

September 2021

FX Market Structure Monthly

CHANGES IN SPREAD AND VOLATILITY FOR MAJOR MARKET PAIRS

In September, FX spreads widened for 16 of the 23 pairs during the four hours pre-WMR Fixing trading window, reversing August and July's narrowing trend. Compared to September 2020, only GBP.USD spreads are wider now. Confirming wider spreads, volatility for 19 of the 23 pairs was also wider last month. Compared to a year ago, volatility has increased for three of 23 pairs: USD.CAD, CAD.JPY and EUR.CAD.

Looking at intraday results for the majors, spreads increased for AUD.USD, GBP.USD and USD.CHF for Tokyo, London and New York trading hours.

READING THE RESULTS

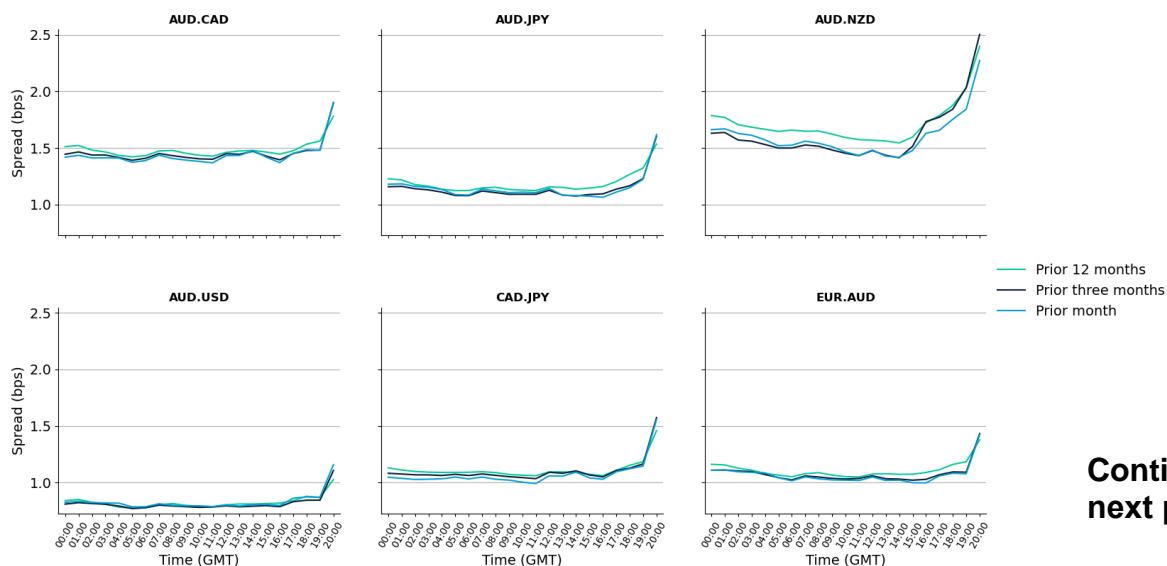
In the intraday charts, the green line presents the average spread or volatility for the past 12 months, the black line is the past three months and the blue line is for the past month. On the daily charts, the green area represents the 95th percentile confidence interval for the spread and volatility,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

SPREADS

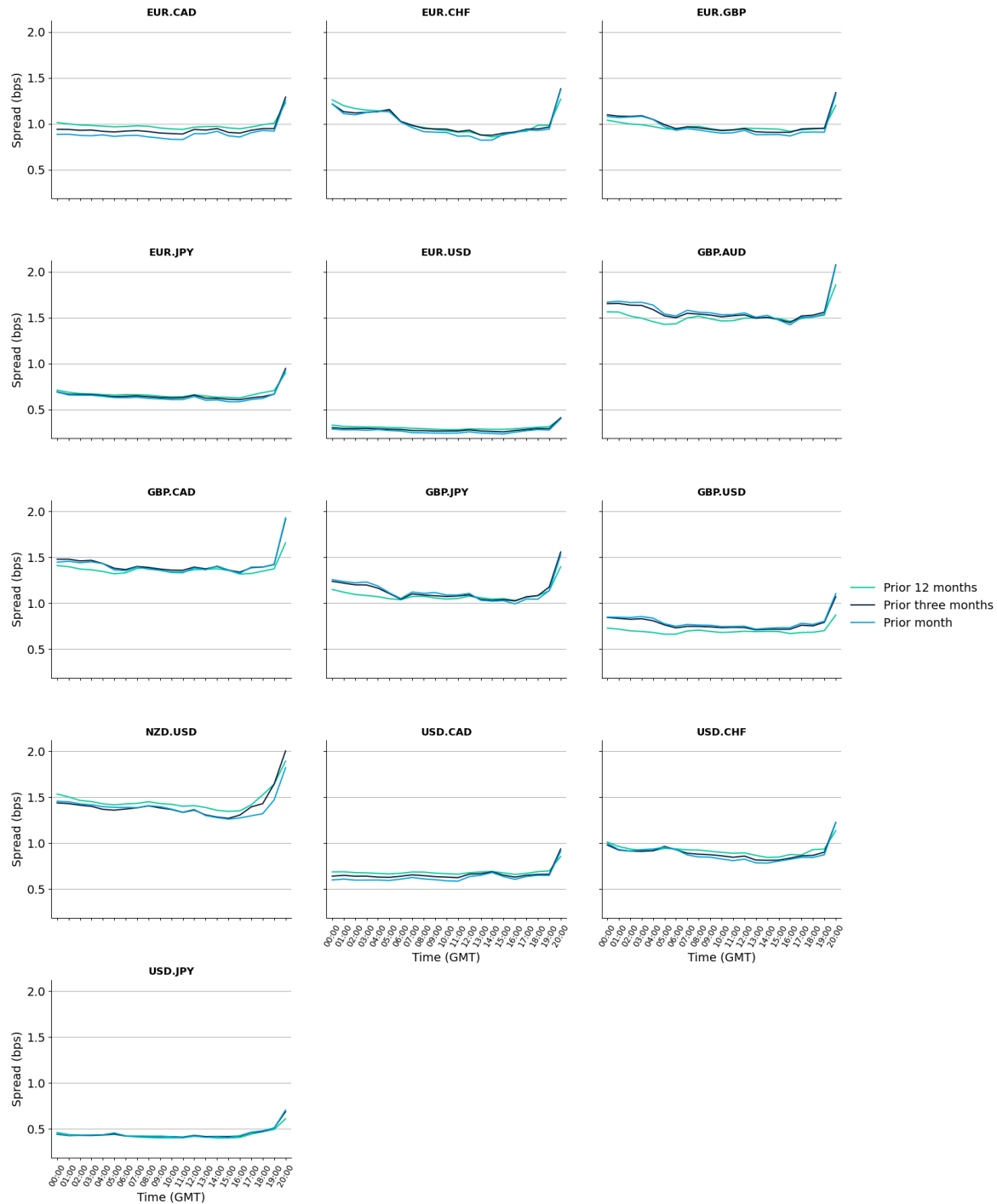
- Average hourly spreads widened for all AUD and GBP pairings across all trading regions. In August we tracked an increase in hourly spreads for all AUD, JPY and NZD crosses.
- Spreads during the 12:00-16:00 GMT trading period widened for four majors, one Scandinavian pair and eight of nine minor pairs. Spreads ticked wider for nine of the 23 pairs over the past three months. Absolute spread changes were small.
- Amongst the Scandinavian pairs, intra-day spreads widened for USD.NOK and EUR.NOK across all three trading regions. Nonetheless, intra-day spreads for all four Scandinavian pairs were narrower compared to six months ago.

G-10 Currency Pairs: Average Hourly Spread, 00:00-20:00 GMT

Comparison over the past month, three months and year



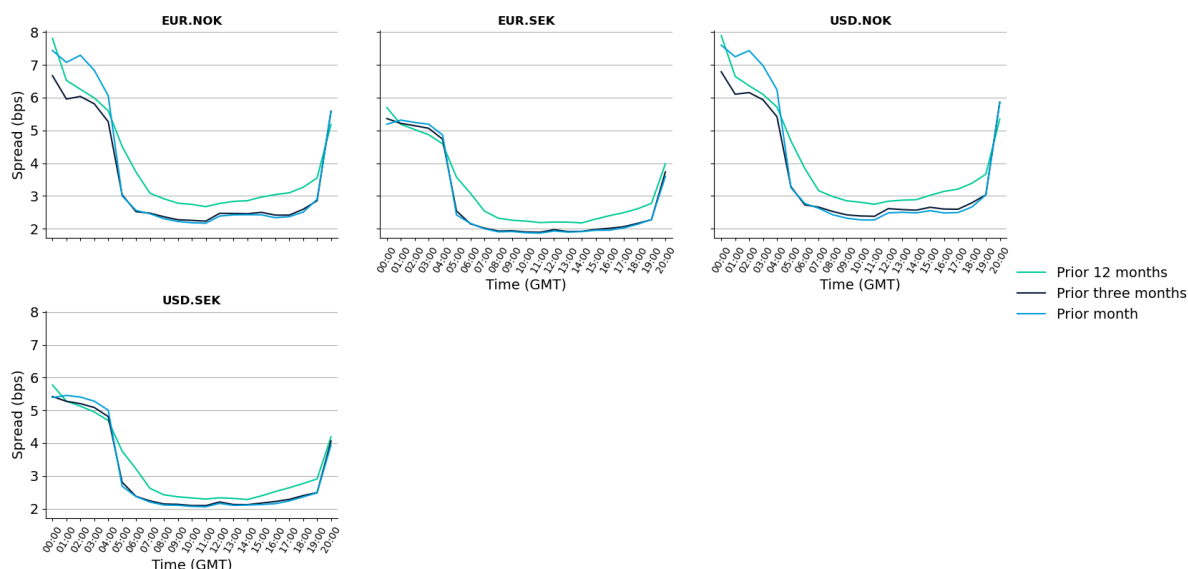
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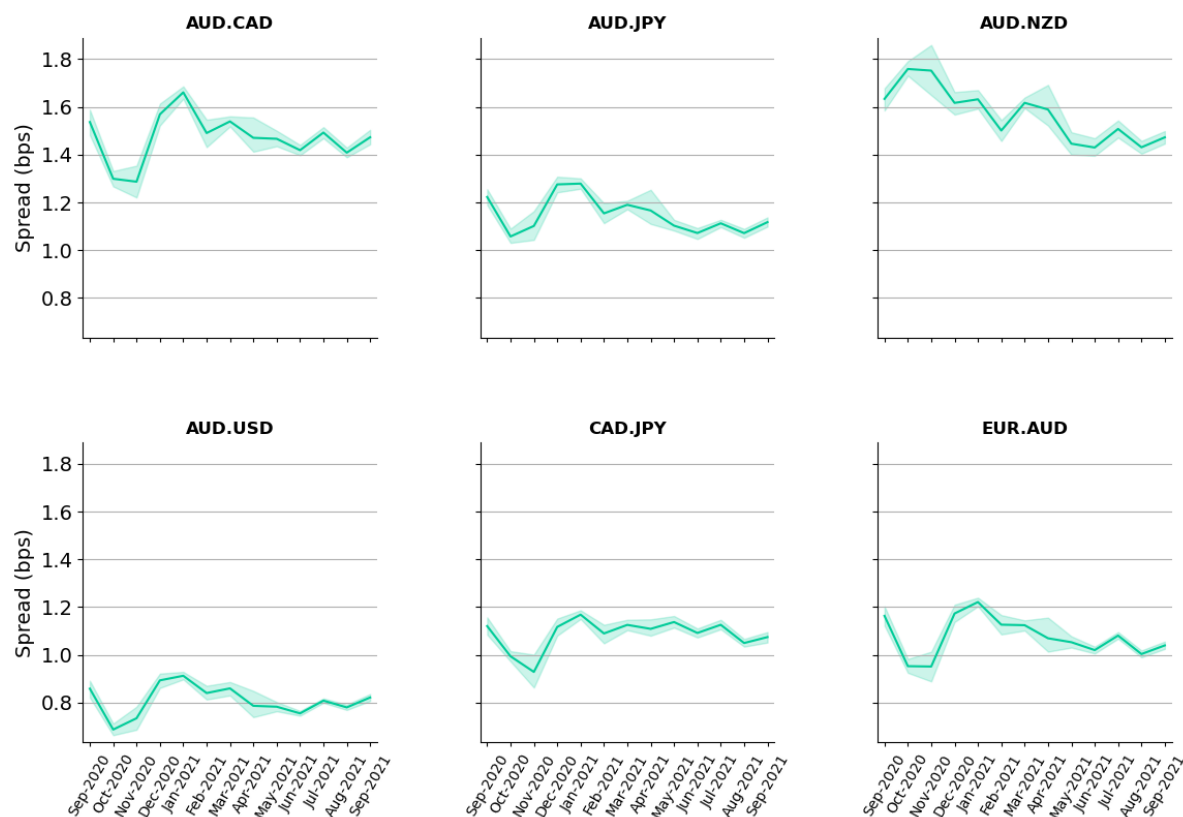
Scandinavian G-10 Currencies: Average Hourly Spread, 00:00-20:00 GMT

Comparison over the past month, three months and year

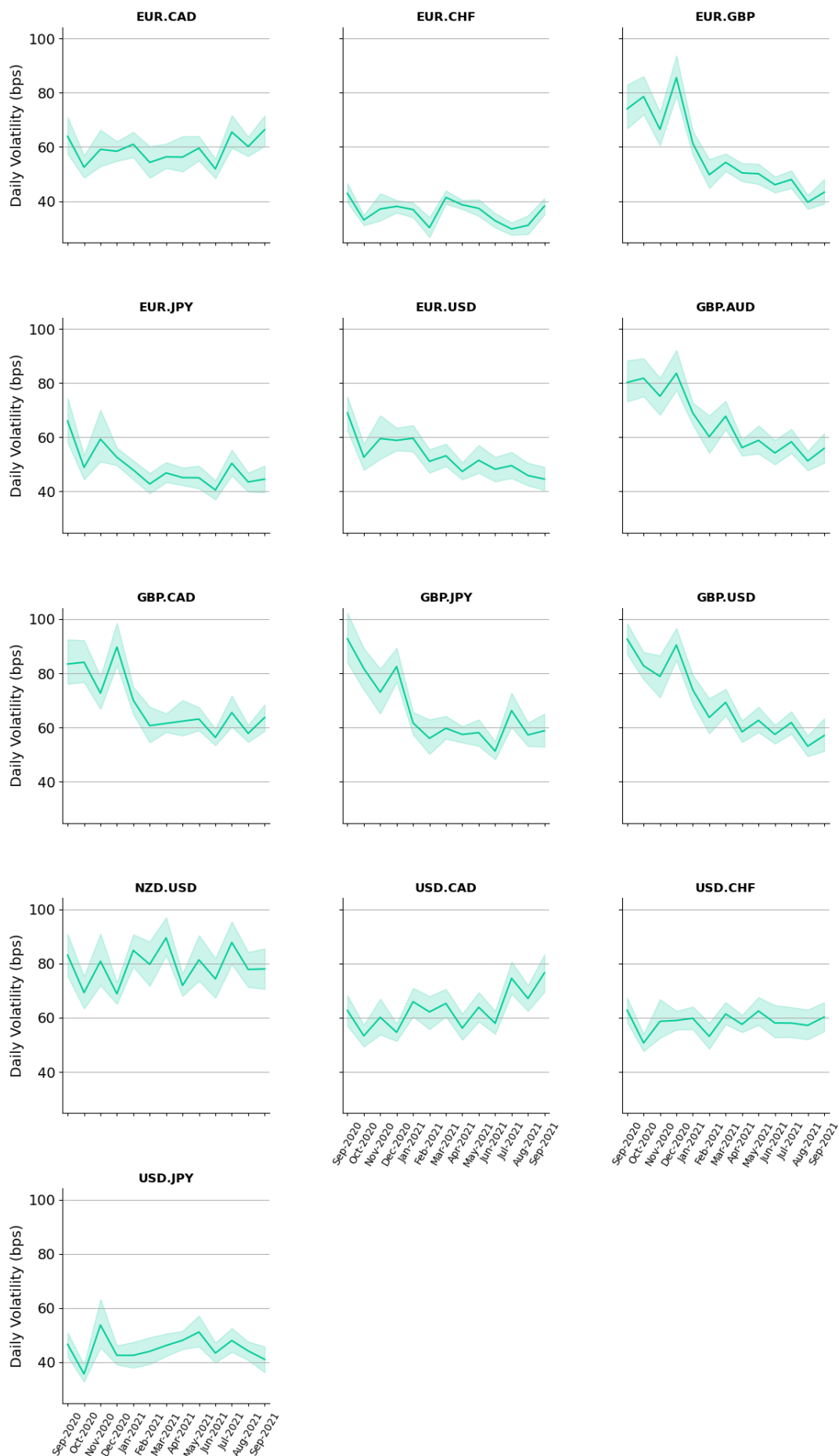


G-10 Currencies: Average Daily Spread, 12:00-16:00 GMT

September 2020-September 2021



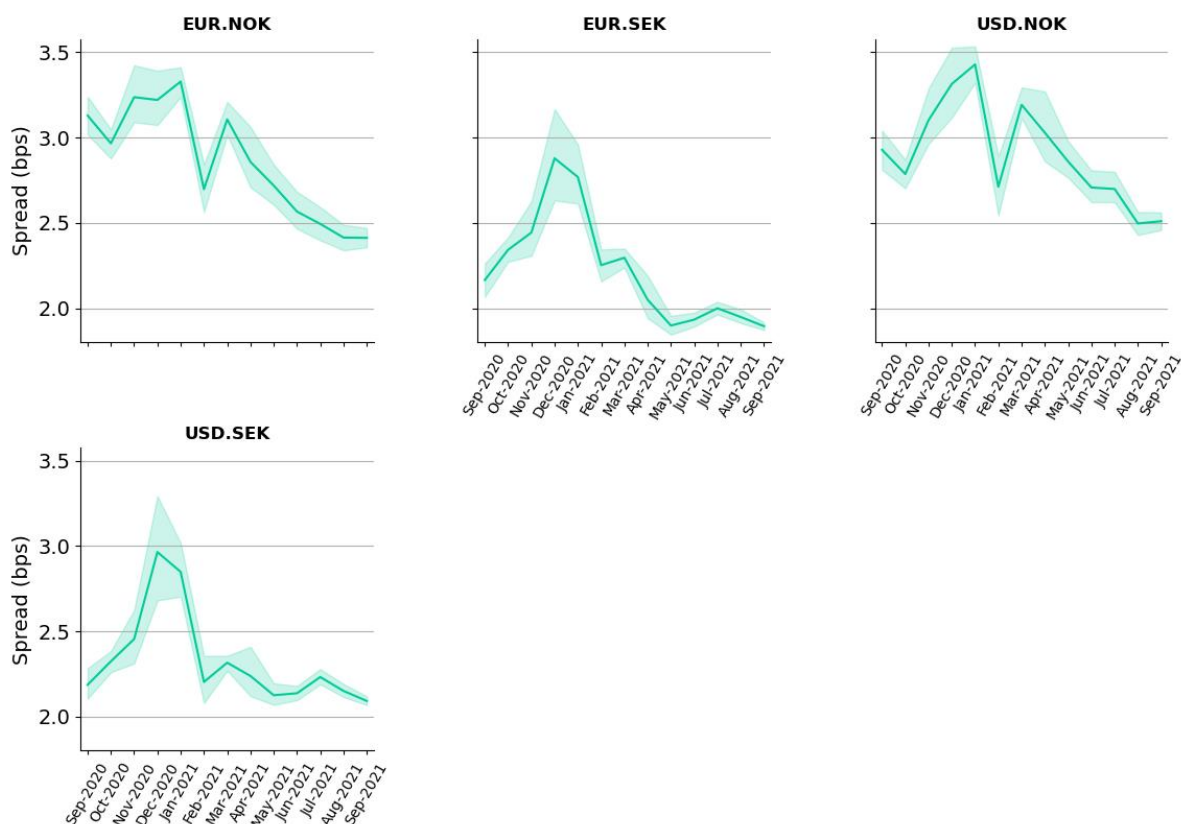
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All chart sources: Virtu Financial, 2021. Spread and volatility calculations are derived from sources that Virtu believes to be reliable but Virtu does not make any claims to its accuracy. USD.NOK, USD.SEK, EUR.NOK and EUR.SEK are shown in separate exhibits.



Scandinavian G-10 Currencies: Average Daily Spread, 12:00-16:00 GMT September 2020- September 2021



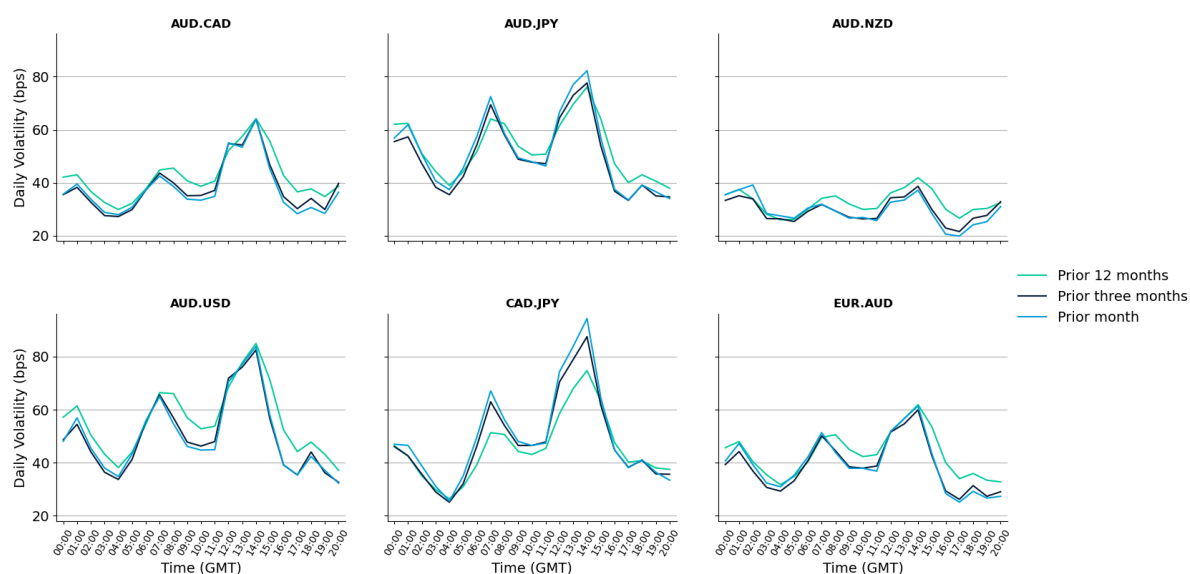


VOLATILITY

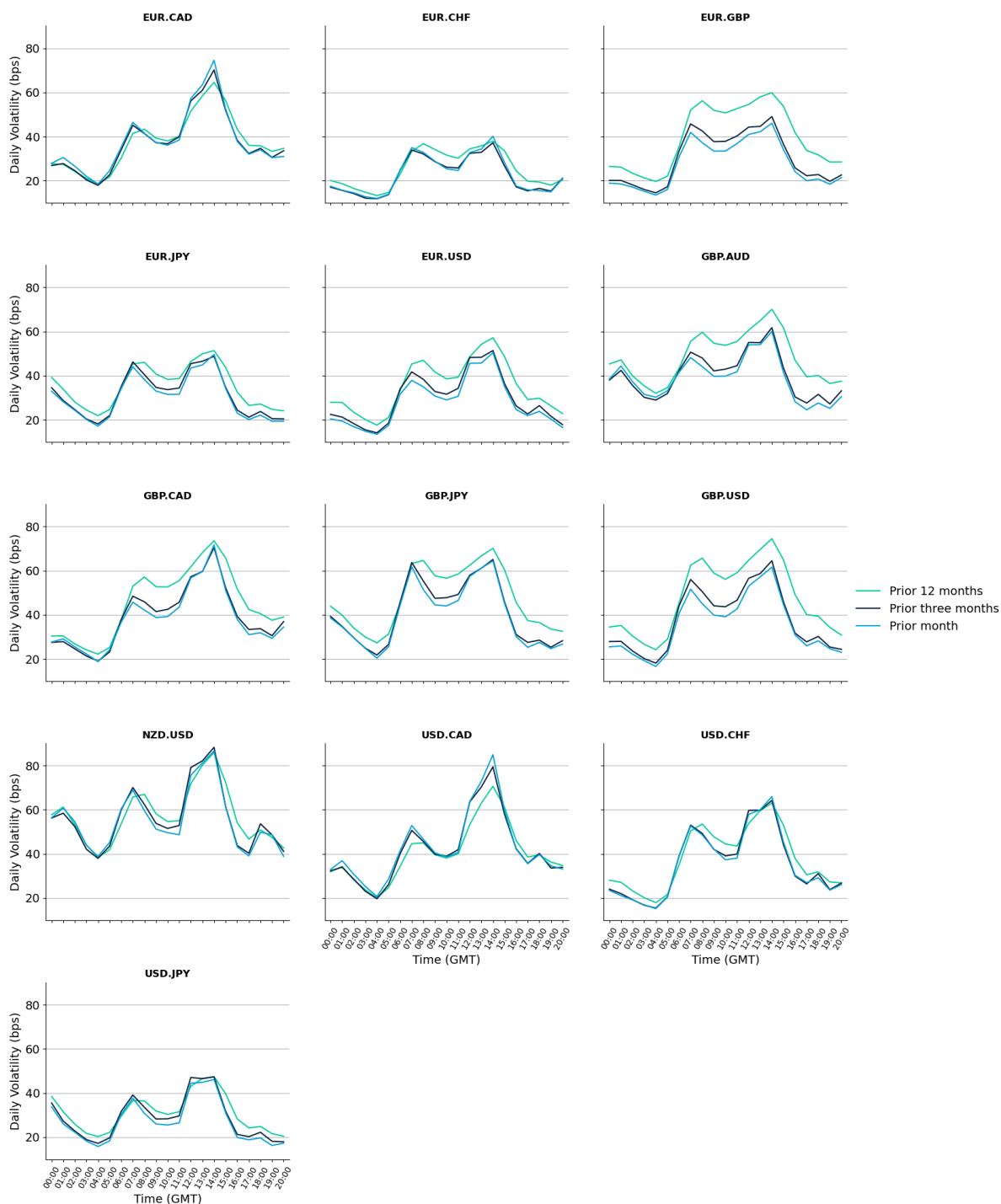
- Continuing the seesaw pattern, September volatility increased throughout the day for most pairs, following August's drop and July's increase. Only one pair, USD.JPY, registered lower volatility during London and New York desk hours. Hourly volatility increased during New York trading hours for at least six hours for 21 of 23 pairs. Globally, compared to six months ago, intra-day volatility is lower.
- Over the 12:00-16:00 GMT pre-WMR Fixing trading window, volatility increased for 21 of 23 pairs, in sharp contrast to August when volatility ticked up only for EUR.CHF. Compared to 12 months ago, volatility remains quiet and is up for only three FX pairs: USD.CAD, CAD.JPY and EUR.CAD.
- Among the Scandinavian pairs, volatility rose for all four pairs both during pre-WMR Fixing trading and when examined on an hourly basis, reversing August's decrease. Rate volatility for EUR.NOK and USD.NOK increased during London hours compared to three months ago.
- Between 16:00-20:00 GMT and 17:00-20:00 GMT at least 20 of the 23 pairs recorded wider volatility, the largest increases during the trading day.

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

Comparison over the past month, three months and year

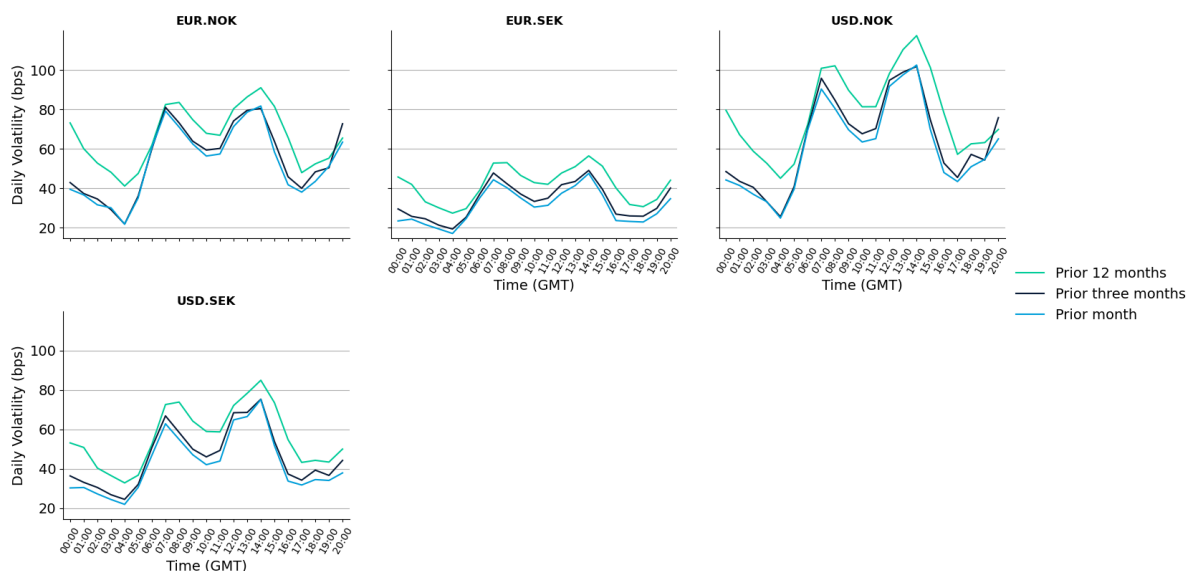


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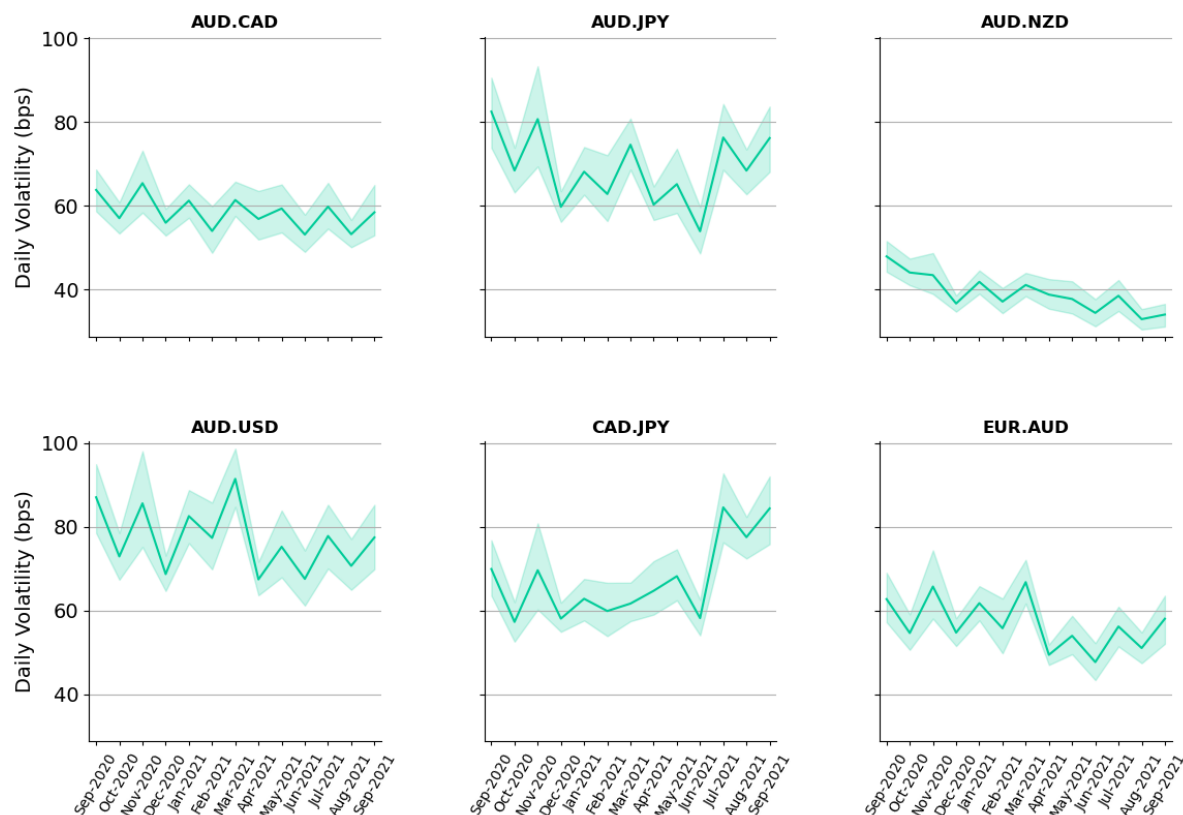




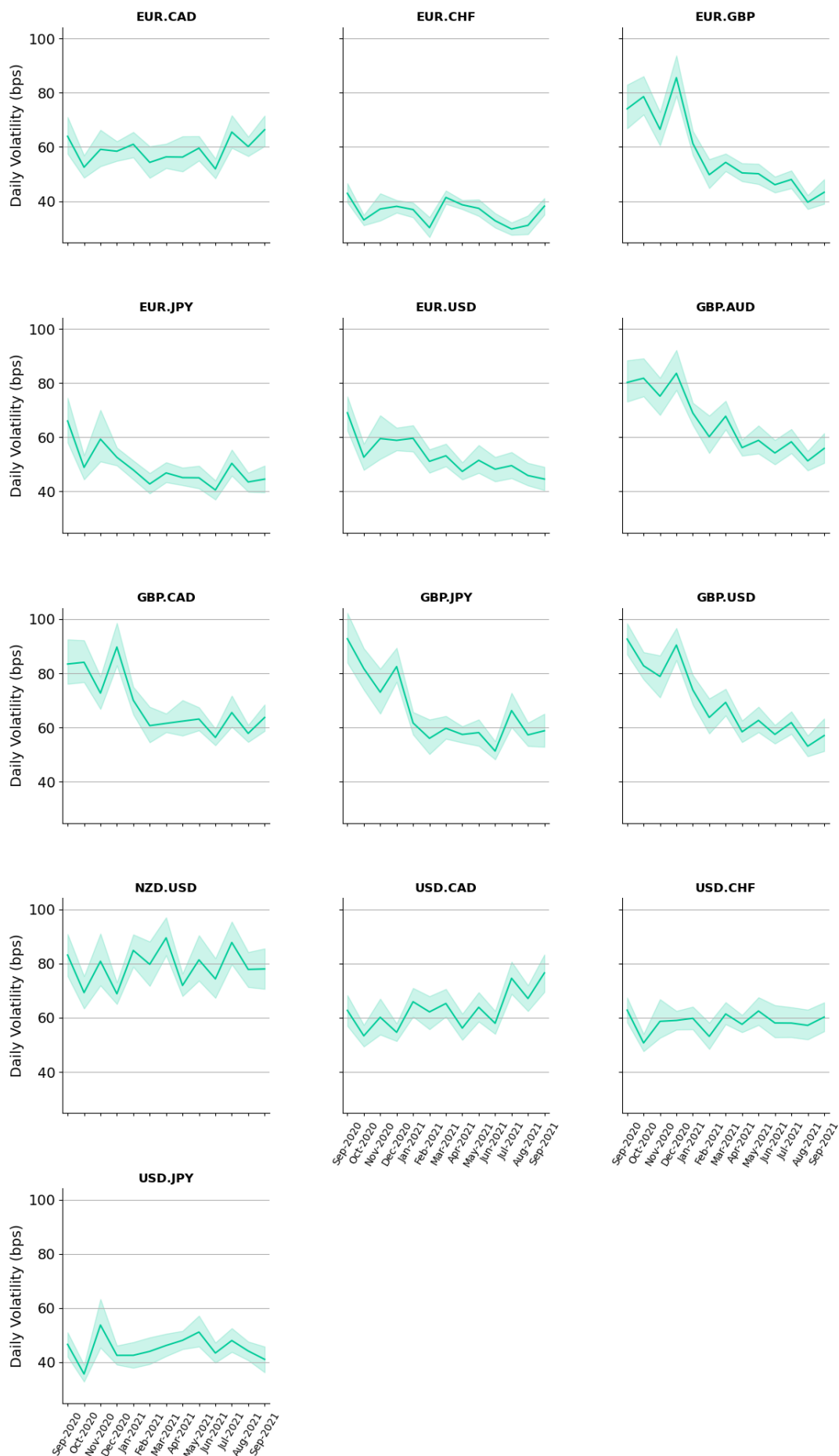
Scandinavian G-10 Currencies: Average Daily Volatility, 00:00-20:00 GMT Past month, three months and year



G-10 Currencies: Average Daily Volatility, 12:00-16:00 GMT September 2020-September 2021



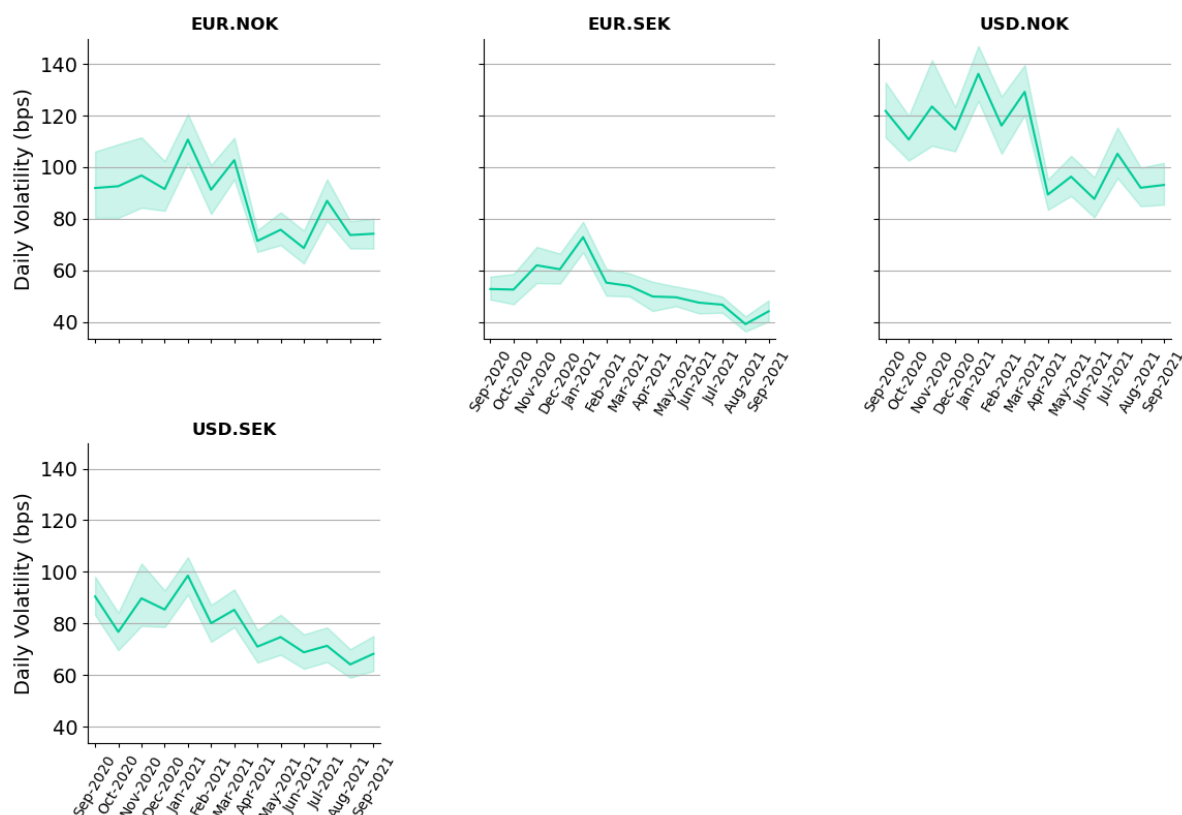
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Scandinavian G-10 Currencies: Average Daily Volatility, 12:00-16:00 GMT September 2020-September 2021



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