Applications of forward and options in the commodity market

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1. Forward contracts

Forward contracts: is contract between two parties to buy or sell an asset at a specified future time at a price agreed upon today.In this case, the risk of price changes is avoided by locking the prices.

- **Forward Contract Example:** Company “A” and Company “B” on 1st October 2022, entered a contract whereby company “A” sold 1000 tons of wheat to company “B” at 100$/ton on 1st January 2023.
- According to the contract, whatever the price on 1st January 2023, “A” has to sell “B” 1000 tons at 100$/ton.

1. Forward contracts

- If the spot price on the delivery date is $100/ton
- If the spot price on the delivery date is $110/ton
- If the spot price on the delivery date is $85/ton
- What are the results achieved by the parties in each case?
- **First if the spot price is 100$/ton,** then, the parties of the contract did not achieve neither profit nor loss.
- Second, the spot price is 110$/ton, then the company A incurs loss 10000$, 1000(100-110)=10000$. The company B make a profit (avoid extra cost by entering into a forward contract) of 10000$

1. Forward contracts

- Third case, the spot price is 85$/ton, then the company A make profit of 15000$, 1000(100-85)=15000$. The company B incurs a loss of 15000$
- The problem arises if one of the parties fails to perform:
- As the trader may not accept to sell if wheat price rise significantly like for example $180|ton in January 2023. On the other hand, if the buyer goes bankrupt or if January 2023 wheat' price drops to $50|ton, there is an incentive to default. All these cases motivat

2. Option contract

- **Definition**: An option is contract that gives the buyer the right, but not the obligation, to buy or sell the underlying asset at a certain date (expiration date) and at a specified price (strike price).
- **Some Important Terminologies in Options Contracts:**

1. **The underlying asset**: is the future contract on a specific commodity
2. **The strike price**: is the price at which the holder of the option can exercise the option to buy or sell an underlying asset.

- **Note:** in the option contract there are two parties the buyer (holder of the option) and the seller of Option.

2. Option contract

- **For example,** if you choose a soybean option with a strike price of $12 per bushel, means you have the right to buy or sell soybean futures for $12. This will occur whatever the current level of soybean futures price.
- Strike prices are listed at predetermined price levels for each commodity: every 25 cents for soybeans, and 10 cents for corn…… For example, if the July corn futures price is $5, there will be corn options introduced with strike prices of $4.80, $4.90, $5.00, $5.10, and $5.20.
- When buying or selling an option, you must choose from a set of these predetermined price levels at which you will enter the futures market, these are called **strike prices**.

2. Option contract

- **The expiration date**: refers to the date in which options contracts expire. On the date of expiration, the option contract is settled between the Buyer and seller. Options expire in the month prior to contract delivery. For example, a July corn option expires in June.
- **Premium:** is the price paid by the buyer of the contract to obtain the option, also called the option price, is non-refundable whatever the future changes.

2. Option contract

- **Types of options contracts:** Options can be divided into several types as follows:

I. American-style options and European-style options.

- **European-style options** can only be exercised on the expiration date.
- **American-style options** can be exercised at any time prior to their expiration.

II. **calls** and **puts**.

1. **Call options:** Calls give the buyer the right, but not the obligation, to buy the underlying asset at the strike price.

- Investors buy calls when they believe the price of the underlying asset will increase and sell calls if they believe that the prices will decrease.

2. Option contract

2. **Put options:** Puts give the buyer the right, but not the obligation, to sell the underlying asset at the strike price.

- Investors buy Puts when they believe the price of the underlying asset will decrease and sell puts if they believe it will increase.

2. Option contract

- If you possess a long call option in a commodity, upon expiry, your position will devolve into a long position in the futures contract.
- If you possess a short call option in a commodity, upon expiry, your position will devolve into a short position in the futures contract.
- If you possess a long put option in a commodity, upon expiry, your position will devolve into a short position in the futures contract.
- If you possess a short put option in a commodity, upon expiry, your position will devolve into a long position in the futures contract.

2. Option contract

Crude oil option position	After exercise of respective crude oil options
Long call option	Long futures
Long put option	Short futures
Short call option	Short futures
Short put option	Long futures

2. Option contract

- **Call oil option example**

✓**Contract type:** Call

✓**Contracts:** 1 (equivalent to 1,000 bbls)

✓**Underlying:** WTI crude oil futures

✓**Strike price:** $95

✓**Premium:** $2/bbl (or $2,000)

✓**Expiration:** 07-17-2022 at 08:00:00 UTC

2. Option contract

- On July 17, 2022, the call option holder has the right to buy WTI crude oil futures for a strike price of $95.
- If on July 17, 2022, the market price of WTI crude oil futures is $100, the option holder could exercise the option and buy WTI crude oil futures for $95 instead of the true market value of $100; then, close the futures position immediately (then offsetting the futures position by selling futures) to make a profit of $5 ($100 – $95) per barrel.each call option would be worth
- **((market price — strike price) — premium)* 1,000 bbls**
- **Profit: ((100-95)-2)*1000= 3000$**

2. Option contract

- **Or profit from the long call is (100-95)*1000=5000$**
- **The premium=2*1000=2000$**
- **Then the net profit is 5000-2000=3000**
- Alternatively, if on July 17, 2022, the market price of WTI crude oil futures was less than $95, for exaple 80$ the contract would expire worthless and the call option holder would have lost the premium of $2,000.

2. Option contract

- **Put oil option example**

✓**ontract type:** Put

✓**Contracts:** 1 (equivalent to 1,000 bbls)

✓**Underlying:** WTI crude oil futures

✓**Strike price:** $95

✓**Premium:** $2/bbl (or $2,000)

✓**Expiration:** 07-17-2022 at 08:00:00 UTC

2. Option contract

- On July 17, 2022, the put option holder has the right to sell WTI crude oil futures for a strike price of $95.
- If on July17, 2022, the market price of WTI crude oil futures is $85, the option holder could exercise the option and sell WTI crude oil futures for $95 instead of the true market value of $85; then, close the futures position immediately (offsetting the futures position by buying futures at 85) to make a profit of $10 ($95 – $85) per barrel. each put option would be worth:
- **((market price — strike price) — premium)* 1,000 bbls**
- **Profit: ((95-85)-2)*1000= 8000$**

2. Option contract

- **Or profit from the long put is (95-85)*1000=10000$**
- **The premium=2*1000=2000$**
- **Then the net profit is 10000-2000=8000**
- Alternatively, if on July 17, 2022, the market price of WTI crude oil futures was above $105, the contract would expire worthless and the put option holder would have lost the $2,000 premium.

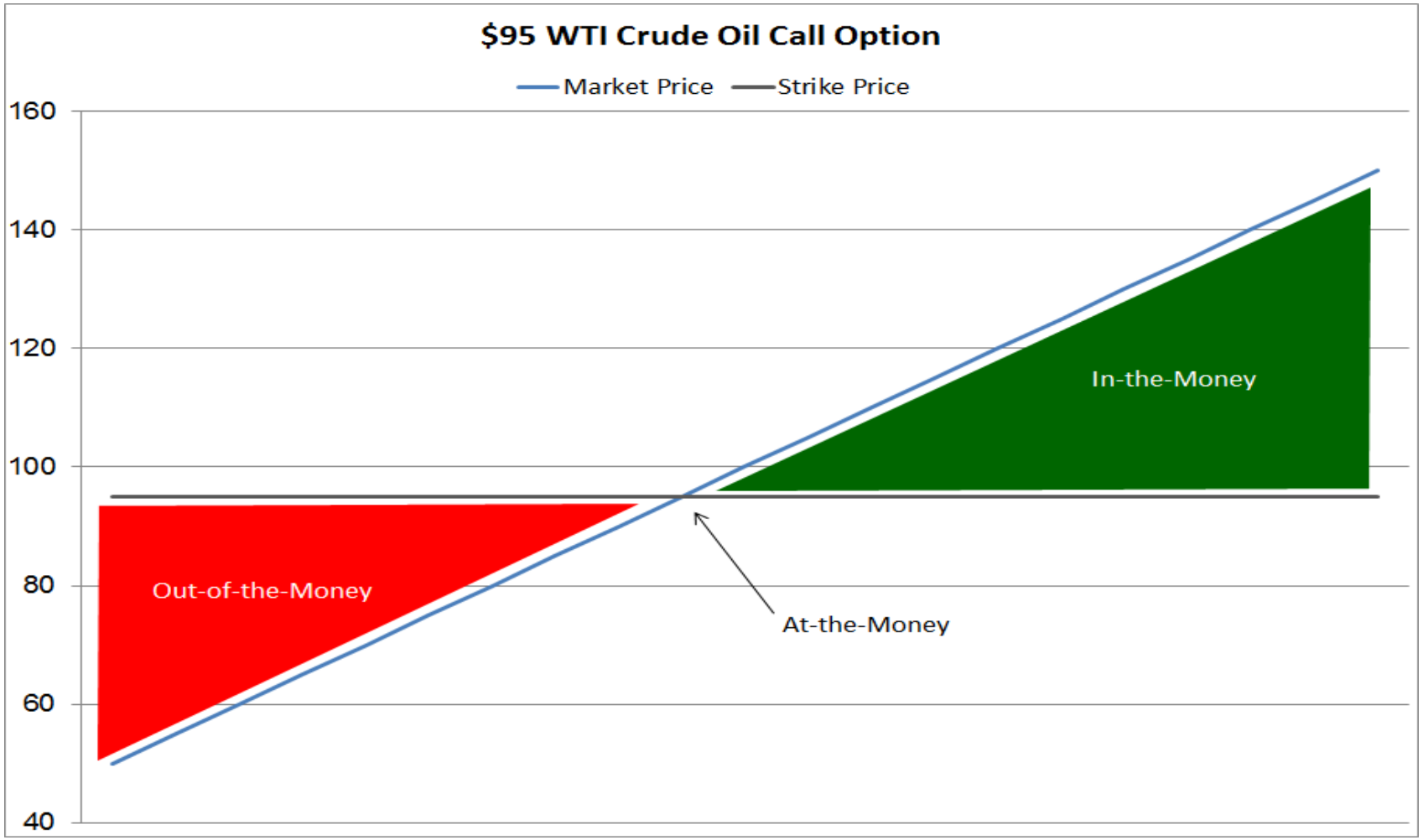
2. Option contract

III. The Out-, At-, and In- the Money option

1. **An option is at-the-money (ATM)**when the strike price equals to the price of the underlying futures .
2. **An option is considered in-the-money (ITM)** when the price of the underlying future is above the strike price of a call option; or when the price of the underlying is below the strike price of a put option.
3. **An option is considered out-of-the-money (OTM)** when the price of the underlying future is below the strike price of a call option; or when the price of the underlying futures is below the strike price of a put option.

Option	Strike Price	Stock Price	In, At, or Out of the Money?
Call	45	$40	Out-of-the-money
Call	40	$40	At-the-money
Call	35	$40	In-the-money
Put	80	$100	Out-of-the-money
Put	100	$100	At-the-money
Put	130	$100	In-the-money

2. Option contract



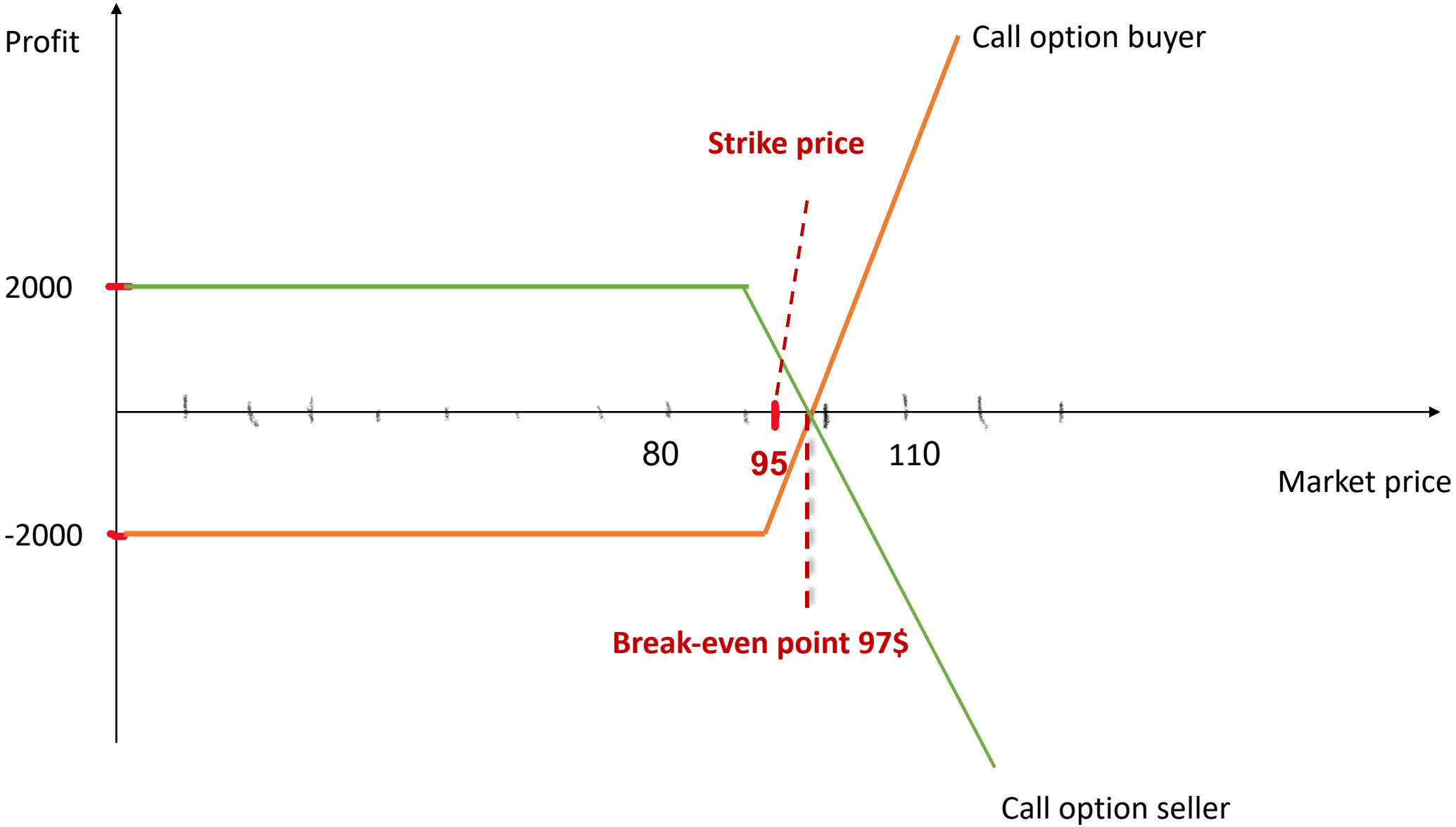
2. Option contract

- **Characteristics of option contracts**
- To understand how these contracts work in the commodity exchange, we are going to present examples of contracts for strategic commodities, and showing the difference between buying and selling options.

2. Option contract

- For instance, assume that on Sept. 27, 2021, trade buys call options on April 2022 crude oil futures at a strike price of $95 per barrel, and that the option costs $2 per barrel. Crude oil futures contract units are 1,000 barrels of crude oil.
- On the expiration date if the crude oil futures price is $110 per barrel or 95$/barrel or 80$/barrel.
- First the premium=1000*2=2000$

- Break-even point= strike price + premium=ç(



	Call Option	**Put Option**
Option Buyer	• Has the right to buy commodities future contract at the strike price on the execution date. • Pay the option premium. • Makes a profit when the price of the commodity future increases. • Makes unlimited profit. • The loss is limited and equal to the premium.	• Has the right to sell commodities future contract at the strike price on the execution date. • Obligated to pay the option premium. • Make a Profit from falling commodity prices. • Make unlimited profit • The loss is limited and equal to the premium
Option Seller	• Obligated to sell the commodityfuture contract on the execution date at the strike price. • Has the right to receive the Premium. • Makes a frofits from the stability or decline in commodity prices • Makes a limited profit (equal or less than premium). • The loss is unlimited	• Obligated to buy commodity future contract on the execution date at the strike price. • Has the right to receive the premium. • Makes a Profit from the stability or rise in prices. • Makes a limited Profit (equal or less than premium). • The loss is Unlimited.

2. Option contract

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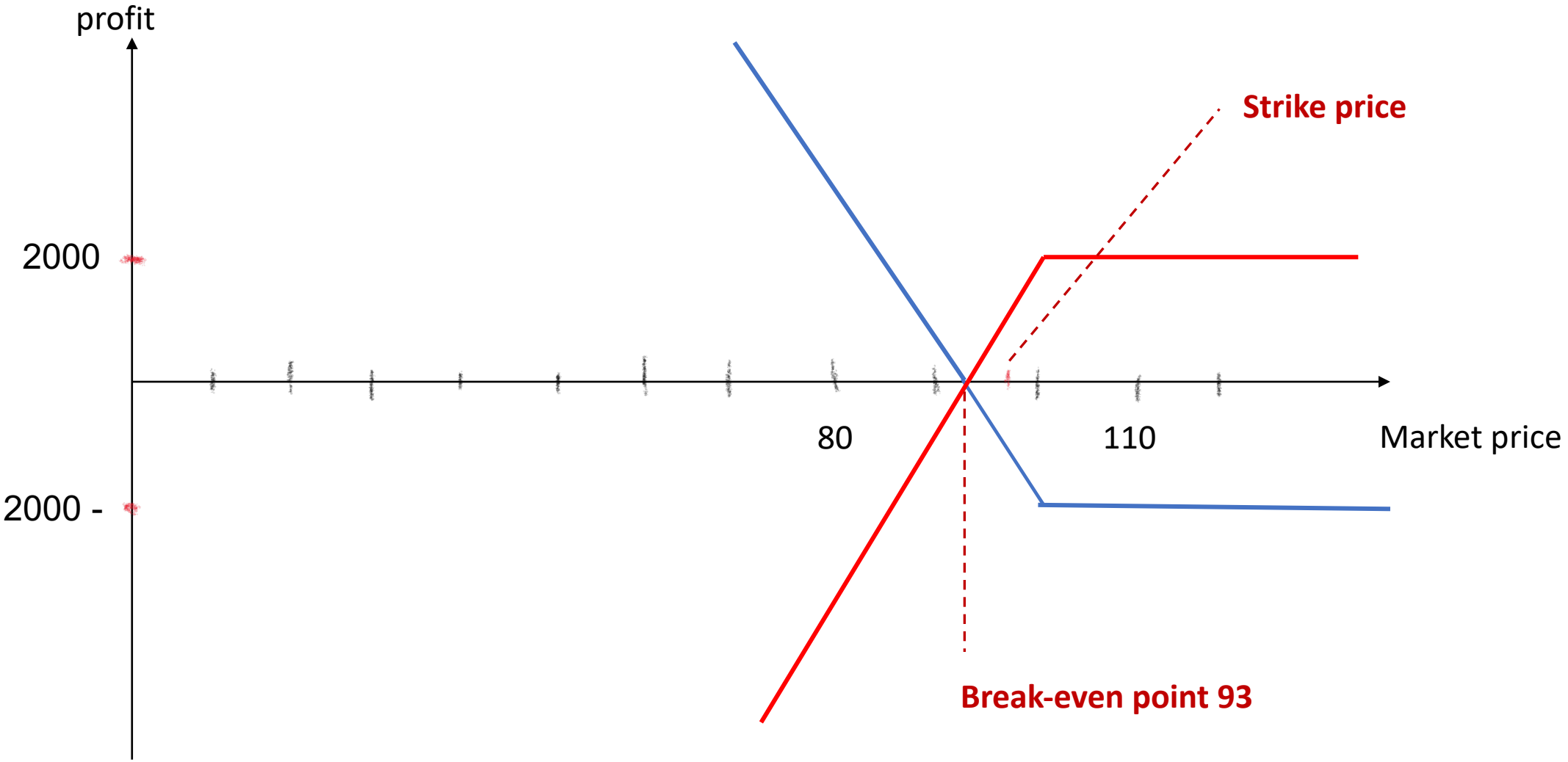
- Break-even point= strike price - premium



Summary

- In the commodity market:
- An option is the right, but not the obligation, to buy or sell a futures contract.
- The buyer of an option acquires this right.
- The option seller (writer) must take the opposite side of the option buyer's futures position.
- For example, if you buy an option with the right to buy futures, the option seller (writer) must sell futures to you if you exercise the option.
- If you buy an option to *buy* futures, you own a *call* option. If you buy an option to *sell* futures, you own a *put* option.
- Call and put options are separate and distinct options. Calls and puts are not opposite sides of the same transaction.

Summary

- If you think oil prices are likely to increase, you could buy a call option or sell a put option.
- If you think oil prices are likely to fall, you could sell a call option or buy a put option.
- When buying an option you must choose which delivery month you want. Options have the same delivery months as the underlying futures contracts. For example, corn options have December, March, May, July, and September delivery months, the same as corn futures. If you exercise a December corn option you will buy or sell December futures.
- **T**here are three ways you can close out an option position. The option can be exercised, it can be sold, or the option can be allowed to expire.

Summary

- Exercising an option converts the option into a futures position at the strike price. Only the option buyer can exercise an option.
- When a call option is exercised, the option buyer buys futures at the strike price. The option writer (seller) takes the opposite side (sell) of the futures position at the strike price.
- When a put option is exercised, the option buyer sells futures at the strike price. The option writer (seller) takes the opposite side (buy) of the futures position.