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Understanding Options SKEW

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OCC / The Options Industry Council (OIC)

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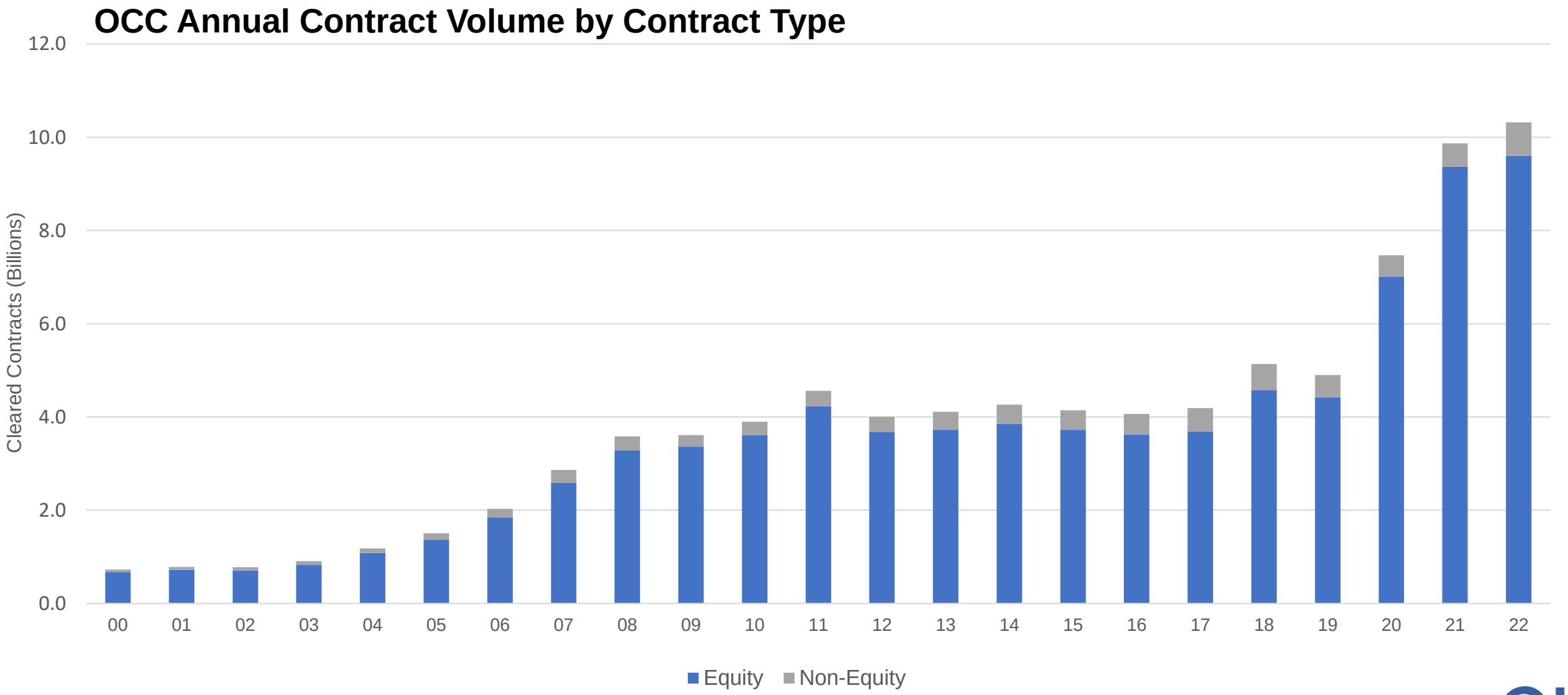
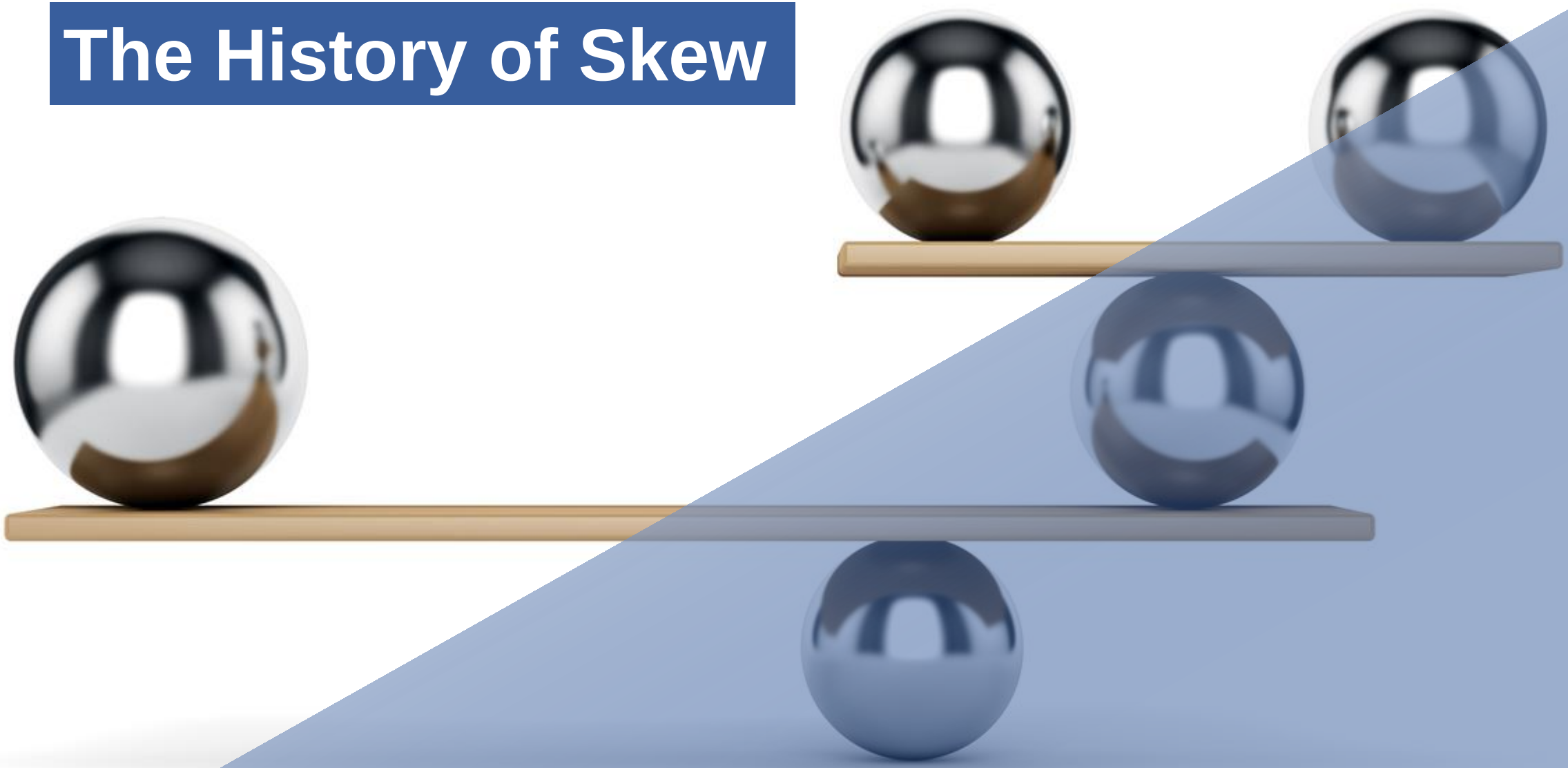
Annual Options Volume 2000-2022



Presentation Outline

- The History of Option Skew
- Definition of Skew
- Positive, Negative, or Smile 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

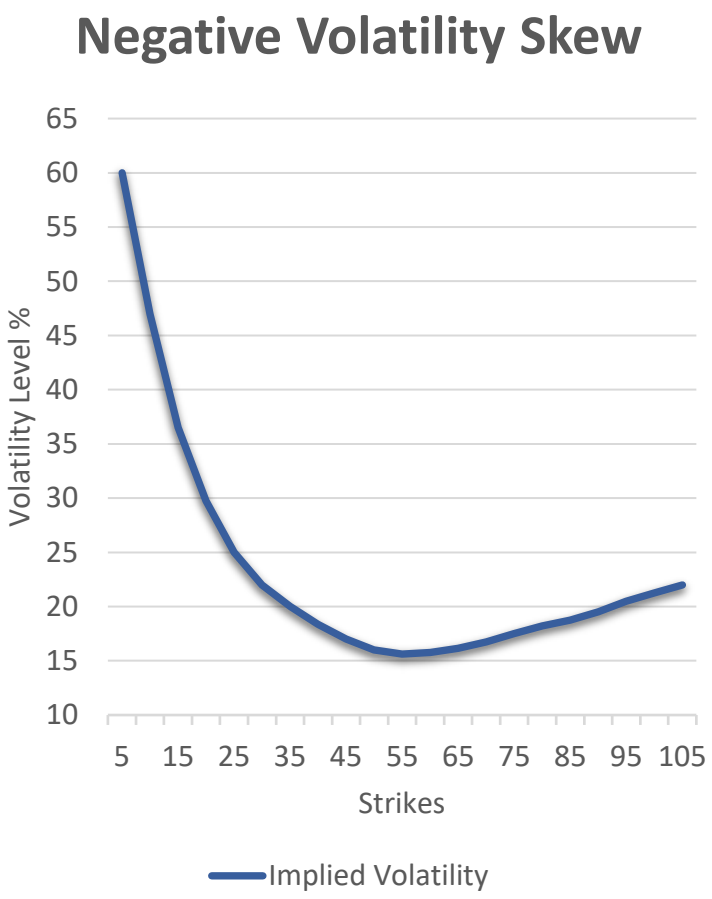
- Skew is ultimately a function of Supply and Demand, meaning:
  - It can be quite dynamic
  - It can be unpredictable

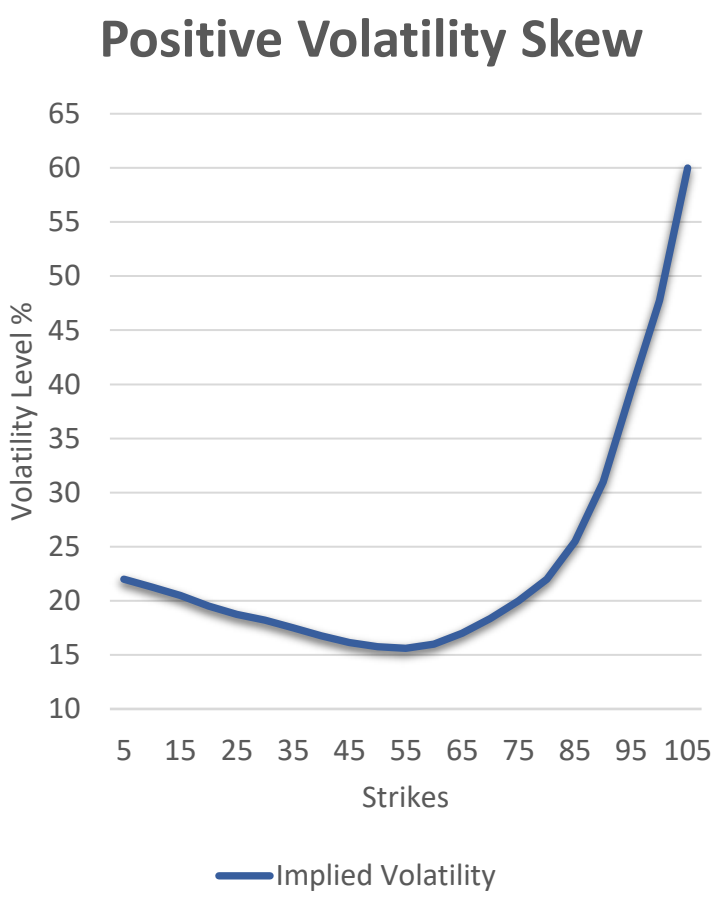
- Some people view it as a sentiment indicator - considering it an indication of which directional tail is more in-demand

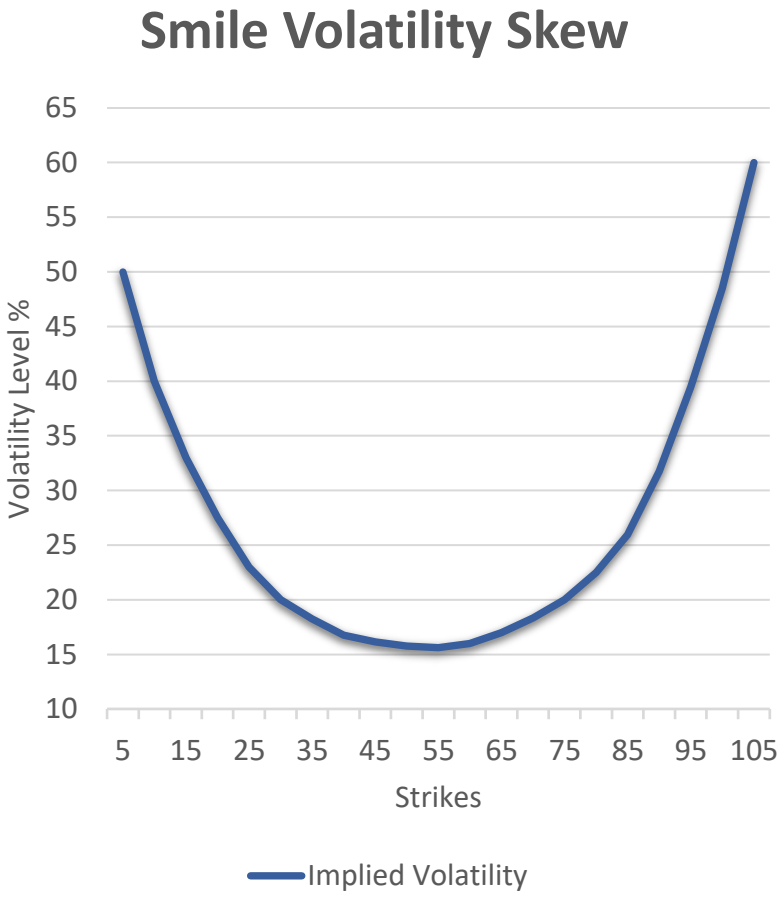
- Skew can be POSITIVE or NEGATIVE!

Positive and Negative Skew

Is it Put Skew, Call Skew, or Smile Skew?

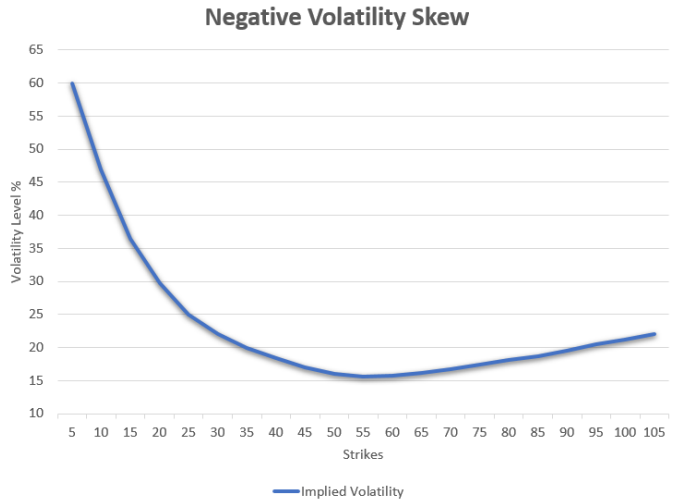




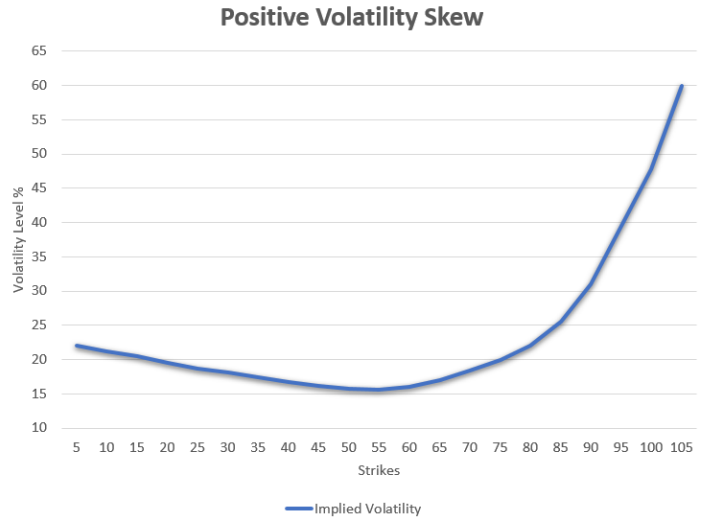


Is it Put Skew or Call Skew?

- 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”

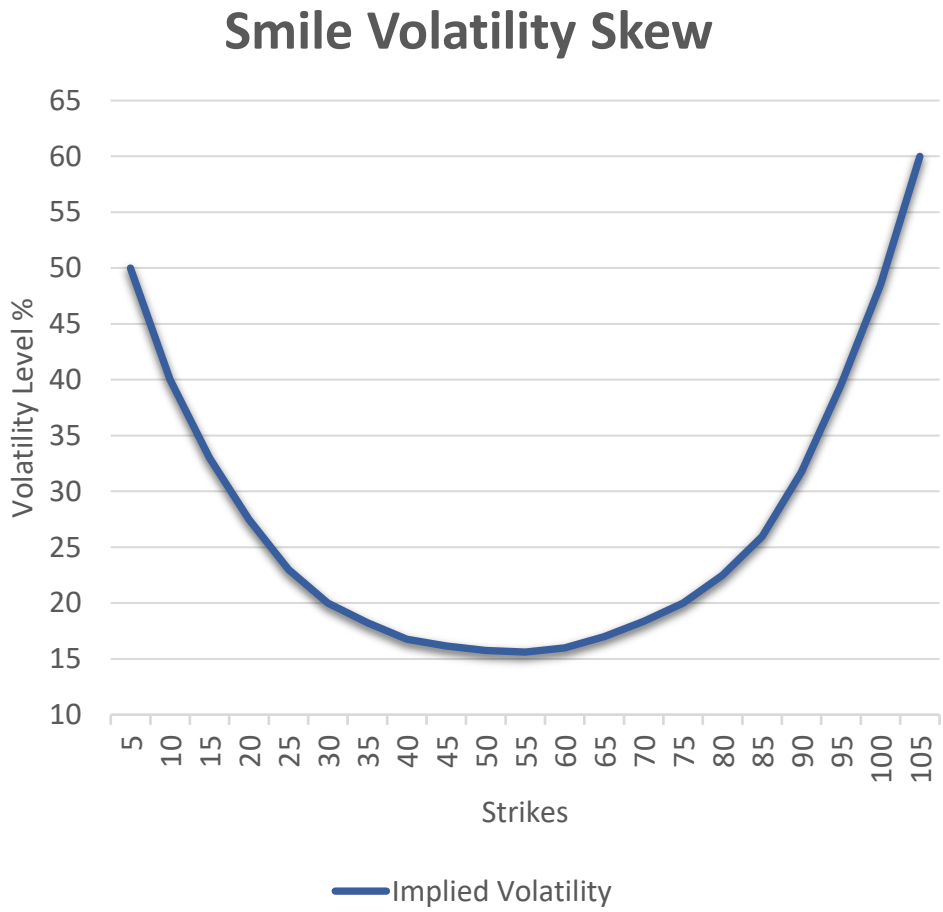


- Some commodities tend to have a demand Skew – with higher volatility levels for OTM calls than OTM puts – and are generally dictated by long term price history – generally referred to as “Positive skew” or “Call skew”



What about the Smile Skew?

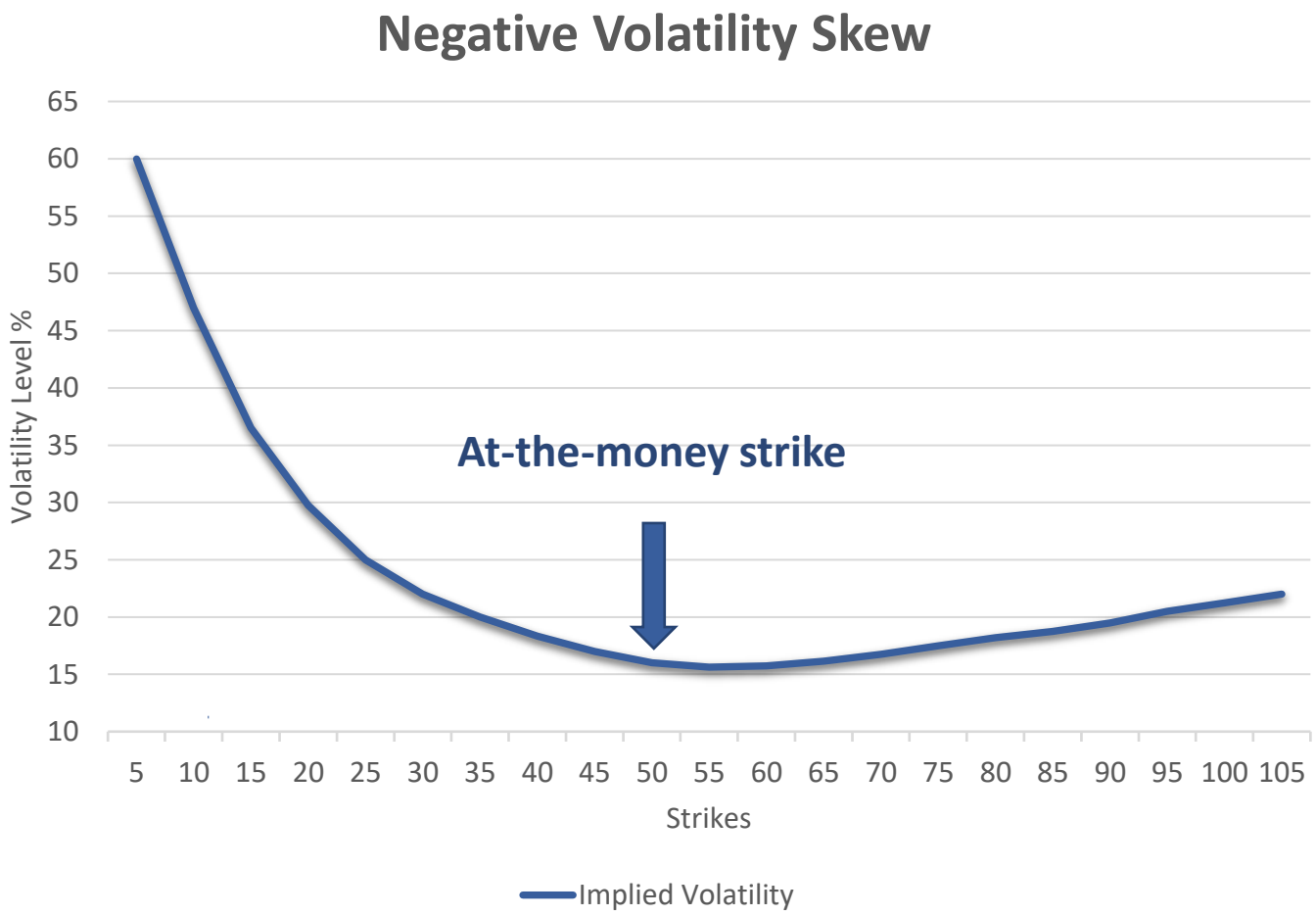
- Smile Skew can be seen in markets where uncertainty or risk is perceived to exist in both directions. Thus, both OTM puts and OTM calls can have higher implied volatility levels than the ATM options



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

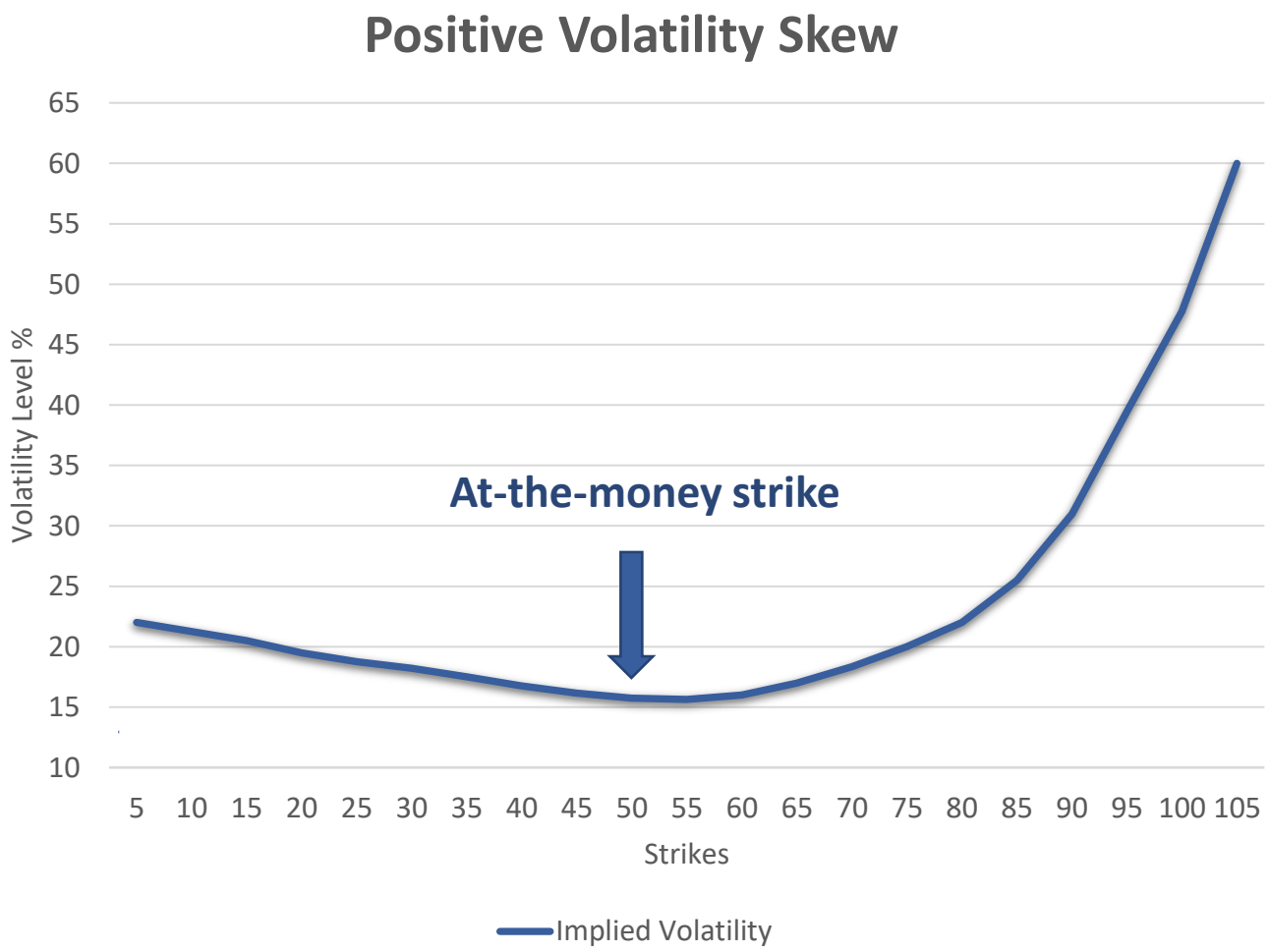
At-the-money strike



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

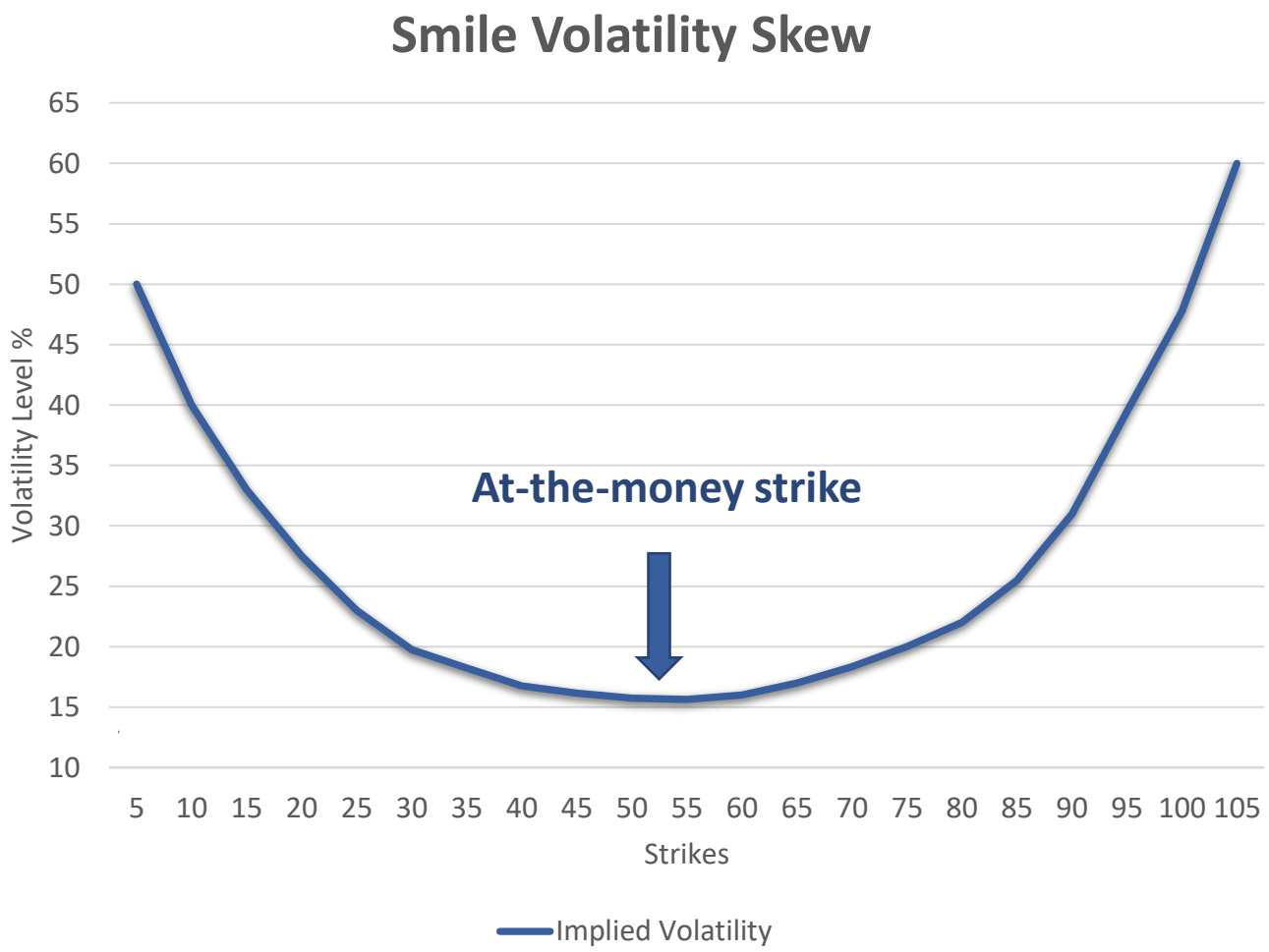
At-the-money strike



Smile Skew - How it might look

Strike Price	Implied Volatility %
5	50
10	40
15	30
20	27.5
25	23
30	19.75
35	18.25
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



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 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 ÷ 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 ÷ 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 ÷ 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 indicies 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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