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OCC

Understanding Option Skew

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Understanding Options SKEW

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Principal / Investor Education / OCC

Instructor / The Options Industry Council (OIC)



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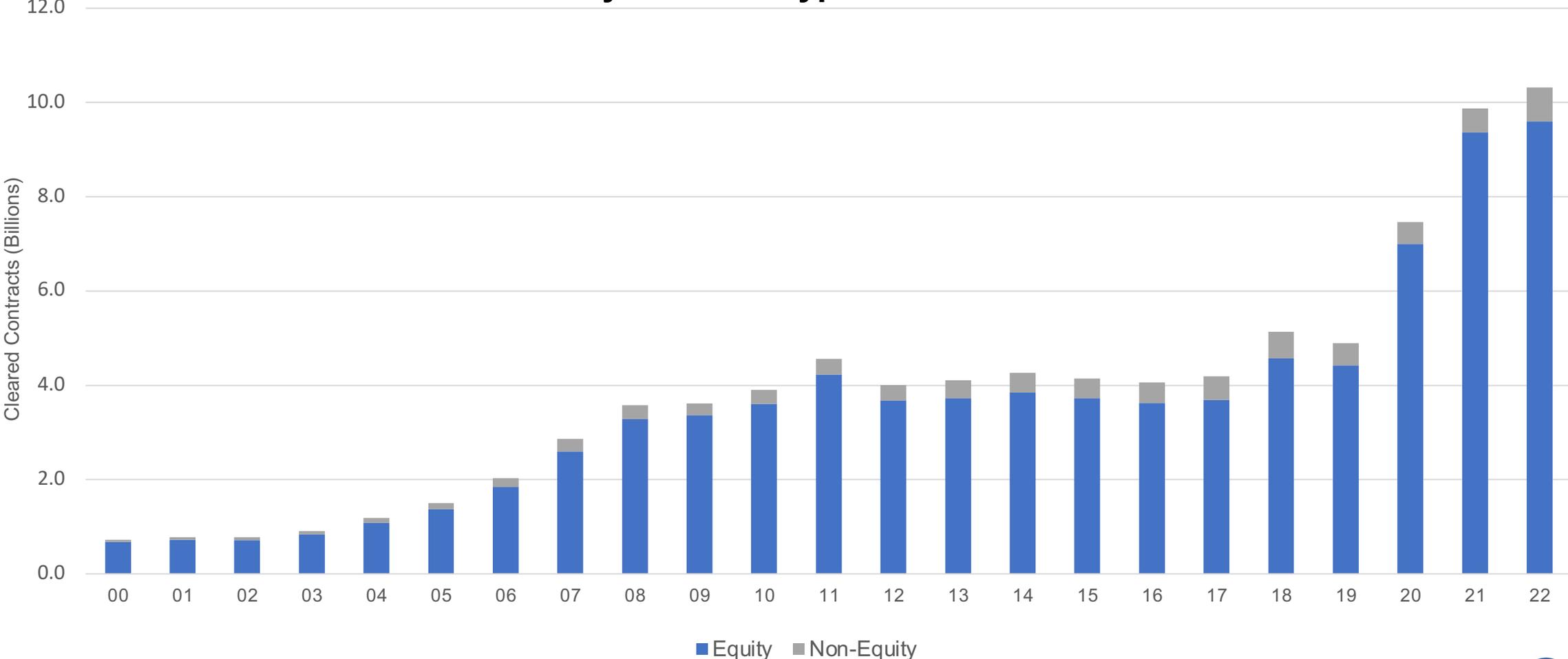
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Annual Options Volume 2000-2022

OCC Annual Contract Volume by Contract Type



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OCC is the world's largest equity derivatives clearing organization. OCC helps provide financial stability and risk management to the U.S. listed-options marketplace.

Core Functions



2021 Performance Highlights

9.93B
CONTRACTS CLEARED

\$225B
MARGIN HELD AT YEAR END

39.4M
AVERAGE DAILY VOLUME

\$16.2B
CLEARING FUND HELD AT YEAR END

Products We Clear



Participant Exchanges

16
OPTIONS EXCHANGES

2
FUTURES EXCHANGES

1
STOCK LOAN ALT. TRADING SYSTEM

As December 31, 2021

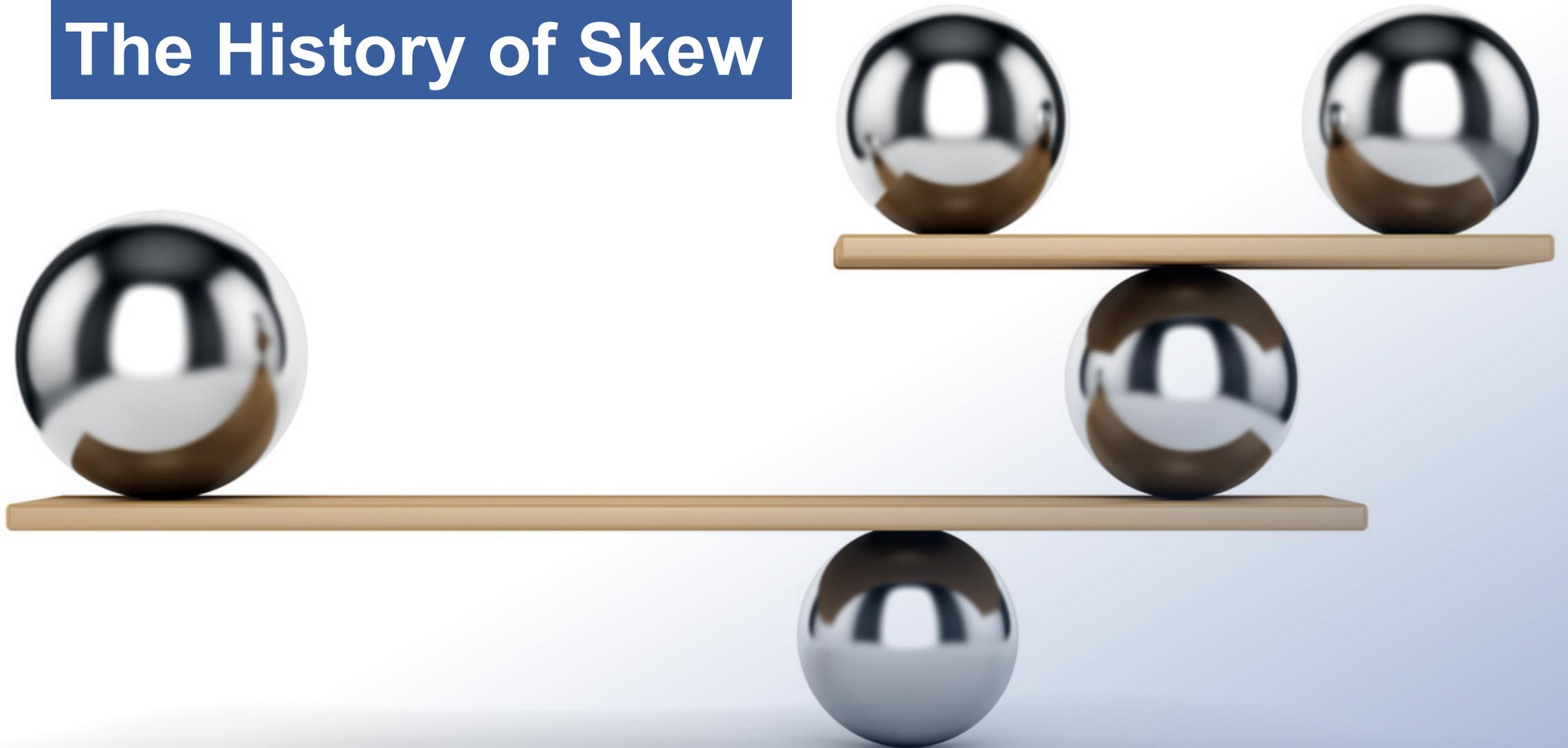
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Presentation Outline

- The History of Option Skew
- Definition of Skew
- Positive or Negative Skew
- Measuring and Tracking Skew
- Q & A



The History of Skew



The History of Option Skew

- Option skew has existed for as long as modern options trading has been around
- Many people consider the financial crises of the late 1980s, 1990's and early 2000's to be the birth of modern skew
- Since then, option skew has become a standard feature of options markets, with traders and investors using it to price options and design trading strategies



Skew: A Definition



Skew: A Definition

- Option skew refers to the potentially asymmetrical implied volatility of options with different strike prices but the same expiration date. It is the difference in implied volatility between out-of-the-money (OTM), at-the-money (ATM), and in-the-money (ITM) options.
- Skew can be measured / quantified in many different ways:
 - Simple price terms:
 - the price differential of a 25 Delta put and a 25 Delta Call
 - As a ratio of the two Implied Vols:
 - 25 Delta put / 25 Delta Call
 - 25 Delta put / At-the-money Implied Vol
 - 25 Delta call / At-the-money Implied Vol

Skew: A Definition

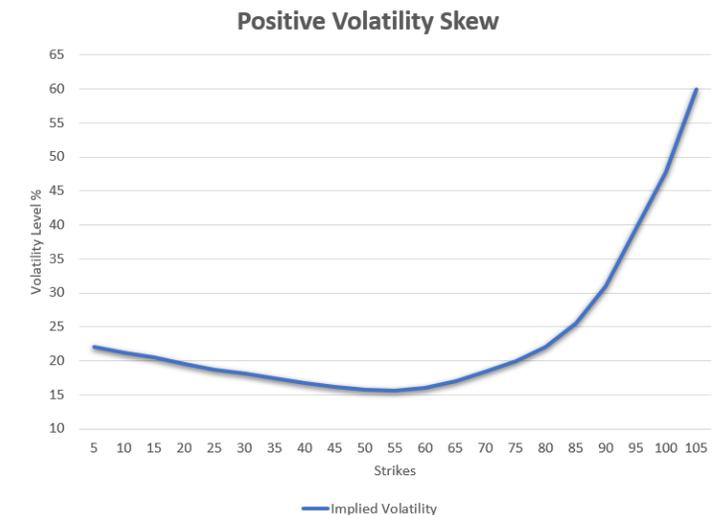
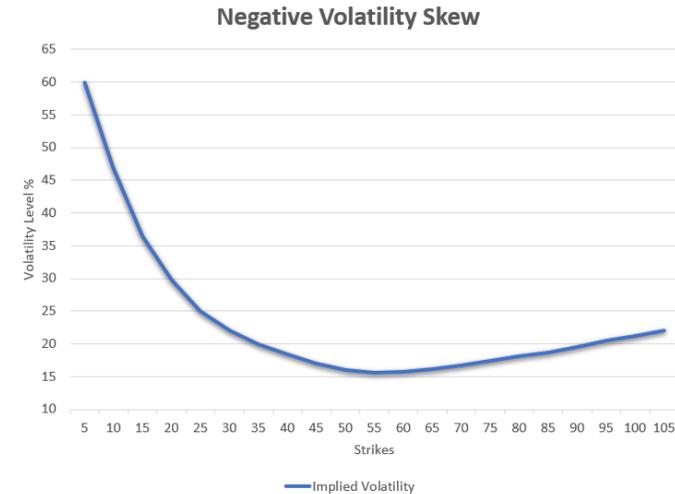
- Skew is ultimately a function of Supply and Demand, meaning:
 - It can be quite dynamic
 - It can be unpredictable
- Some people view it as a sentiment indicator - considering it an indication of which directional tail is more in-demand
- Skew can be POSITIVE or NEGATIVE!

Positive and Negative Skew



Is it Put Skew or Call Skew?

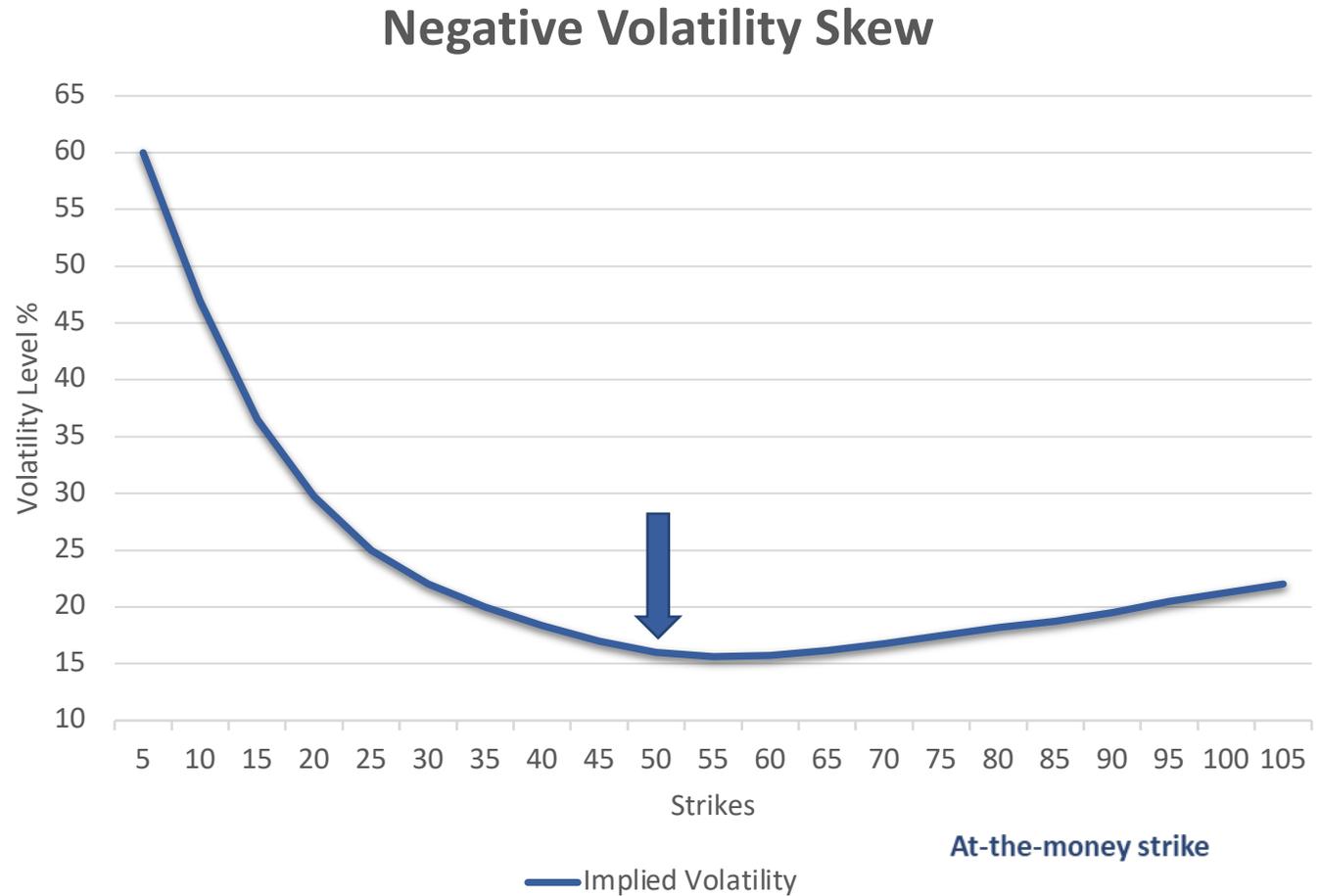
- Equities and Indices tend to have a skew with higher OTM puts than OTM calls – generally dictated by long term price history – sometimes referred to as “Negative skew” or “Put skew”
- Some commodities tend to have a demand Skew – with higher volatility levels for OTM calls than OTM puts – and are generally dictated by long term price history – generally referred to as “Positive skew” or “Call skew”



Negative Skew - How it might look

Strike Price	Implied Volatility %
5	60.00
10	47.00
15	35.00
20	29.00
25	25.00
30	22.00
35	20.00
40	18.00
45	17.00
50	16.00
55	15.63
60	15.75
65	16.00
70	16.75
75	17.50
80	18.00
85	18.75
90	19.50
95	20.50
100	21.25
105	22.00

At-the-money strike

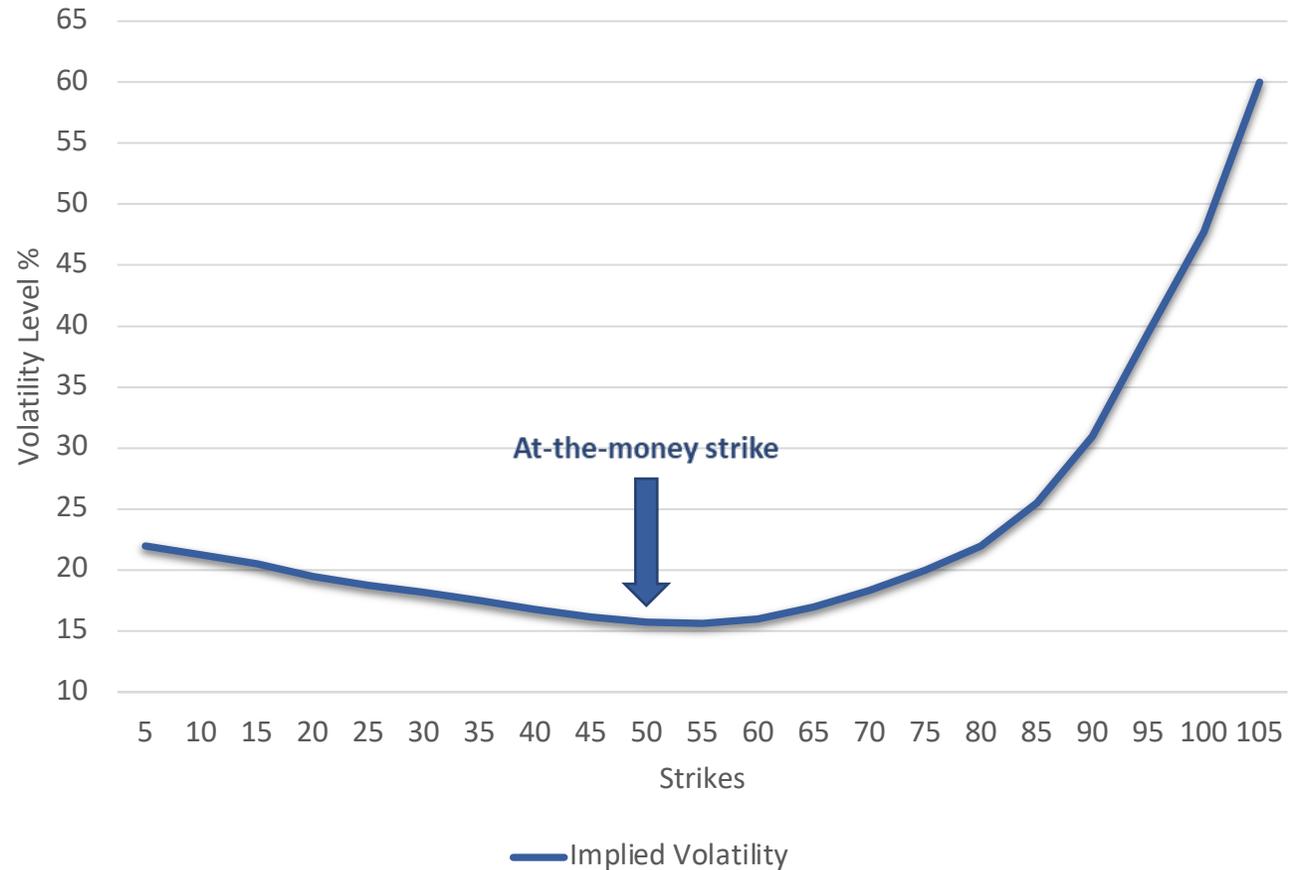


Positive Skew - How it might look

Strike Price	Implied Volatility %
5	22
10	21.25
15	20.5
20	19.5
25	18.75
30	18.2
35	17.5
40	16.75
45	16.15
50	15.75
55	15.625
60	16
65	17
70	18.35
75	20
80	22
85	25.5
90	31
95	39.5
100	47.75
105	60

At-the-money strike

Positive Volatility Skew



Measuring and Tracking Skew



Measuring and Tracking Skew Metrics by Price

Delta (Calls)	Implied Vol (Calls)	Price (Calls)	STRIKE	Price (Puts)	Implied Vol (Puts)	Delta (Puts)
.80	21.8	10.00	203.00	1.20	21.8	-.20
.75	20.1	8.30	206.00	1.75	20.1	-.25
.60	18.3	4.59	210.00	2.78	18.3	-.40
.50	17.2	3.35	212.00	3.48	17.2	-.50
.40	15.9	2.16	214.00	4.36	15.9	-.60
.26	14.4	1.06	216.50	5.77	14.4	-.74
.21	13.75	.90	217.00	6.10	13.75	-.79

One Method of Tracking Skew is by comparing the prices near the 25 Delta Put and the 25 Delta Call for options sharing the same expiration date. In the case of a product with Put skew, the put is generally going to be more expensive.

In this case, that leaves us with the following:

25 Delta Put – 25 Delta Call = Price of the “Risk Reversal”

$$1.75 - 1.06 = .69 \text{ cents}$$

Measuring and Tracking Skew Metrics using the Volatility Ratio (25 Delta Put ÷ 25 Delta Call)

Delta (Calls)	Implied Vol (Calls)	Price (Calls)	STRIKE	Price (Puts)	Implied Vol (Puts)	Delta (Puts)
.80	21.8	10.00	203.00	1.20	21.8	-.20
.75	20.1	8.30	206.00	1.75	20.1	-.25
.60	18.3	4.59	210.00	2.78	18.3	-.40
.50	17.2	3.35	212.00	3.48	17.2	-.50
.40	15.9	2.16	214.00	4.36	15.9	-.60
.26	14.4	1.06	216.50	5.77	14.4	-.74
.21	13.75	.90	217.00	6.10	13.75	-.79

Another Method of Tracking Skew is by comparing the Implied Volatility levels near the 25 Delta Put and the 25 Delta Call for options sharing the same expiration date. In the case of a product with Put skew, the put is generally going to have a higher Implied Volatility level.

In this case, that leaves us with the following:

25 Delta Put Vol ÷ 25 Delta Call Vol = Skew Volatility Ratio

$$20.1 \div 14.4 = 1.39$$

Measuring and Tracking Call Skew Metrics using only the Calls (50 Delta Call ÷ 25 Delta Call)

Delta (Calls)	Implied Vol (Calls)	Price (Calls)	STRIKE	Price (Puts)	Implied Vol (Puts)	Delta (Puts)
.80	21.8	10.00	203.00	1.20	21.8	-.20
.75	20.1	8.30	206.00	1.75	20.1	-.25
.60	18.3	4.59	210.00	2.78	18.3	-.40
.50	17.2	3.35	212.00	3.48	17.2	-.50
.40	15.9	2.16	214.00	4.36	15.9	-.60
.26	14.4	1.06	216.50	5.77	14.4	-.74
.21	13.75	.90	217.00	6.10	13.75	-.79

Another Method of Tracking only the Call Skew is by comparing the Implied Volatility levels near the 50 Delta Call and the 25 Delta Call for options sharing the same expiration date. In the case of a product with Negative skew, the 50 Delta Call Implied Vol is generally going to have a higher Implied Volatility level.

In this case, that leaves us with the following:

50 Delta Call Vol ÷ 25 Delta Call Vol = Call Skew Volatility Ratio

$$17.2 \div 14.4 = 1.19$$

Measuring and Tracking Put Skew Metrics using only the Puts (50 Delta Put ÷ 25 Delta Put)

Delta (Calls)	Implied Vol (Calls)	Price (Calls)	STRIKE	Price (Puts)	Implied Vol (Puts)	Delta (Puts)
.80	21.8	10.00	203.00	1.20	21.8	-.20
.75	20.1	8.30	206.00	1.75	20.1	-.25
.60	18.3	4.59	210.00	2.78	18.3	-.40
.50	17.2	3.35	212.00	3.48	17.2	-.50
.40	15.9	2.16	214.00	4.36	15.9	-.60
.26	14.4	1.06	216.50	5.77	14.4	-.74
.21	13.75	.90	217.00	6.10	13.75	-.79

The Last Method of Tracking Skew is by comparing the Implied Volatility levels near the 50 Delta Put and the 25 Delta Put for options sharing the same expiration date. In the case of a product with Put skew, the 25 Delta put is generally going to have a higher Implied Volatility level, so this ratio will generally be less than 1.00.

In this case, that leaves us with the following:

50 Delta Put Vol ÷ 25 Delta Put Vol = Put Skew Volatility Ratio

$$17.2 \div 20.1 = .855$$

Knowledge Check

- For an option in a month with Negative Skew, are the implied volatilities generally higher for Out-of-the-Money Puts or Calls? **Puts**
- Do equities and indices generally have Negative (Put) skew or Positive (call / demand) Skew? **Negative**
- Skew is dynamic and moves around during the trading day: T/F? **True**
- Skew is a function of Supply and Demand, and is closely tied to option prices and Implied Volatility levels: T/F? **True**

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