



ARTICLE

Investing in oil, in a crisis

COVID-19 - Impacts on oil futures and ETPs

July 2020

The economic shocks resulting from COVID-19 hit the global oil market particularly hard. This is evidenced by the first ever negative prices in oil futures. The recent changes in the supply and demand balance for physical and financial exposure to oil have led to extreme oil price volatility and had material repercussions for financial instruments linked to these prices.

The COVID-19 outbreak has resulted in unprecedented supply and demand shocks to the world economy. Lockdown measures, implemented to control the spread of the virus, have curtailed global economic activity and mobility in 2020 to-date.

Oil has been particularly hard hit, with prices of two main crude oil benchmarks, West Texas Intermediate (WTI) and Brent, dropping respectively by 67% and 66% in Q1 2020 alone.¹ Prices dropped due to plummeting global demand for oil; Q1 2020 saw a 6.4% year-on-year demand reduction and Q2 2020 a reduction of 17.5%.² In response, OPEC+ agreed to collectively cut production by 9.7 million barrels per day from May to June 2020, followed by a phased increase to 30 April 2022.³ There remains a question as to whether the agreed cuts will be realised and sufficient to overcome the drop in demand.

The oil market has also been unusually volatile, attributable not only to the shocks to physical demand and supply for oil, but also to contemporaneous behaviours of investors in financial instruments linked to oil. Reacting to weak oil fundamentals, financial investors significantly increased their exposure to crude oil, hoping to benefit from an eventual recovery. The trading behaviour of funds seeking financial exposure to oil prices exacerbated the downward pressure on oil futures prices.

In this article, we discuss key financial products that provide exposure to the oil market, how these have been impacted by recent events and the risks faced by investors.

¹ These are the drops in front-month mid prices from the beginning of January to the Q1 minima on 30-31 March. Prices continued to fall in Q2; the drops from the beginning of January to the minima YTD were 121% and 70%, respectively. Sources: Bloomberg; FTI calculations

² OPEC, 17 June 2020, OPEC monthly oil market report.

³ OPEC, 13 May 2020, OPEC monthly oil market report.

Crude oil futures

The most notable manifestation of the aforementioned shocks to the market occurred on 20 April 2020. For the first time in history, front-month WTI futures experienced negative prices.

Forwards and futures are a convenient and common way to gain exposure to commodities.⁴ These, as well as other derivatives, are often used by investors who seek to hedge their risk by fixing a price at which they will buy or sell oil in the future, or investors who seek to speculate on the price of oil. A number of these investors desire purely financial exposure and not the physical commodity itself.

Futures prices tends to approach the spot price as the futures near expiry. Therefore, it is common for investors to take positions in futures with the nearest expiry date – called front-month futures – if they want exposure to spot prices. In order to maintain exposure to spot prices, investors roll their futures position; that is, they close their front-month positions prior to expiry and take positions in the contracts expiring in the next month. This is especially important for physically settled futures contracts, to avoid taking unwanted delivery of the commodity.

Despite the disparate intentions of those who invest in oil for purely financial reasons and those who participate in physical oil markets, the financial and physical sides of the market are interdependent and must be considered together.

Key oil benchmarks: WTI and Brent

Two main crude oil benchmarks, WTI and Brent, refer to oil produced and traded at different geographic locations. WTI is traded and delivered at Cushing, Oklahoma, and is used to benchmark U.S. crude oil prices. Brent is extracted from different fields in the North Sea and dominates as the benchmark in European and many other global markets. Derivatives on both benchmarks, including futures, are traded worldwide.

The vast majority of WTI crude oil futures are traded on the New York Mercantile Exchange (NYMEX) and require physical settlement of the contract, i.e. the oil is physically delivered at Cushing. On the other hand, Brent crude futures are predominantly traded on the Intercontinental Exchange (ICE). Brent crude futures can be physically settled, based on an off-market Exchange Futures for Physical (EFP) mechanism, but also offer an option to cash settle.

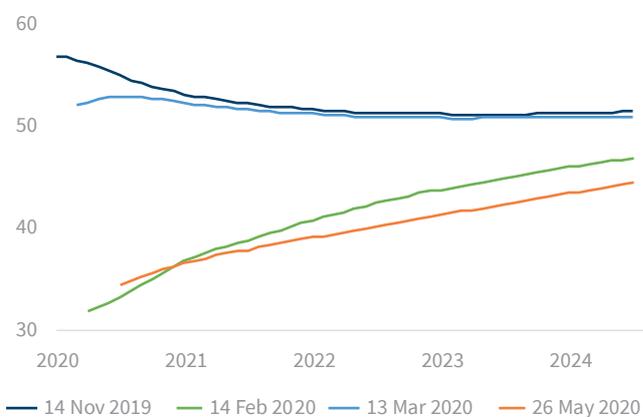
Shape of the forward curve and significance to investors

The shape of the forward curve, a shorthand for futures with ever increasing maturities, can be such that prices of short-dated futures are lower than the price of long-dated futures – referred to as contango – or such that prices of short-dated futures are higher than the price of long-dated futures – referred to as backwardation.

Whether the crude oil futures market is in contango or backwardation has important implications for investors. When the market is in contango, it is expensive to roll futures since longer-dated futures, that need to be bought when rolling the position, are more expensive than shorter-dated futures, that need to be sold. The reverse is true when the market is in backwardation, though transaction costs, such as bid/offer spreads, occur in either market condition. Whether the futures market is in contango or backwardation depends on expectations of future market prices as well as expected costs or benefits of holding physical oil rather than the associated derivative.

The crude oil market was in backwardation at the end of 2019 but had moved into contango by March 2020. In Figure 1 we illustrate the move from backwardation to contango for WTI crude futures. If the contango market were to persist, as was the case after the global financial crisis of 2008, investors in crude oil futures could be exposed to significant rolling costs, which would negatively impact their returns.

FIGURE 1: EVOLUTION OF WTI CRUDE FORWARD CURVE OVER THE LAST 6 MONTHS (USD/BARREL)



Note: The year markings on the x-axis indicate 1 January of that year.
Source: Bloomberg.

⁴ Futures are standardised products publicly traded on exchanges while forwards are tailored and privately traded over the counter. Both are contracts to exchange an asset at a specified price on a specified future date. We focus our attention on futures throughout the remainder of this article.

Why did negative oil prices occur?

Physically settled WTI crude front-month futures went negative for the first time in history just after 18:00 EDT on 20 April 2020. In addition to weak market fundamentals globally, WTI prices were further impacted by a looming crisis in storage capacity.

The WTI price reflects supply from land-locked onshore U.S. production and demand from U.S. refineries, given pipeline capacity constraints to the global market. The fall in U.S. refinery demand meant that as WTI futures settled physically at their settlement point of Cushing, Oklahoma, the excess oil supply had to be stored locally. Storage capacity there was expected to approach its limit mid-May. For holders of the front-month futures with physical delivery during May, this created a risk of being stuck with oil that they did not need and could not store. This made it more difficult to sell the futures, pushing down the price until it effectively offered compensation to those who had some of the limited spare storage capacity and thus could purchase them.

Brent crude futures prices also declined but did not go into negative territory. In contrast to WTI, Brent is a waterborne supply that is more easily transported around the world, and the physical settlement of Brent futures is a more complex and diverse process. Specific grades of oil and delivery locations are priced as spreads to the settlement price of the futures, negotiated via the EFP mechanism. This lack of reliance on a single location, together with the option to cash settle, mitigates – to an extent – concerns about storage capacity when settling the futures. These characteristics helped Brent crude oil front-month futures avoid the downward price pressure experienced by the WTI crude oil front-month futures.

FIGURE 2: WTI CRUDE AND BRENT CRUDE FRONT-MONTH FUTURES PRICES, YTD 2020 (USD/BARREL)



Note: The WTI futures pictured are those traded on NYMEX while the Brent futures are those traded on ICE.
Source: Bloomberg.

Crude oil ETPs

INTRODUCTION TO ETPs

Exchange traded products (ETPs) are alternative investments with shares listed and traded on exchanges. They offer exposure to various markets with cost and convenience advantages over direct investment. They are usually open-ended, meaning they do not have a fixed number of shares, and shares can be created or redeemed at any time.

ETPs on crude oil provide exposure to changes in the price of crude oil. They are generally structured by entering into crude oil futures or swap contracts. For an investor, the main advantage of holding ETPs, rather than futures, is that the ETPs do not require investors to roll positions or post additional collateral in case of adverse market movements. ETPs can be particularly attractive to retail investors as they are available to trade in smaller sizes, when compared to futures.

Crude oil ETFs increase in size

The recent volatility in oil prices attracted investors to oil ETPs. In this section, we focus on this phenomenon as manifested in key exchange traded funds (ETFs), which are ETPs structured as investment funds and which, in this case, seek to replicate movements in crude oil prices or price indices by trading futures.

The recent inflow of investment to crude oil together with the incentive structure underlying ETFs, has led to a sudden creation of a substantial number of new shares in ETFs. Consequently, fund managers saw dramatic increases in their assets under management (AUM) and had to accommodate rolling much larger positions when the futures neared expiry. The largest ETFs tracking the performance of WTI and Brent crude oil are:

1. **United States Oil Fund (USO)**, which tracks the price movements of WTI crude oil;
2. **ProShares Ultra Bloomberg Crude Oil (UCO)**, which provides two times (2x) the daily performance of the Bloomberg WTI Crude Oil Subindex;
3. **Samsung S&P GSCI Crude Oil ER Futures ETF (HKEX-3175)**, which tracks the performance of the S&P GSCI Crude Oil Index Excess Return;
4. **Invesco DB Oil Fund (DBO)**, which tracks the performance of DBIQ Optimum Yield Crude Oil Index Excess Return; and
5. **United States Brent Oil Fund (BNO)**, which tracks the daily price movements of Brent crude oil.

In Figure 3 we show how the AUM for these five ETFs increased in size from 2 January 2020 to 1 June 2020.

FIGURE 3: EVOLUTION OF AUM OF LARGEST OIL ETFs, YTD 2020 (USD BILLION)



Source: Bloomberg.

The major oil ETFs all saw their AUM sharply increase during March and April 2020. In particular, USO, the largest oil ETF, more than doubled in size from USD 1.5 billion at the end of February 2020 to approximately USD 3.5 billion at the end of April 2020. In the following case study we use USO as an example to illustrate the problems created by increased size coupled with wider market conditions.

Case Study: USO's expansion causes problems

USO is managed by United States Commodity Funds (USCF), is traded on the Archipelago Exchange (NYSE Arca) and has the investment objective to track daily changes in the WTI spot price. USO benchmarks its performance against specified short-term futures contracts: the front-month WTI futures or the next month WTI futures when the front-month futures are within two weeks of expiry.

We discuss the main issues experienced by the fund in turn.

DISCONNECT BETWEEN TRADED PRICE AND NAV

The net asset value (NAV) of a fund is calculated as the difference between total assets and total liabilities. Since ETPs are typically liquid, open-ended investments, their share price tends to trade at or close to their per share NAV. In fact, USO believes that “*market arbitrage opportunities will cause daily changes in USO's share price on the NYSE Arca on a percentage basis to closely track daily changes in USO's per share NAV on a percentage basis*”.⁵

However, in the wake of the oil price crash, capital inflows into USO created significant mismatches between its traded price and the NAV per share of the fund. For example, on 21 April 2020, USO traded at price of USD 2.81 while the published NAV per share for the day was USD 2.06, implying a share price premium of 36% to the NAV, as shown in Figure 4.

Such premia can arise either from excessive demand for the ETP relative to its underlying or from excessive selling pressure in the underlying relative to the ETP.⁶ When the ETP is overpriced, an arbitrage opportunity exists in the market and its authorised participants (APs) are incentivised to sell units in the ETP, create shares in the fund, and buy the underlying in the market.⁷ Effectively, APs seek to profit from offloading overpriced shares to investors who do not realise the mispricing, a phenomenon which counteracts selling pressure in the underlying and in addition to buyer interest, contributes to AUM growth.

⁵ USO Prospectus, 23 March 2020, page 1.

⁶ FT Alphaville, 21 April 2020, The United States Oil Fund mystery, revived.

⁷ APs are financial institutions capable of managing complex securities settlements that create and redeem ETF shares in the primary market in exchange for underlying securities. Each AP has an agreement with an ETF sponsor that gives it the right (but not the obligation) to create and redeem ETF shares. APs frequently create or redeem shares in order to manage inventories of ETF shares sold or bought through trading in the secondary market. APs may act either on their own behalf or on the behalf of market makers or institutional clients.

FIGURE 4: USO'S PREMIUM, NAV PER SHARE AND CLOSING PRICE, YTD 2020 (USD)



Source: Bloomberg.

ROLLING FUTURES POSITIONS

USO typically rolls its front-month futures each month within two weeks of expiration, and its specific projected roll dates and approach are published on the USCF website. In April 2020, the oil futures market was in contango, exposing USO's investors to rolling costs since the lower-priced expiring futures would be sold and higher-priced next month futures purchased.

Other traders in the market sought to profit from the predictability of USO's behaviour by entering the next month contract before USO's roll dates.⁸ This behaviour raised the cost for USO to roll its futures – costs covered by its AUM and therefore detrimental to its performance. As USO's AUM grew, it was obliged by its mandate to take a more dominant position in the front-month futures, both increasing the volume of positions requiring rolling and raising attention to the profit-making opportunity. In this way, USO's increased size led to increases in its roll costs.

CHANGE IN MANDATE AND MARKET IMPACT

By mid-April, USO held a quarter of the available NYMEX WTI June futures. In an attempt to reduce rolling costs and amid growing pressure from regulators and exchanges, USO changed its mandate on five separate occasions during the second half of April, leading it further away from tracking WTI front-month future price, as shown in Table 1.

TABLE 1: USO'S TARGET SHARE OF ITS PORTFOLIO INVESTED IN WTI FUTURES AT EACH OF ITS ANNOUNCEMENT DATES BETWEEN 16 APRIL 2020 AND 27 APRIL 2020

	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Oct 2020	Dec 2020	Jun 2021
16-Apr-20	80%	20%					
21-Apr-20	40%	55%	5%				
22-Apr-20	20%	50%	20%	10%			
24-Apr-20	20%	40%	20%	20%			
27-Apr-20		30%	15%	15%	15%	15%	10%

Source: USO's Form 8-K Disclosures.

These announcements moved futures market prices due to the significant size of USO. For example, following USO's announcement on 21 April 2020, the price of the June 2020 futures fell from USD 20.43 to USD 11.57. On 22 April, USO sold 90 million out of the 143 million June 2020 contracts held by the fund. USO announced on 27 April 2020 that it would roll its remaining June futures contracts to later months over 27, 28 and 29 April, with approximately one third of required trades taking place each day. The announcement led to a 25% drop in the price of the front-month futures on 27 April, demonstrating the power of the ETP to move the underlying futures market.

LIMITS IMPOSED BY COUNTERPARTIES

In the midst of the oil market turmoil, decisions taken by some of USO's counterparties have created additional strain on USO to comply with its investment objectives. On 23 April 2020, CME ordered USO not to assume a position in WTI futures in excess of a pre-specified number of contracts for each of the four monthly futures nearest expiry.⁹

These imposed limits have implications for how the fund is managed, and consequently for investors in the fund. USO is no longer able to invest all, or a substantial amount, of its assets in front-month futures in line with its investment objective. As USO was forced to change its mandate to hold positions in longer dated futures, it is harder to track the spot price of oil, since the discrepancy between spot and futures prices is greater the further away the futures is from expiry. In turn, investors may not experience the precise level of exposure they seek, which could lead to inefficient hedges or deviations from their expected returns.

8 FT Alphaville, 21 April 2020, The United States Oil Fund mystery, revived.

9 USO, 4 June 2020, Form S-3/A.

Furthermore, on 21 May 2020, USO disclosed that RBC Capital Markets, LLC (RBC) – USO’s only futures commission merchant (FCM) – had taken risk mitigation measures that constrained USO’s ability to invest in oil futures contracts.¹⁰ In particular, RBC informed USO that it may not hold positions in the front-month futures contract (that is, the June futures expiring 19 May). RBC also informed USO that going forward it would only allow the purchase of benchmark or other oil futures contracts as related to rolls and rebalances but not for new creations.¹¹

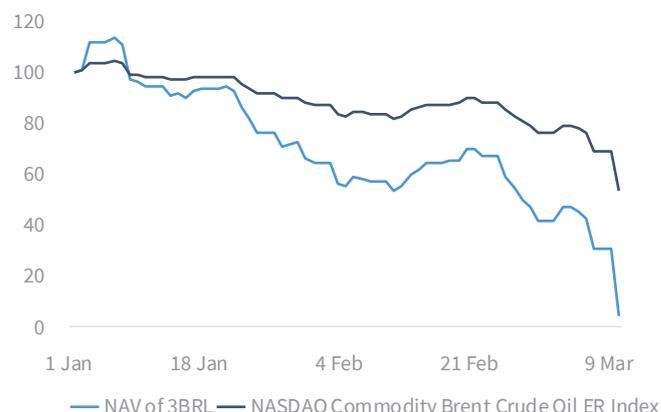
Since it was USO’s only FCM, RBC’s measures put USO at risk of being unable to make new investments. However, on 28 May 2020, USO entered into an agreement with the Rosenthal Collins Group division of Marex Spectron (RCG) as another FCM. This helped to mitigate the problem since RCG has not so far precluded USO from making desired investments. However, USO’s managers are uncertain as to when RBC may reduce restrictions, or whether limits will be imposed by RCG or other FCMs in the future, thus the risks remain.

Leveraged ETPs

In addition to the problems set out above, oil ETPs have also been exposed to significant risks arising from the recent volatility in oil markets. This is best illustrated by examining leveraged ETPs.

Leveraged ETPs offer magnified exposure to an underlying market, allowing investors to gain such exposure with a lower commitment of capital. Effectively, an investor is borrowing money to invest, rather than having to produce the full capital outlay from their own assets. If an ETP were, for example, three times leveraged, an investment in the ETP would experience three times the gains (or losses) and volatility of the underlying market. We illustrate this in Figure 5 by reference to a three times leveraged ETP. Specifically, we show the 3BRL exchange traded commodity (ETC) issued by WisdomTree, a major asset manager and ETP sponsor whose products have been significantly impacted by the recent oil market volatility.¹²

FIGURE 5: PERFORMANCE OF 3BRL AGAINST INDEX (%)



Notes: 3BRL’s NAV is measured in USD. NAV and index points displayed are normalised with their values at 1 Jan 2020 = 100.
Sources: WisdomTree; S&P Capital IQ.

Leveraged ETPs typically track an index as a proxy for the market, similar to non-leveraged, passively managed ETPs. Rather than holding units in the index, the ETP provider enters into swaps with third parties, which contract the rights to a certain multiple of the returns on the index. This structure, known as synthetic replication, provides purely financial, rather than physical, exposure to the market and guarantees that losses do not exceed the initially committed capital.

In order to maintain the desired leverage factor, leveraged ETPs must be frequently rebalanced – typically daily; without this feature, investors buying or selling the ETP on any given day may not transact at the exact advertised leverage factor.

In the following case study, we focus on certain leveraged ETPs issued by WisdomTree. We illustrate the volatility triggered contractual clauses regarding rebalancing and termination in the underlying swaps and underline the implications of these events for investors.

¹⁰ FCMs are intermediaries that buy and sell futures on behalf of their customers and ensure the contracts are fulfilled upon maturity.

¹¹ USO, 4 June 2020, Form S-3/A.

¹² 3BRL is an ETC on Brent oil with three times leverage. ETCs, more broadly, are ETPs that are structured as non-interest paying debt securities, which offer exposure to commodities or baskets of commodities.

Case Study: WisdomTree's oil ETPs, forced redemption or rebalancing due to extreme price movements

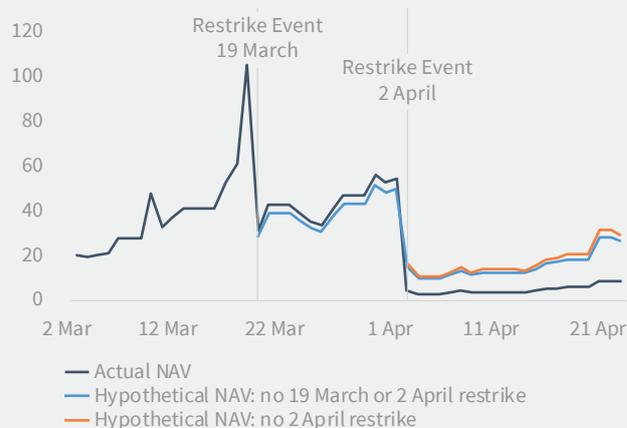
WisdomTree's European offerings include leveraged and unleveraged ETPs tracking long and short positions on WTI Crude Oil and Brent Crude Oil indices. As a result of the recent oil market volatility, WisdomTree halted creations on, and opted to terminate, several ETPs.¹³

In respect of its 3x leveraged ETCs, WisdomTree experienced the trigger of contractual mechanisms designed to protect against extreme oil price movements. The two types of events triggered in this context were:¹⁴

- **Restrike Events**, which occurred following intraday price moves greater than 20% in the underlying index, and which triggered intraday rebalancing that would have otherwise occurred at the end of the day; and
- **Severe Overnight Gap Events**, which were overnight price moves greater than 20% in the underlying market and gave the swap counterparty the option to terminate the swaps.

Restrike Events led to intraday rebalances of WisdomTree's 3x short Brent ETC (3BRS) on 2 April and its 3x short WTI ETC (3OIS) on 19 March and 2 April.¹⁵ These events are designed to protect investors against extreme losses; the intraday rebalancing lessens the severity of adverse movements later in the day. However, it also stops investors from recuperating losses if prices subsequently move in a favourable direction. To demonstrate loss protection coupled with the inability to recuperate losses, we present the actual and hypothetical NAVs per share of 3OIS in Figure 6.

FIGURE 6: ACTUAL AND HYPOTHETICAL NAVS PER SHARE OF 3OIS, YTD 2020 (USD)



Sources: WisdomTree; FTI calculations.

Between the time of the Restrike Event at 15:30 BST on 19 March and the end of the same day, the underlying index price rose, an adverse movement for 3OIS since it is a short product.¹⁶ 3OIS closed at USD 31.06, rather than the USD 28.23 at which it would have closed had the rebalancing not occurred, demonstrating how it mitigated further investor losses.¹⁷

Contrarily, on 2 April, the index price fell after the Restrike Event at 15:35 BST, and 3OIS closed at USD 4.54 while it would have closed at USD 16.24 absent the rebalancing earlier that day.¹⁸ In this case, 3OIS would have performed better had the rebalancing not occurred, since subsequent movements in the underlying index were favourable to its value.

Severe Overnight Gap Events protect the swap counterparty by giving them the option to terminate the swaps. These events led to the discontinuation of three of WisdomTree's 3x leveraged products: 3x long WTI ETC (3OIL) on 9 March, 3BRL on 9 March, and 3OIS on 22 April.¹⁹ Redemption was mandated for these ETCs, meaning losses were effectively locked in for the investors as they were no longer exposed to oil prices.

¹³ WisdomTree, 2020, Important Notices.

¹⁴ WisdomTree, 3 September 2019, Base Prospectus; WisdomTree, 9 March 2020, 3OIL Final Terms; WisdomTree, 9 March 2020, 3BRL Final Terms; WisdomTree, 22 April 2020, 3OIS Final Terms; WisdomTree, 27 May 2020, 3BRS Final Terms.

¹⁵ WisdomTree, 3 April 2020, Summary of events related to WisdomTree Brent Crude Oil 3x daily short (3BRS) on Thursday, 2nd April 2020; WisdomTree, 3 April 2020, Summary of events related to WisdomTree WTI Crude Oil 3x Daily Short (3OIS) on Thursday, 2nd April 2020; WisdomTree, Summary of events related to WisdomTree WTI Crude Oil 3x Daily Short (3OIS) on Thursday, March 19th 2020.

¹⁶ WisdomTree, Summary of events related to WisdomTree WTI Crude Oil 3x Daily Short (3OIS) on Thursday, March 19th 2020.

¹⁷ Ibid; FTI calculations.

¹⁸ WisdomTree, 3 April 2020, Summary of events related to WisdomTree WTI Crude Oil 3x Daily Short (3OIS) on Thursday, 2nd April 2020; FTI calculations.

¹⁹ WisdomTree, 2020, Important Notices.

With respect to other ETPs impacted by the oil market volatility, WisdomTree decided to close its WisdomTree Oil Securities Limited subsidiary, leading to the mandatory redemption on 22 June 2020 of 8 oil and 1 carbon ETPs.²⁰ The decision to end the product line was made on 20 May following the swap counterparty's notice to terminate its agreement. To manage risk given the market volatility, creations on these and five other oil ETPs had already been halted between 24 April and 18 May.²¹ These actions demonstrate the wider extent of the impact on oil-linked ETPs, and the ability for risk-management decisions by WisdomTree or its counterparties to further restrict and financially impact investors.

How FTI Capital Market Services can help

We cumulate decades of experience in trading, investment management, valuation, risk management and regulation covering a wide range of complex financial instruments and derivatives across asset classes. Our team is composed of industry experts who have worked for leading global financial institutions and bring quantitative expertise in developing models and risk analytics in complex trading environments.

Having been involved in previous market turmoil, FTI has a long track-record of providing independent opinions in special situations such as restructurings and transactions advisory, and testimonies in the context of disputes, litigations and arbitrations.

Given the extreme oil price movements and losses suffered on associated complex financial products, we anticipate disputes, or other needs for support assessing and managing the financial impacts, could arise. FTI will continue to monitor market developments in order to best assist its clients when the need arises.

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