

January 2023

FX Market Structure Monthly

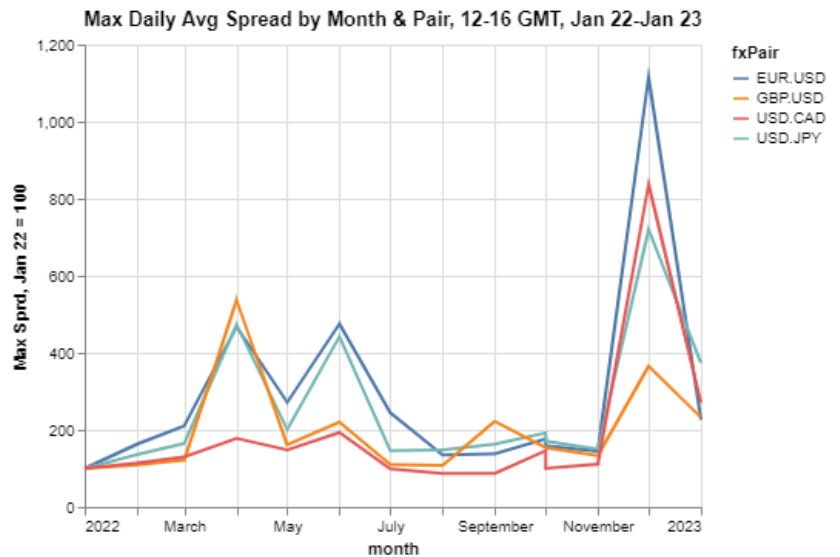
CHANGES IN SPREAD AND VOLATILITY FOR MAJOR MARKET PAIRS

During the January 12:00-16:00 GMT trading window, median spreads showed a slight decrease. However, out of the 23 G-10 currency pairs monitored, 6 recorded an increase in spreads. Throughout the day, none of the 23 pairs experienced wider quotes across the desks in Tokyo, London, and New York.

SPREADS

Since November, the value of the USD has experienced a decline of 6.7% compared to the global currency basket monitored by the Federal Reserve. During the pre-WMR Fixing window, we noted that the maximum daily spread shows a significant increase regardless of the movement of the USD. In April, the USD experienced a surge of 3.8%, followed by a 2.3% rise in June. Although the maximum spread showed a substantial increase in December, the Fed's index saw a decline of -4.3% in November with little change in

December. Last month, the USD weakened by -2.5% and the maximum daily spread was noticeably higher compared to months with minimal changes in rates months with minimal changes in rates.





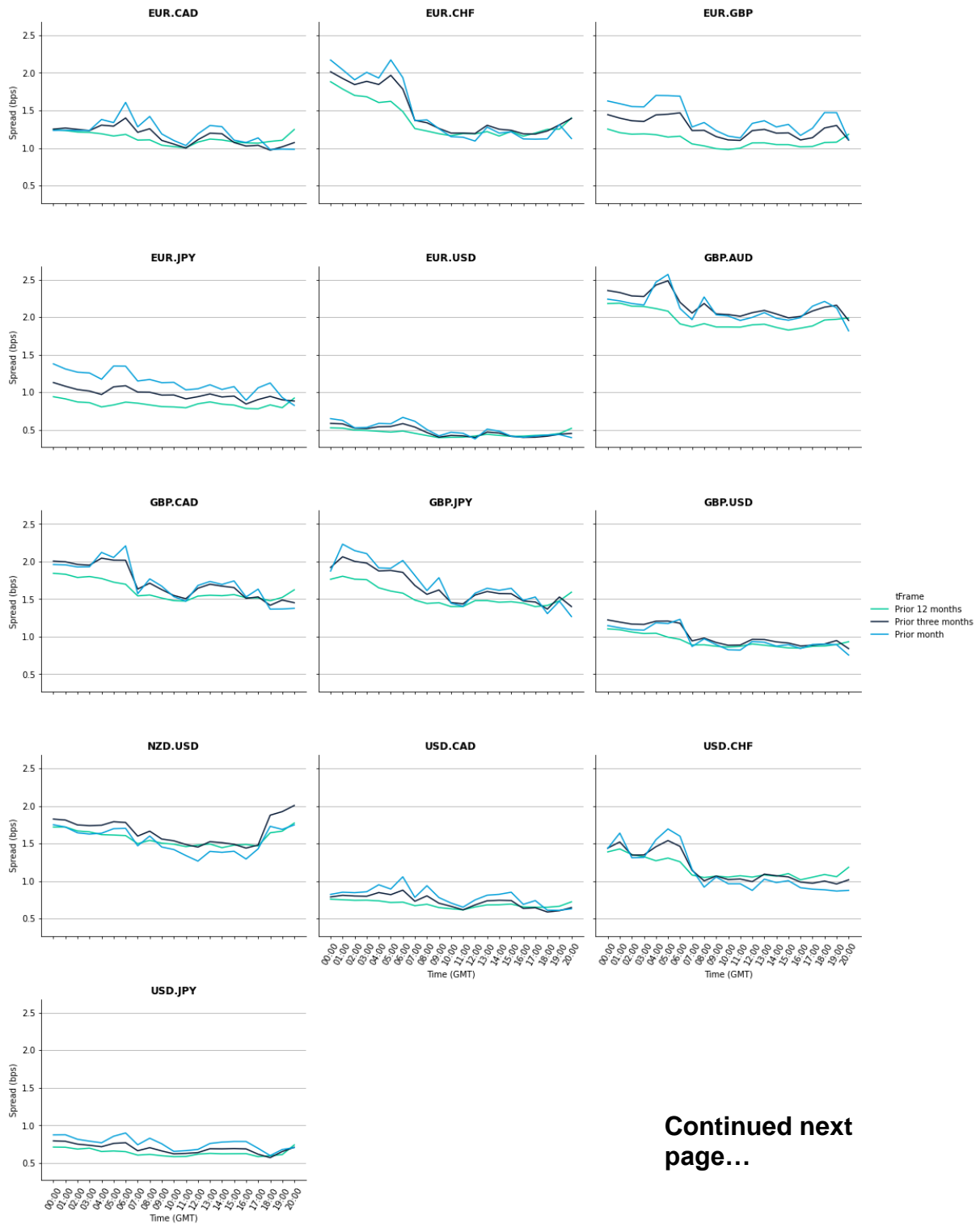
READING THE RESULTS

In the intraday charts, the green line represents the average spread or volatility for the past 12 months, the black line represents the past three months, and the blue line represents the past month. On the daily charts, the green area represents the 95th percentile confidence interval for the spread and volatility, showing the stability of the calculated median value.

G-10 Currency Pairs: Average Hourly Spread, 00:00-20:00 GMT Comparison over the past month, three months and year



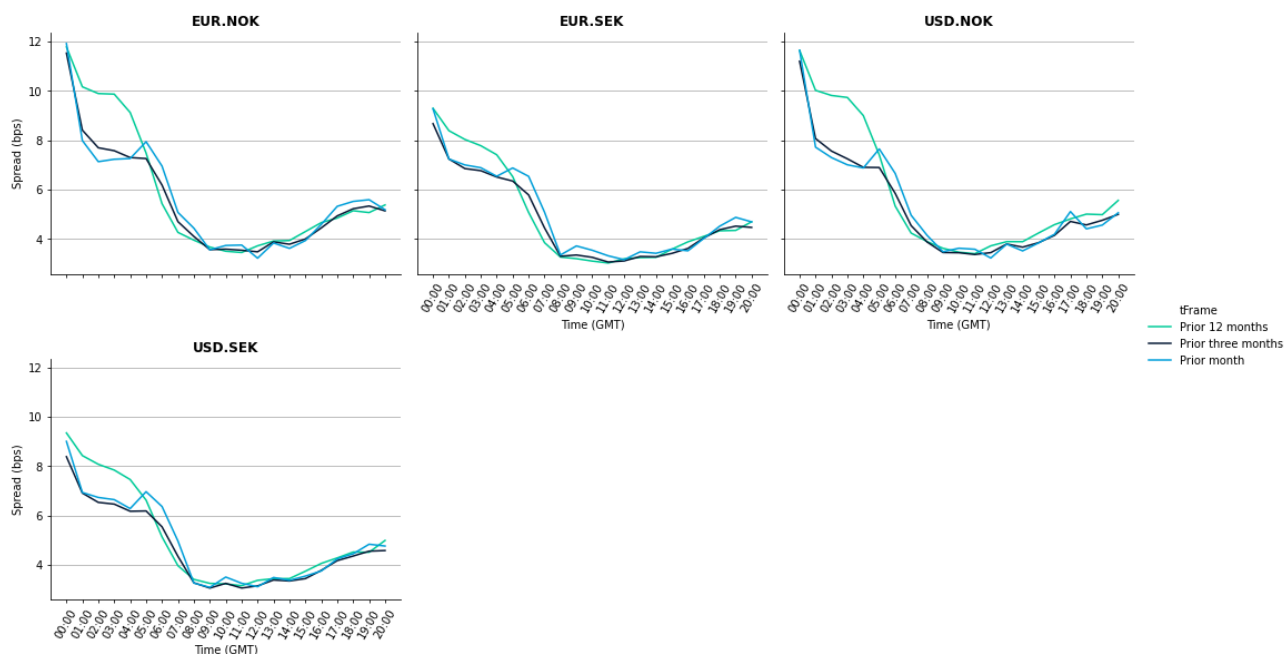
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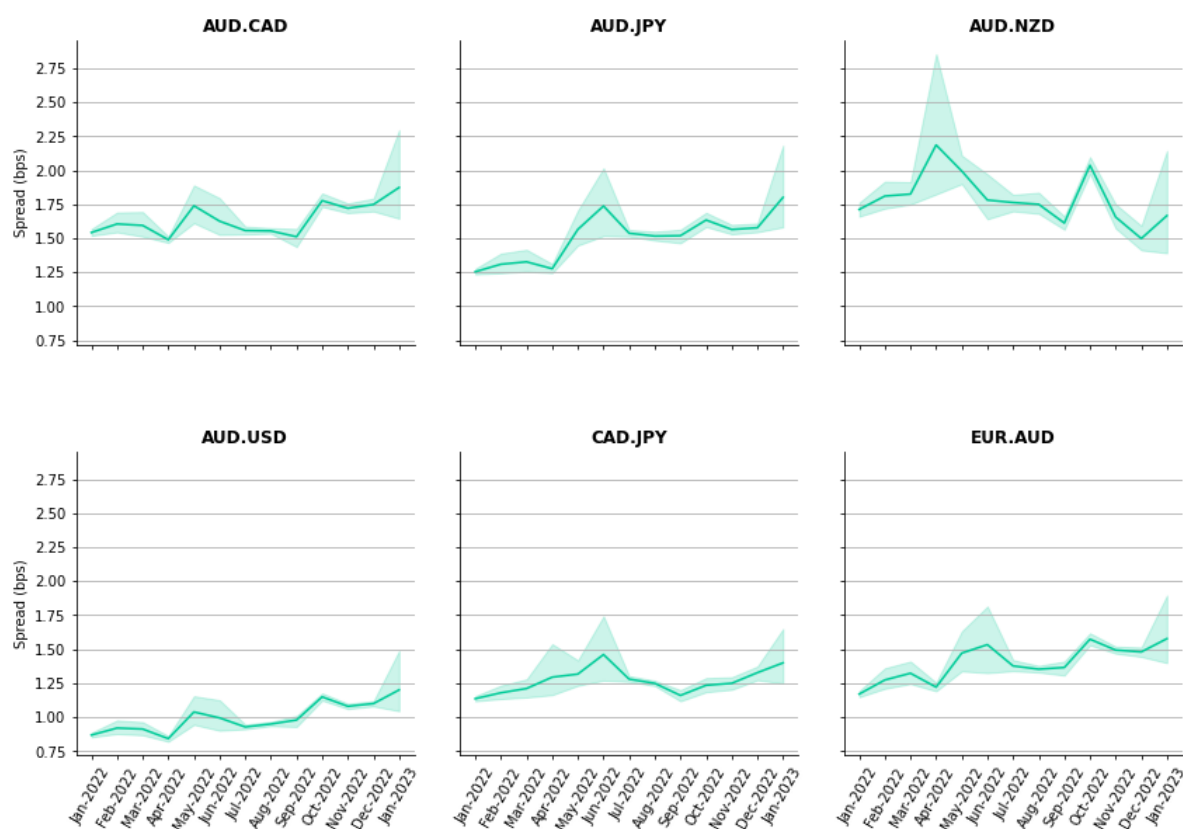
All chart sources: Virtu Financial, 2023. Spread and volatility calculations are derived from sources that Virtu believes to be reliable, but Virtu does not make any claims to its accuracy. USD.NOK, USD.SEK, EUR.NOK and EUR.SEK are shown in separate exhibits.



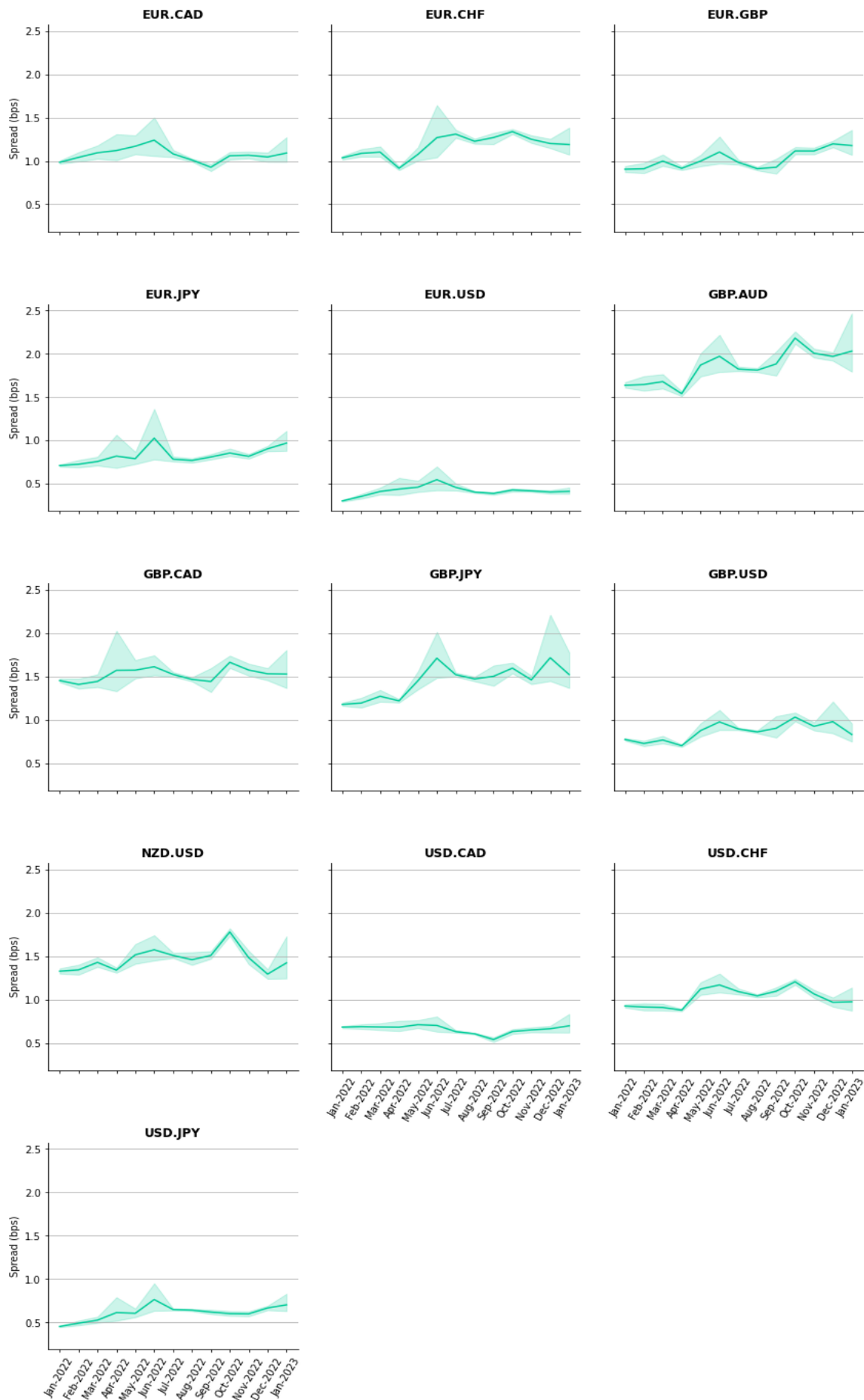
Scandinavian G-10 Currencies: Average Hourly Spread, 00:00-20:00 GMT Comparison over the past month, three months and year



G-10 Currencies: Average Daily Spread, 12:00-16:00 GMT January 2022- January 2023



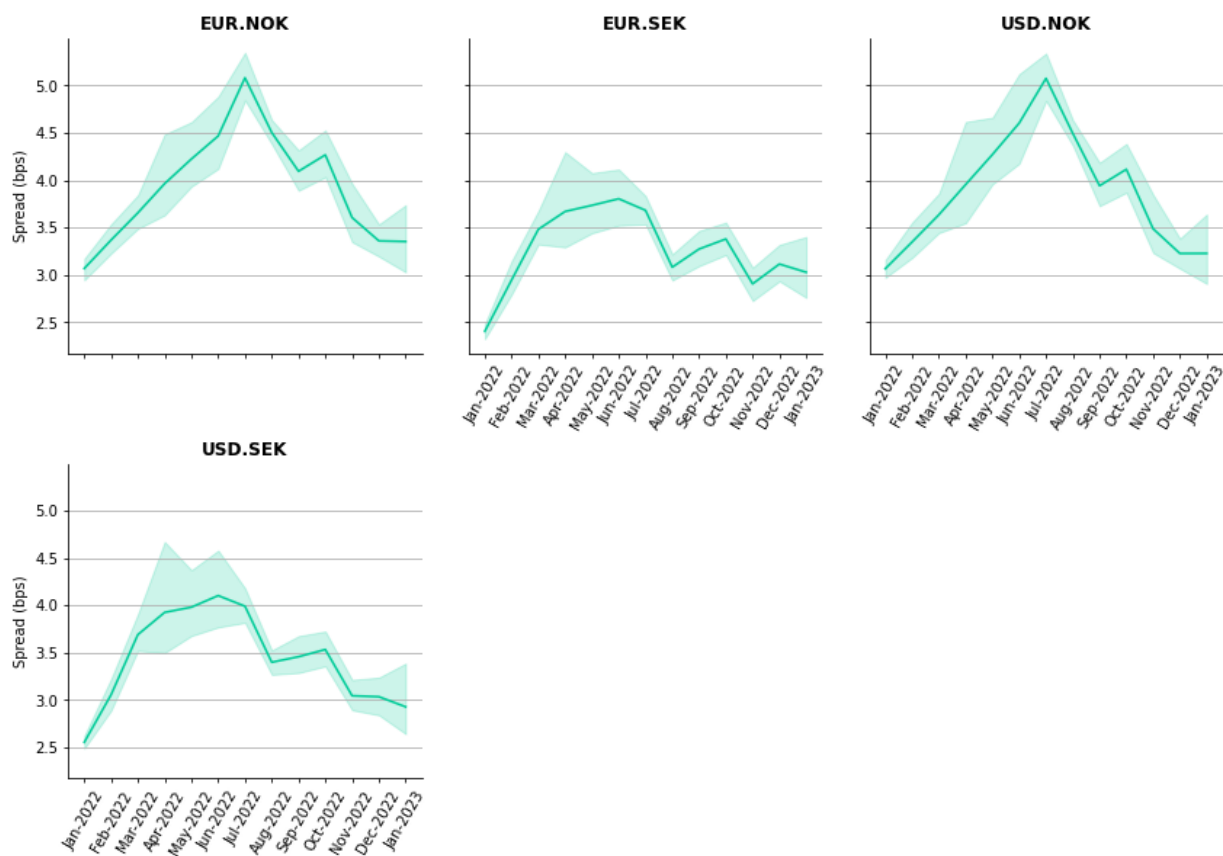
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Scandinavian G-10 Currencies: Average Daily Spread, 12:00-16:00 GMT January 2022-January 2023



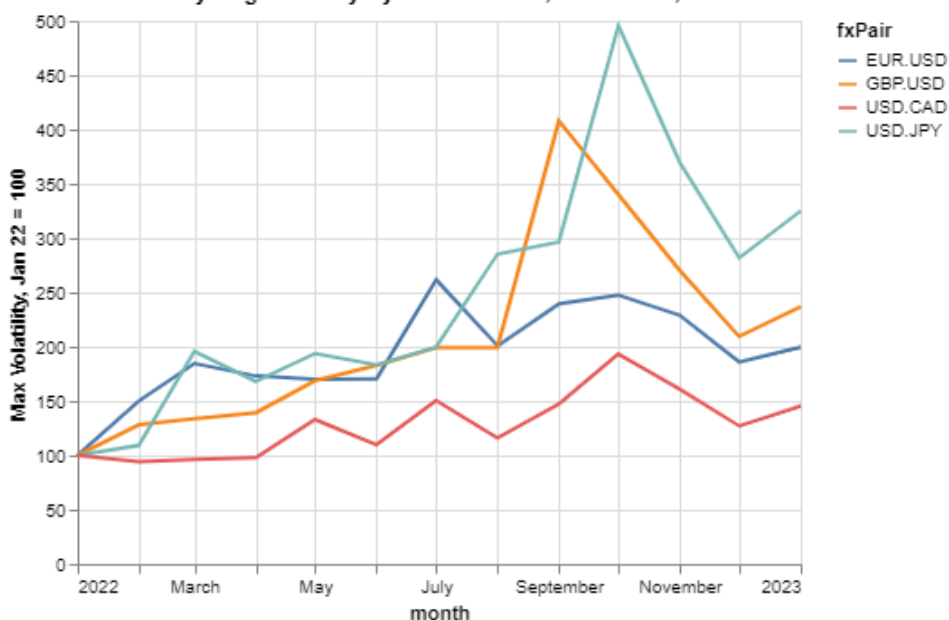


VOLATILITY

In December, volatility declined to low levels but has since returned to November's levels. During the 12:00-16:00 GMT pre-WMR Fixing window, 16 out of the 23 currency pairs recorded higher volatility compared to December. Intraday, the AUD.USD, NZD.USD, USD.CHF, and EUR.JPY experienced increased volatility across all global trading regions.

It's important to note that daily volatility does not reflect the changes in the value of the USD, unlike the maximum spread. To provide a clear picture, we have plotted the maximum daily volatility from the 12-16 GMT pre-WMR Fixing window and used January 2022's volatility as a

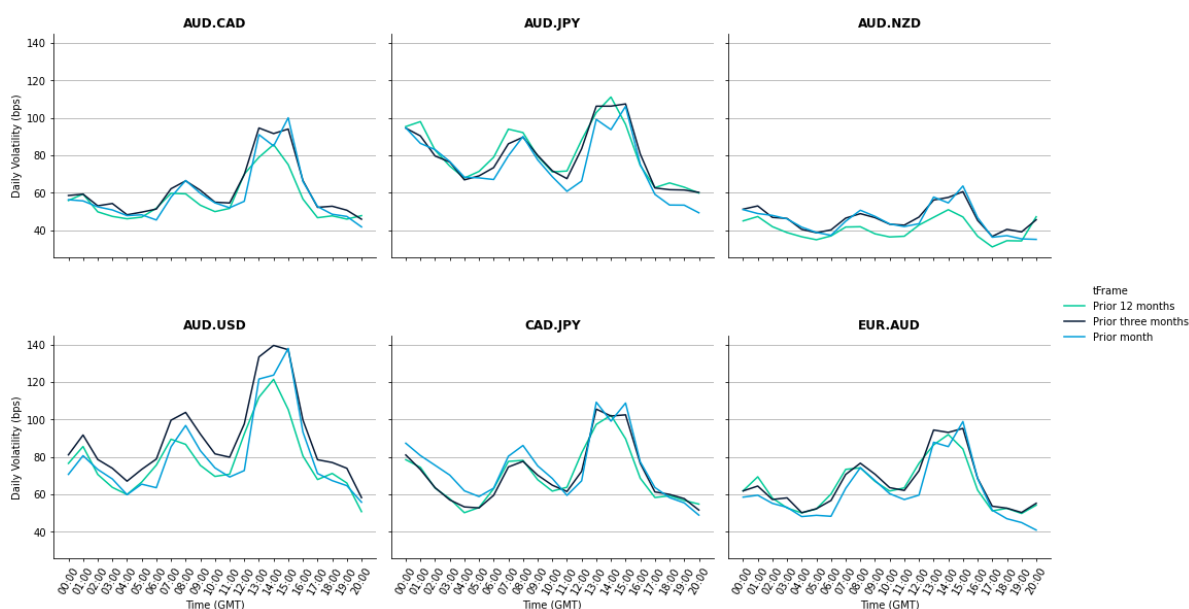
Maximum Daily Avg Volatility by Month & Pair, 12-16 GMT, Jan 22-Jan 23



benchmark, with a value of 100. This January's highest day of volatility was 1.5 to over three times higher than the maximum volatility in January 2022. Throughout the year, maximum volatility for all pairs has shown a significant increase.

G-10 Currencies: Average Hourly Volatility, 00:00-20:00 GMT

Comparison over the past month, three months and year



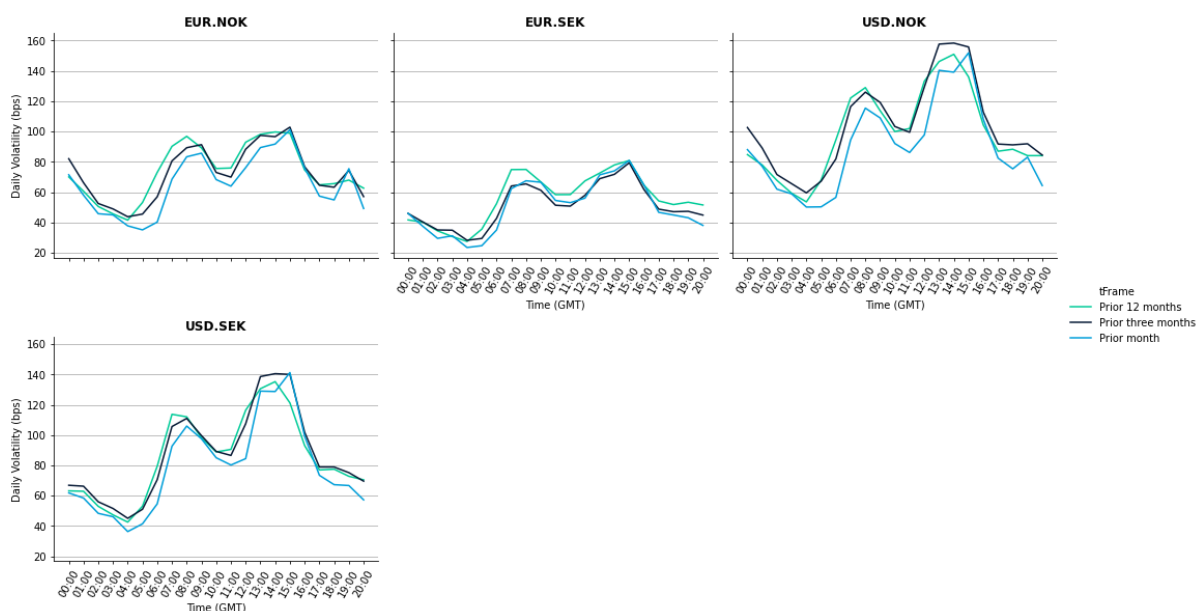
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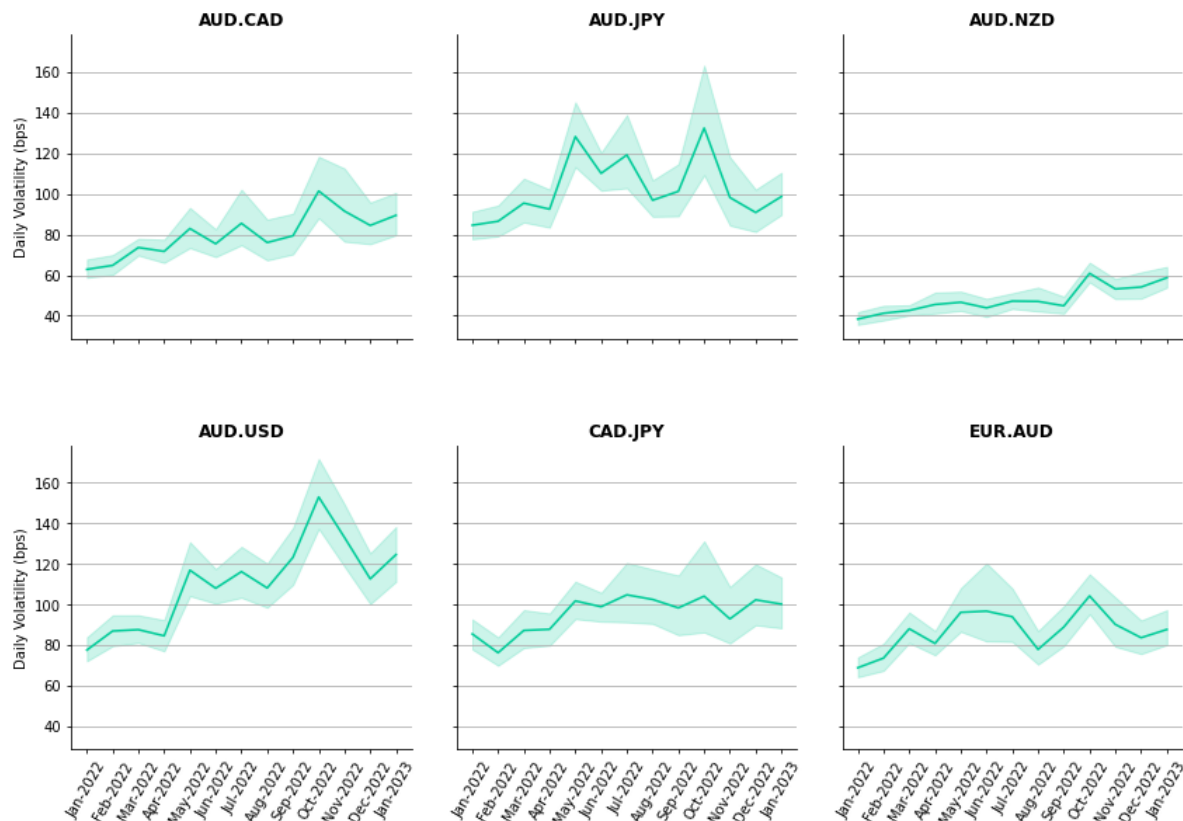
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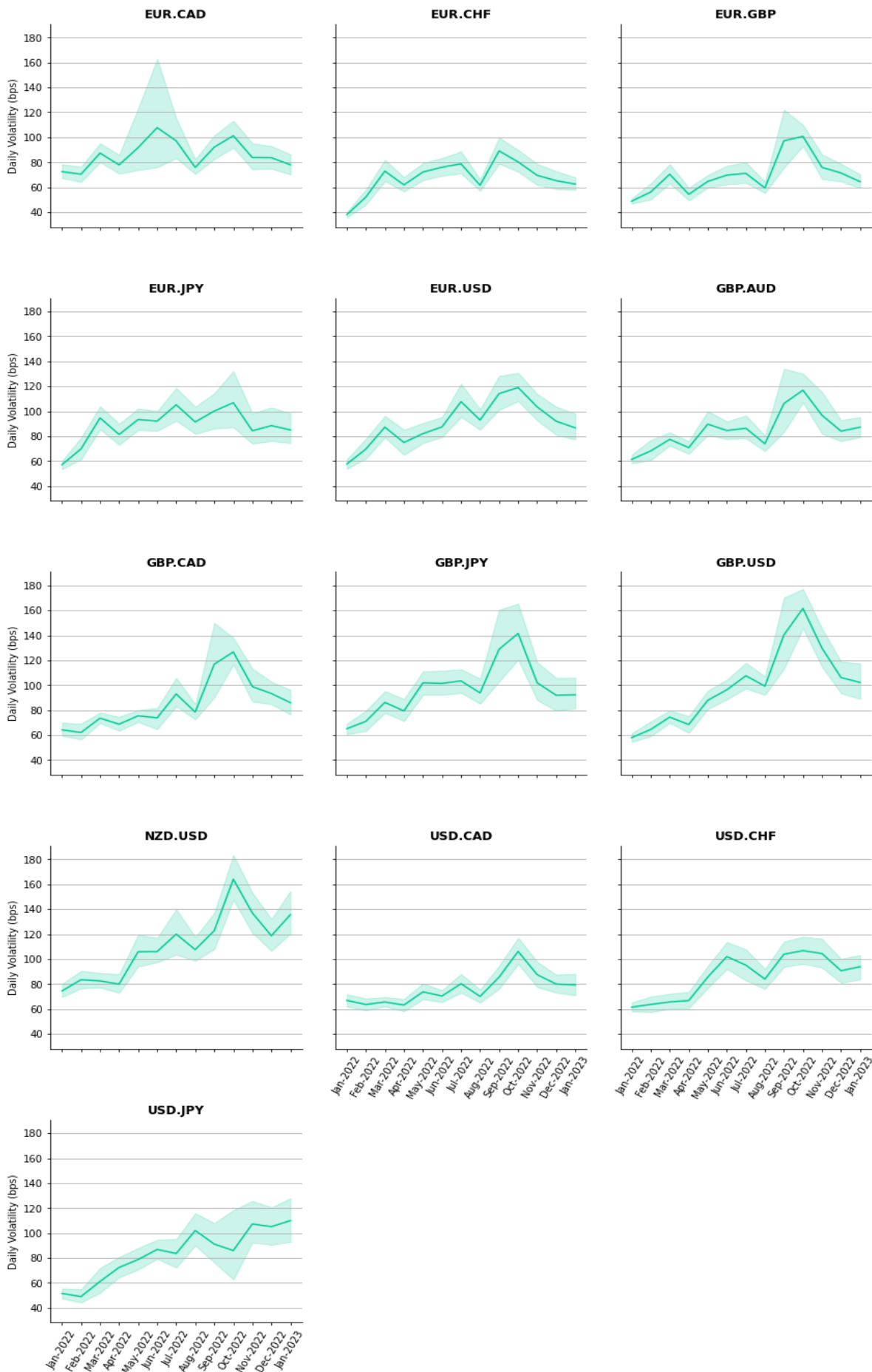
Scandinavian G-10 Currencies: Average Hourly Volatility, 00:00-20:00 GMT Past month, three months and year



G-10 Currencies: Average Daily Volatility, 12:00-16:00 GMT January 2022-January 2023



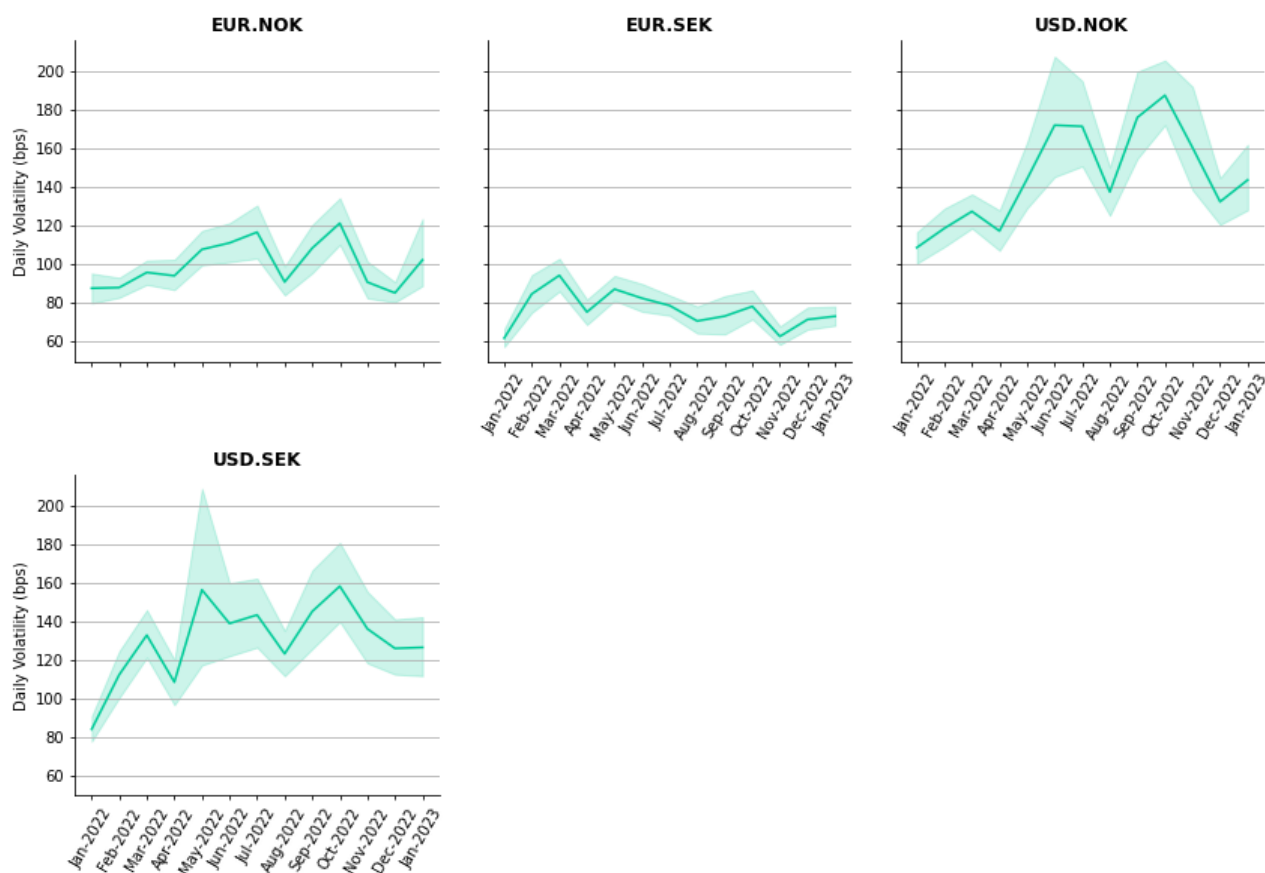
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Scandinavian G-10 Currencies: Average Daily Volatility, 12:00-16:00 GMT December 2021-January 2023



Have questions? To learn more, contact your regional Virtu Analytics representative.
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