

# VSTOXX Derivatives

July 2024



# VSTOXX® Futures & Options on VSTOXX® Futures

Symbol	OVS2	FVS
Product Name	Options on VSTOXX® Futures	VSTOXX® Futures
Underlying	VSTOXX® Futures	The VSTOXX® Index, a market estimate of expected volatility that is calculated every 5 seconds by using real-time EURO STOXX 50® option bid/ask quotes
Contract Value	EUR 100 per index point of the underlying	
Price Quotation and Minimum Price Change	The Minimum Price Change is 0.025 points (equivalent to a value of EUR 5)	The Minimum Price Change is 0.05 points (equivalent to a value of EUR 2.5)
Contract Months	The next eight successive calendar months	
Exercise Price Intervals	Staggered by Volatility Index Level:	
	= < 20 - 1 Index Point	-
	> 20 and =< 50 - 2.5 Index Points	-
	> 50 - 5 Index Points	-
Exercise	American-style; an option can be exercised until the end of the Post-trading Full Period on any exchange day during the lifetime of the option.	-
Settlement	Physical delivery of the underlying. The underlying matures on the same exchange day and will be settled in cash.	Cash settlement, payable on the first exchange day following the Final Settlement Day.
Daily Settlement Price	Established by Eurex, determined through a binomial pricing model	Determined during the closing auction of the respective futures contract
Last Trading Day and Final Settlement Day	30 calendar days prior to the third Friday of the expiration month of the underlying options. This is usually the Wednesday prior to the second last Friday of the respective expiration / maturity month	
Final Settlement Price	Average of the VSTOXX® values on the Last Trading Day between 11:30 and 12:00 CET	
Block Trade Size	TES 1,000 Contracts; Enlight Min Block 500 Contracts	1,000 Contracts
Vendor Codes	Bloomberg: FVSA INDEX OMON Reuters: 0#FVS2+	Bloomberg: FVSA INDEX Reuters: 0#FVS:

# EURO STOXX 50® Volatility – How VSTOXX® is derived

The VSTOXX® Index is Europe’s volatility benchmark, designed to reflect investors sentiment and economic uncertainty by measuring the 30-day implied volatility of the EURO STOXX® 50

## How is the VSTOXX® Index calculated?

Eight sub-indices are calculated by using the **market prices** of a **basket** of EURO STOXX® 50 Index Options within the same expiry. The basket of options used is screened by the following filters:

- Option prices that are one-sided are screened out.
- Only options that are quoted within the maximum spreads of 8% are eligible.
- “Cutting the Wings” – exclusion of option prices that are too far OTM, ensures that prices used do not fall short of a minimum value of 0.5 index points

Each sub-index represents one expiration. Therefore, the first sub-index uses front month EURO STOXX® 50 Index Options, the second sub-index uses second month options, and so on

The main VSTOXX® Index is designed as a rolling index at a fixed 30-days to expiry that is achieved through linear interpolation of the two nearest of the eight sub-indices

The **futures** on the VSTOXX® index is the expectation of where the 30-day implied volatility will be at the futures expiration date

The change in the term structure of the Euro Stoxx 50 options is the main driver for futures prices – rather than the VSTOXX® index itself

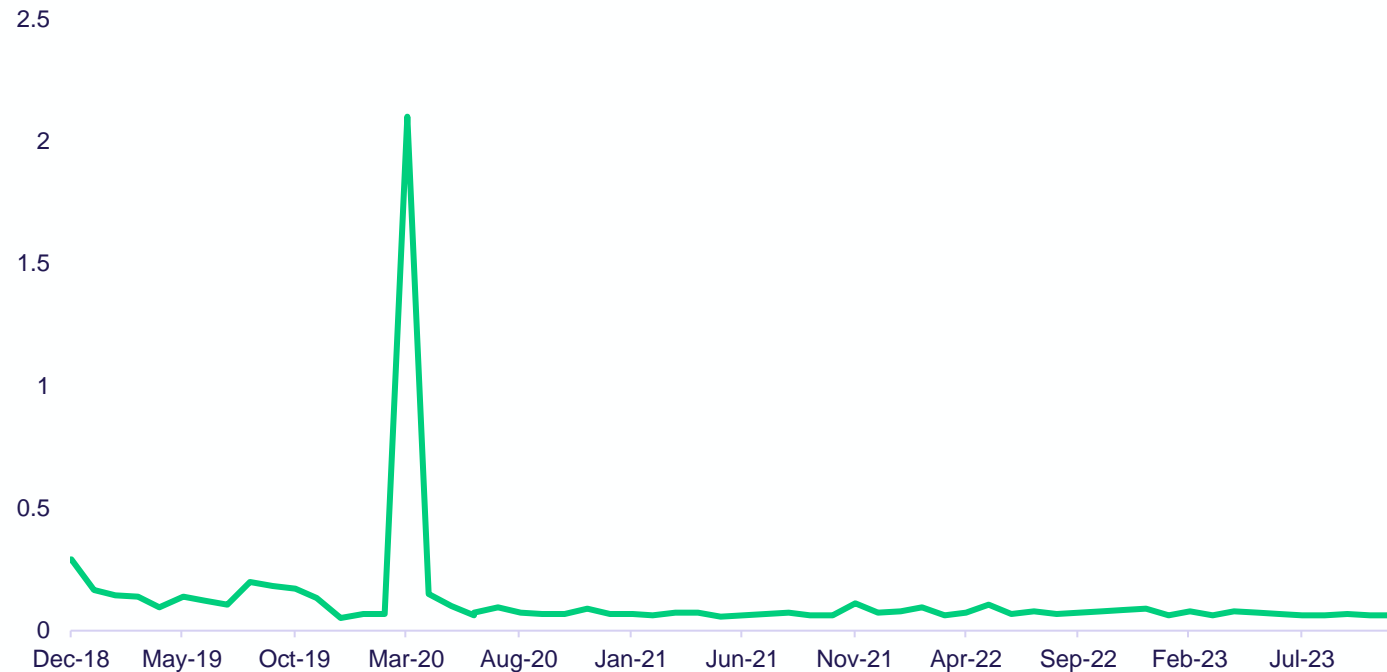
## Market prices used in the VSTOXX® sub-index

CBQty	CBid	CAsk	CAQty	Contract	PBQty	PBid	PAsk	PAQty
				OESX Nov14 2500	1900	0.4	0.6	4153
				OESX Nov14 2525	2401	0.4	0.6	2352
				OESX Nov14 2550	1200	0.5	0.7	3803
				OESX Nov14 2575	2851	0.5	0.7	2352
				OESX Nov14 2600	1600	0.6	0.8	1753
				OESX Nov14 2625	1000	0.7	0.9	2103
				OESX Nov14 2650	2853	0.7	1.0	2472
201	378.9	381.8	201	OESX Nov14 2675	2847	0.8	1.1	2465
201	354.0	356.9	201	OESX Nov14 2700	2846	0.9	1.2	1769
201	329.1	332.1	201	OESX Nov14 2725	2045	1.0	1.3	1753
201	304.3	307.2	201	OESX Nov14 2750	2444	1.2	1.5	1753
201	279.5	282.4	201	OESX Nov14 2775	1000	1.5	1.7	753
201	254.8	257.7	201	OESX Nov14 2800	100	1.8	2.0	2440
201	230.2	233.0	201	OESX Nov14 2825	2361	2.0	2.3	1553
201	205.7	208.5	201	OESX Nov14 2850	100	2.6	2.8	1913
201	181.3	184.1	201	OESX Nov14 2875	100	3.2	3.4	665
201	157.2	159.9	201	OESX Nov14 2900	1973	4.0	4.3	314
201	133.5	136.1	201	OESX Nov14 2925	1605	5.2	5.5	10
201	110.4	112.9	201	OESX Nov14 2950	215	7.1	7.4	259
201	88.2	90.6	201	OESX Nov14 2975	723	9.7	10.2	359
201	67.3	69.3	100	OESX Nov14 3000	597	13.7	14.3	415
201	48.4	50.1	100	OESX Nov14 3025	203	19.6	20.3	203
150	32.5	33.2	100	OESX Nov14 3050	166	28.1	28.8	166
174	19.4	20.1	174	OESX Nov14 3075	100	40.0	41.0	451
684	10.3	10.8	223	OESX Nov14 3100	201	55.1	57.3	201
877	4.9	5.2	225	OESX Nov14 3125	201	74.5	77.0	201
1305	2.2	2.4	18	OESX Nov14 3150	201	96.6	99.3	201
1893	1.0	1.3	2243	OESX Nov14 3175	201	120.3	123.1	201
2603	0.5	0.7	1350	OESX Nov14 3200	201	144.7	147.6	201

# A Path to Liquidity: Improve VSTOXX® Futures Orderbook

Order book spread improvements

VSTOXX Futures - Monthly Bid/Ask Spread Average



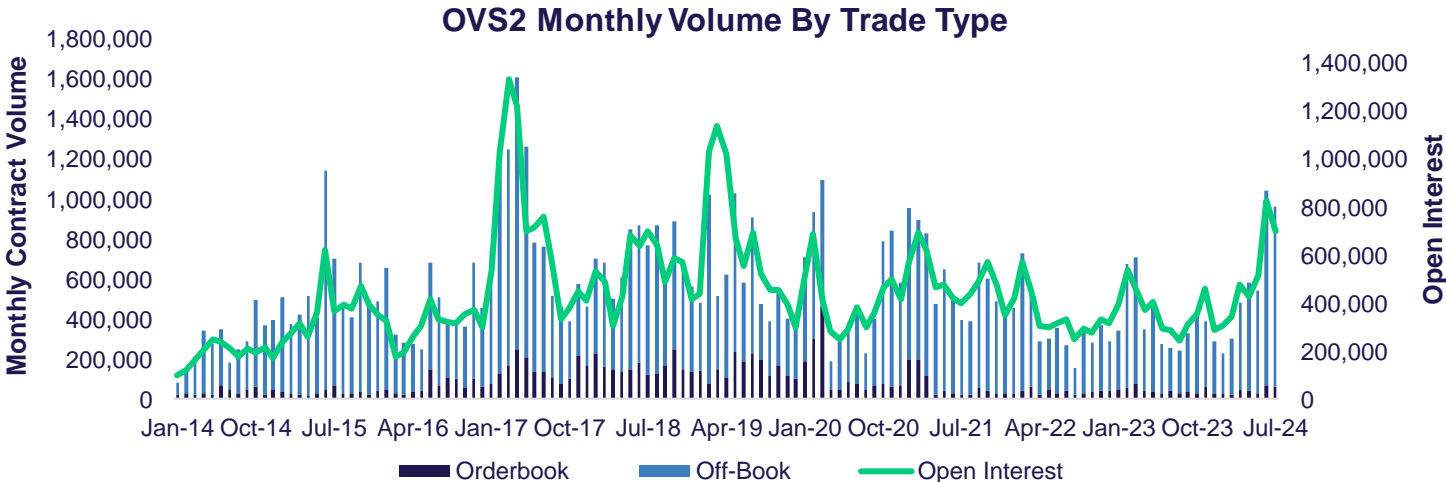
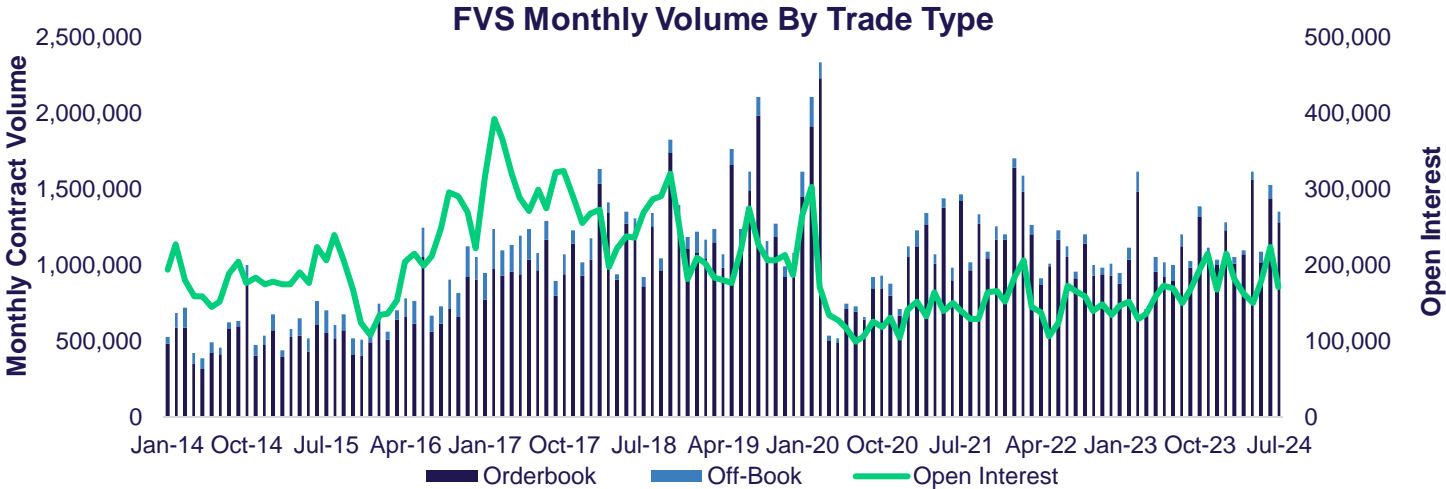
VSTOXX Futures Orderbook (May 2023)

Contract	CBQty	CBid	CAsk	CAQty
FVS Jul21	53	19.90	19.95	180
FVS Aug21	105	20.95	21.00	40
FVS Sep21	13	21.45	21.50	25
FVS Oct21	13	21.15	21.35	31
FVS Nov21	200	20.90	21.20	1
FVS Dec21	200	20.65	21.20	50
FVS Jan22	64	21.25	21.80	50
FVS Feb22	100	20.00		
FVS SPD Jul21 Aug21	63	-1.10	-1.05	17
FVS SPD Jul21 Sep21	25	-1.60	-1.50	13
FVS SPD Jul21 Oct21	6	-1.45	-1.15	163
FVS SPD Jul21 Nov21	53	-1.55	-0.95	163
FVS SPD Jul21 Dec21	53	-1.40	-0.70	163
FVS SPD Jul21 Jan22	50	-1.90	-1.25	50
FVS SPD Jul21 Feb22			-0.05	100
FVS SPD Aug21 Sep21	34	-0.55	-0.45	48
FVS SPD Aug21 Oct21	6	-0.40	-0.10	40
FVS SPD Aug21 Nov21	88	-0.50	0.10	40
FVS SPD Aug21 Dec21	88	-0.35	0.35	40
FVS SPD Aug21 Jan22	50	-0.85	-0.20	40
FVS SPD Aug21 Feb22			1.00	40

- Bid/Ask spread on VSTOXX futures narrowed by 49% in 2021 compared to 2020 due to the recovery of normal trading levels prior to the Mar 2020 Covid outbreak; **€0.0660 vs €0.2431**
- Front months futures are usually quoted **0.05 to 0.1** points wide



# Average Daily Volume and Open Interest Growth



	FVS ADV	OVS2 ADV
2012 ADV	15,000	5,638
2013 ADV	21,000	7,947
2014 ADV	27,500	13,380
2015 ADV	29,500	27,000
2016 ADV	38,200	19,000
2017 ADV	52,640	39,795
2018 ADV	61,176	33,794
2019 ADV	62,944	29,211
2020 ADV	49,769	27,068
2021 ADV	56,882	28,625
2022 ADV	54,346	16,954
2023 ADV	51,834	18,701
2024 ADV	60,545	27,828

Order book volume 2012 vs 2023		
	2012	2024
<b>FVS</b>		
Order book	71.93%	95.42%
<b>OVS2</b>		
Order book	2.66%	7.47%

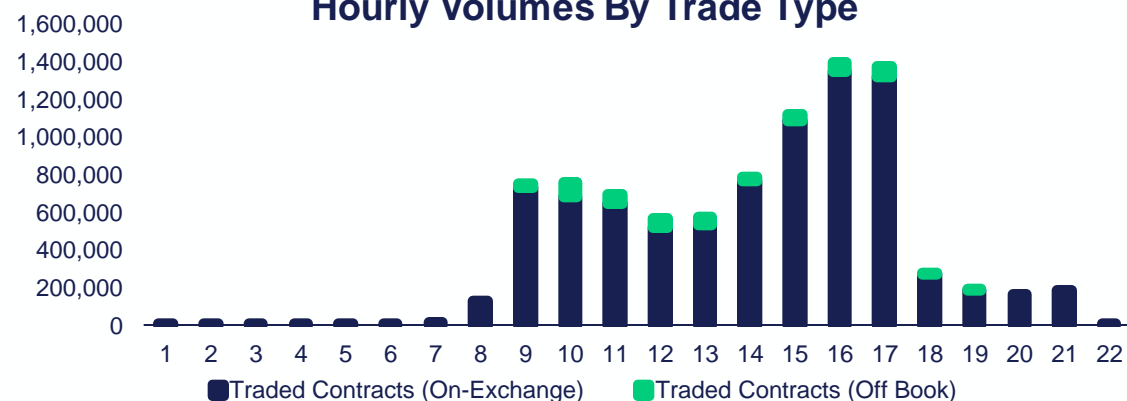
# VSTOXX® – Volume by Hour and Trade Size

In both options and futures on VSTOXX, US hours (14:00 Hours CET onwards) constitute majority of the trading day volumes (see table).

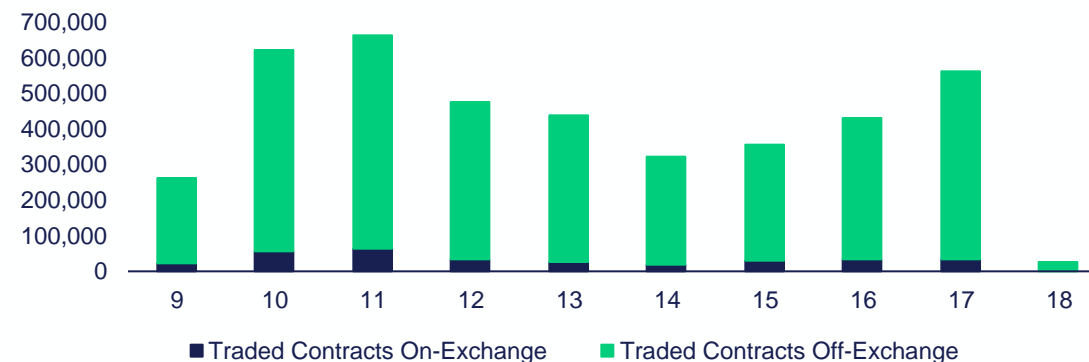
Product	Year	% Volume During US Hours	Average Notional Trade Size - Orderbook	Average Notional Trade Size - Offbook	Average Notional Trade Size - Total	Average Trade Size (Contract) - Orderbook	Average Trade Size (Contract) - Offbook	Average Trade Size (Contract) - Total
FVS	2024	60.77%	12,052	969,175	12,637	8	613	8
	2023	59.97%	10,835	1,671,166	11,651	6	871	6
	2022	61.38%	11,943	2,065,455	12,564	4	762	5
	2021	64.41%	13,785	1,348,361	14,578	6	630	7
	2020	60.24%	19,809	2,297,914	21,214	7	956	8
OVS2	2024	40.73%	239,903	4,316,213	1,698,193	102	2,270	878
	2023	51.82%	279,625	5,449,087	1,470,843	81	2,237	578
	2022	59.38%	263,296	8,495,789	2,040,678	71	2,279	548
	2021	59.38%	358,529	5,865,702	2,037,102	113	2,090	716
	2020	62.52%	567,671	6,816,794	1,637,405	144	2,401	530

Charts below depict the trend of hourly volumes in 2024 for FVS and OVS2. Increase in volumes is evident during US hours.

### VSTOXX Futures - 2024 Hourly Volumes By Trade Type



### VSTOXX Options - 2024 Hourly Volumes By Trade Type

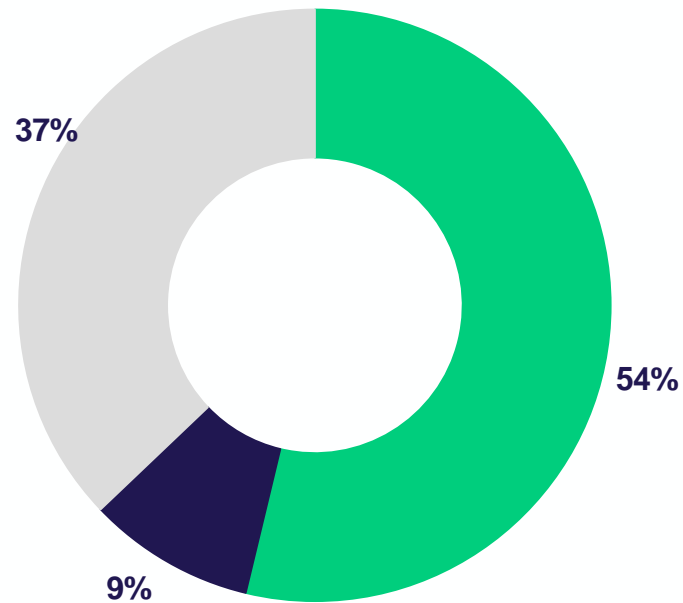


Hours are depicted in Central European Time

# VSTOXX® - Volumes By Account Type

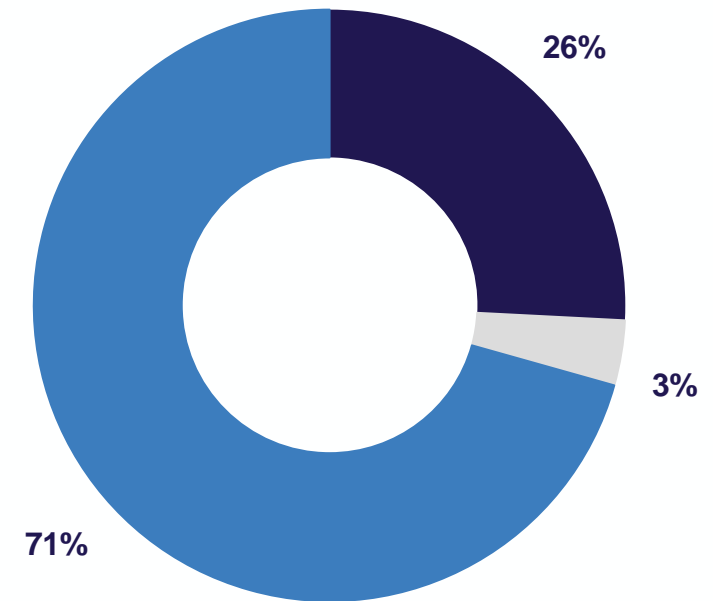
Mixed and healthy account structure

### FVS Account Role - YTM 2024



■ Market Maker ■ Principal ■ Agent

### OVS2 Account Role - YTM 2024

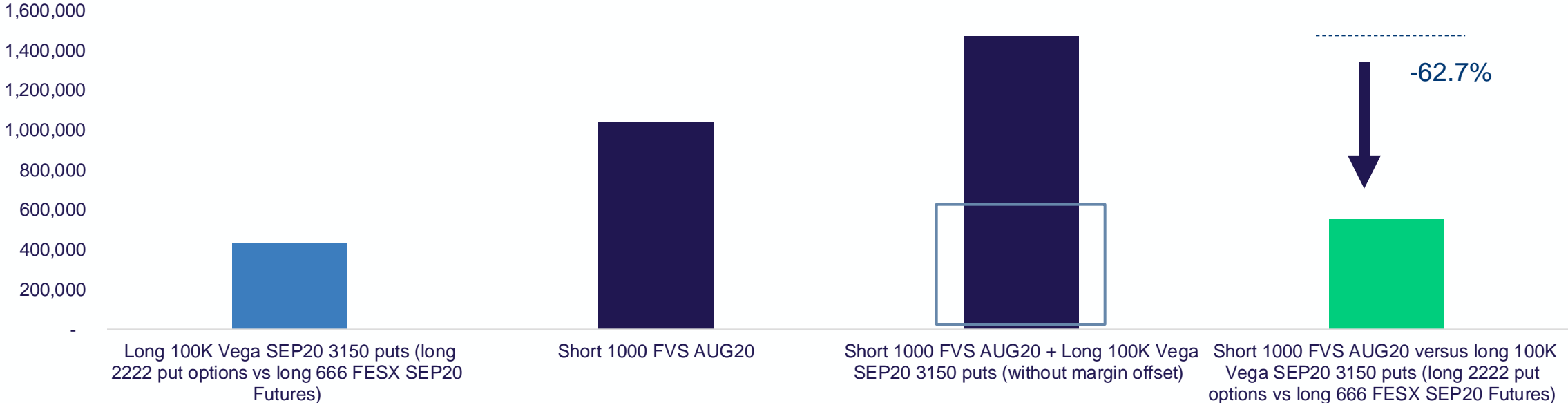


■ Market Maker ■ Principal ■ Agent

# The effects of the Eurex portfolio margin system (PRISMA)

Positive margin offsets based on a diversified portfolio example comprising Short 1000 FVS AUG20 and Long 100K Vega SEP20 3150 puts

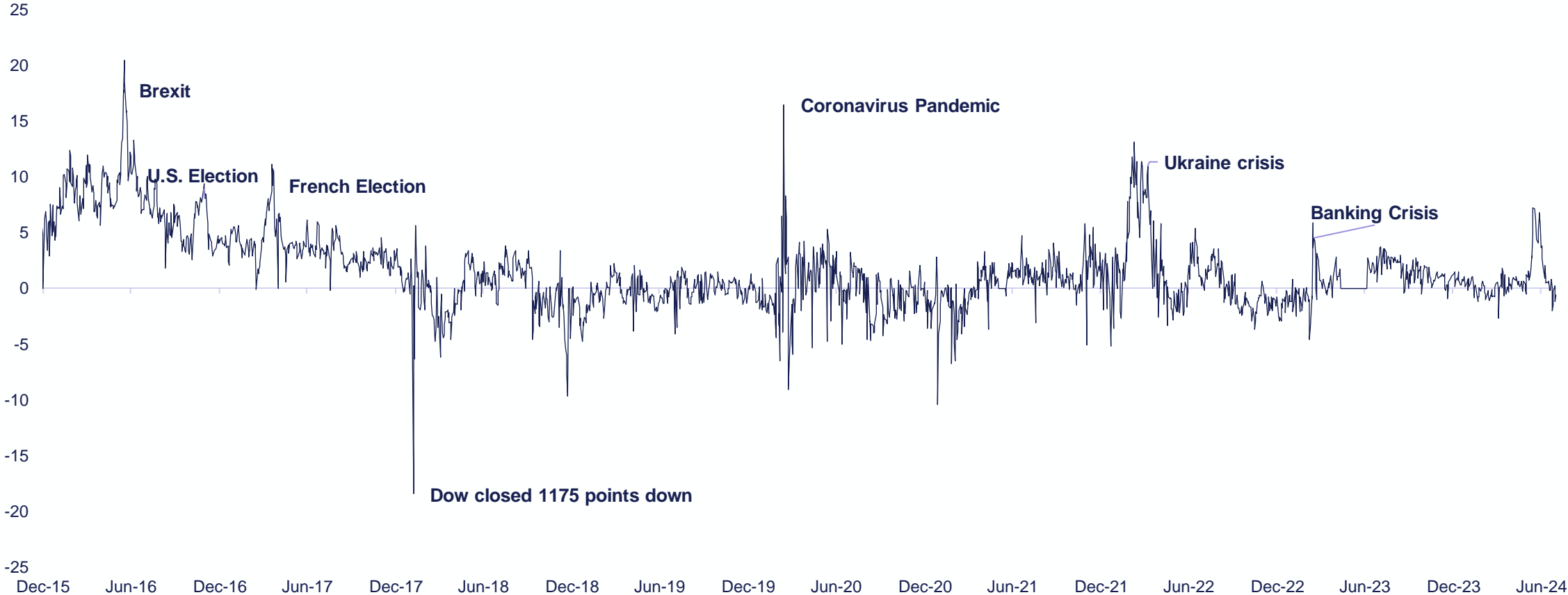
Without Prisma margin offset	With Prisma margin offset	Relative Margin Change
1,472,642.06	549,377.65	-62.7%





# VSTOXX<sup>®</sup> vs. VIX<sup>®</sup>

VSTOXX<sup>®</sup>/VIX<sup>®</sup> spread has historically been mean-reverting, but relationship can break down during times of Euro or US specific events. Between Jan 2016 and Jul 2024, the spread has averaged 1.66 points (VSTOXX<sup>®</sup> over the VIX)



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