



Chicago Mercantile Exchange

AN INTRODUCTION TO LUMBER OPTIONS

Basic economic uncertainty and price volatility represent both opportunities and risks for firms involved in the lumber industry. Since 1969, companies and individuals engaged in producing, processing and marketing lumber products have been able to reduce their price risk by hedging with the Chicago Mercantile Exchange's Random Length Lumber futures. In May 1987 the lumber industry added a new tool to manage its inherent price risk-options on lumber futures.

Options on lumber futures contracts offers many opportunities for both hedgers and traders:

- limited risk
- unlimited profit/price protection
- many new strategies for all market conditions

Lumber options are part of the successful family of options contracts currently trading at the Chicago Mercantile Exchange. The CME trades options on its currency, index, commodity and interest rate futures contracts.

Options are a tool both hedgers and traders can use to manage their price risk. This brochure is an introduction to the mechanics of options trading and basic lumber option hedging strategies. Let's look at what these option contracts are and how they can become an effective part of your pricing plans.

The Concept of Options

Choice is the main feature of an option. When you buy an option you acquire the right, but *not* the obligation, to assume a long or short position in a specific futures contract at a fixed price on or before the expiration date. For the right granted by the option contract, you pay a sum of money (premium) to the option seller. The option seller or writer- keeps the premium whether the option is used or not. The writer must fulfill the contract terms if it is exercised by you-the buyer. But when you buy an option, you are "buying" a choice: You could choose to let the option expire without a commitment or delivery obligation.

Calls or Puts

There are two types of options -calls and puts, which offer opposite pricing alternatives. A *call* option gives the buyer the right to *buy* a futures contract at a fixed price level on or before an expiration date. Conversely, a put option gives the buyer the right to *sell* a futures contract at a fixed price level, on or before an expiration date.

An easy way to remember the difference between calls and puts is: with a call option one can "call away" or purchase a futures contract; with a put option, one can "put to" or sell a contract.

Generally, when you buy a call option you are bullish or optimistic about the underlying futures price; if you are bearish about the underlying futures price, you would probably buy a put option. We'll look at these positions a little later.

Calls and puts are separate option contracts. They are *not* the opposite sides of the same transaction. For every purchase of a call option, there is a corresponding sale of the same call option. This is also true for put options: one buyer/one seller for each put option transaction.

Option Position Summary

Call Option-Buyer

Bullish
Right to buy futures
Pays premium

Call Option-Seller

Bearish/Neutral
Obligation to sell futures
Receives premium

Put Option-Buyer

Bearish
Right to sell futures
Pays premium

Put Option-Seller

Bullish/Neutral
Obligation to buy futures
Receives premium

Once you purchase an option you have three alternatives: (1) let the option expire; (2) offset the option at the current premium value; or (3) exercise the option. Typically, you would offset the option prior to or at expiration and receive the current premium value. Prior to expiration, the premium value could be higher or lower than the original purchase price depending on how the underlying futures price had changed. Alternative (3)-to exercise the option -would be used if you as the option buyer desired to have the underlying futures position or actually wanted to make or take delivery on the underlying futures contracts.

There are also three alternatives once you write (sell) an option. The option may be: (1) offset at the current premium value; (2) exercised by the buyer, obligating you as the writer to accept a futures position at the price specified in the contract; or (3) allowed to expire. The writer can either choose to offset the option or wait for expiration of the option. Only the *buyer* can exercise the option.

Option Specifications

Like futures contracts, lumber option contracts are standardized.

1. **Type of option:** You must decide whether to use a call or a put option. Again, a call option gives the buyer the right to buy a futures contract; a put option gives the buyer the right to sell a futures contract.
2. **Underlying futures contract:** One option contract gives the buyer the right to establish one futures contract position (long or short) at the selected price level. A brief summary of

lumber futures contract specifications can be found in the CME's *Random Length Lumber Futures & Options Facts* brochure.

3. Lumber option specifications:

Strike price (exercise price) of the option. - The strike price of the option is the price at which a futures position is taken if the option is exercised. Strike prices for lumber are listed both above and below the current futures price at intervals of \$ 5.00 per thousand board feet (MBF). If, for example, the March futures contract is trading at \$280, call and put options would be listed at \$275, \$280, \$285 as designated in the option contract specifications (CME Rule 6401).

Expiration date: The expiration date of lumber options is prior to the expiration date of the underlying futures. The lumber options expire on the last business day in the month prior to the delivery month of the underlying futures contract. The early expiration date prevents possible market congestion during the spot month as the contract approaches expiration and the physical delivery of lumber.

Option Premiums

Buyers and sellers in the marketplace ultimately determine option prices or premiums. Buyers pay premiums to acquire the rights associated with the particular option. Sellers receive those premiums as compensation for the risk associated with writing the option. An option transaction occurs when the buyer and seller agree on the premium price.

An option premium can be divided into two categories: *intrinsic value and time value*. A call has intrinsic value when the strike price is below the current futures price. A put option has intrinsic value when the strike price is above the current futures price. When an option has intrinsic value, it is referred to as *in-the-money*. Not all options have intrinsic value, but every option has time value.

Call Option Example

Assume:

1. It's currently November
2. March Lumber futures are trading at \$260.00
3. March LB 270 call is trading at \$8.00/MBF

$$\begin{array}{rcc} \text{Intrinsic value} + \text{Time value} = \text{Option premium} \\ 0 \qquad \qquad \qquad 8.00 \qquad \qquad \qquad 8.00 \end{array}$$

In this example, the intrinsic value of the option is zero because the call strike price level is above the current futures price. The option, however, still has a time value of 8.00 due to the possibility of price change between November and late February.

Put Option Example

Assume:

1. It's currently June
2. November Lumber futures are trading at \$298.00

3. November LB 300 put is trading at \$12.00/MBF

$$\frac{\text{Intrinsic value}}{2.00} + \frac{\text{Time value}}{10.00} = \frac{\text{Option premium}}{12.00}$$

In this example, the intrinsic value is 2.00 (300 - 298), the option's value if it were exercised today. In addition to the intrinsic value, the option also has a time value of 10.00.

It is important to note that an option is an eroding asset; that is, its time value erodes as the option approaches expiration. This time decay normally accelerates the last 35-40 days from expiration.

Fundamentally, five factors affect the value of option premiums:

1. Time remaining until option expiration
2. Price volatility of the underlying futures contract
3. Current short-term interest rates
4. Relationship between the underlying futures price and the option exercise level
5. Market expectations

If the outlook for a particular market is uncertain, buyers are willing to pay higher premiums for price protection; sellers require higher premiums to accept the risk associated with writing the option contract. Generally, the higher the market volatility and the longer the time until the option expires, the higher the option premium. Conversely, the lower the probability of price change and the fewer the days until the option's expiration, the lower the option's premium.

The current short-term interest rate has a minor effect on the option premium. The options market is in competition for investor capital. Therefore, high interest rates cause option premiums to be slightly lower to offset the attractive high interest-rate yields available elsewhere to investors. Lower interest rates slightly increase option premiums.

The relationship between the option's strike price and the futures price can have three forms:

1. In-the-money
2. At-the-money
3. Out-of-the-money

A call option is "in-the-money" if the underlying futures price is above the strike price of the option; "at-the-money" if the underlying futures price is the same as the strike price of the option; and "out-of-the-money" if the futures price is below the option's strike price.

Call Option Example

<u>Futures Price</u>	<u>Call Option</u> <u>with \$250 Exercise Price</u>
\$260	In-the-money (+\$10)

\$250	At-the-money (0)
\$240	Out-of-the-money (-\$10)

Conversely, a put option is in-the-money if the underlying futures price is below the strike price of the option; at-the-money if the futures price is the same as the strike price of the option; and out-of-the-money if the futures price is above the option's strike price.

Put Option Example

<u>Futures Price</u>	<u>Put Option</u> <u>with \$250 Exercise Price</u>
\$260	Out-of-the-money (-\$10)
\$250	At-the-money (0)
\$240	In-the-money (+\$10)

As the futures price moves higher and lower, call and put options move in or out of the money. Assuming equal expiration dates, generally call and put options that are in-the-money have higher premium values than options at-the-money, and at-the-money options have higher premiums than those out-of-the-money.

Option Price Reporting

Once an option trade occurs at the Chicago Mercantile Exchange, the quote is quickly disseminated through the many news wire services. Up-to-the-minute premium price levels also can be obtained by contacting your broker. The settlement prices for CME options are listed in many financial newspapers.

Sample Premium Quotes

<u>Strike Price</u>	<u>Calls</u>			<u>Puts</u>		
	<u>Mar</u>	<u>May</u>	<u>Jul</u>	<u>Mar</u>	<u>May</u>	<u>Jul</u>
260	10.80	12.20	13.00	1.60	2.30	3.00
265	8.00	9.00	9.80	3.00	4.10	4.70
270	4.80	6.00	6.60	4.80	6.00	6.60
275	3.10	4.20	5.00	7.80	8.70	9.50
280	1.70	2.50	3.20	10.60	12.00	12.60

For example, the premium on a July 270 call option closed at 6.60 or \$6.60/MBF, more commonly referred to as 660 points.

A March 260 put had a closing premium of 1.60. This quotation table reflects the closing lumber option premium prices for one particular trading day. As the futures prices change so would the call and put option premiums.

The Delta Factor

As you can see, different strike price levels have different premium prices. Consequently, all option premiums do not move the same as the underlying futures price changes. The deeper a call or put option is in-the-money, the more it responds to the futures price changes. The more an option is out-of-the-money, the less responsive the premium is to the futures price movements. The relationship or ratio between the change in the option premium and the change in the underlying futures price is referred to as the *delta factor*. The delta is important because it tells an individual how much of an increase or decrease one can expect with a short-term change in the futures price.

Example

Assume:

September Lumber futures are trading at \$260:

<u>Sept Call Option</u> <u>Strike Prices</u>	<u>Premium</u> <u>Prices</u>	<u>Delta</u>
\$240	20.50	.95
\$250	11.00	.75
\$260	5.00	.50
\$270	3.00	.30
\$280	1.50	.20
\$290	.75	.10

For example, if the futures were to increase by \$1.00, one would expect each call premium to increase by its delta factor-e.g. the 250 call would increase 75 points to a premium value of 11.75, the 260 call would increase in value 50 points to the new premium level of 5.50. If the futures were to decline by \$1.00, one would expect the call premiums to drop by their approximate delta factors.

An option's delta is not fixed; it is constantly changing as the futures price rises or falls around the option strike price. Generally, only traders using sophisticated strategies keep track of an option's exact delta. However, most individuals develop a feel for an option delta based on how close the strike price is to the current futures price. For example, an at-the-money option will respond about half as much as the change in the underlying futures contract or is said to have .50 delta. In-the-money options have delta factors greater than .50 while out-of-the-money options have delta factors less than .50.

Strategies

You can employ many different hedging strategies using lumber futures options. As a hedger you may even use options in conjunction with a long or short futures position. Choosing a particular hedging strategy depends mainly on the level of protection you want. Consider these three short and three long hedge strategies.

Short Hedge

A short hedger owns the underlying futures commodity and seeks to forward price that product. Three basic short hedging strategies can be used:

1. Buy a put option
2. Write a call option
3. Short fence (buy a put and write a call)

These three strategies offer substantially different price protection and risk exposure.

1. Buying Put Options

A put option gives the buyer the right, *not* the obligation, to sell a futures contract at a selected price level. Consequently, a producer can establish a minimum selling price (floor price) for his lumber without substantially limiting the gain if the markets should rally.

Example

Assume:

1. November Lumber futures are trading @ \$260/MBF
2. A producer buys 1 November LB 260 put option @ 4.00/MBF

At Option Expiration

<u>Cash/Futures</u>	<u>Gain/Loss 260 Put Option</u>	<u>Realized Hedge* Price</u>
\$280	(4.00)	\$276
\$270	(4.00)	\$266
\$260	(4.00)	\$256
\$250	6.00	\$256
\$240	16.00	\$256

**Realized Hedge Price represents the difference between the cash/futures prices and the option gain/loss. The Price excludes basis and brokerage commissions.*

If the market rallies to the \$270-280/MBF level, the lumber can be sold in the cash market at the higher price. The protection provided by the put is not needed, with the loss on the put option limited to the premium paid plus commissions. Remember, there are no performance bond requirements or performance bond calls when buying options.

If the market declines below the 260 strike price level, the option will increase in value, somewhat compensating for the declining cash value of the lumber. Also notice that a floor price is established at the \$ 2 56 level - no matter how far the cash and futures prices decline (260 strike price minus 4.00 premium = \$256).

If the futures price remains stable at the \$ 260 level, the put premium will erode in value as it approaches expiration. Under stable market conditions the put purchase may be viewed as an unnecessary cost. However, the real advantage of buying a put option is the peace of mind it can

give a hedger- knowing that a minimum selling price is established while he or she waits or hopes for higher prices.

2. Selling Call Options

The writer (seller) of a call option has the obligation to sell the underlying futures contract at the selected strike price level if the option is exercised by the call buyer. For granting the buyer this right and assuming this obligation, the call writer receives a payment, called the premium. Selling calls against lumber being produced is typically presented as an income-producing strategy rather than a hedging strategy. Unlike a true hedge position, selling calls only gives the producer limited downside protection by the amount of the premium received, and may obligate him or her to accept a short futures position if the market should move above the strike price level.

Example

Assume:

1. July Lumber futures are trading @ \$275/MBF
2. A producer sells 1 July LB 280 call @ 6.00/MBF

At Option Expiration

<u>Cash/Futures</u>	<u>Gain/Loss 280 Call Option</u>	<u>Realized Hedge Price</u>
\$290	(4.00)	\$286
\$285	1.00	\$286
\$280	6.00	\$286
\$275	6.00	\$281
\$270	6.00	\$276
\$265	6.00	\$271

If the market should rally sharply to the \$290 level, the writer has limited his or her upside potential by writing the call. The cash lumber will increase in value, but he or she will have to meet performance bond calls on the short call position, much like a futures hedge.

The maximum sale price is calculated by adding the premium received to the strike price level, which, in this example, equals \$286.

If the market drops to the \$265 level, the call expires worthless; the seller keeps the entire premium of 6.00. However, the premium only offsets a portion of the cash market decline. If the market remains stable at the \$275 level, the option erodes in value to the benefit of the call seller, the lumber can be sold at the same \$275 price and the call premium income increases the overall returns.

Writing calls allows the producer to gain on the time decay effect of an option's premium. However, producers using this option strategy normally monitor their positions closely and are well versed in the fine points of the option market such as volatility, delta, and rolling of positions.

3. Selling Calls and Buying Puts (A "Fence")

The fence strategy consists of both selling call and buying put options, using out-of-the-money strike price levels. Some hedgers may view the fence strategy as a way to combine the best aspects of strategies #1 and #2 -unlimited downside price protection and reduced premium expense with a limited amount of upside profit potential. The fence strategy establishes a range of possible hedge prices rather than one set price.

Example

Assume:

1. May Lumber futures are trading @ \$300/MBF
2. XYZ Lumber Company sells 1 May LB 320 call @ 2.00/MBF, and buys 1 May LB 280 put @ 2.00/MBF

At Option Expiration

<u>Cash/Futures</u>	<u>Gain/Loss</u> <u>320 Put</u>	<u>Gain/Loss</u> <u>280 Put</u>	<u>Realized Hedge</u> <u>Price</u>
\$340	(18.00)	(2.00)	\$320
\$320	2.00	(2.00)	\$320
\$300	2.00	(2.00)	\$300
\$280	2.00	(2.00)	\$300
\$280	2.00	(2.00)	\$280

If the market sharply rallies to the \$340 level, the upside sale price is limited to \$320. However, compared to the current price of \$300, there is \$20/MBF of upside potential (320 strike price - 300 futures = \$20.00 upside potential).

If the market drops to the \$280 level, the call premium erodes in value and the put premium increases in value, compensating for the declining cash value of the lumber. Notice that a floor price is established at the \$280 price level-the selected put strike price.

If the market remains stable and seesaws between the two strike price levels (280-320), the loss is just the brokerage commission plus or minus cash market changes.

The real advantage to the fence strategy is that the premium outlay is usually small -the hedger defines his or her own profit/loss levels instead of "the market" determining his or her risk exposure.

Long Hedge

A long hedger will need the underlying futures commodity at a later date and seeks to forward price the anticipated purchase. There are three basic long hedging strategies:

1. Buy a call option
2. Sell a put option
3. Long fence (buy a call and sell a put)

Each strategy offers substantially different price protection and risk exposure.

1. Buying Call Options

A call option gives the buyer the right, *not* the obligation, to buy a futures contract at a selected price level. Consequently, wholesalers and retailers can establish a maximum purchase price for the needed lumber without substantially limiting the gain if the markets should decline.

Example

Assume:

1. March Lumber futures are trading @ \$240/MBF
2. A producer buys 1 March LB 240 call option @ 5.00/MBF

At Option Expiration

<u>Cash/Futures</u>	<u>Gain/Loss 240 Call Option</u>	<u>Realized Hedge Price</u>
\$260	15.00	\$245
\$250	5.00	\$245
\$240	(5.00)	\$245
\$230	(5.00)	\$235
\$220	(5.00)	\$225

If the market drops to the \$220-\$230 level, the lumber can be bought in the cash market at the lower price. The protection provided by the call is not needed, with the loss on the call option limited to the premium paid plus commissions. Remember, there are no performance bond requirements or performance bond calls when buying options.

If the market rallies above the 240 strike price level, the option will increase in value, somewhat compensating for the rising cash cost of the lumber. Also notice that a ceiling price is established at the \$245 level no matter how far the cash and futures prices rise (240 strike price plus 5.00 premium = \$245 futures ceiling price, excluding basis and commissions).

If the futures price remains stable at the \$240 level, the call premium will erode in value as it approaches expiration. Under stable market conditions the call purchase may be viewed as an unnecessary cost. However, the real advantage of buying a call option is the peace of mind it can give a long hedger-knowing that a maximum purchase price is established while he or she waits or hopes for lower prices.

2. Selling Put Options

The writer (seller) of a put option has the obligation to buy the underlying futures contract at the selected strike price level if the option is exercised by the put buyer. For granting this right and assuming this obligation, the put writer receives a premium payment.

Selling puts against lumber that is going to be purchased is typically presented as a cost-reducing strategy rather than a hedging strategy. Unlike a true long hedge position, selling puts only gives the producer limited upside protection by the amount of the premium received, and may obligate him or her to accept a long futures position if the market should move below the strike price level.

Example

Assume:

1. July Lumber futures are trading @ \$250/MBF
2. A company sells 1 July LB 240 put @ 3.00/MBF

At Option Expiration

<u>Cash/Futures</u>	<u>Gain/Loss 240 Call Option</u>	<u>Realized Hedge Purchase Price</u>
\$265	3.00	\$262
\$265	3.00	\$252
\$265	3.00	\$242
\$230	(2.00)	\$237
\$220	(12.00)	\$237

If the market should drop sharply to the \$225 level, the hedger has limited the downside potential (cost saving) by writing the put. The cash lumber can be purchased more cheaply, but he or she will have to meet performance bond calls on the short put position, much like a long futures hedge.

The minimum purchase price is calculated by subtracting the premium received from the strike price level, which, in this example, equals \$237.

If the market rises to the \$255-\$265 level, the put expires worthless and the put seller keeps the entire premium of 3.00. However, the premium only offsets a portion of the cash market increase. If the market remains stable at the \$250 level, the option erodes in value to the benefit of the put seller. The cash lumber can be bought at the same \$ 250 price and the put premium income decreases the overall costs.

Writing puts allows the firm to gain on the time decay effect of an option's premium. However, hedgers using this option strategy normally monitor their positions closely and are well versed in the fine points of the option market such as volatility, delta and rolling of positions.

3. Selling Puts and Buying Calls (A Long Fence)

The long fence strategy consists of both selling put and buying call options using out-of-the-money strike price levels. Some long hedgers may view the fence strategy as a way to combine the best aspects of strategies #1 and # 2 -unlimited upside price protection and reduced premium expense with a limited amount of downside profit potential. The fence strategy establishes a range of possible purchase prices rather than one set price.

Example

Assume:

1. November Lumber futures are trading @ \$290/MBF
2. A wholesaler sells 1 November LB 280 put @ 2.00/MBF, and buys 1 November LB 300 call @ 2.00/MBF

At Option Expiration

<u>Cash/Futures</u>	<u>Gain/Loss</u> <u>300 Call</u>	<u>Gain/Loss</u> <u>280 Put</u>	<u>Realized Hedge</u> <u>Price</u>
\$310	8.00	2.00	\$300
\$300	(2.00)	2.00	\$300
\$290	(2.00)	2.00	\$290
\$280	(2.00)	2.00	\$280
\$270	(2.00)	(8.00)	\$280

If the market drops to the \$270 level, the downside purchase price is limited to the \$280. However, compared to the current price of \$290, there is \$10.00 of downside potential (280 strike price -290 futures = \$10 potential).

If the market rallies to the \$310 level, the call premium increases in value and the put premium decreases in value, compensating for the rising cash cost of the lumber. Notice that a ceiling price is established at the \$300 price level, the selected call strike price.

If the market remains stable and seesaws between the two strike price levels (300-280), the loss is just the brokerage commission plus or minus cash market changes.

The real advantage to the fence strategy is that the premium outlay is usually small -the hedger defines his or her own purchase levels instead of the market determining the risk exposure.

Options Considerations

Options greatly expand the number of pricing strategies you can use in marketing your lumber. But you need to fully understand the mechanics and capabilities of options before using them as a pricing tool:

1. Options give hedgers a form of *price insurance* determined by the strike price of the option plus or minus the premium cost.
2. Buying an option establishes a *pre-determined* financial risk level without limiting profit potential for hedgers and speculators. The amount of options risk is limited to the premium cost.
3. Once you pay for an option, you have NO PERFORMANCE BOND CALLS for that option. (The option seller has performance bond requirements.) If you decide to exercise your option, you must meet futures contract performance bond requirements.
4. Options are an eroding asset. Assuming a constant futures price, the time value premium erodes as options move toward expiration. Time works *against* the option buyer and for the option seller.

5. Unlike most forward cash contracts, an option can be offset prior to expiration.

Conclusion

As you can see, there are many option strategies one can use in forward pricing lumber. Some strategies are very simple and involve limited risk. Others are more complex and require a high degree of sophistication. Individuals using options for the first time may only want to hedge a portion of their inventory/production and then evaluate the results.

In addition to understanding the risks and rewards of a particular option strategy, a hedger still has to keep other factors in mind:

1. Your own cost of production or storage.
2. The futures and options contract specifications.
3. The local basis-the relationship of cash to futures prices. (Remember that the option contract expires prior to the underlying futures delivery month.)
4. Work with a knowledgeable broker and lender.
5. Have a specific marketing plan and goals.

Companies and individuals that understand all the marketing and pricing tools available will certainly stand a better chance of having a profitable lumber operation.

For more information about options and the important opportunities they provide, contact your broker. Together, you can determine what role options should play in your investment strategy.

Glossary

At-the-money option	Call and put options are at-the-money when the price of the underlying futures is the same as or near the strike price.
Call option	An exchange-traded contract that gives the purchaser the right, but <i>not</i> the obligation, to buy the futures contract underlying the option at the stated strike price prior to the expiration date of the option.
Delta	The ratio between the change in an option's premium and the change in the underlying futures price.
Exercise or strike price	The price at which one may purchase or sell the underlying futures contract upon the exercise of an option.
Expiration date	The last day that an option may be exercised or offset into the underlying futures contract.
Fence	A term used to describe an option hedging strategy that uses a combination of out-of-the-money call and put positions.

In-the-money option	A call option is in-the-money when the price of the underlying futures contract is above the strike price. A put option is in-the-money when the price of the underlying futures contract is below the strike price. An option that is in-the-money has intrinsic value.
MBF	A unit of lumber measure that represents one thousand board feet.
Out-of-the-money option	A call option is out-of-the-money when the strike price is significantly above the current price of the underlying futures contract. A put option is out-of-the-money when the strike price is significantly below the current price of the underlying futures contract. The premium value of an out-of-the money option represents all time value.
Premium	The amount agreed upon between the purchaser and seller for the purchase or sale of a commodity option. Purchasers pay the premium; writers receive the premium.
Purchaser, Buyer	An individual who buys an option.
Put option	An exchange-traded contract that gives the purchaser the right, but <i>not</i> the obligation, to sell the futures contract underlying the option at the stated strike price prior to the expiration date of the option.
Seller, Writer	An individual who sells an option. In exchange for the premium, the option seller accepts the obligation to assume a position, either long or short, in the futures market if the buyer chooses to exercise the option.
Underlying futures	The futures contract that may be purchased or sold upon the exercise of the option.

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