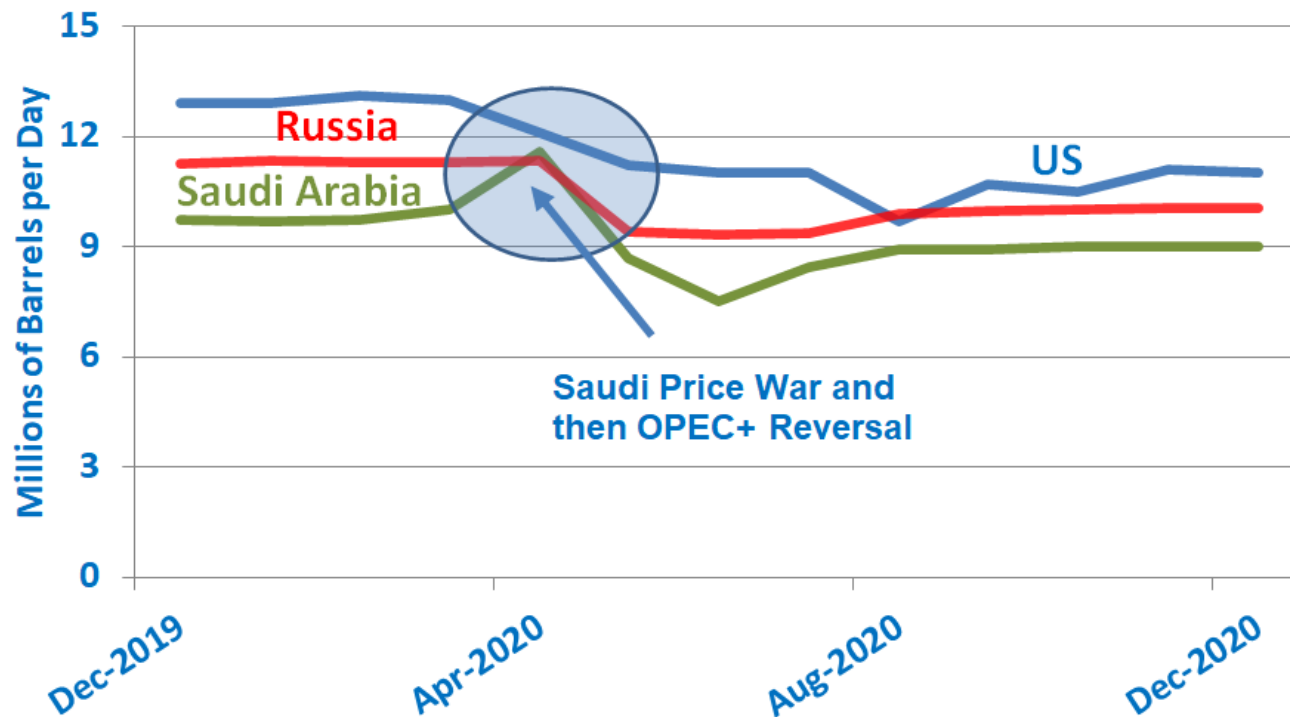
**Case of the Saudi-Russian price war at the beginning of the Pandemic of 2020.**

Chart Created by CME Group Economics.

Source: Bloomberg Professional  
(DOETCRUD, OPCRSAUD, DWOPRUSS and RUSOTTDY, PIWANORT).



# U.S., Russian, Saudi Arabian Oil Production



**Case of the Saudi-Russian price war at the beginning of the Pandemic of 2020.**

Chart Created by CME Group Economics.

Source: Bloomberg Professional  
(DOETCRUD, OPCRSAUD, DWOPRUSS and RUSOTTDY, PIWANORT).

## Brent minus WTI Spot Price Spread

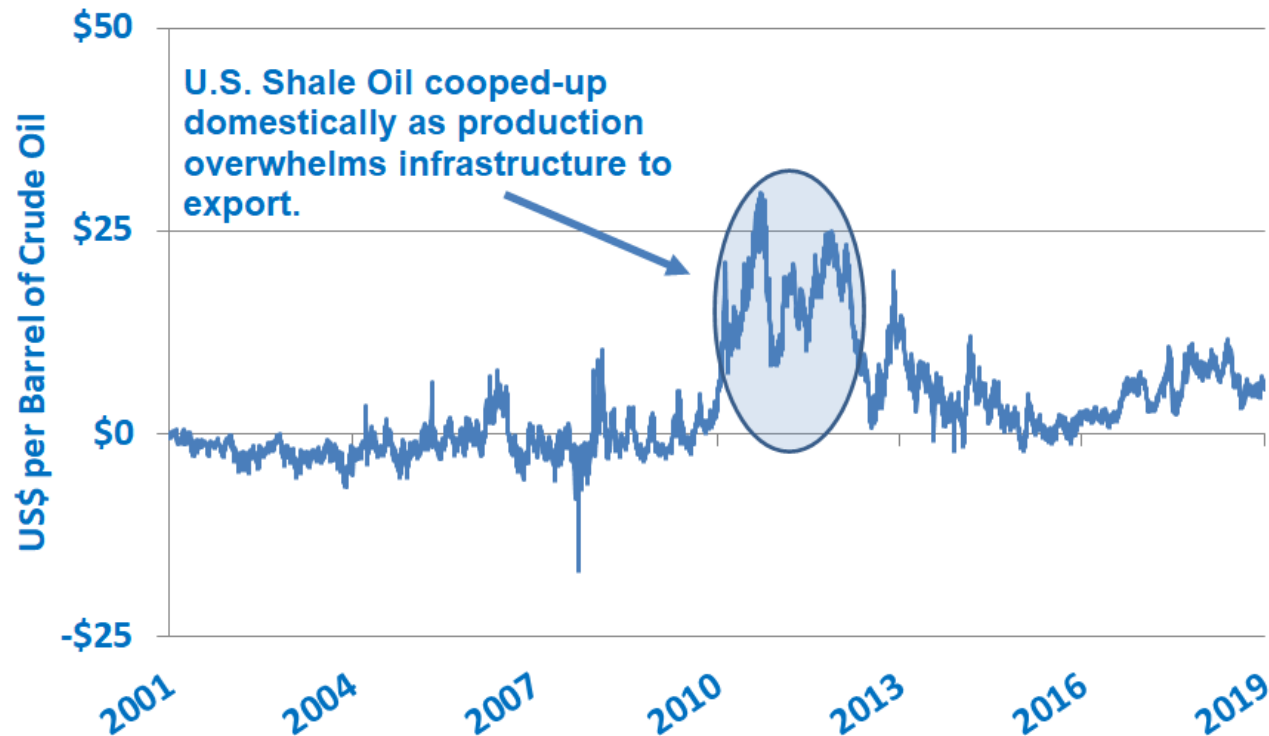


Chart Created by CME Group Economics.  
Source: Bloomberg Professional  
(Brent = EUCRBRDT, WTI = USCRWTIC).

**As the U.S. shales oil revolution accelerated, the country was not set-up to export oil.**

## U.S. Petroleum Exports and Imports

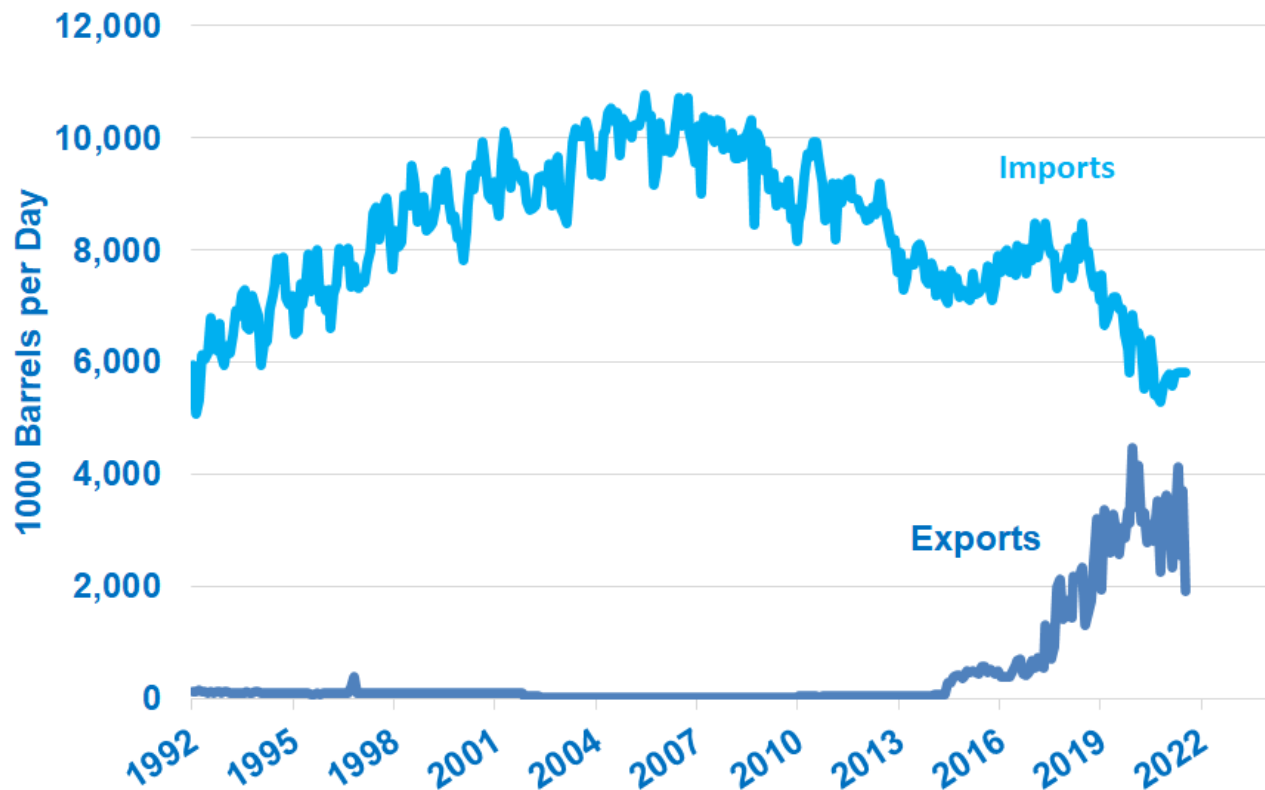


Chart Created by CME Group Economics.  
Source: Bloomberg Professional (DOEBCEXP, DOCRTOTL).

**Once the U.S. was able to expand petroleum exports, the Brent-WTI price spread narrowed dramatically.**

## WTI Crude Oil Nearby Futures Price per Barrel

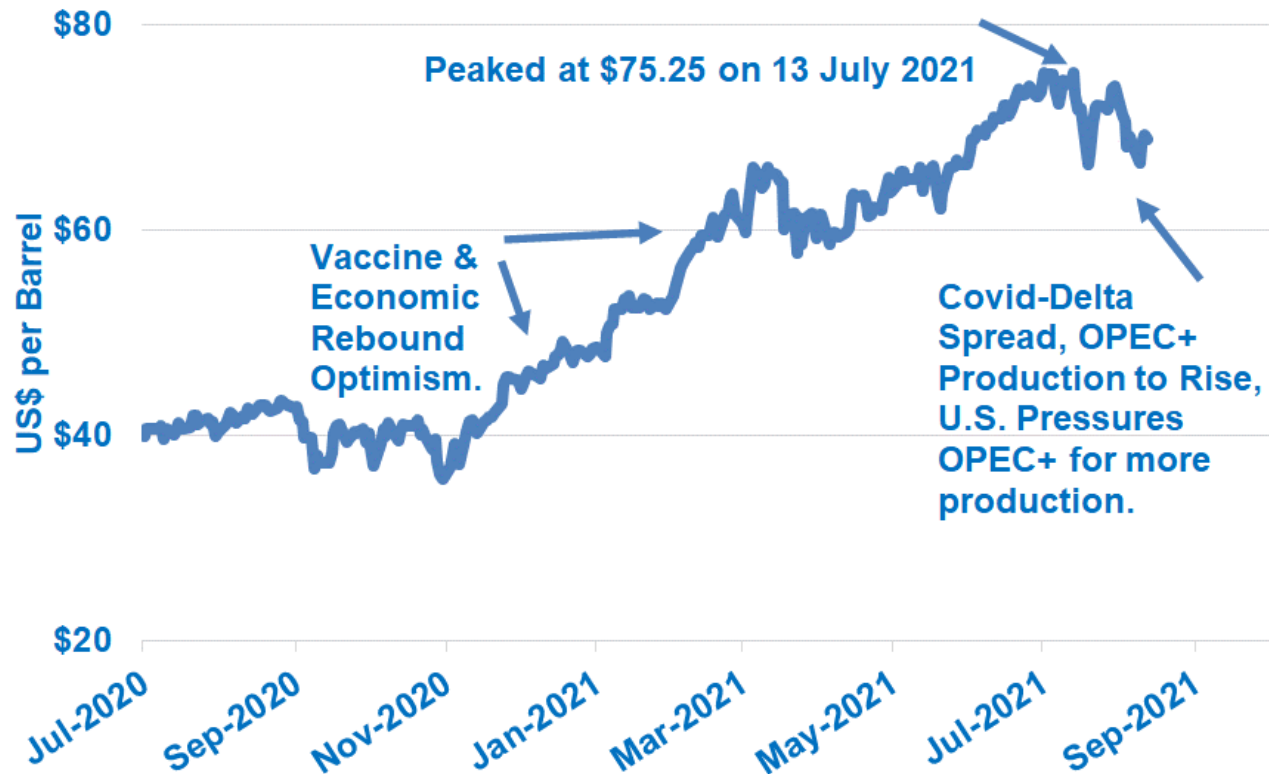


Chart Created by CME Group Economics.  
Source: Bloomberg Professional (CL1).

Oil prices had a nice rebound from the depths of the pandemic, but that rebound has taken a break.

# WTI Crude Oil Futures Maturity Curves

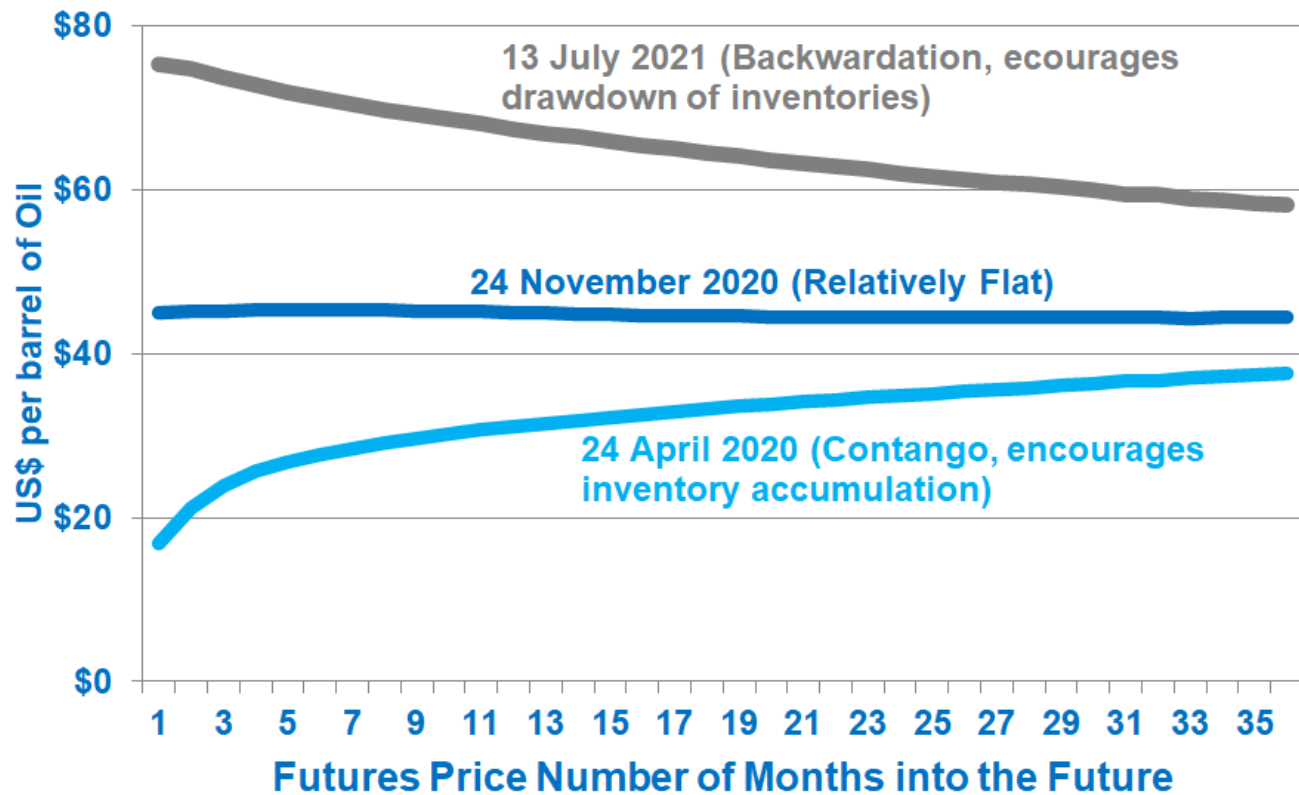


Chart Created by CME Group Economics.  
Source: CME Data Mine (CL, end of day).

In addition to spot prices, the maturity curve is very important, especially in terms of how it impacts incentives to build or drawdown inventories.

## U.S. Oil Stocks (excluding Strategic Petroleum Reserve)

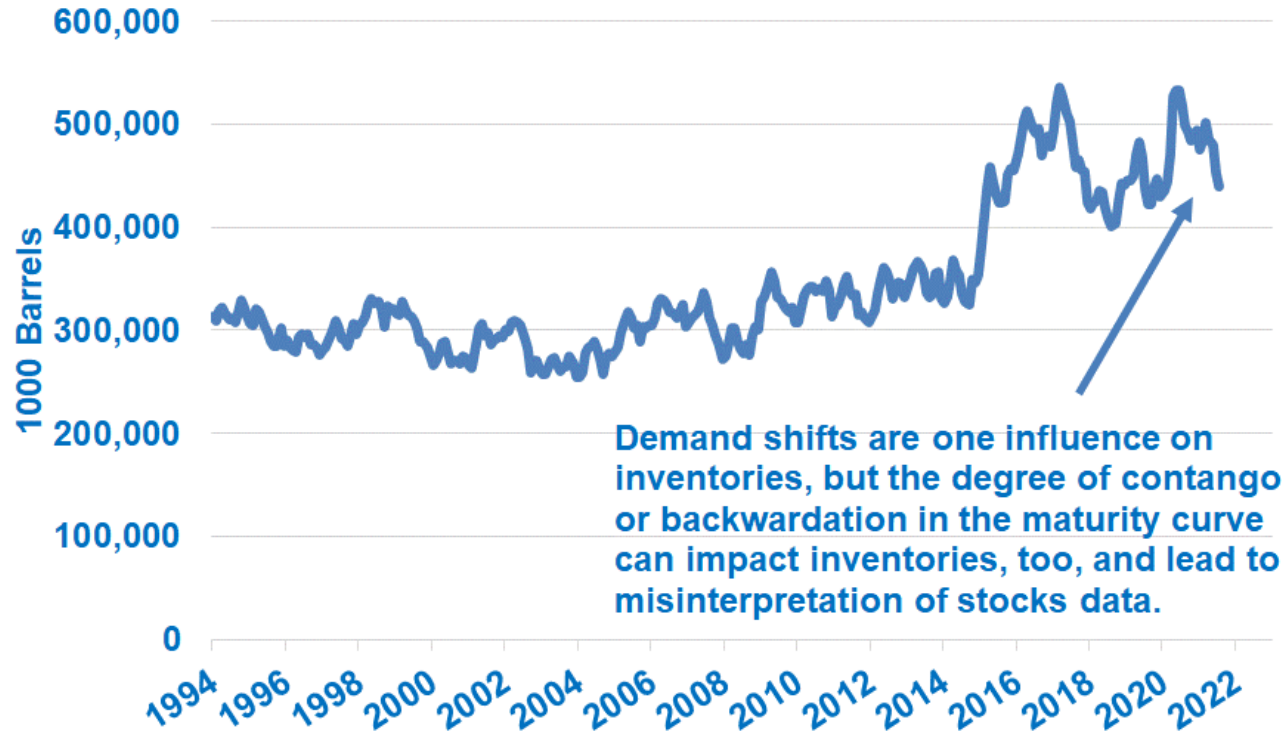


Chart Created by CME Group Economics.  
Source: Bloomberg Professional (DOESCRUD).

**Backwardation  
can encourage  
sales from  
inventories,  
even when  
demand might  
be slowing, as  
in July-August  
2021.**

## Newly Completed U.S. Shale Oil Wells

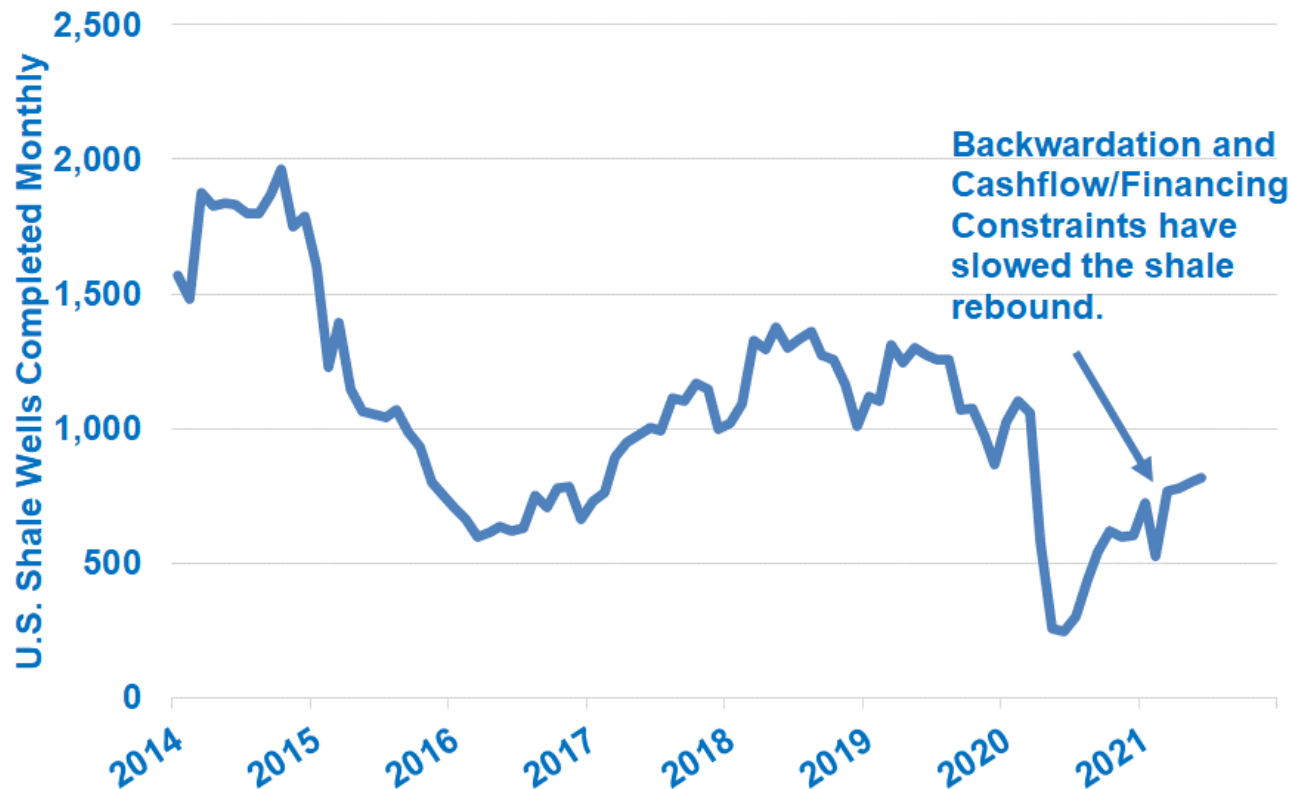


Chart Created by CME Group Economics.  
Source: Bloomberg Professional (WDUCDRCM).

**Backwardation is also a potential disincentive to expand shale oil production, given the relatively short production cycle and the hedging environment.**

## WTI Crude Oil Futures Maturity Curves

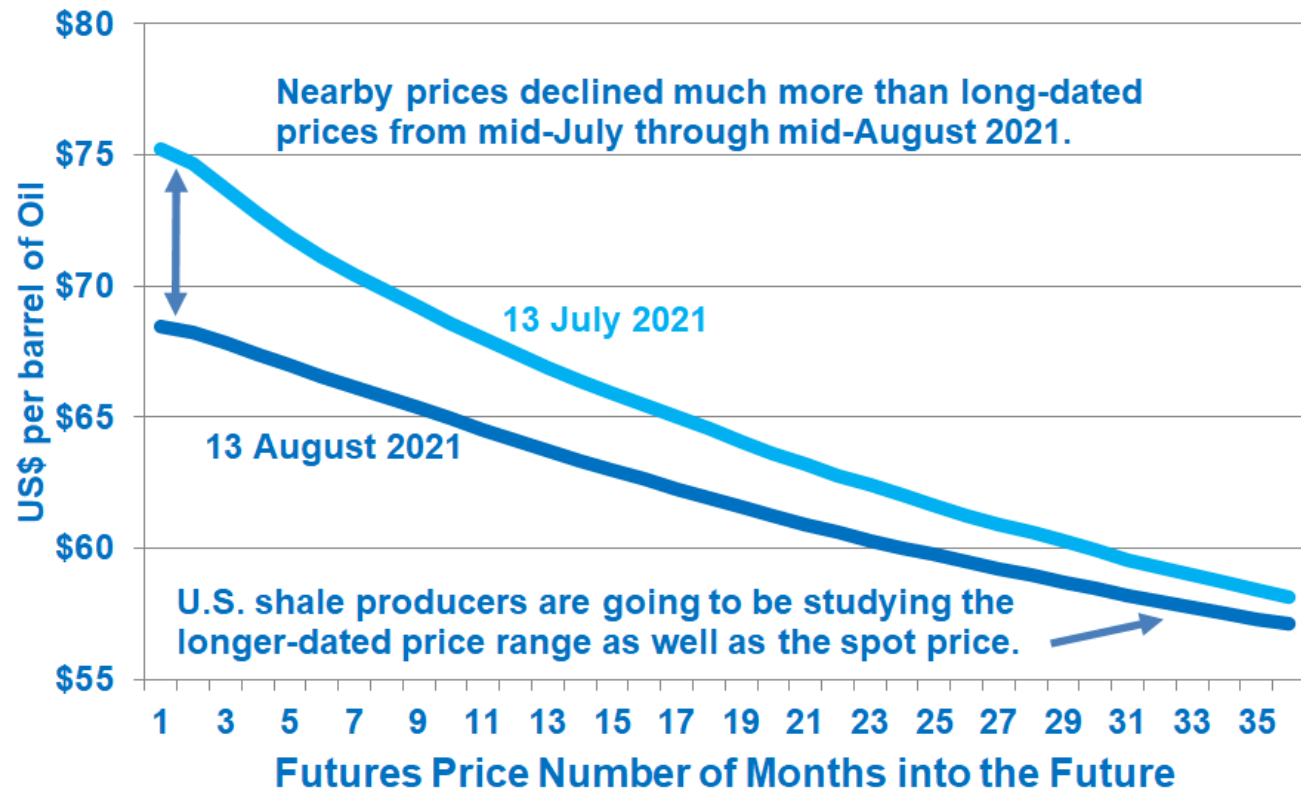


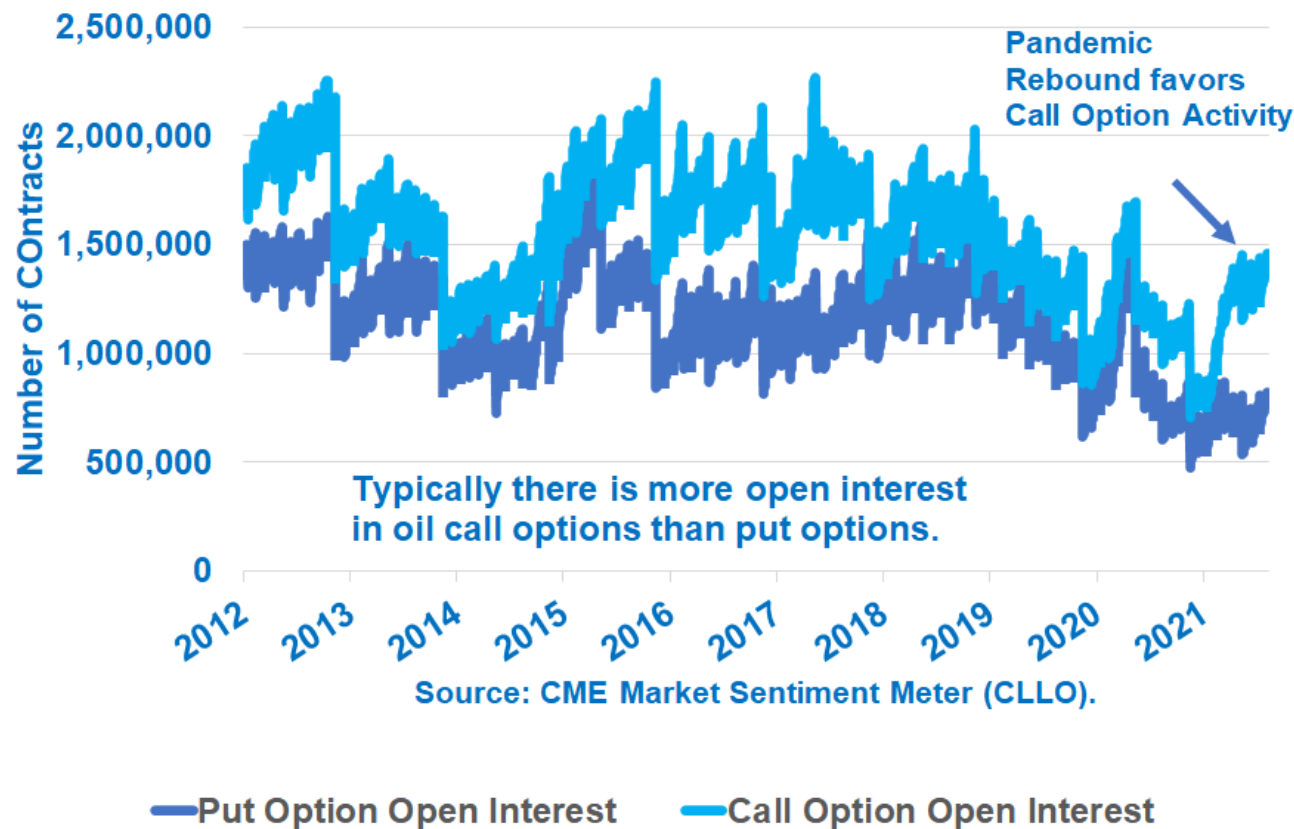
Chart Created by CME Group Economics.  
Source: Blommborg Professional (CL).

The oil maturity curve flattened (less backwardation) during the July-August 2021 period after oil prices had peaked.



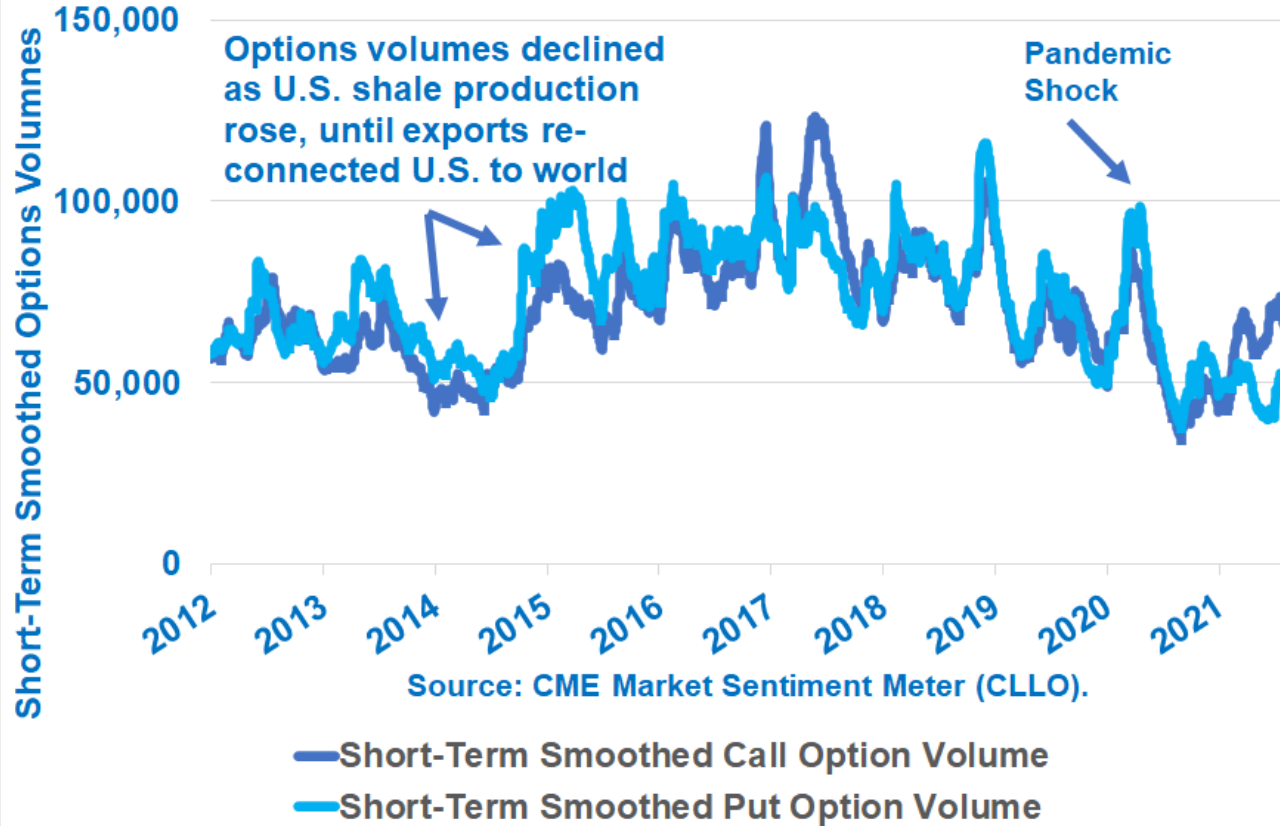
# Volume and Open Interest: Looking for Changing Patterns

## WTI Oil: Call and Put Option Open Interest



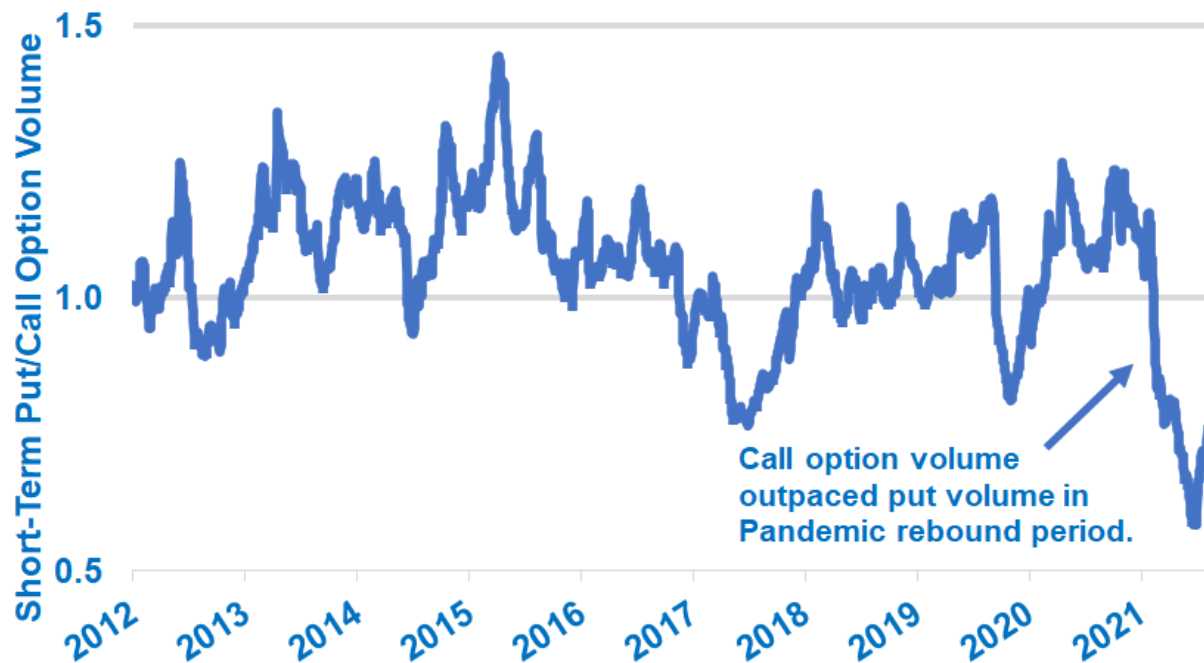
The oil market typically sees more volume of call options than puts; however, the relative pattern can be quite interesting.

## WTI Oil: Short-Term Call and Put Option Volumes



The relative pattern of put option volume versus call options can signal which side of the market is more 'in play'.

## WTI Oil: Ratio of Short-Term Put Option Volume to Call Option Volume



Call option volume outpaced put volume in Pandemic rebound period.

**When the trend is for rising prices, call options volume may be emphasized (until prices peak).**

Source: CME Market Sentiment Meter (CLLO).

## CME Oil Call Options Contracts OI Percent (Strikes over 100 Contracts vs All Contracts)

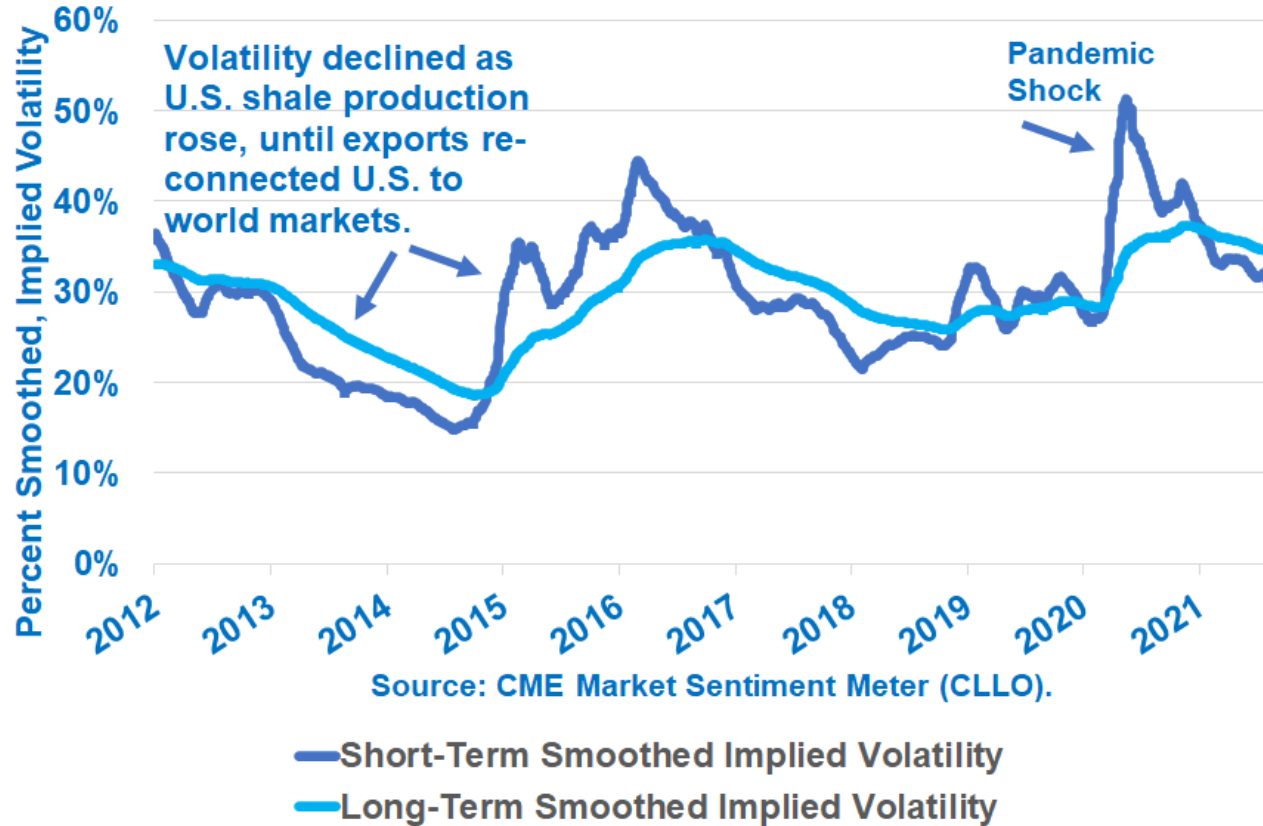


Chart: CME Group Economics  
Source: CME Datamine  
Data as of 06/18/2021

**The oil market saw a surge in open positions for call option strikes at or above \$100 per barrel. Remember there is a buyer for every seller.**

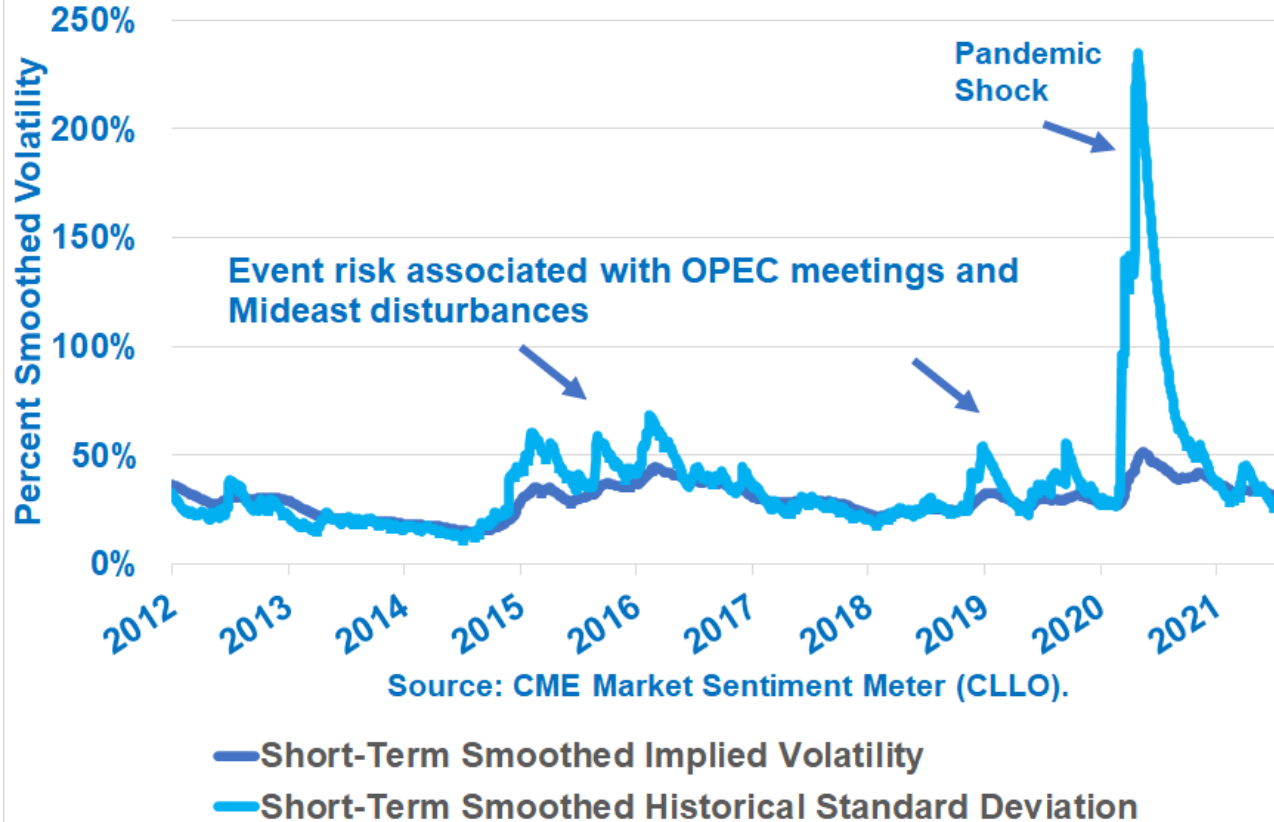
# Implied Volatility: A Variety of Perspectives

## WTI Oil Implied Volatility: Short-Term vs Long-Term



**Just as with price momentum, it is also interesting to compare the short-term and longer-term momentum in implied volatility.**

## WTI Oil: Implied Volatility compared to Short-Term Historical Standard Deviation

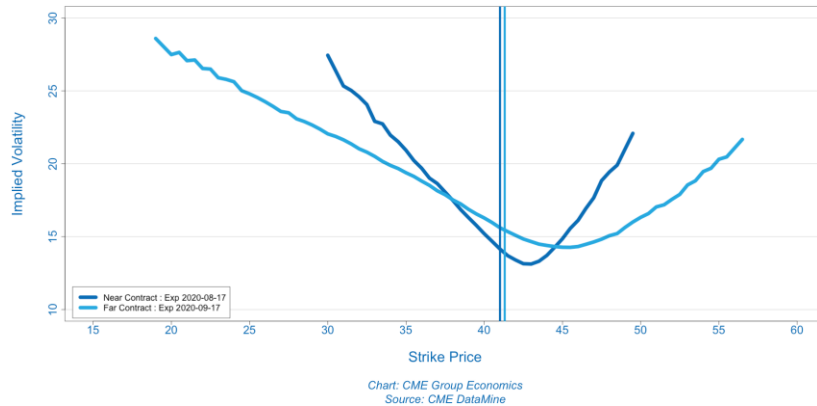


A shock event, typically raises implied volatility temporarily as the surprise is digested by risk managers.

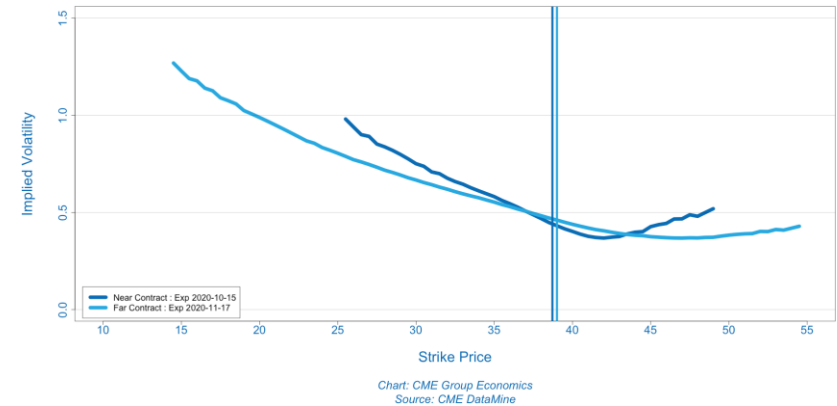


# Comparison of Implied Volatility ‘Smiles’ for two different dates and two contract maturities can also provide information about changing expectations.

Comparison of Near and Far Contract on 2020-08-03

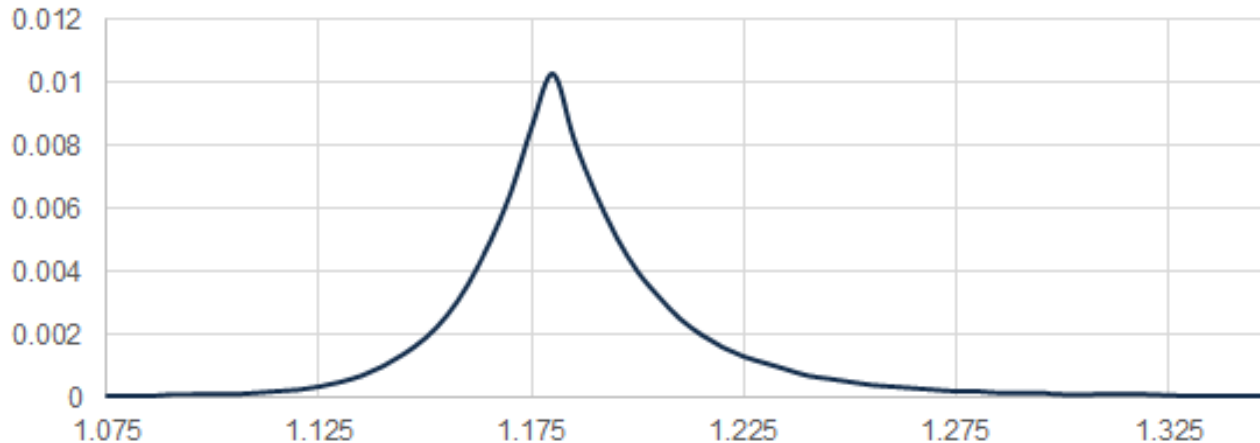


Comparison of Near and Far Contract on 2020-10-01



# Cvol: An alternative method of calculating implied volatility

- \* **Distribution Independent**
- \* **Uses out of the money put prices for the left side and out of the money call prices for the right side of the distribution**
- \* **Area under the curve represents a measure of variance**



# Sentiment: Constructing Hypothetical Risk-Return Distributions

# Market Sentiment Meter

## Analyze historical market sentiment on eight major products

When market-moving events create highly uncertain environments, a trader needs to assess possible outcomes and prepare for market implications

Partnering with 1QBit, CME Group created the Market Sentiment Meter to help assess the magnitude of historical market sentiment. Using eight of CME Group's major futures and options products, the tool tracks sentiment changes.

Based on data back to 2012, the Market Sentiment Meter updates daily with a variety of metrics available through CME DataMine, our cloud-based historical data platform.

### Dive deeper with CME DataMine

Explore historical market sentiment and the data used for the Market Sentiment Meter with CME DataMine.

→ [Access CME DataMine](#)

<https://www.cmegroup.com/tools-information/market-sentiment-meter.html>

# Market Sentiments

The Market Sentiment Meter focuses on four risk profiles common in the futures markets. Below are the illustrative charts that match the sentiment states.

## COMPLACENT



**Rare**  
Low level of market anxiety

## BALANCED



**Common**  
Normal level of market anxiety

## ANXIOUS



**Rare**  
High level of market anxiety

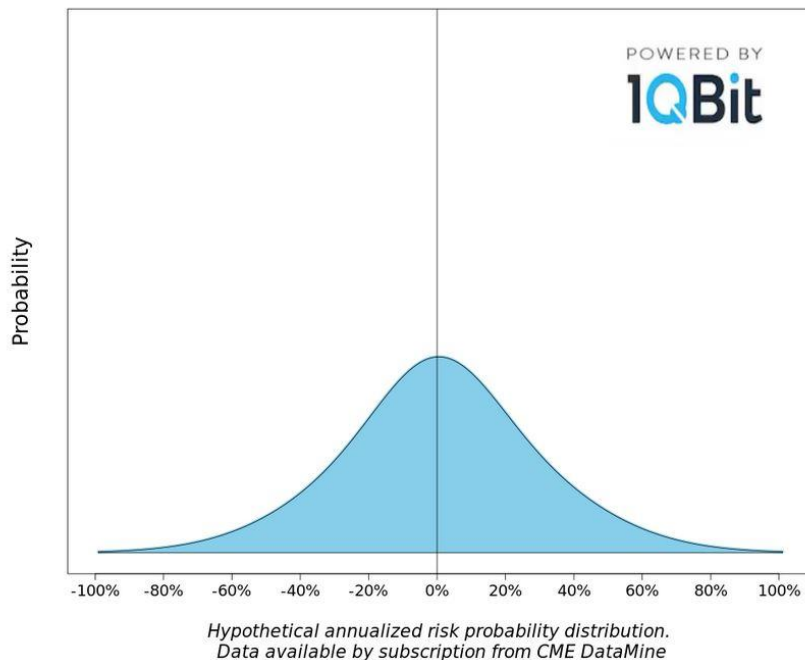
## CONFLICTED



**Extremely Rare**  
Price gap anxiety

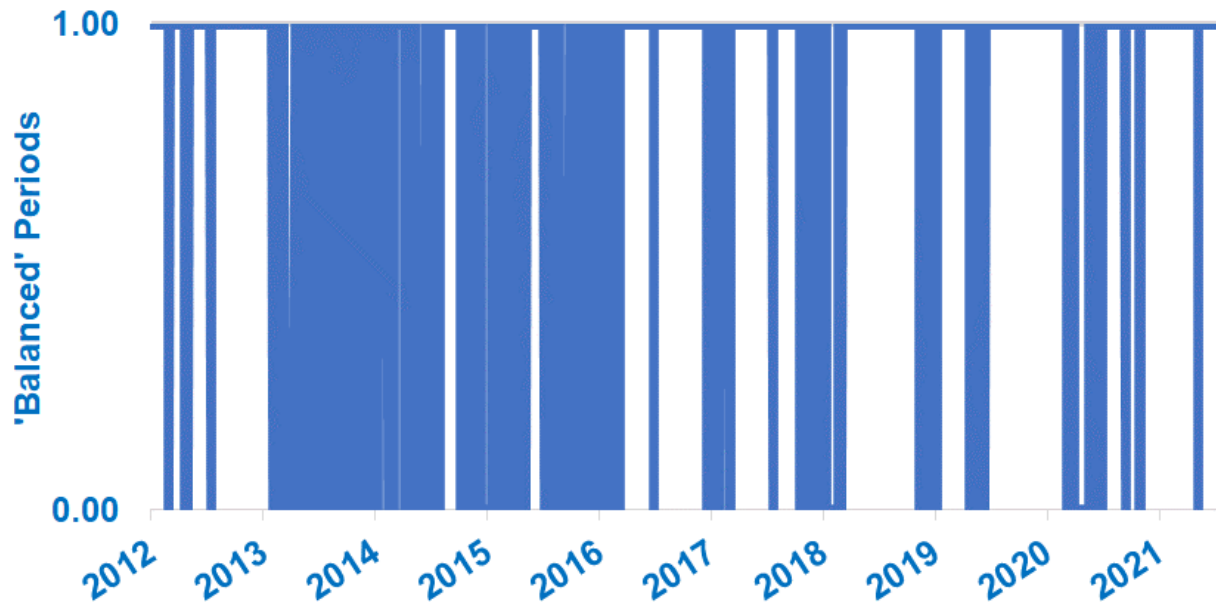
## WTI Crude Oil (NYMEX)

Market Sentiment: Balanced



**Most of the time, about 75%, markets typically exhibit a bell-shaped curve in the CME hypothetical risk-return probability distribution. In the balanced case, there are relatively neutral readings from put/call volumes, intra-day market volatility, implied volatility relative to historical standard deviations, etc.**

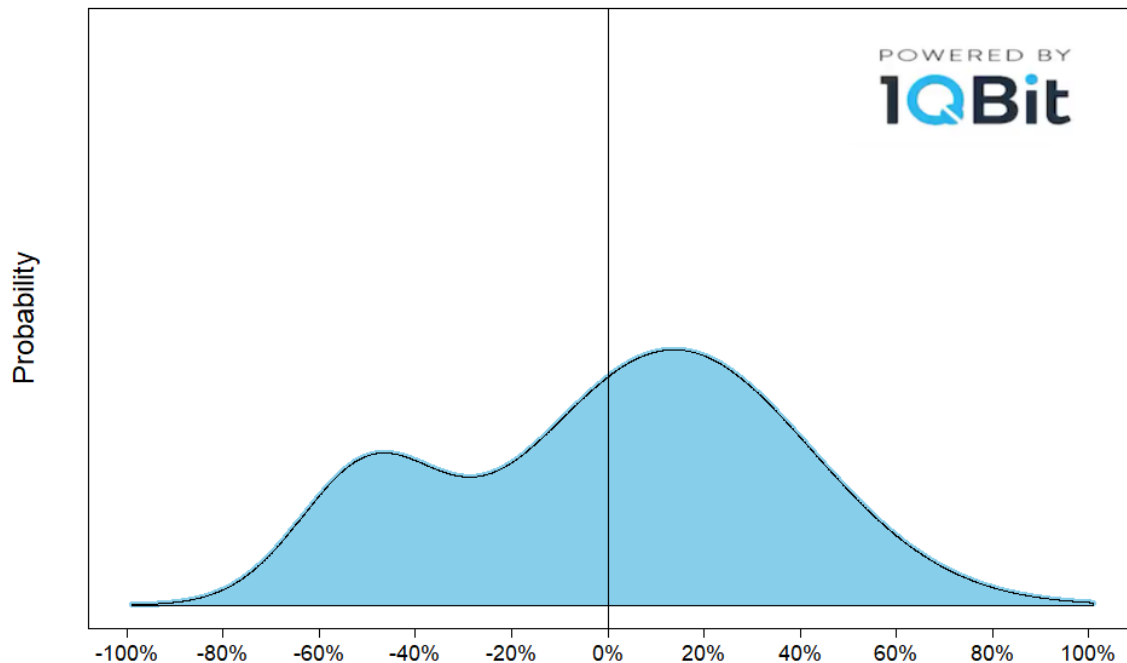
## WTI Oil: Periods with 'Balanced' Hypothetical Risk-Return Probability Distributions (CME Market Sentiment Meter)



Source: CME Market Sentiment Meter (CLLO).

As noted, most of the time markets typically exhibit a bell-shaped curve in the risk-return probability distribution.

## WTI Crude Oil 2019-05-07(Conflicted)

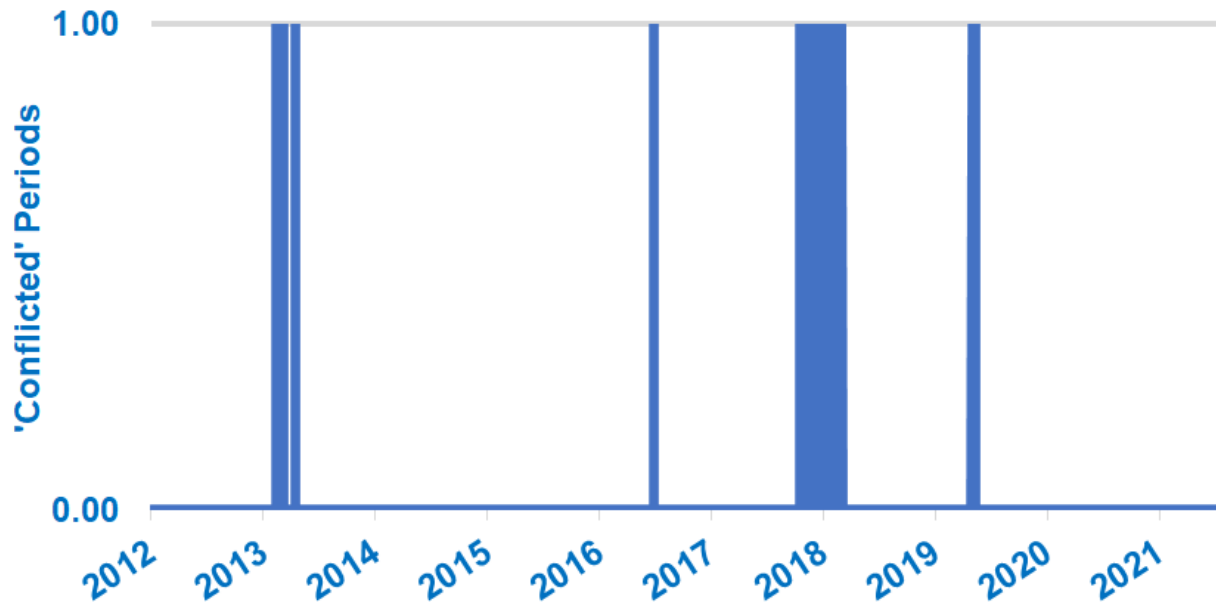


*Hypothetical Annualized Risk Probability Distribution.  
Data available by subscription from CME DataMine: Third-Party: 1QBit*

**In rare cases, the Market Sentiment Meter observes a ‘Conflicted’ or bi-modal risk-return probability distribution. Back in May 2019, this was due to uncertainties over Mideast tensions that might impact supply.**



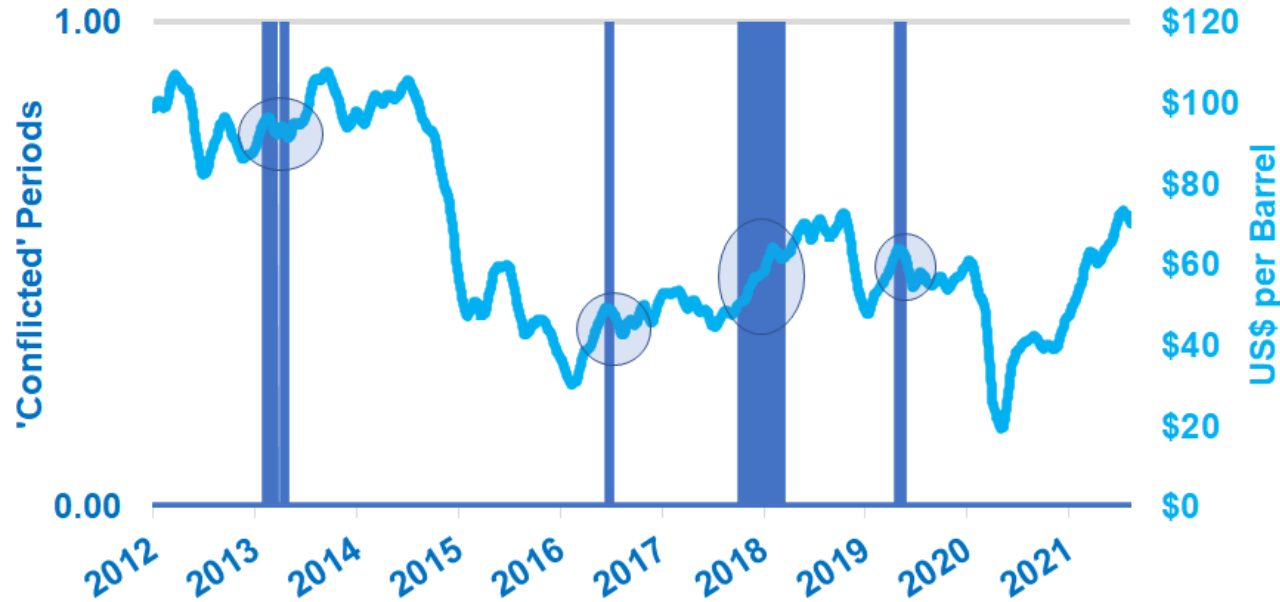
## WTI Oil: Periods with 'Conflicted' or Bi-Modal Hypothetical Risk-Return Probability Distributions (CME Market Sentiment Meter)



Source: CME Market Sentiment Meter (CLLO).

**The 'Conflicted' or bi-modal case is rare and episodic. We interpret the 'conflicted' state as a possible indicator of an elevated probability of event risk.**

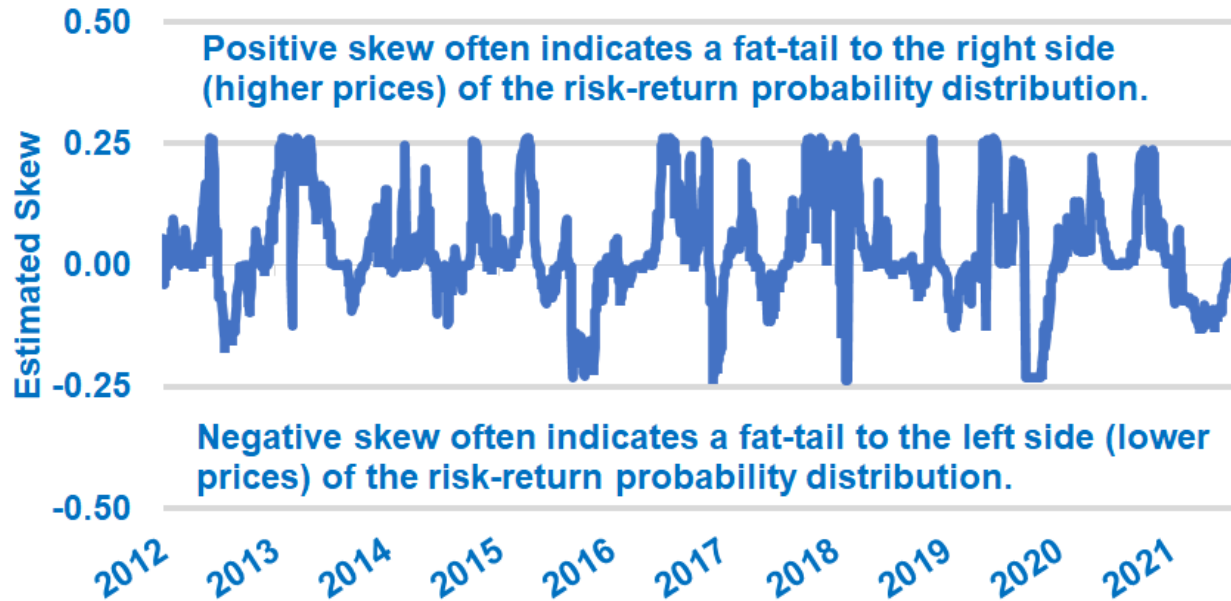
## WTI Oil: Periods with 'Conflicted' or Bi-Modal Hypothetical Risk-Return Probability Distributions (CME Market Sentiment Meter)



Source: CME Market Sentiment Meter (CLLO).

**'Conflicted' or bi-modal cases have been associated with both up and down price moves. Our research is studying non-directional options strategies to handle possible event risk.**

## WTI Oil: Estimated Skew of Hypothetical Risk-Return Probability Distribution from CME Market Sentiment Meter



Source: CME Market Sentiment Meter (CLLO).

We also study the skew in the risk-return probability distribution to provide another reading to compare with put/call options volume to appreciate which side of the market is more 'in play'.

# Commodity Super-Cycle?

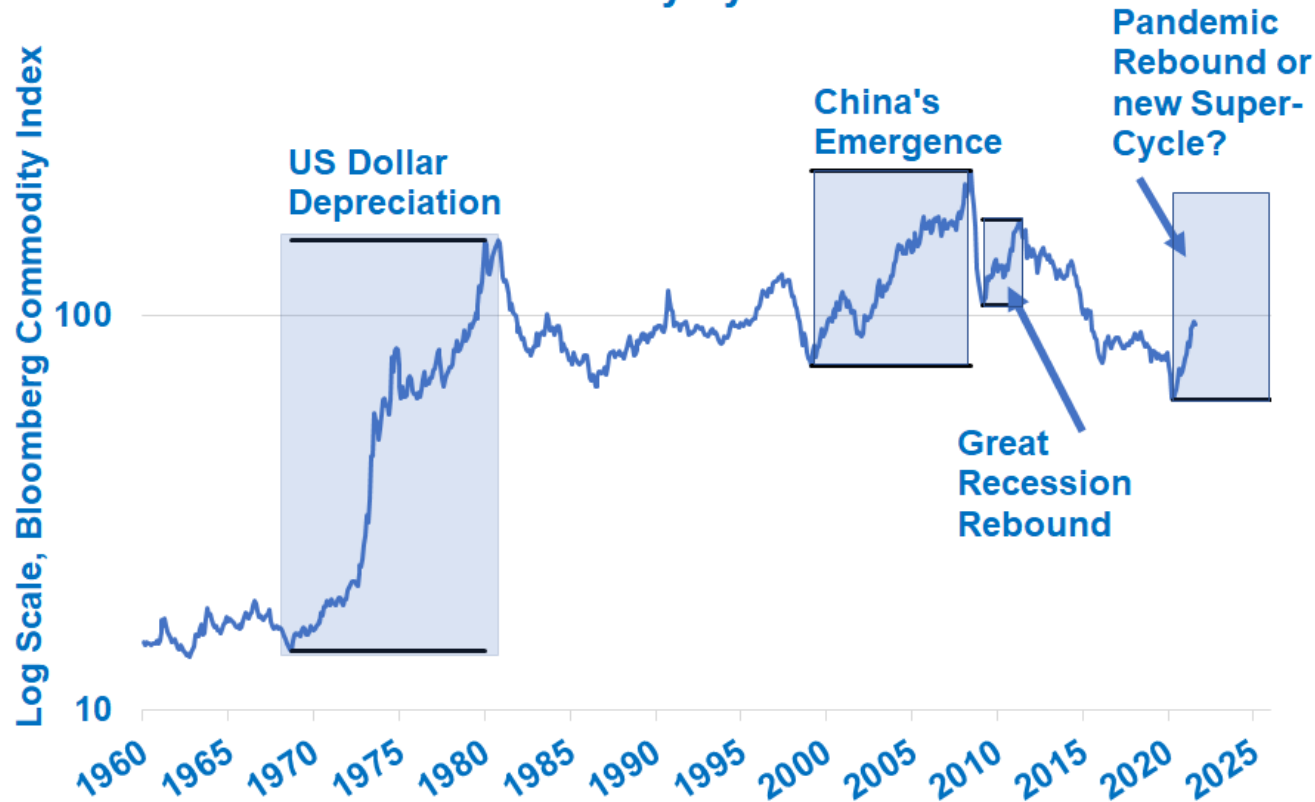
# Definition of a Commodity Super-Cycle

**‘Commodity’ = a broad-based portfolio of commodities, not just one or two.**

**‘Super’ = an out-sized price move of a large magnitude such as 3x or 4x or more.**

**‘Cycle’ = commodity prices rise for many, many years; not just a rebound from an economic shock.**

## Commodity Cycles



Created by CME Group Economics.  
Source: Bloomberg Professional (BCOM).

**We arbitrarily distinguish between a super-cycle that might last a decade from a rebound from a disruptive event, such as a recession, that might only last a year or two.**

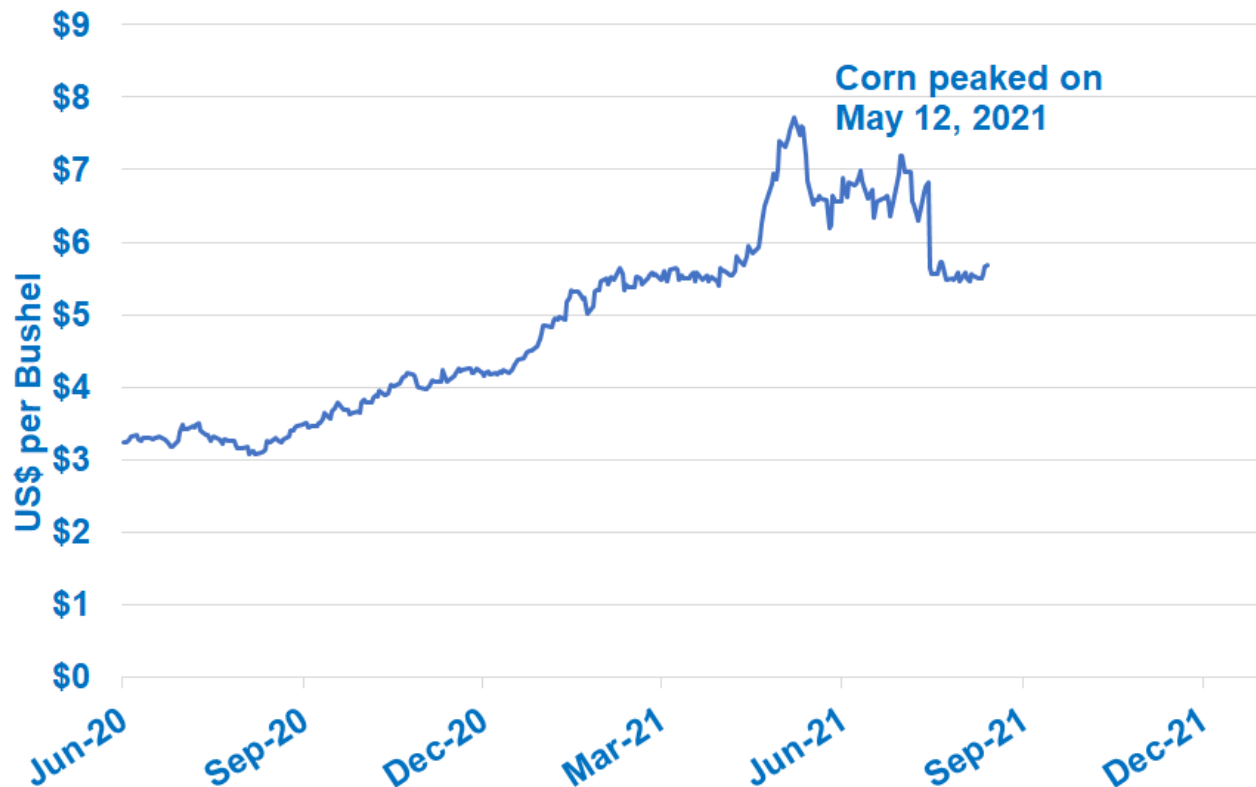
# Lumber Nearby Futures Price



Lumber peaked  
on May 7, 2021

Chart Created by CME Group Economics.  
Source: Bloomberg Professional (LB).

## Corn Nearby Futures Price



Corn peaked on  
May 12, 2021

Chart Created by CME Group Economics.  
Source: Bloomberg Professional (C).



## Soybeans Nearby Futures Price



Soybeans peaked  
in May 11, 2021

Chart Created by CME Group Economics.  
Source: Bloomberg Professional (S).

## WTI Oil Nearby Futures Price

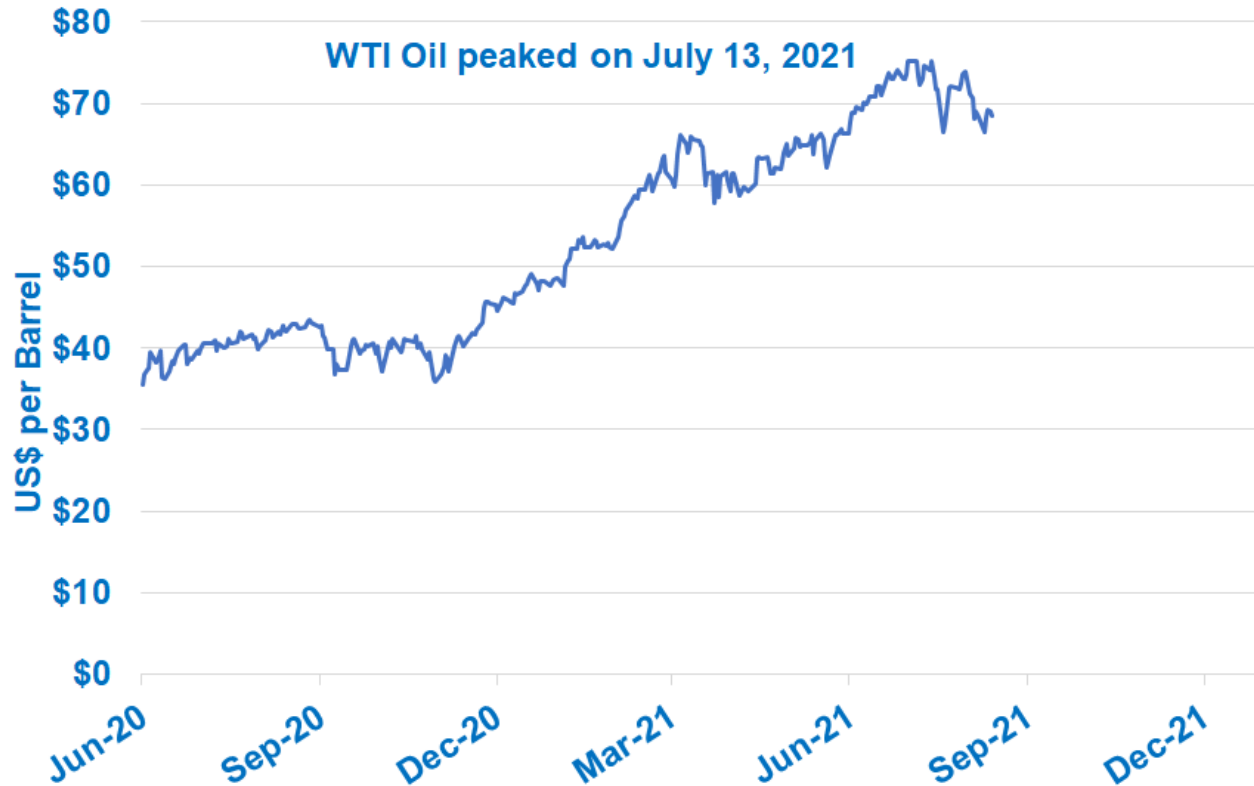


Chart Created by CME Group Economics.  
Source: Bloomberg Professional (CL).

## Copper Nearby Futures Price



Copper peaked  
on May 18, 2021

Chart Created by CME Group Economics.  
Source: Bloomberg Professional (HG).

# Gold Nearby Futures Price

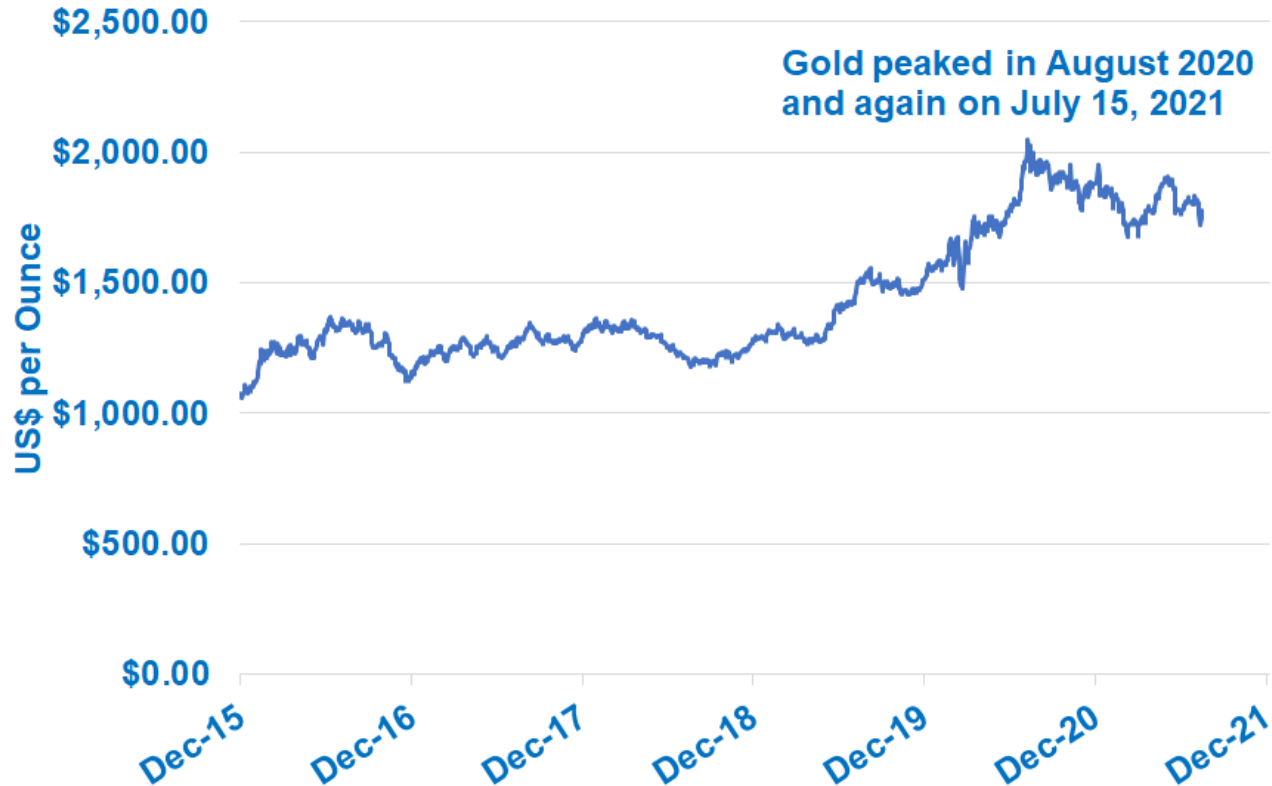
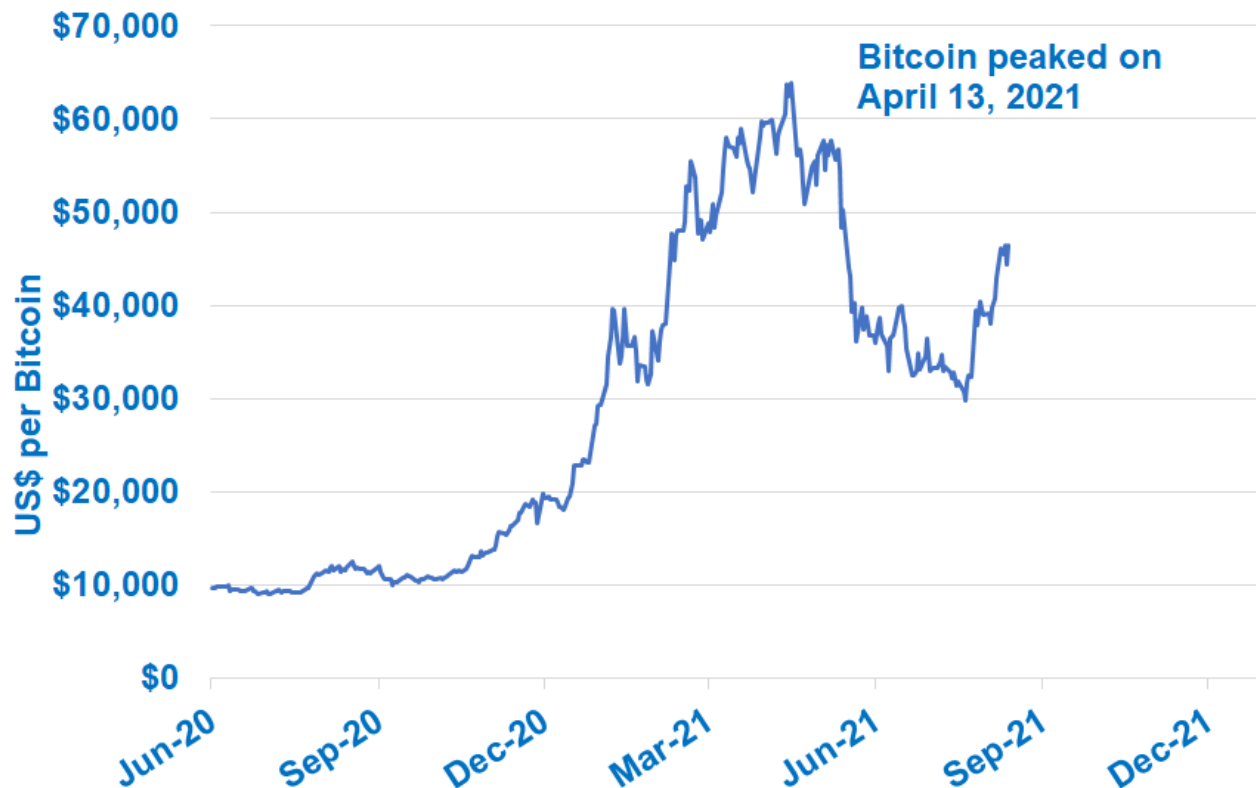


Chart Created by CME Group Economics.  
Source: Bloomberg Professional (GC).

## Bitcoin Nearby Futures Price



Bitcoin peaked on  
April 13, 2021

Chart Created by CME Group Economics.  
Source: Bloomberg Professional (C).

# Future Research Ideas

# Effectiveness of non-directional options strategies to manage potential event risk when the Market Sentiment Meter signals an “Anxious’ or ‘Conflicted” sentiment state.

*Review of Financial Economics.* "Case Study of Event Risk Management with Options Strangles and Straddles", Forthcoming Fall 2021.

# Phase Transitions

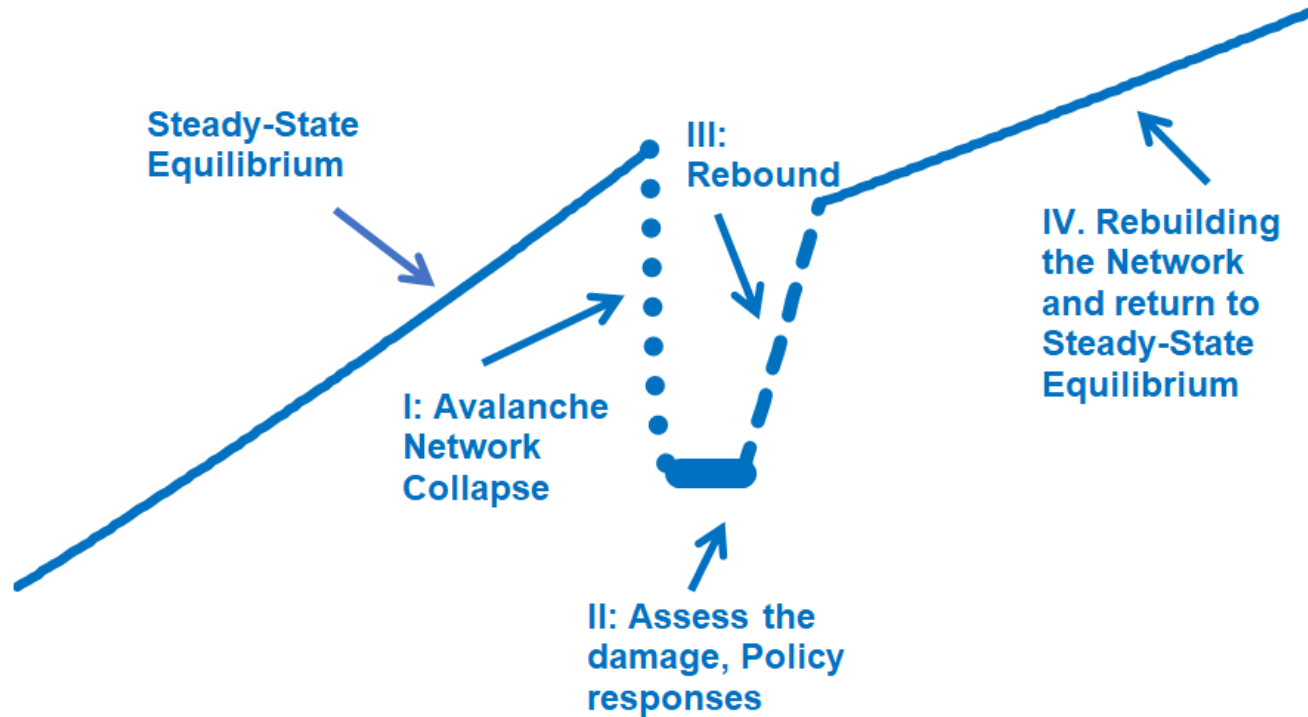


Chart Created by CME Group Economics.

Original Inspiration: Dr. John Rutledge, "Far from Equilibrium".

Academic paper: "From phase transitions to Modern Monetary Theory: A framework for analyzing the pandemic of 2020", *Review of Financial Economics*, 9/2020.

We have found using the physics of phase transitions as a very useful framework for analyzing the Pandemic.

*Review of Financial Economics*. "From phase transitions to Modern Monetary Theory: A framework for analyzing the pandemic of 2020", Fall 2020.



## **Comparing the implied volatility smile for different maturity dates.**

**When nearby options contract shows elevated implied volatility compared to further-out contracts, we want to see if this is an immediate reaction to a surprise event.**

**When nearby options contract shows decreased implied volatility compared to further-out contracts, we want to see if this is an indicator of a higher probability environment for event risk.**

**In various research, we have noticed that developing trends toward more extreme implied skews in the Market Sentiment Meter is an important metric potentially signaling a higher probability of event risk. We are studying how to recalibrating our Market Sentiment Meter to increase to emphasis on the implied skew.**

**Thank you.**

