

## Commodity Derivatives: Overview (US) USA (National/Federal)

### Related Content

*This Practice Note provides an overview of commodity derivatives transactions in the US, including products, markets, mechanics, and uses. This Note also examines how commodity producers and end users of commodity derivatives use commodity derivatives to hedge price risk in the commodities markets.*

Commodity derivatives originated from old style open-pit commodity exchanges in Chicago and New York, the latter famously depicted in the classic 1980s comedy film *Trading Places*. These exchanges birthed commodity [options](#) and other exchange-traded commodity derivatives, such as commodity [futures contracts](#). These instruments later expanded into financial contracts to create a complete derivatives marketplace.

Some of the commodity derivatives market became "[bilateralized](#)" beginning in the 1980s, with the advent of commodity [swaps](#).

Today, commodity derivatives are generally separated into two major categories:

- [Over-the-counter](#) (OTC) transactions, such as swaps and options.
- Cleared, exchange-traded products, such as commodity futures contracts.

Like financial derivatives, commodity derivatives transactions may be used:

- As speculative investments by investors looking to gain exposure to a particular commodity or basket of commodities.
- By commercial end users of derivatives, such as producers of commodities or manufacturers or businesses that use commodities (collectively, end users), to [hedge](#) price risk in the commodities markets or in a particular commodity.

Hedges are a risk-mitigation mechanism and are distinguishable from speculative commodity transactions in which a party assumes, rather than transfers, price risk related to a commodity in hopes that the future increase or decrease in price of the commodity will result in trading profits.

In a commodity hedge, a commodity producer or end user uses a derivative instrument to reduce price risk and transfer some or all of this risk to a party that is willing and able to assume and manage this risk.

This Note focuses on instruments that end users use to hedge price risk in the commodities markets.

## Types of Commodity Derivatives Transactions

In broad terms, commodity derivatives transactions can be separated into two major categories:

- OTC commodity derivatives transactions (see [OTC Commodity Derivatives Transactions](#)).
- Exchange-traded commodity derivatives transactions (see [Exchange-Traded Commodity Derivatives Transactions](#)).

An end user's decision to hedge using one or both of these types of transactions is made on a case-by-case basis depending on several considerations, including:

- The sensitivity of its business plan and capital structure to revenue fluctuations.
- Its appetite for risk.
- Its [liquidity](#).
- Any lender- or investor-imposed restrictions or requirements.
- The timing, location, and amount of its expected production or use of a commodity.
- Its degree of confidence in its projections of future production or use of a commodity.

## Differences Between OTC Commodity Derivatives Transactions and Exchange-Traded Commodity Derivatives Transactions

OTC commodity derivatives transactions are bilateral transactions between parties that are intended to meet each party's specific risk- and financial-management strategies. While these transactions allow the parties to negotiate the exact terms of an agreement, their [bespoke](#) characteristics limit the parties' ability to assign these agreements to third parties.

By contrast, exchange-traded commodity derivatives transactions are standardized one-size-fits-all transactions that require the parties to implement hedging strategies based on a narrow range of contract terms. While these transactions offer many advantages and benefits, including greater assignability, they limit a party's flexibility in hedging its risk.

OTC commodity derivatives transactions are especially useful to commodity producers because they allow producers to hedge all or some of their expected production farther into the future than may be practical with exchange-traded commodity derivatives transactions. This allows the parties to structure a hedge that is highly correlated to the volatility of their market and their business model.

## Settlement of Commodity Derivatives Transactions

Both OTC and exchange-traded commodity derivatives can be either:

- [Cash settled](#) (also referred to as "financially settled") (see [Cash-Settled OTC Commodity Derivatives Transactions](#)).
- [Physically settled](#) (see [Physically Settled Commodity Derivatives Transactions](#)).

## Physically Settled Commodity Derivatives Transactions

Physically settled commodity derivatives transactions involve the actual purchase and sale of physical commodities at an agreed later date. For a physically settled transaction to be a hedge, the contract must specify that the underlying commodity is to be sold at some time in the future for a fixed price.

These contracts are also referred to as commodity [forward contracts](#).

Because physical settlement requires the actual delivery of a specified quantity of a particular commodity on a specified date, these transactions present several additional issues that must be considered. These include:

- Ensuring the commodity producer will have sufficient production to meet its obligations (see [OTC Transaction Risks: Production Risk](#)).
- Clarifying where title to the commodity is transferred from the seller to the buyer.
- Clarifying when the commodity is to be delivered and which party bears the transportation costs.
- Ensuring the commodity meets the quality standards set out in the contract.
- Specifying which party bears the risk of loss.
- Defining what constitutes a [force majeure](#).

## Cash-Settled Commodity Derivatives Transactions

Cash-settled commodity derivatives transactions result only in payment obligations between the parties and do not involve the purchase or sale of a physical commodity. The parties' payment obligations in a cash-settled commodity derivatives transaction are derived from the value of the underlying commodity as determined based on an agreed pricing mechanism.

Because these transactions do not involve issues that must be considered with physically settled transactions (for example, transportation and risk of loss) they are less complicated than physically settled transactions, but they present other issues that must be considered (see, for example, [OTC Transaction Risks: Credit Risk](#)).

## OTC Commodity Derivatives Transactions

Parties may negotiate and customize all aspects of an OTC commodity derivatives transaction. This gives the end user control over:

- The structure of the hedging transaction.
- The exact quantity of the commodity to be hedged.
- The index price used to price the commodity (in the case of natural gas, for example, price indices, such as "Gas Daily" or "Inside FERC" published by S&P Global Platts).
- The [collateral](#) requirements securing the parties' obligations (see [ISDA Collateral Requirements](#)).
- The remedies available to the parties in the event of a default.

OTC commodity derivatives transactions are either physically settled or cash settled (see [Settlement of Commodity Derivatives Transactions](#)). The method of settlement of the transaction is specified in a [transaction confirmation](#) and the underlying [ISDA® Master Agreement](#) (see [ISDA Master Agreement](#)).

## Types of OTC Commodity Derivatives Transactions

The most common OTC commodity derivatives products are:

- Swap contracts.
- Option contracts.
- Fixed-price physical contracts.

## Commodity Swap Contracts

Swaps are bilateral contracts that provide for the exchange or "swapping" of a series of cash flows at defined intervals. They are attractive to commodity producers because:

- They require no upfront costs.
- There are a relatively large number of swap counterparties and swap transactions available, creating an active and liquid market for these products.

Commodity producers and end users often use commodity price swaps to hedge price risk.

Commodity "price swaps" involve swapping, at defined intervals for a specified period into the future, a fixed price for a floating price that is based on the market – or index – price of an agreed [notional](#) quantity of the commodity.

Commodity price swaps are cash settled on agreed periodic dates by comparing the floating price of the commodity (as published by an index selected by the parties) to the fixed price agreed on in the swap contract.

If, on the calculation date, the published index price of the commodity (the floating price) is:

- Less than the fixed price, then the floating-price payor (often a commodity producer) receives a payment from the fixed-price payor equal to the difference between the fixed and floating prices multiplied by the notional quantity of the commodity specified in the contract.
- Greater than the fixed price, then the floating-price payor is obligated to make a payment to the fixed-price payor equal to the difference between the floating and fixed prices multiplied by the notional quantity of the commodity specified in the contract.

Swap counterparties exchange a single payment on each payment date, which is the [net](#) amount owed by one party to the other under the commodity swap contract.

Commodity swaps help producers lock in the fixed price agreed in the swap contract, guaranteeing a predictable stream of revenue from their production. However, the producer gives up the potential upside of increased revenue if prices rise in the marketplace.

For more information, see [Practice Notes, Derivatives: Overview \(US\): Swaps](#) and [Derivatives: Commercial Uses: Managing Commodity Risk: Commodity Derivatives](#).

### Illustration of a Commodity Swap

To understand how commodity producers and end users of commodities use price swap contracts to lock in (or hedge) the prices they receive or pay in the market, consider this example:

Assume a wheat producer expects to produce 25,000 bushels (bsh) of wheat in February and has contractually committed to sell this production at index-based [spot prices](#). Assume also that the producer desires to hedge 100% of this production at a fixed price of \$5.00 per bushel, thus locking in \$125,000 of revenue from its production for that month ( $\$5.00/\text{bsh} \times 25,000 \text{ bsh} = \$125,000$ ).

Then under the wheat price swap hedge, the producer is required to make a payment to its swap counterparty equal to the floating, indexed price of wheat specified in the contract multiplied by the notional quantity of wheat specified in the contract in exchange for receiving a payment from the swap counterparty equal to the fixed price agreed in the contract multiplied by the notional quantity of wheat specified in the contract (these payments are netted).

If the index price of wheat is:

- \$6.50 per bushel at the time specified for valuation in the swap contract (valuation time), the producer will owe its swap counterparty \$37,500 under the hedge contract or the product of the spot price (\$6.50/bsh) minus the fixed price (\$5.00/bsh) multiplied by the notional quantity (25,000 bsh). Assuming that the producer's contract to sell its production in February is determined by the same index, then the producer will be entitled to receive the spot price (\$6.50/bsh) multiplied by the number of bushels to be sold (25,000) or \$162,500.
- As a result, the producer will receive enough revenue from the purchaser of its wheat production to pay the settlement obligation to the swap counterparty and still net a \$5.00 per bushel profit, or \$125,000 ( $\$162,500 - \$37,500$ ).
- \$4.00 per bushel at the valuation time specified in the swap contract, the swap counterparty will owe the producer \$25,000 under the hedge contract or the product of the fixed price (\$5.00/bsh) minus the spot price (\$4.00/bsh) multiplied by the notional quantity (25,000 bsh). That payment, combined with the amount the producer receives from the purchaser of its wheat production (assuming that the physical contract price for that period is determined by the same index), will result in the producer receiving its target price of \$5.00 per bushel.
- The hedge swap payment (\$25,000), therefore, supplements the producer's sale of wheat at the spot price ( $\$4.00/\text{bsh} \times 25,000 \text{ bsh} = \$100,000$ ). This provides the producer with \$125,000 of revenue during the month of February ( $\$100,000 + \$25,000 = \$125,000$ ).

### Benefits and Limitations of Commodity Swaps

As the examples above illustrate, because of the commodity swap, the producer's per-bushel effective net revenue is equal to the agreed fixed price (\$5.00/bsh) set out in the swap ( $\$125,000 / 25,000 \text{ bsh} = \$5.00/\text{bsh}$ ), regardless of whether the spot price is higher or lower than the fixed price specified in the swap contract for that month. For this reason, price swaps are commonly used by:

- Producers to protect against falling commodity prices.
- End users to hedge against rising commodity prices.

However, as these examples also illustrate:

- The producer gives up the potential upside of increased revenue if prices rise.
- The end user hedging against the risk of rising prices gives up the potential opportunity for lower expenses if prices fall

Therefore, the benefits of these transactions come at a cost. Nevertheless, producers often make the decision to hedge using price swaps because certainty and predictability for a period of time may be more valuable than the potential financial upside.

### Commodity Option Contracts

Option contracts provide the holder of the option the right, but not the obligation, to either purchase (with a [call option](#)) or sell (with a [put option](#)) a specified quantity (and sometimes quality) of an underlying commodity at a specific location and on a specific date (or series of dates) in the future at a price specified for each such date (the strike or exercise price).

For example:

- A food manufacturer can enter into a call option to hedge against the possibility that wheat prices will rise in the future; and
- A wheat farmer can enter into a put option to hedge against the possibility that wheat prices will fall in the future.

OTC option contracts are often cash settled and do not involve physical delivery of the underlying commodity. Under a commodity option contract that allows for financial settlement, if the floating price of the commodity (such as wheat) drops below the strike price specified in the option contract (and the producer, as the holder of a put option, exercises its option in a timely manner), the option contract entitles the producer to receive a payment from the option writer equal to the difference between the strike price and the floating price of wheat multiplied by the notional quantity of wheat specified in the contract.

Therefore, in this scenario, while the producer must still sell its physical wheat production at the lower floating price, it receives from the option writer a payment offsetting the difference between the strike price and the floating price.

The option holder has no obligation to the option writer to make a payment if prices rise above the strike price, but must pay a premium to the option writer for entering into the option contract at the time the contract is entered into. Therefore, unlike a swap, there is an up-front cost associated with most options.

Depending on the movement of wheat prices, the option holder can choose one of the following three ways to close out and liquidate its position in an OTC commodity option contract:

- **Exercise of the option.** American-style options may be exercised at any time on or before the option expires, while European-style options may only be exercised on the date they expire. If and when the holder properly exercises the option, the seller of the option (the option writer) is obligated to fulfill its contractual obligations under the option contract.
- The holder of a call option would exercise the option if the strike price for the commodity specified in the option contract is below the floating price on the exercise date. The holder of a commodity put option would exercise the option if the strike price for the commodity specified in the option contract is above the floating price on the exercise date.
- For details, see [Illustration of Commodity Put Option Contract](#).
- For more information on European-style vs. American-style options, see [Practice Note, Derivatives: Overview \(US\): Types of Options](#).
- **Resale of the option.** Depending on the exercise price and the terms of the particular option transaction, the option holder may elect to sell an [in-the-money](#) option, taking in some profit rather than holding the option until its expiration. When an option is sold, the hedge has been lifted and a producer has full exposure to future price fluctuations.
- **Expiration of the option.** The holder of an option may elect to let the option expire if it does not make economic sense to exercise or sell the option. For example, if the strike price in a put option is below the floating price on the exercise date, the producer would sell its commodity in the [spot market](#) and let the option expire.
- The producer achieves a sale at the higher spot price, but the producer's revenue from the spot sale of its commodity is offset by the premium it must pay to the option writer.

### Illustration of Commodity Put Option Contract

Continuing the example from above ([Illustration of a Commodity Swap](#)): Assume that instead of locking in prices with a price swap, the commodity producer desires to hedge all of its production to lock in a revenue floor for its production during the month of February, while still retaining the benefit of the upside if prices rise.

Assume further that the producer has determined, based on a review of its budget, that it needs to protect itself from wheat prices generating revenue below \$3.50 per bushel, or net revenues of \$87,500 ( $\$3.50/\text{bsh} \times 25,000 \text{ bsh} = \$87,500$ ) during the month of February.

To achieve these goals, the commodity producer enters into a cash-settled put option contract with a strike price of \$4.50 per bushel at a premium of \$1.00 per bushel or \$25,000 ( $\$1.00/\text{bsh} \times 25,000 \text{ bsh} = \$25,000$ ). (The strike price minus the premium gives the producer its revenue target of \$3.50 per bushel.)

If the price of wheat:

- Remains at or above the strike price during the term of the put option contract, the option is [out of the money](#). In this case, the commodity producer will choose not to exercise its option (and allow it to expire). It will sell the 25,000 bushels of wheat at the spot price. The producer's cost

for the unexercised put option contract is the premium paid to the option writer (\$25,000). Thus, the producer's revenue would be equal to the product of the spot price multiplied by 25,000 bushels of wheat less the premium for the put option (for example, assuming the wheat was sold at \$6.00 per bushel, the producer would net \$125,000 in revenue ( $[(\$6.00/\text{bsh} \times 25,000 \text{ bsh}) = \$150,000] - \$25,000 = \$125,000$ )).

- Falls below the strike price during the term of the put option contract, the option is in the money. Assuming the spot price of wheat is \$3.00 per bushel at the time the producer exercises its put option, the option writer will owe the commodity producer \$37,500. This is equal to the strike price (\$4.50/bsh) minus the floating price (\$3.00/bsh) multiplied by the notional quantity (25,000 bsh).

The option payment of \$37,500 supplements the producer's sale of wheat at the spot price ( $\$3.00/\text{bsh} \times 25,000 \text{ bsh} = \$75,000$ ) leaving the producer with \$112,500 of revenue during the month of February ( $\$75,000 + \$37,500 = \$112,500$ ). The producer's cost for the put option contract is the premium paid to the option writer (\$25,000). Therefore, its net revenue during the month of February is \$87,500 ( $\$112,500 - \$25,000 = \$87,500$ ) or \$3.50 per bushel ( $\$87,500 / 25,000 \text{ bsh} = \$3.50$ ).

### Benefits and Limitations of Commodity Options

As the examples above illustrate, the wheat producer's put option contract is intended to ensure that its net revenue from its wheat production during the month of February never falls below a certain price after subtracting the premium paid for the option contract (\$3.50 per bushel, or \$87,500, in this example), while simultaneously allowing the producer to benefit from an increase in wheat prices.

With the put option, the wheat producer is protected from changes in the price of the commodity in one direction while retaining the ability to benefit from movement of the price in the other direction. If a commodity option contract is out of the money, the producer's only cost is the premium paid for the option to the option writer.

Therefore, a commodity put option protects a producer against falling commodity prices while preserving the opportunity to benefit from the upside if commodity prices rise to the extent that they exceed the option premium. Commodity purchasers can also purchase a call option to protect against rising commodity prices while preserving the opportunity to benefit if commodity prices fall.

OTC option contracts are appealing to commodity producers that are willing to pay a premium for downside price protection without having to give up the potential upside of increased revenue if commodity prices rise (as they do in a commodity price swap) by an amount greater than the option premium. However, depending on the amount of this premium, an option contract may not be practicable because it requires a payment of cash up front. This negative cash flow may discourage some producers from buying options at the outset.

### Fixed-Price OTC Physical Commodity Contracts

Fixed-price physical commodity contracts are traditional purchase and sale transactions and can be entered into in lieu of commodity swap or option contracts. The primary distinguishing features of fixed-price OTC physical commodity contracts are:

- Considerations related to physical delivery of the commodity.
- The use of a fixed price rather than a floating price. (Note that the term "fixed price" does not necessarily mean that there is one price for the commodity during the entire term of the contract. Rather, the price per unit is "fixed" for a certain period of time which is specified in advance for each time period during the term of the contract.)

For example, a wheat producer that expects to produce 25,000 bushels of wheat during the month of February can enter into a fixed-price physical contract with a counterparty willing to purchase and take physical delivery of this specified quantity of February wheat production at an agreed location for a fixed price. The wheat producer is, therefore, hedged against price risk by the predictability of its future revenue.

However, as with all fixed-price contracts, the wheat producer gives up the potential upside of increased revenue if wheat prices rise. As with all physically settled contracts, the wheat producer must also consider issues such as title transfer, quality, and risk of loss.

While fixed-price OTC physical commodity contracts eliminate price risk, they do not eliminate all other risks that the commodity producer faces. Because these contracts involve the physical delivery of a commodity and a fixed price, the producer is subject to:

- The risk that the counterparty will take delivery and fail to pay for all or part of the production, known as settlement risk (see [Settlement Risk](#)).
- The risk that the counterparty may refuse to perform the contract if the spot price of commodity is less than the fixed price under the contract, known as [mark-to-market](#) risk (see [Mark-to-Market Risk](#)).
- The risk that it may not produce enough commodity to meet its obligations under the contract (see [OTC Transaction Risks: Production Risk](#)).

### Benefits and Limitations of Fixed-Price Commodity Contracts

In-field purchasers of commodities are often reluctant to enter into fixed-price OTC physical commodity contracts with producers because the assumption of the producer's price risk may be outside the purchaser's core business and beyond its risk tolerance. These parties may also be unwilling or unable to post sufficient credit support to secure the performance of their payment obligations under the contract.

As a result, fixed-price OTC physical commodity contracts are infrequently entered into between producers and in-field purchasers. Instead, commodity producers often enter into floating-price OTC physical commodity contracts with in-field purchasers and hedge exposure to price risk using cash-settled swap transactions with commodity trading companies, banks, and financial institutions that are more willing and able to post sufficient credit support.

## How Are OTC Commodity Derivatives Transacted?

OTC commodity derivatives transactions are not traded on or supervised by organized exchanges. Rather they are bilaterally negotiated private contracts tailored to each party's specific risk and financial management strategies.

The most widely used OTC commodity contract is the ISDA Master Agreement (ISDA Master) published by the [International Swaps and Derivatives Association, Inc.](#) (ISDA).

### ISDA Master Agreement

The ISDA Master is a standardized, pre-printed form agreement published by ISDA that is used to document OTC commodity derivatives transactions. The pre-printed ISDA Master includes general terms and conditions governing OTC transactions, including payment provisions, representations and warranties, events of default, and [termination events](#) (see [Practice Notes, ISDA Documents: Overview \(US\): The ISDA Master Agreement and Understanding the ISDA Master Agreement and Schedule](#)).

There are two versions of the pre-printed ISDA Master that market participants can use to document OTC transactions: the 1992 ISDA Master and the 2002 ISDA Master. Some of the primary differences between the two versions include settlement (or close-out) procedures, force majeure, termination events, events of default, and [setoff](#). For details on the differences between the two agreements, see [Practice Note, Comparison of 1992 and 2002 ISDA Master Agreements](#).

The parties add to or modify the terms of the pre-printed ISDA Master through the use of a [Schedule to the ISDA Master Agreement](#) (ISDA Schedule), which is incorporated into and forms part of the ISDA Master and includes important elections, amendments, supplemental terms, notice information, and closing deliverables (see [Practice Notes, ISDA Documents: Overview \(US\): The ISDA Schedule and Understanding the ISDA Master Agreement and Schedule: Schedule to the ISDA Master](#)).

The ISDA Master (including the ISDA Schedule) is an umbrella document that parties use almost universally to govern their bilateral derivatives trading relationships, including OTC commodity derivatives transactions.

An ISDA Master may cover many transactions of different types, each of which is evidenced by a separate [transaction confirmation](#). The transaction confirmation confirms the economic deal terms of each transaction and automatically forms part of and is governed by the terms of the ISDA Master (see [Practice Note, ISDA Documents: Overview \(US\): Transaction Confirmation](#)).

Without a master-agreement structure, the parties would be required to enter into a separate legal agreement each time a physical or financial transaction is consummated between them.

ISDA's master-agreement documentation architecture allows parties to trade both physical and financial transactions under a single agreement. The benefits inherent in a single-agreement structure often prompt OTC market participants to use the ISDA Master and its various commodity annexes instead of or in addition to other master-agreement documentation that is limited to one particular type of commodity (for example, natural gas transactions under the Base Contract for Sale and Purchase of Natural Gas published by the North American Energy Standards Board (NAESB) or power transactions under the Master Power Purchase & Sale Agreement published by the Edison Electric Institute (EEI)).

For further details on the ISDA Master and Schedule, see [Practice Note, Understanding the ISDA Master Agreement and Schedule](#).

### ISDA Credit-Risk Mitigation Mechanisms

The ISDA Master provides several mechanisms to help reduce parties' credit risk to one another in a commodity transaction, each of which is subject to negotiation between the parties. These provisions are contained within the pre-printed text of the ISDA Master and can be further expanded using the [ISDA Credit Support Annex](#) (CSA).

These mechanisms include:

- The right to terminate and liquidate all of the transactions under the ISDA Master when a counterparty default occurs.



- The right to setoff obligations owing between the parties.
- The right to withhold payment after the occurrence of an event of default.
- The right to demand collateral from a counterparty under certain conditions.
- The ability to monitor and adjust the exchange of collateral as frequently and as specifically as the parties desire.

### ISDA Collateral Requirements

The ISDA Master is often supplemented by a CSA, which is an annex to the ISDA Schedule and, when executed by the parties, supplements and forms a part of the ISDA Master. The CSA governs [margin](#) collateral posting requirements relating to transactions entered into under the ISDA Master.

There are many ways a commodity producer or end user can secure obligations under the ISDA Master. A party may:

- Grant liens to its counterparty on its assets, subject to the terms of its [security documents](#) with its lenders.
- Use the CSA to govern the exchange and management of collateral to secure a party's payment obligations under the ISDA Master.

Like the pre-printed text of the ISDA Master, the CSA includes pre-printed terms (Paragraphs 1 to 12) that the parties specifically tailor to their needs during the negotiation of Paragraph 13, which includes terms, such as:

- Types of collateral that may be posted (eligible collateral).
- Treatment and use of collateral by the secured party ([rehypothecation](#)).
- Return of collateral.

For more information on the ISDA CSA, see [Practice Notes, The ISDA Master Agreement: Negotiating the ISDA Credit Support Annex \(CSA\)](#) and [The New ISDA Credit Support Annexes and Global Margin Compliance for Uncleared Swaps](#).

## OTC Transaction Risks: Generally

Hedging commodity prices with OTC products does not result in a risk-free transaction. Though a properly executed hedge reduces a commodity producer's or end user's exposure to price risk for any hedged production, it is important to keep in mind that price risk is replaced by other risks that the parties assume, including:

- Credit risk (including settlement risk and mark-to-market risk).
- Production risk.
- Basis risk.
- Bankruptcy risk.

### OTC Transaction Risks: Credit Risk

Credit risk is the risk that a counterparty will fail to meet its payment obligations. This is sometimes also referred to as counterparty risk. The risk that a counterparty will fail to meet its payment obligations under the contract is of paramount concern to commodity producers.

In a hedge transaction, this risk of non-payment manifests itself in two ways:

- Settlement risk.
- Mark-to-market risk.

### Settlement Risk

In an OTC commodity derivatives transaction, settlement risk is the risk that a purchaser takes physical delivery of the producer's commodity and fails to pay for any or all of the delivered commodity. Settlement risk is, therefore, unique to physically settled transactions, including fixed-price and floating-price contracts.

A commodity producer's exposure to settlement risk can be estimated in advance of delivery by multiplying the quantity of the commodity to be delivered by the price to be paid by the purchaser. The commodity producer can mitigate its settlement risk by requiring from the purchaser:



- A [guaranty](#) or a [letter of credit](#).
- Prepayment of a portion of the purchase price.
- Delivery of certain collateral in advance of the delivery of the producer's commodity in an amount equal to all or part of the commodity producer's exposure.

Failure by a purchaser to pay under a physically settled commodity contract can impact the producer's ability to satisfy its obligations under a cash-settled hedge contract that it may have entered into with a third party. When a commodity producer enters into a commodity swap contract it relies on its physical purchaser to take, and pay in a timely manner for, the commodity produced.

When the floating index price for the commodity specified under the swap is greater than the fixed price under the swap for any specified period, the producer (as the floating-price payor) owes the difference to the swap counterparty (see [Commodity Swap Contracts](#)).

The physical commodity transaction and the swap hedge are separate and distinct transactions. As a result, the failure of a purchaser to perform under the purchase and sale contract does not excuse the commodity producer's obligation to make payment under the hedge swap contract. If the producer is forced to fund that obligation from other sources, it could create debilitating liquidity problems.

In order to mitigate this counterparty settlement risk, the producer often obtains collateral or other credit support from the purchaser.

### **Mark-to-Market Risk**

Mark-to-market risk arises for a commodity producer when the spot price of the commodity is less than the fixed price agreed to in the fixed-price physical or swap contract. This may incentivize the counterparty to walk away from the contract and default on its obligations under the fixed-price physical or swap contract. Mark-to-market risk is, therefore, unique to fixed-price contracts, whether cash settled or physically settled.

Marktomarket risk is forward-looking and is an estimate of the difference between the fixed price and the future spot price multiplied by the notional quantity and discounted back to a present value based on a reasonable discount rate determined by the parties. Both counterparties to a fixed-price contract are exposed to mark-to-market exposure as spot prices fluctuate over the term of the contract.

### **Managing Credit Risk in OTC Commodity Derivatives Transactions**

Provisions designed to mitigate credit risk can be just as (or even more) complex than the commercial terms of the underlying OTC commodity derivatives transaction and must be customized to accommodate the specific needs of the parties. Factors to consider include:

- The type of credit risk the parties are exposed to in the transaction.
- The maximum potential credit exposure created by the transaction.
- The liquidity of any collateral to be provided by a counterparty under the terms of the contract.
- Whether collateral is required at the time of execution of the contract or only if the credit exposure of a party increases over a certain threshold during the term of the contract.
- Changes in market value of posted collateral over the term of the contract.
- The likelihood that a party will be able to liquidate the collateral in the event the posting party fails to make a required payment.

Fortunately, ISDA has made it easy for parties to establish terms that mitigate credit risk in commodity transactions. The ISDA Master provides several mechanisms to help reduce parties' credit risk to one another in a commodity transaction, each of which is subject to negotiation between the parties (see [ISDA Credit-Risk Mitigation Mechanisms](#)).

In addition to or in combination with these ISDA documentational risk-management tools, the parties can require prepayment, guarantees, letters of credit, or margining from counterparties to OTC commodity transactions to secure performance of the parties' obligations. Given that its exposure is potentially limitless, a commodity producer in a fixed-price physical or swap contract needs to pay particular attention to the rights granted to the counterparty to demand additional collateral and the impact of these requests on any credit agreements to which it is a party.

### **OTC Transaction Risks: Production Risk**

The above discussion of credit risk associated with OTC transactions assumes that the quantity of commodity to be produced by a commodity producer during future time periods is known. However, the farther into the future the contract extends, the lower the delivery confidence level. This is a risk for a purchaser under a contract for physical delivery.

If a producer suffers any setback with respect to its expected production of its commodity, it may not be able to meet its physical delivery obligations for the commodity under the contract. The purchaser bears the risk that the producer will be unable to produce the specified quantity of the commodity to be purchased and fail to deliver all or part of the contract quantity of the commodity at the time of delivery.

Production risk is also critically important to commodity producers in the context of any of its financial hedging strategies. For example, the calculation of a commodity swap settlement amount is based on a notional quantity of commodity production for the month that is defined in the swap contract. As discussed above, the producer relies on the proceeds of sale of the physical commodity to fund any payment due to its hedge swap counterparty (see [Commodity Swap Contracts](#)).

If actual production is lower than the notional quantity specified for the period in the swap contract, then the producer may lack part of the funds needed to pay its obligations under the swap. In extreme circumstances, the producer could have total swap obligations in excess of total physical revenue.

For this reason, it is unusual for commodity producers to enter into financial hedges for 100% of anticipated commodity production. Moreover, lenders often limit the percentage of a producer's future commodity production that the producer can hedge. A producer that enters into transactions for quantities beyond those that it controls is no longer hedging, it is speculating.

### **OTC Transaction Risks: Basis Risk**

In financial hedges, commodity producers are at risk if there is not an exact alignment between the price they receive under their physical commodity sale contract and the price, usually based on an index, on which the obligations under the swap contract are determined. Any number of physical and economic factors can occur that disrupt even long, stable price relationships – this is basis risk.

The subject of basis hedges is beyond the scope of this Note, but is a matter of great importance to commodity producers and end users alike. Any producer or end user with physical sales contracts with pricing mechanisms that do not align with the mechanisms in its hedging contracts is exposed to basis risk.

### **OTC Transaction Risks: Bankruptcy Risk**

Another issue to consider is how hedge obligations are treated in bankruptcy. This is an especially important consideration for producers because hedging transactions (both physically and cash-settled) are given special treatment by the bankruptcy code. Great care should be taken to structure hedge transactions to take full advantage of the Bankruptcy Code's safe harbor protections for financial and physical contracts (for example, [11 U.S.C. §§ 362\(b\)\(6\), \(17\), 546\(e\), \(g\), 556, 560, and 561](#); see [Guide to Bankruptcy Code Safe Harbors for Financial Contracts: Checklist](#)).

## **Exchange-Traded Commodity Derivatives Transactions**

Exchange-traded commodity derivatives contracts are traded on organized exchanges, such as the Chicago Mercantile Exchange (CME), Chicago Board Options Exchange (CBOE), and New York Mercantile Exchange (NYMEX). Each exchange uses its own highly standardized process to govern trading activities, including which commodities are traded on the exchange and the use of its own standardized contracts. These contracts stipulate a specific set of volumes, grades and quality criteria, definitions, durations, delivery points and dates, and trading and credit procedures for each commodity available on the exchange.

The standardization of exchange-traded contracts enables exchanges and market participants to quickly and effectively facilitate trading by matching, documenting, and processing various commodities in the marketplace under uniform accepted terms. However, because the terms are standardized, commodity producers and their counterparties are limited in their ability to tailor these agreements to suit their exact hedging needs. One of the principal disadvantages of standardized exchange-traded contracts is this inflexibility.

### **Types of Exchange-Traded Commodity Derivatives Transactions**

The two most commonly used exchange-traded commodity products are:

- Futures contracts.
- Option contracts.

### **Commodity Futures Contracts**

Futures contracts are highly standardized, exchange-traded contracts to either take or make delivery of a specified quantity and quality of an underlying commodity at a specified location on a future date (or dates) at a price set out in the contract. Commodity producers use futures contracts to lock in commodity prices for a notional quantity of commodity production to ensure a steady, predictable, and consistent stream of revenue during a given time period.

For more information on futures contracts, see below and [Practice Note, Derivatives: Overview \(US\): Forwards and Futures](#).

### **Settling a Commodity Futures Contract**

A party entering into a futures contract to purchase a commodity (such as an end user) has the right and obligation to take actual delivery of the commodity (known as the long position) at the price set out in the contract. A party entering into a futures contract to sell a commodity (such as a producer) has the right and obligation to make actual delivery of the commodity (known as the short position) at the price set out in the contract.

In practice, however, it is uncommon for commodity futures contracts to settle by physical delivery. This is because of the standardized delivery points set out in these contracts. Unless a producer's manufacturing or production facilities are located near the specified delivery point, it is unlikely the producer will want to incur costs related to transporting its commodity to the delivery point, or to incur costs related to otherwise procuring the commodity for delivery at the delivery point. Therefore, in most cases, a party will exit its commodity futures positions before the contracts mature and require the actual physical taking or making of delivery of the commodity.

This can be accomplished by selling those futures contracts on the open market. For example, a party holding an in-the-money futures contract will typically sell that contract as the delivery date approaches rather than receiving the commodity on that date. The purchaser in that transaction might well be a party to a futures contract specifying the same quantity that does not want to make physical delivery.

### **Benefits and Limitations of Commodity Futures Contracts**

Entering into futures contracts provides commodity producers with the ability to lock in commodity prices for expected future production regardless of whether commodity prices increase or decrease. However, the commodity producer also gives up the potential upside of increased revenue if commodity prices rise.

One way to avoid this dilemma is to enter into an exchange-traded put option contract allowing the producer to hedge against decreasing prices while retaining the ability to benefit if prices rise (see [Commodity Option Contracts](#) and [Exchange-Traded Commodity Option Contracts](#)).

### **Exchange-Traded Commodity Option Contracts**

Like commodity futures contracts, exchange-traded commodity option contracts are highly standardized contracts traded on exchanges. The standardization of option contracts enables exchanges and market participants to trade contracts quickly and efficiently. However, unlike OTC option contracts, exchange-traded option contracts may not be tailored to the parties' specific hedging strategies. Exchange-traded option contracts also differ from OTC option contracts in that:

- The parties enter into trades with the exchange as the counterparty.
- All trades must be cleared by a [clearinghouse](#).
- The parties are subject to the clearinghouse's mandatory margining requirements (see [Practice Note, Mechanics of Derivatives Clearing: Clearing and Margin Collateral](#)).

For more information on options, including an illustration of an option contract, see [Commodity Option Contracts](#).

### **How Are Exchange-Traded Commodity Derivatives Transacted?**

The purchase and sale of exchange-traded commodity products between market participants are facilitated by exchanges using one of two methods:

- Open outcry.
- Electronic trading.

The basic steps of both methods are essentially the same. Customers (such as commodity producers) establish relationships and enter into brokerage agreements with [futures commission merchants](#) (FCMs) that, based on a customer's hedging strategy, submit orders (either bids to purchase or offers to sell exchange-traded products) to an exchange where trades are executed with other market participants that take equal, but opposite, positions.

Information about exchange-traded commodity products that have been traded, whether by open outcry or electronic trading, is broadcast to the public and disseminated to various price reporting services. Though electronic trading is significantly faster (often executed in milliseconds) than open outcry, both methods, because of diverse market participation and efficient price discovery, give an accurate picture of the commodity markets and reflect the marketplace's collective valuation of what purchasers are willing to pay and what commodity producers are willing to accept for a particular contract.

Visible and transparent pricing information enables commodity market liquidity and allows open positions on commodity futures or option contracts to be easily valued and closed out.

### Open Outcry

The traditional method of trading commodity derivative contracts in the US is by the open outcry auction process. An FCM communicates its commodity customers' purchase and sell orders to its representative trader standing in the appropriate trading ring – or "pit" – on the floor of the exchange. All orders are communicated by open outcry and various hand signals between traders in the same trading ring and are executed when the spread between the ask price (the price at which the traders purchase) meets the bid price (the price at which the traders sell).

Executed trades are recorded by traders and submitted to the exchange where the information is entered into the exchange's central computer system. Trades are then booked with the exchange's clearinghouse and customers are notified of completed trades.

### Electronic Trading

In today's marketplace, however, it is more common for exchange-traded commodity derivatives transactions to be executed on an electronic platform where computers handle all trading activity. An FCM that has been pre-approved for electronic trading submits its customers' purchase and sell orders directly from its computer to an electronic marketplace offered by the exchange.

Sophisticated computer software identifies matching bids and offers and generally fills orders on a first-in, first-out basis. In essence, the trading ring is replaced by a computer screen and the floor traders standing on the floor of the exchange are replaced by market participants accessing the platform electronically.

## Managing Risks Associated with Exchange-Traded Commodity Derivatives Transactions

One of the most important features differentiating exchange-traded commodity derivatives transactions from OTC transactions is the role of an exchange's affiliated clearinghouse. Once a trade has been executed on an exchange it is subsequently cleared by the exchange's affiliated clearinghouse in a process known as [novation](#).

In the novation, the clearinghouse inserts itself between two matching counterparties in the marketplace to replace and become counterparty to what are now two independent and distinct transactions. In other words, a party's purchase of an exchange-traded product is a transaction with the exchange's clearinghouse, not directly with another market participant.

The clearinghouse therefore mitigates counterparty credit risk that market participants are otherwise exposed to in OTC transactions. The clearinghouse assumes the risk that a counterparty will lack the financial capability to perform and be unable to meet its payment obligations under the commodity transaction.

With exchange-traded transactions, the clearinghouse is always the counterparty to all other counterparties and their transactions. Therefore, a commodity producer that desires to enter into futures contracts, option contracts, or other exchange-traded products does not need to evaluate the creditworthiness of another market participant.

While there is no credit risk between market participants when a commodity transaction is cleared, clearinghouses absorb the credit risk of all market participants. Clearinghouses themselves therefore create potential default risk.

For more information on derivatives clearing and the role of clearinghouses, see [Practice Note, Mechanics of Derivatives Clearing](#).

### Margining a Cleared Commodity Hedge

To mitigate counterparty risk, clearinghouses generally require that all market participants post an initial amount collateral, known as [initial margin](#). Market participants must also post [variation margin](#) throughout the term of the contract depending on the mark-to-market value resulting from the daily fluctuation of commodity prices. The clearinghouse either adds or subtracts funds from a market participant's account, depending on how much the contract's price has moved during the day, ensuring that the correct daily mark-to-market value is reflected in each party's account.

If the margin account goes below a certain value set by the clearinghouse, then a margin call is made, and the account must be replenished. The daily "true-up" of accounts means that there is usually little additional payment due when closing out an exchange-traded commodity transaction: only the

final day's gain or loss, not the gain or loss over the life of the contract. The pooled capital of all market participants of the clearinghouse over-collateralizes the clearinghouse and mitigates counterparty risk.

However, a clearinghouse's margining requirements can be a prohibitive threshold to entering into exchange-traded commodity derivatives transactions. Not all commodity parties are capable of posting the initial and variation margin collateral required for cleared transactions. A commodity producer may find the clearinghouse's initial margining requirements difficult to satisfy and, depending on the magnitude of commodity price fluctuations during the term of an exchange-traded contract, may find it burdensome to satisfy the clearinghouse's daily variation margining requirements and periodic margin calls.

In these circumstances, parties frequently elect to use OTC products (such as commodity swaps) and negotiate security or margining requirements that are less burdensome and tailored to the specific creditworthiness of the parties and risk profile of the transaction. For example, a counterparty to an OTC commodity derivatives transaction may be willing to either:

- Allow a producer to secure its obligations to the counterparty by pledging liens on the producer's assets rather than posting [cash collateral](#).
- Accommodate the producer by not requiring the producer to post collateral until and unless the producer exceeds a specific threshold.

For more information on OTC derivatives margin arrangements, see [Practice Note, The ISDA Master Agreement: Negotiating the ISDA Credit Support Annex \(CSA\)](#).

#### PRODUCTS

PL Canada Finance, PLC US Finance, PLC US Financial Services, PLC US Law Department

© 2019 THOMSON REUTERS. NO CLAIM TO ORIGINAL U.S. GOVERNMENT WORKS.

Practical Law. © 2019 Thomson Reuters | [Privacy Statement](#) | [Accessibility](#) | [Supplier Terms](#) | [Contact Us](#) | 1-800-REF-ATTY (1-800-733-2889) | [Improve Practical Law](#)