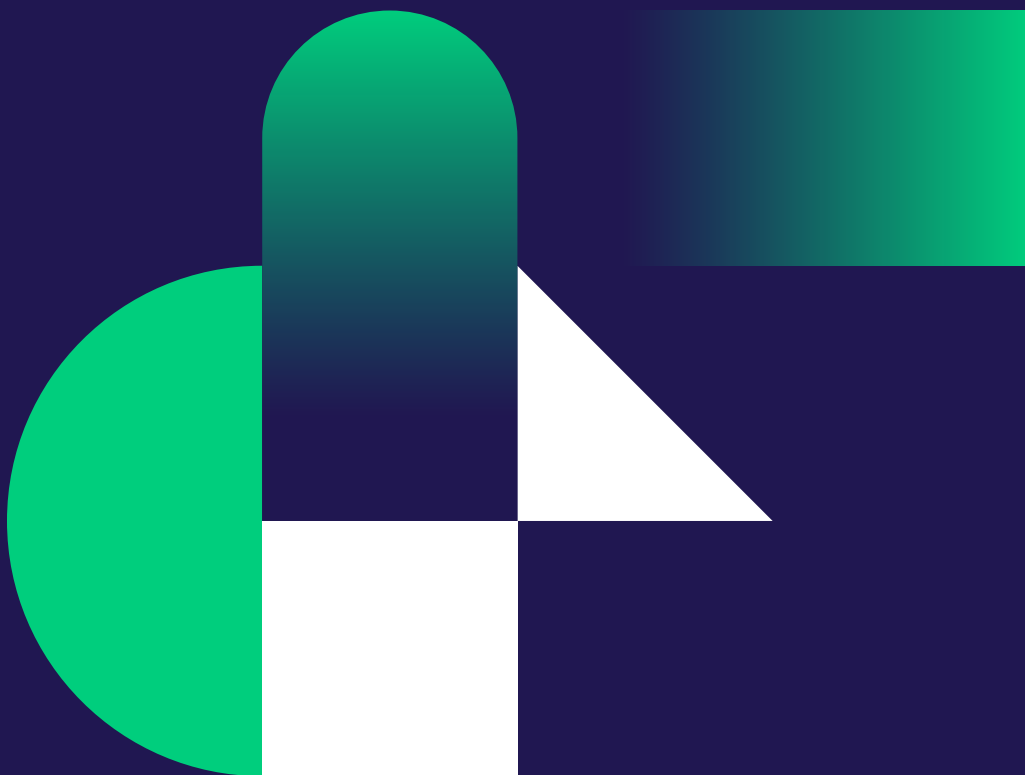
EUREX Architects of trusted markets

Trading European markets during Asian hours

Eurex's STOXX® derivatives –
The building blocks of Europe



Trading European markets during Asian hours

Eurex has an encompassing suite of global, regional, and thematic index derivatives. With its integrated clearing, cross-margining and a massive pool of products and liquidity, Eurex offers a single point of entry into a sea of liquidity, with operational and financial efficiency. Our European benchmark index products are among the most liquid exchange-traded derivatives worldwide and attract a global network of market participants.

The extension of trading hours into Asian time zones has been a logical step for its status as a global derivative trading hub and gateway to European liquidity.

In this whitepaper, we explore the fundamentals of the EURO STOXX 50®, STOXX® Europe 600 and EURO STOXX® Bank indexes, as well as how trading strategies on the three have historically performed. All three indexes are offered during Eurex's extended Asian trading hours and are essential components of the European equity derivatives markets.

Each major stock market has a variety of measures to demonstrate the performance of that market. For example, the health of European stocks may be demonstrated through the EURO STOXX 50® or STOXX® Europe 600 indexes. Both benchmarks have active futures markets, allowing market participants to gain exposure to each or manage portfolio risk efficiently. A third index, the EURO STOXX® Banks, also has an active futures market due to the importance of the banking sector in Europe. This paper analyzes the similarities and differences among these three indexes, along with a method of putting on a market-neutral position by buying one and shorting another in an equal dollar amount.

EURO STOXX 50®

The EURO STOXX 50® is well diversified despite only holding fifty stocks. Table 1 shows the industry breakdown for the components of the EURO STOXX 50® as of early January 2024.

Table 1: EURO STOXX 50® industry breakdown

Industry	Weighting
Technology	15.9%
Industrial Goods and Services	14.0%
Consumer Products and Services	13.3%
Banks	10.9%
Insurance	6.4%
Health Care	6.0%
Automobiles and Parts	5.8%
Energy	5.7%
Chemicals	4.2%
Food, Beverage and Tobacco	3.8%

Source: STOXX (data as of 29 Dec 2023)

"Our markets are now open for investors to trade our products directly and they can react to market news, movements, geopolitical events and financial announcements in the same time zone that they take place.

Mezhgan Qabool, Head of Business Development and Sales APAC and Middle East, Asia, Eurex

Table 2 lists the top ten companies by market capitalization in the EURO STOXX 50®. There are ten industries in the EURO STOXX 50® and the top ten holdings represent seven industries. These stocks represent over 43% of the index's market capitalization, making the EURO STOXX 50® a candidate for dispersion trading.

Table 2: EURO STOXX 50® top holdings

Company	Weighting	Industry
ASML HLDG	8.56%	Technology
LVMH MOET HENNESSY	5.91%	Consumer Products and Services
TOTALENERGIES	4.63%	Energy
SAP	4.44%	Technology
SIEMENS	3.96%	Industrial Goods and Services
L'OREAL	3.40%	Consumer Products and Services
SCHNEIDER ELECTRIC	3.24%	Industrial Goods and Services
SANOFI	3.20%	Health Care
ALLIANZ	3.04%	Insurance
AIR LIQUIDE	2.87%	Chemicals

Source: STOXX (data as of 29 Dec 2023)

STOXX® Europe 600

The STOXX® Europe 600 industry breakdown in Table 3 differs from that of the EURO STOXX 50®. The "banks" and "insurance" industry sectors in STOXX® Europe 600 have a total weighting of 14% compared to 17.9% in the EURO STOXX 50® index. However, Health Care has a higher weighting in the STOXX® Europe 600 and Consumer Discretionary stocks have a higher representation in the EURO STOXX 50®. Despite the industry differences, the correlation between the STOXX® Europe 600 and the EURO STOXX 50® is around 0.96 over a 10-year period. EURO STOXX 50® index only contains Euro-denominated markets, while STOXX® Europe 600 also includes non-European markets (number of eligible countries and covered GDP differential). The strong but not perfect relationship between the two allows for spread trading opportunities that will be discussed later in this paper.

Table 3: STOXX® Europe 600 industry breakdown

Industry	Weighting
Health Care	15.1%
Industrial Goods and Services	13.3%
Banks	8.7%
Technology	7.6%
Food, Beverage and Tobacco	6.9%
Consumer Products and Services	6.6%
Energy	6.2%
Insurance	5.3%
Utilities	4.0%
Construction and Materials	3.9%

Source: STOXX (data as of 29 Dec 2023)

The top ten holdings for the STOXX® Europe 600 appear in Table 4. Note that this index has four Health Care firms in the top ten holdings. The total weighting for Health Care and Consumer Staples in the STOXX® Europe 600 makes the index more defensive than the EURO STOXX 50®.

> **"The STOXX® Europe 600 index is a well-diversified index offering broader coverage of more European markets and industries, so it provides another angle to get involved in the European equities market.**
>
> Henky Toha
> Founder of HNK Alpha

Table 4: STOXX® Europe 600 top holdings

Company	Weighting	Industry
NOVO NORDISK B	3.18%	Health Care
NESTLE	2.95%	Food, Beverage and Tobacco
ASML HLDG	2.47%	Technology
SHELL	2.23%	Energy
ASTRAZENECA	1.98%	Health Care
NOVARTIS	1.96%	Health Care
LVMH MOET HENNESSY	1.89%	Consumer Products and Services
ROCHE HLDG P	1.85%	Health Care
TOTALENERGIES	1.71%	Energy
HSBC	1.47%	Banks

Source: STOXX (data as of 29 Dec 2023)

EURO STOXX® Banks

There is no need for an industry breakdown for the EURO STOXX® Banks index as it is 100% comprised of Banks. Table 5 shows the top ten holdings, representing a good portion of the index.

Table 5: EURO STOXX® Banks top holdings

Company	Weighting
BNP PARIBAS	13.32%
BCO SANTANDER	11.75%
BCO BILBAO VIZCAYA ARGENTARIA	9.28%
ING GRP	9.12%
UNICREDIT	8.90%
INTESA SANPAOLO	8.30%
NORDEA BANK	7.43%
DEUTSCHE BANK	4.43%
GRP SOCIETE GENERALE	3.64%
CAIXABANK	3.04%

Source: STOXX (data as of 29 Dec 2023)

Performance

Figure 1 shows the annual performance from 2013 through 2023, with 2023 representing the year's first ten months. The EURO STOXX 50® and STOXX® Europe 600 annual performance difference averages 1.91%, with the first ten months of 2023 seeing the widest divergence over the last eleven years at 4.99%. The EURO STOXX® Banks index is more volatile than the other two and the annual performance difference averages about 10% versus the EURO STOXX 50® and 11% versus the STOXX® Europe 600. The difference varies between outperformance and underperformance for the EURO STOXX® Banks index.

Another performance comparison for the three indexes shows up in Figure 2, representing the growth of €100 invested in the total return for each from 2013 through October 2023.

The strong correlation between the EURO STOXX 50® and STOXX® Europe 600 is obvious as the two hypothetical returns overlap for most of the above ten-plus-year period. The EURO STOXX® Banks index has underperformed over this period, but in four years, it did outperform the other two indexes. The first ten months of 2023 are one of these four periods of outperformance.

Figure 1: Annual performance 2013 – 2023 (first 10 months)

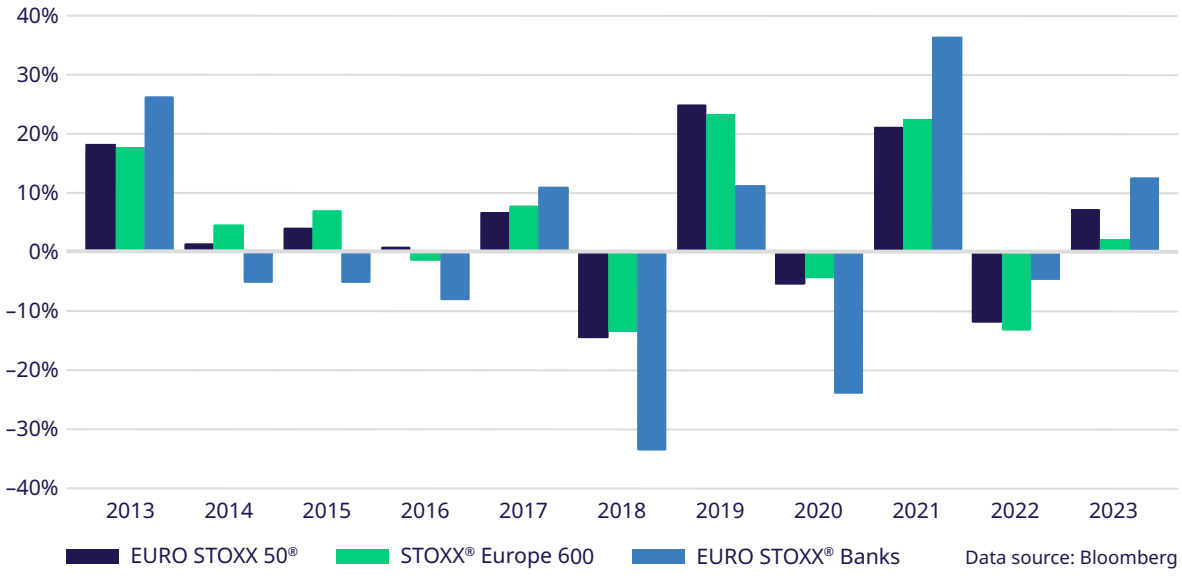
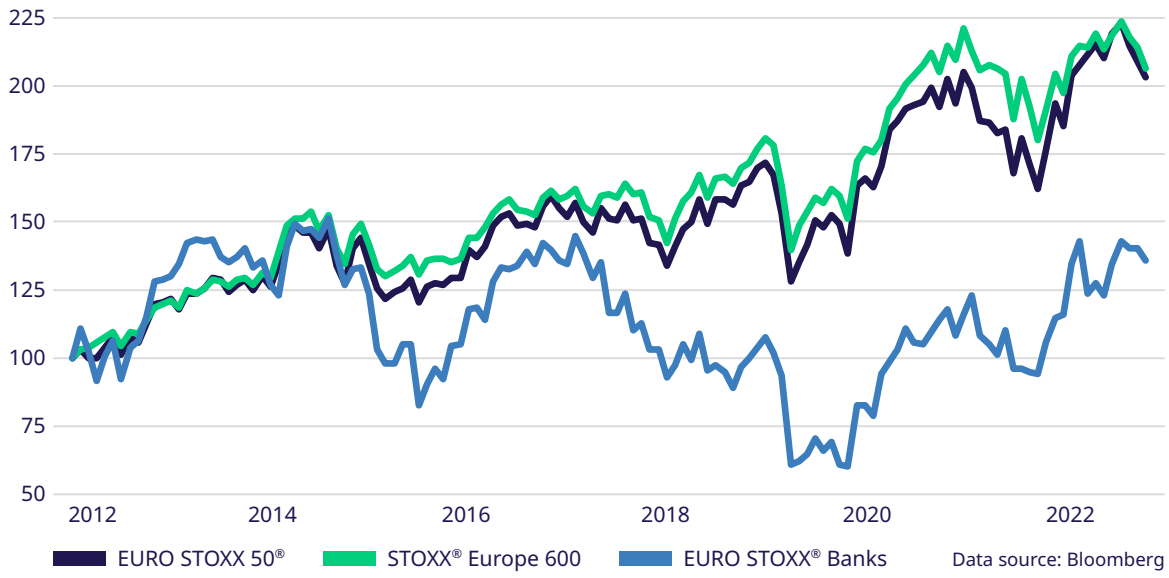


Figure 2: Growth of EUR 100 (Dec 2012 – Oct 2023)

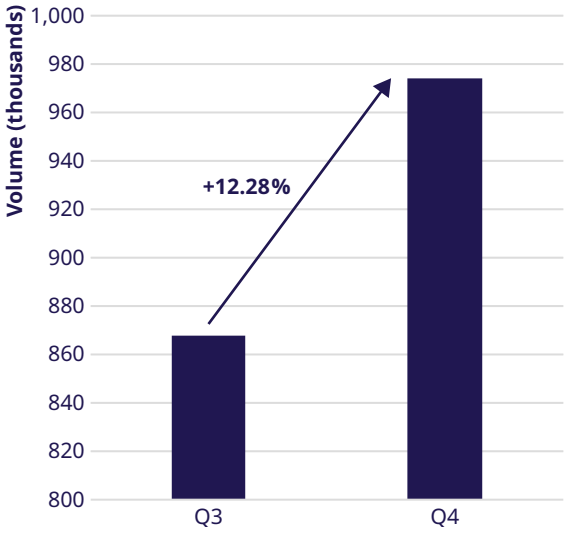


Liquidity

All three products offer traders sufficient liquidity during both European and Asian market hours. Additionally, each continues to experience increased trading volumes, as demonstrated in the following three charts during the Asian hours[1].

Starting with EURO STOXX 50® futures, the figure below shows average daily volume (ADV) in the 3rd and 4th quarters of 2023. Q3 ADV topped 867,000 contracts, while Q4 rose by over 100,000 contracts to almost 974,000. The result is a gain of 12.28% on a quarterly basis.

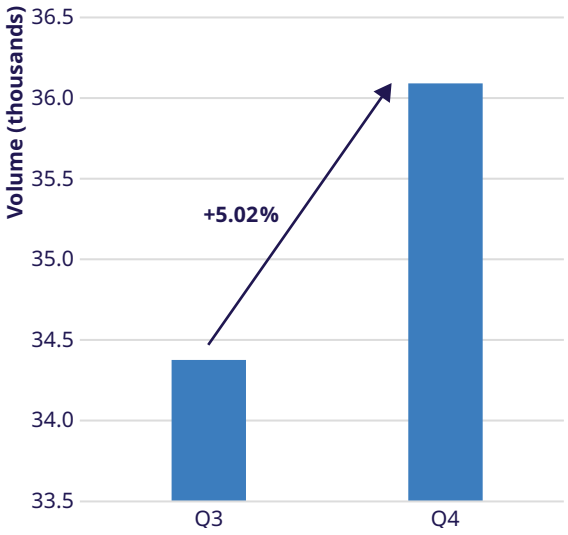
Figure 3: EURO STOXX 50® Futures volume development (Q3–Q4 2023) during Asian hours



Source: Eurex

ADV for EURO STOXX® Banks futures trading topped 36,000 in Q4 2023, a gain of just over 5% in Q3. A figure not included on the chart below but worth noting is that ADV in the first half of 2023 was just over 18,000 contracts. This puts Q4 ADV at about two times the first half of 2023.

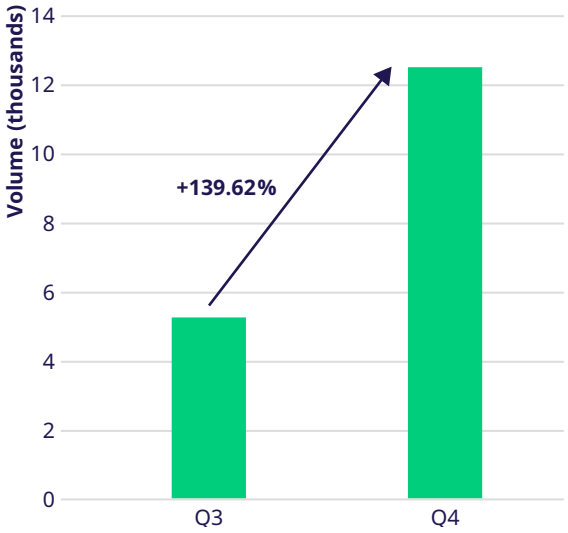
Figure 4: EURO STOXX® Banks futures volume development (Q3–Q4 2023) during Asian hours



Source: Eurex

Finally, STOXX® Europe 600 futures ADV was just over 12,500 contracts in Q4 2023. This is an impressive 139.62% increase over ADV in Q3 2023.

Figure 5: STOXX® Europe 600 futures volume development (Q3–Q4 2023) during Asian hours



Source: Eurex

Volume is only one figure that indicates liquidity for a futures market. The average bid-ask spread is another. All three markets have an average bid-ask spread that is slightly greater than the minimum tick. For instance, the average bid-ask spread for the EURO STOXX 50® futures ranges from 1.03 during European market hours to 1.04 (just 0.01 higher) during Asian market hours.

[1] Definition of Asian hours in this document:
08:15 – 14:00 SGT during summer
(26 March 2023, 02:00 CEST/08:00 SGT to 29 October 2023, 03:00am CEST/09:00 SGT)
08:15 – 15:00 SGT during winter
(29 October 2023, 03:00 CET/09:00 SGT to 31 March 2024, 02:00 CET/08:00 SGT)

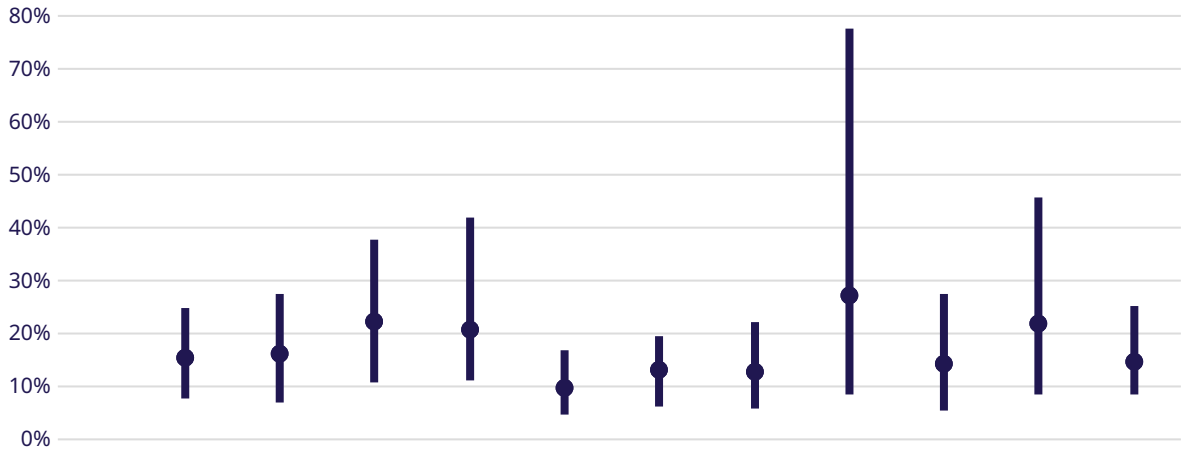
Realized volatility

The price behavior of the EURO STOXX® Banks Index is more volatile than that of the other two indexes. Each index's annualized rolling 30-day realized volatility was calculated and broken down by year. Figure 6 shows the 30-day realized volatility range and average by year for the EURO STOXX 50®.

The long-term average 30-day realized volatility for the EURO STOXX 50® is 17.16%. Note that in 2020, 30-day realized volatility reached almost 80%. This coincided with VSTOXX®, a measure of 30-day expected volatility, closing over 80 twice in March 2020.

The STOXX® Europe 600 has the lowest average realized volatility at 14.31% over the last ten-plus years. The pattern in Figure 7 represents the 30-day realized volatility statistics for the STOXX® Europe 600.

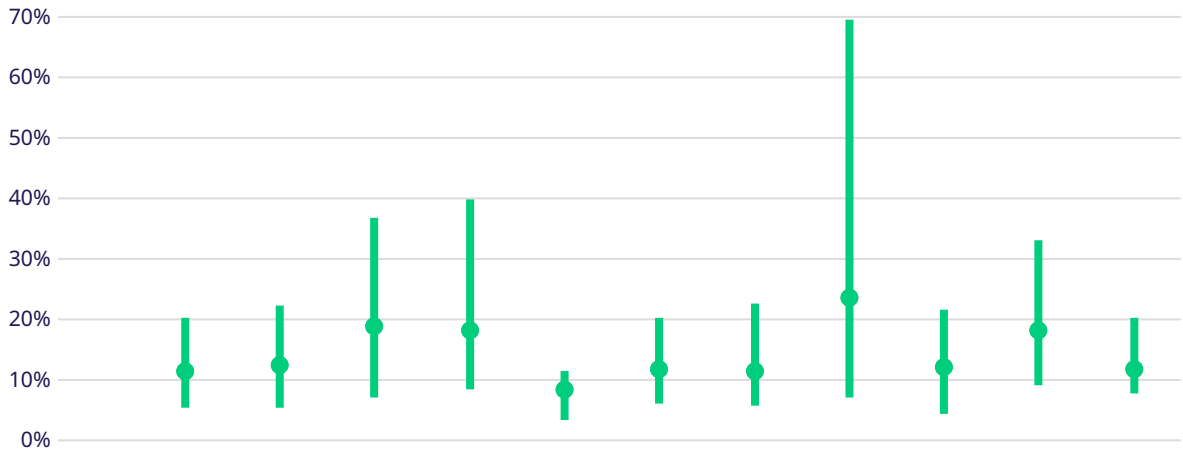
Figure 6: EURO STOXX 50® 30-day volatility by year



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
High	24.93%	27.69%	37.90%	41.98%	16.90%	19.56%	22.16%	77.94%	27.55%	45.76%	25.11%
Low	7.70%	7.04%	11.01%	11.18%	4.73%	6.45%	6.03%	8.39%	5.34%	8.69%	8.50%
● Average	15.57%	16.05%	22.25%	20.64%	9.88%	12.94%	12.76%	27.25%	14.34%	22.02%	14.59%

Data source: Bloomberg

Figure 7: STOXX® Europe 600 30-day volatility by year



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
High	20.26%	22.26%	36.86%	39.85%	11.37%	20.12%	22.54%	69.58%	21.31%	32.98%	20.02%
Low	5.36%	5.11%	6.98%	8.13%	3.29%	5.99%	5.41%	6.82%	4.17%	9.00%	7.45%
● Average	11.39%	12.41%	18.71%	18.22%	8.16%	11.55%	11.32%	23.34%	11.98%	18.09%	11.73%

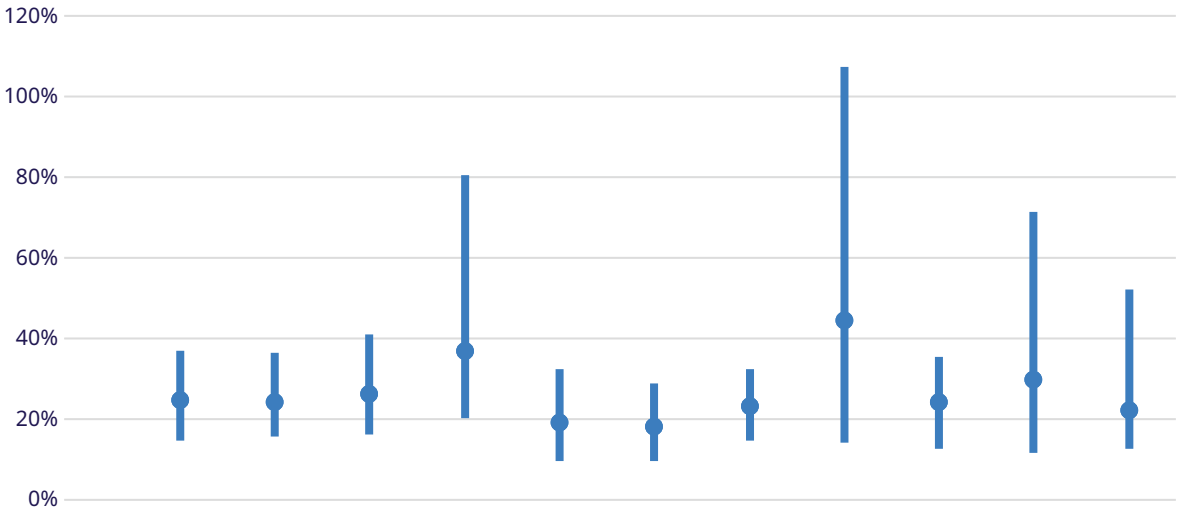
Data source: Bloomberg

The highest level reached on Figure 7 is just under 70%. Recall that the EURO STOXX 50® peaked at 10% higher in 2020. STOXX® Europe 600 volatility is consistently lower than the other two indexes. For example, the average topped 20% only once for the STOXX® Europe 600, while it is over 20% four times for the EURO STOXX 50®.

The EURO STOXX® Banks realized volatility is much higher than the other two indexes, averaging 26.58% over the period analyzed. In Figure 8 the average only falls under 20% for two years.

The 30-day realized volatility peaked at over 100% in 2020. Of note are the elevated levels in 2016 at near 80% and 2022 closing in at 70%. Some traders are attracted to volatility; some are not. For those who seek it out, the EURO STOXX® Banks index futures market is a great source of volatility.

Figure 8: EURO STOXX® Banks 30-day volatility by year



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
High	36.96%	36.45%	40.63%	80.57%	32.38%	28.84%	32.13%	107.07%	35.14%	71.46%	52.02%
Low	14.29%	15.56%	15.77%	20.28%	9.21%	9.34%	14.69%	14.14%	12.64%	11.27%	12.23%
● Average	24.69%	23.92%	26.00%	36.88%	19.03%	18.04%	22.91%	44.22%	24.07%	29.56%	22.13%

Data source: Bloomberg

Futures specifications

One of the most efficient methods of gaining exposure to the EURO STOXX 50®, STOXX® Europe 600, or the EURO STOXX® Banks index is through futures contracts. This section examines the contract specifications that traders should know before trading futures on these indexes.

There are common characteristics for all three futures markets discussed in this paper. Each opens at 08:10 SGT and closes the following day at 04:00[2]/05:00 SGT, starting with the opening on Monday morning and closing for the weekend early on Saturday morning. Futures expire quarterly in March, June, September, and December, typically on the third Friday of the month. Finally, a large portion of trading volume is in the front month future. Table 6 shows some characteristics that are unique to each futures.

Table 6 shows the minimum tick for each contract, the value of a tick in Euros, the contract multiplier, and the notional value of each contract (based on 15 November market pricing).

[2] See footnote on page 6.

> **Liquidity is pretty good, and spreads are attractively tight during the Asian trading session. With the liquidity and spread conditions continuously improving in the STOXX® products, we are also seeing good opportunities to build up positions in these contracts without affecting our bottom line too much.**

Xian Han Seah,
Trader of Theme International Trading

Table 6: Unique contract specifications

	Minimum tick	Tick value (EUR)	Multiplier (EUR)	Notional value (EUR)
EURO STOXX 50®	1.00	10.00	10.00	43,180
STOXX® Europe 600	0.10	5.00	50.00	22,785
EURO STOXX® Banks	0.05	2.50	50.00	5,690

Data source: Bloomberg

Trading strategies

There are many approaches to trading each of these three futures contracts. The paper looks at how these three indexes interact with each other and trading strategies that involve buying one and selling the other. Each index was tested using daily data from January 2013 through October 2023. A 14-day relative strength index (RSI) is calculated for each index. On the market close each day, the index with the highest RSI is purchased and the index with the lowest RSI is sold short. The equity index futures each have different notional sizes, so the assumption is made that an equal notional Euro amount of futures is traded. For simplicity, €50,000 is assumed, and that figure is consistent across all days. Figure 9 shows this approach's cumulative profit and loss, starting with the first day in 2013.

Figure 9: RSI system results



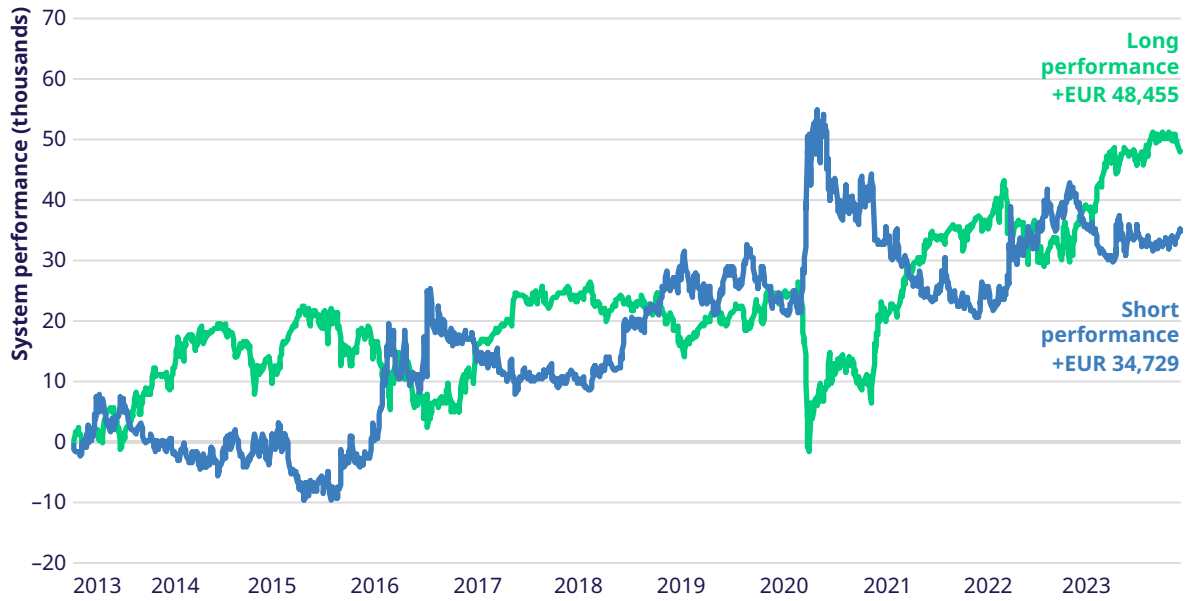
Data source: Bloomberg

The long-term profit for the system described above returns over €83,000, a pretty impressive figure considering the back test assumed €50,000 notional for the long and short futures legs of the spread. The long timeframe does mask some of the drawdowns which topped €10,000 a couple of times.

This approach is interesting because both the long and short legs of this strategy profited over the period analyzed. Figure 10 shows the running profit and loss through shorting the future with the lowest RSI and purchasing the figure with the highest RSI.

For shorter-term spread trades, the EURO STOXX 50® and STOXX® Europe 600 have an ideal relationship with performance consistently converging and diverging. The EURO STOXX® Banks index has periods where the performance divergence is dramatic and trends over a long period, which was a major contributor to the results above. Recall that the EURO STOXX® Banks Index has beaten the other two indexes three times in the last ten years and is on track to do so again in 2023. Each year following the outperformance of the EURO STOXX® Banks Index, it was lower the following year. In fact, all three indexes were lower the year after the EURO STOXX® Banks' outperformance.

Figure 10: RSI system long / short results



Data source: Bloomberg

Conclusion

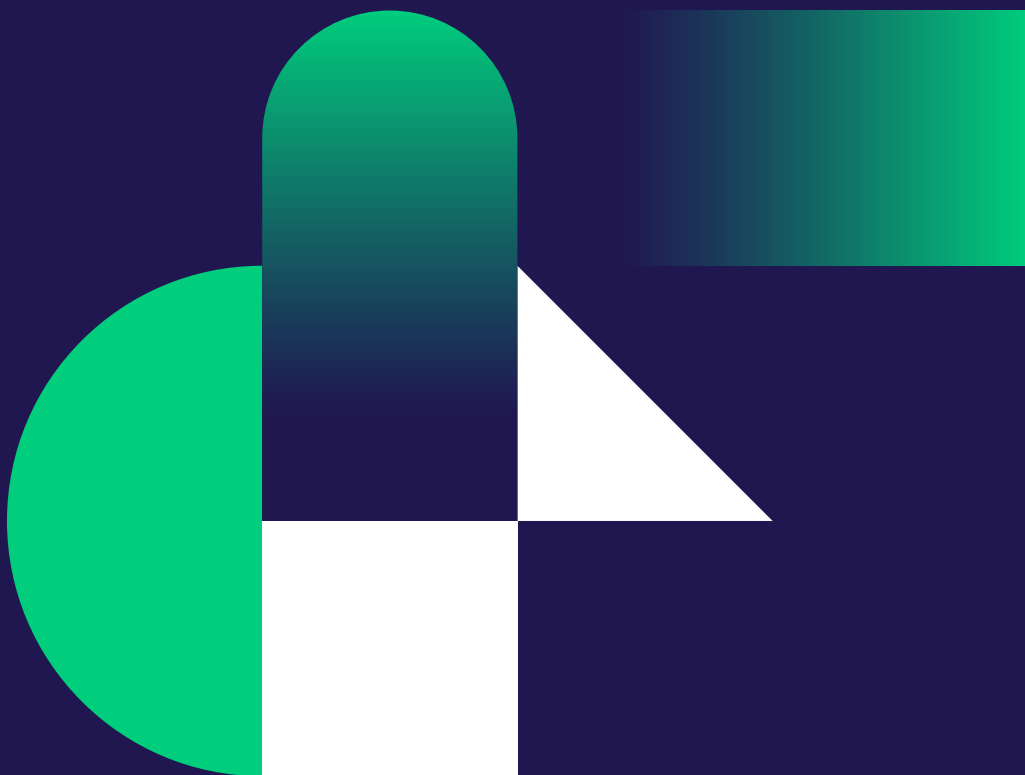
Each of the three indexes discussed in this paper has a viable futures market during and outside regular European trading hours. Both volume and overnight volatility create an environment where European stock exposure can be enhanced or hedged during Asian market hours.

Depending on a trader's market outlook, each offers unique exposure to European stocks, allowing for various risk management or speculative uses for the associated futures contracts. This paper demonstrates the fundamental differences between these three markets and looks at how each behaves relative to the other, creating spread trading opportunities.

There are many aspects of each index and the relationship between those indexes that traders should keep in mind when taking a position based on European equities.

Five key takeaways

1. All three indexes have highly liquid futures markets that allow market participants to take positions anytime based on an outlook for European stocks.
2. The EURO STOXX 50® and STOXX® Europe 600 indexes are good pair markets due to their different composition and the strong correlation between them.
3. The EURO STOXX® Banks is more volatile than the other two markets, which may offer attractive trading opportunities for more active traders as well as option traders.
4. The EURO STOXX 50® has a higher weighting in cyclical stocks and the STOXX® Europe 600 has more defensive stocks, making each more attractive based on an economic outlook.
5. A few stocks dominate the EURO STOXX® Banks index performance. Do consider company-specific events when trading futures on this market.



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