

January 2022

FX Market Structure Monthly

CHANGES IN SPREAD AND VOLATILITY FOR MAJOR MARKET PAIRS

FX spreads were mixed in January, of the 23 G-10 pairs that Virtu Analytics track, about half recorded wider spreads during Tokyo and London desk hours. After the 16:00 London WMR fixing window, the number of pairs recording wider spreads dropped to eight reflecting the change in funding dynamics after year-end. Volatility, in contrast, increased throughout the day for almost all pairs.

Spreads widened for 12 of the 23 pairs during the four hours prior to the WMR Fixing trading window, compared to 21 pairs recording higher spreads in December. Compared to three and six months ago, spreads have widened for 22 and 21 pairs respectively. In January, volatility increased for 20 pairs, including all seven majors. While volatility increased broadly in January, volatility is not up uniformly over the past three or six months.

READING THE RESULTS

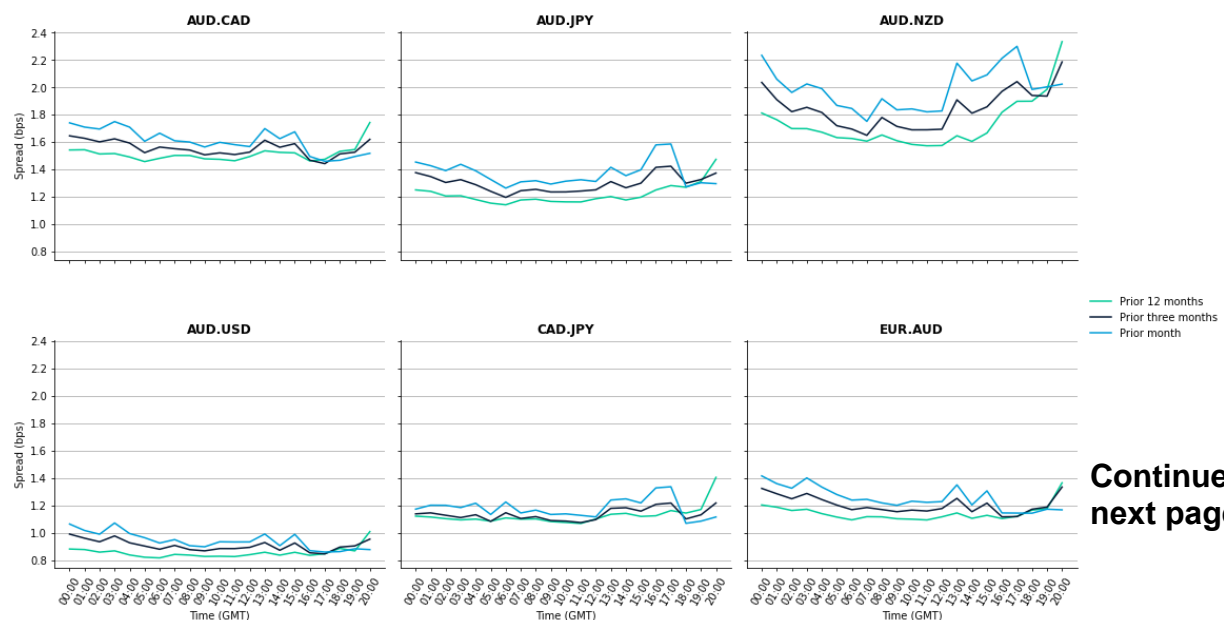
In the intraday charts, the green line presents the average spread or volatility for the past 12 months, the black line is the past three months and the blue line is for the past month. On the daily charts, the green area represents the 95th percentile confidence interval for the spread and volatility,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

SPREADS

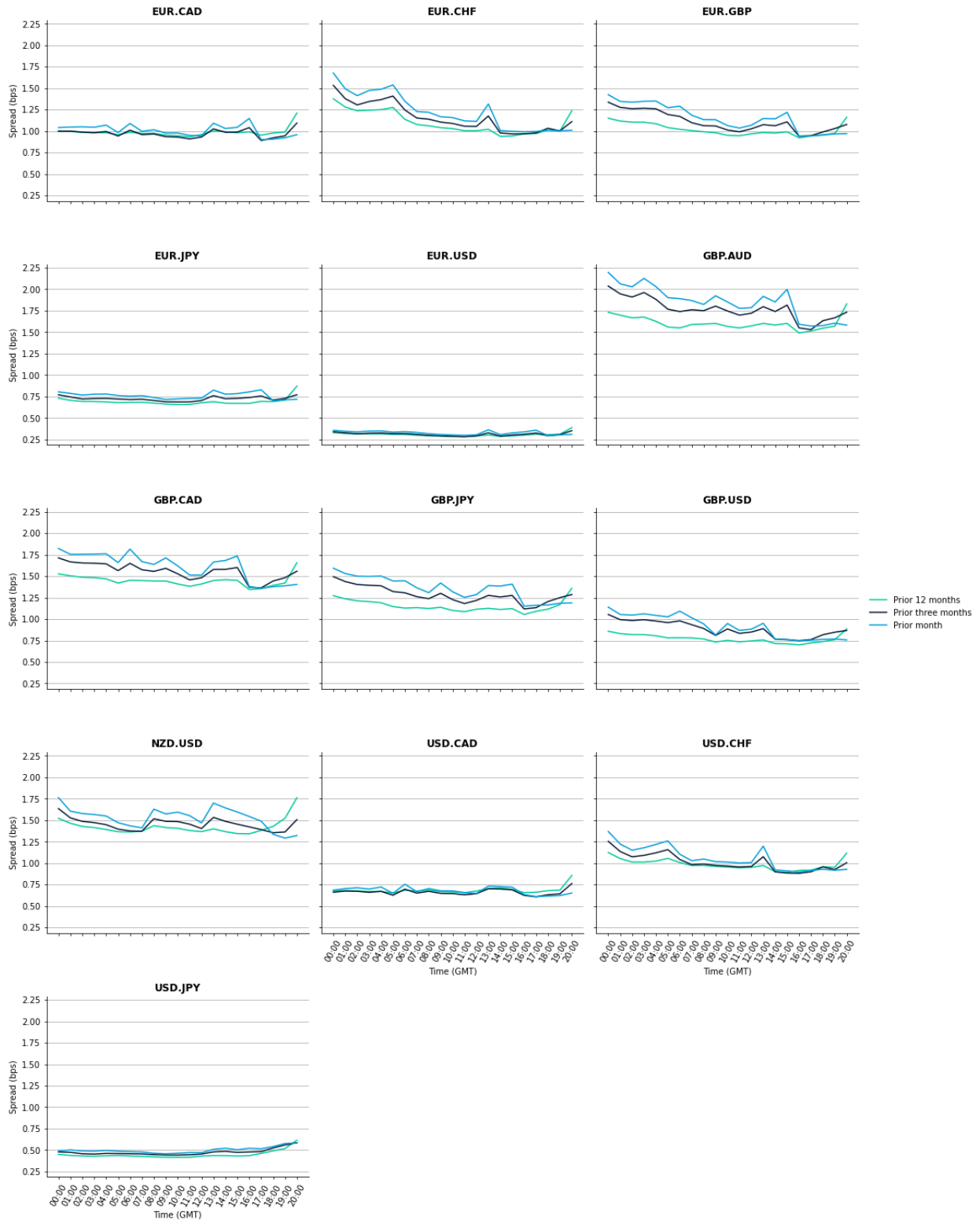
- Average hourly spreads increased throughout the trading day for USD.CAD, EUR.CAD and the four Scandinavian pairs, but narrowed for EUR.USD, GBP.USD, NZD.USD, EUR.GBP, GBP.AUD and GBP.JPY.
- All four Scandinavian pairs trade at wider levels globally than three or six months ago.

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

Comparison over the past month, three months and year



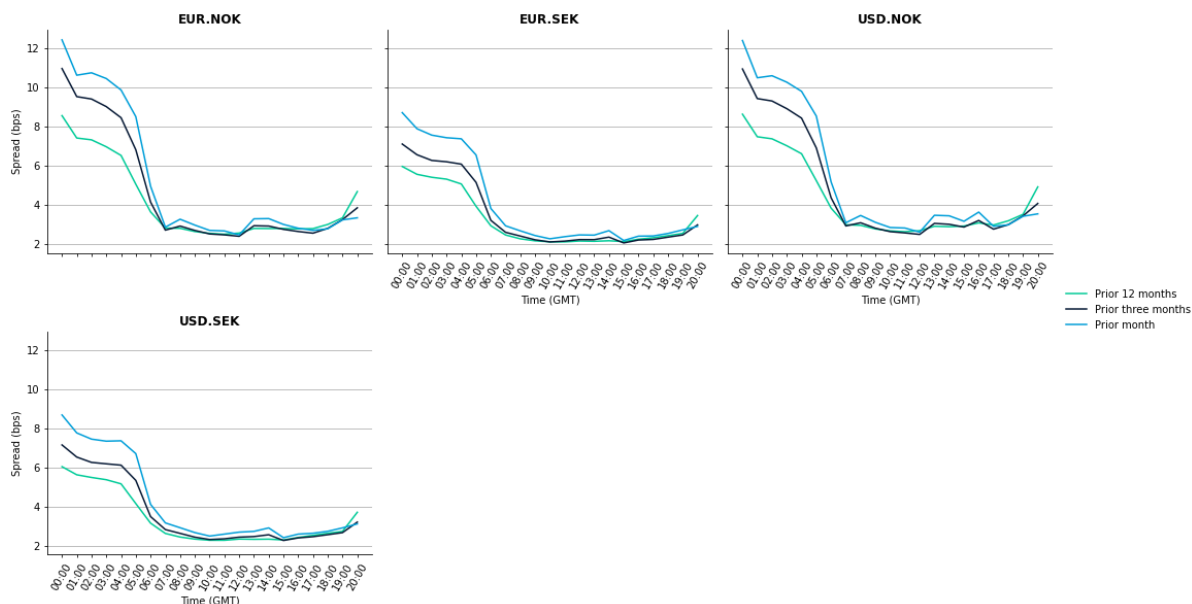
All chart sources: Virtu Financial, 2022. Spread and volatility calculations are derived from sources that Virtu believes to be reliable, but Virtu does not make any claims to its accuracy. USD.NOK, USD.SEK, EUR.NOK and EUR.SEK are shown in the separate exhibits



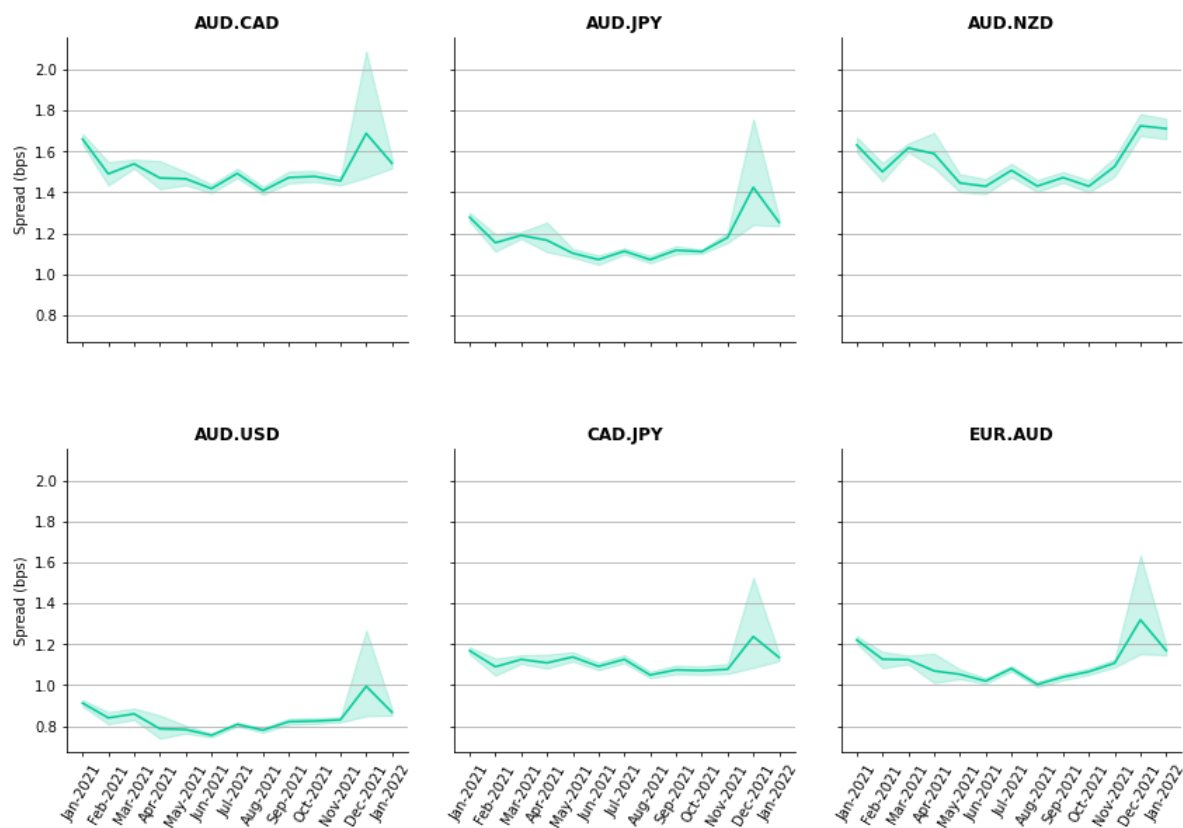
All chart sources: Virtu Financial, 2022. Spread and volatility calculations are derived from sources that Virtu believes to be reliable, but Virtu does not make any claims to its accuracy. USD.NOK, USD.SEK, EUR.NOK and EUR.SEK are shown in separate exhibits.



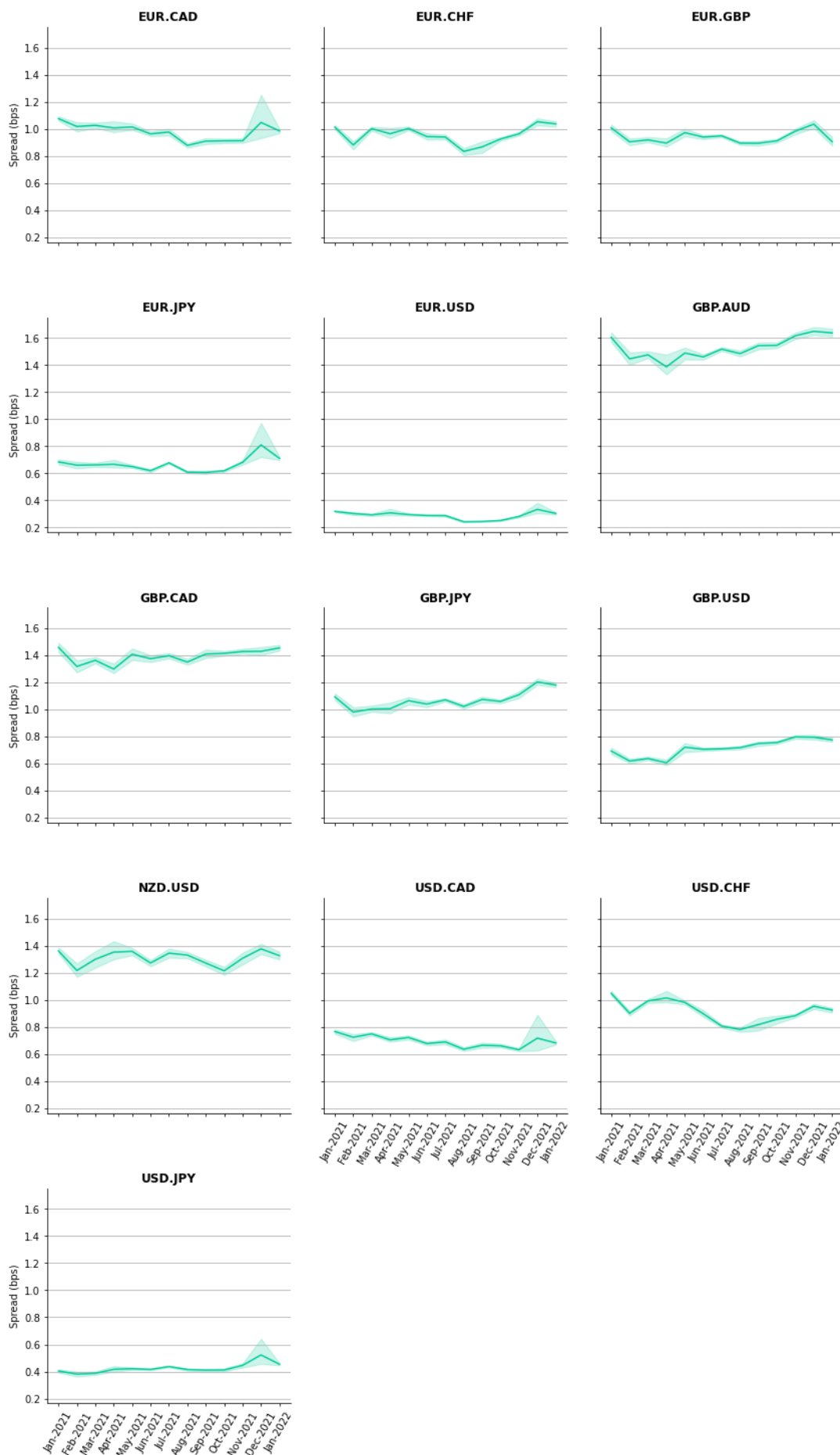
Scandinavian G-10 Currencies: Average Hourly Spread, 00:00-20:00 GMT Comparison over the past month, three months and year



G-10 Currencies: Average Daily Spread, 12:00-16:00 GMT January 2021-January 2022



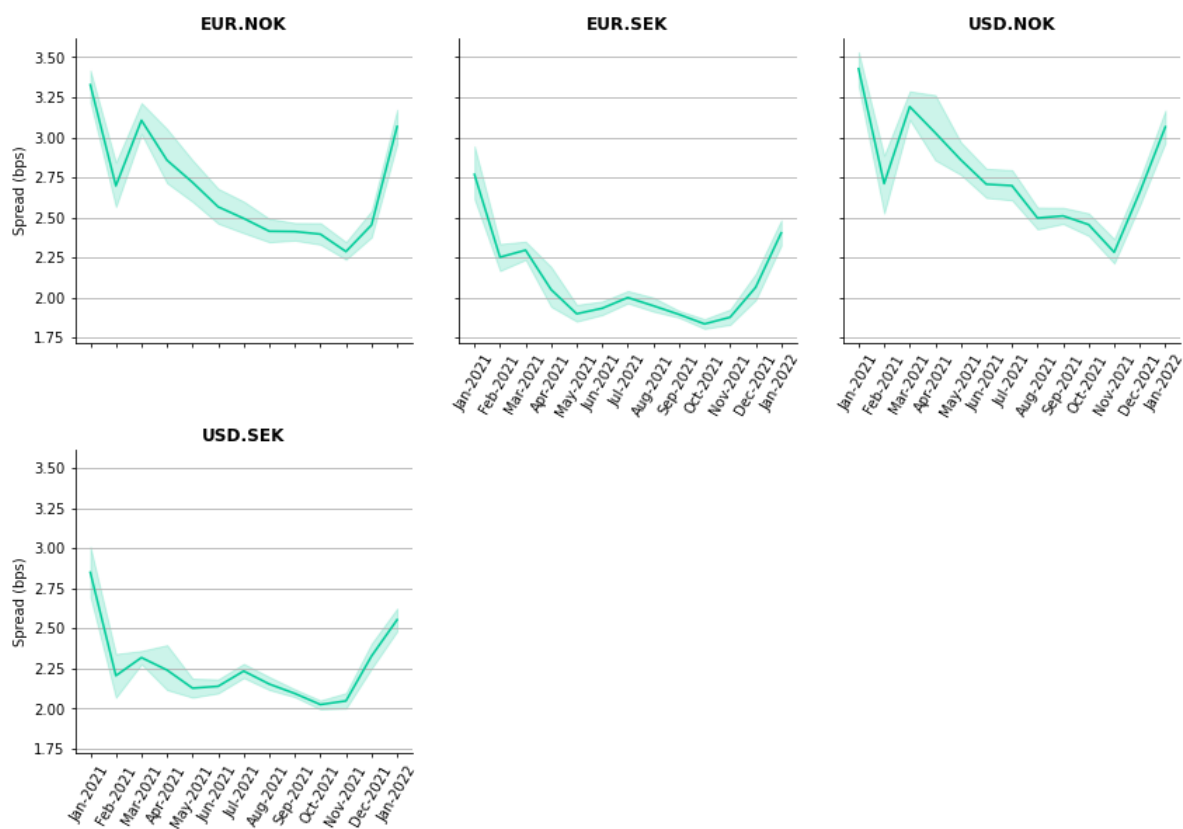
Continued next page...



All chart sources: Virtu Financial, 2022. 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 January 2021-January 2022



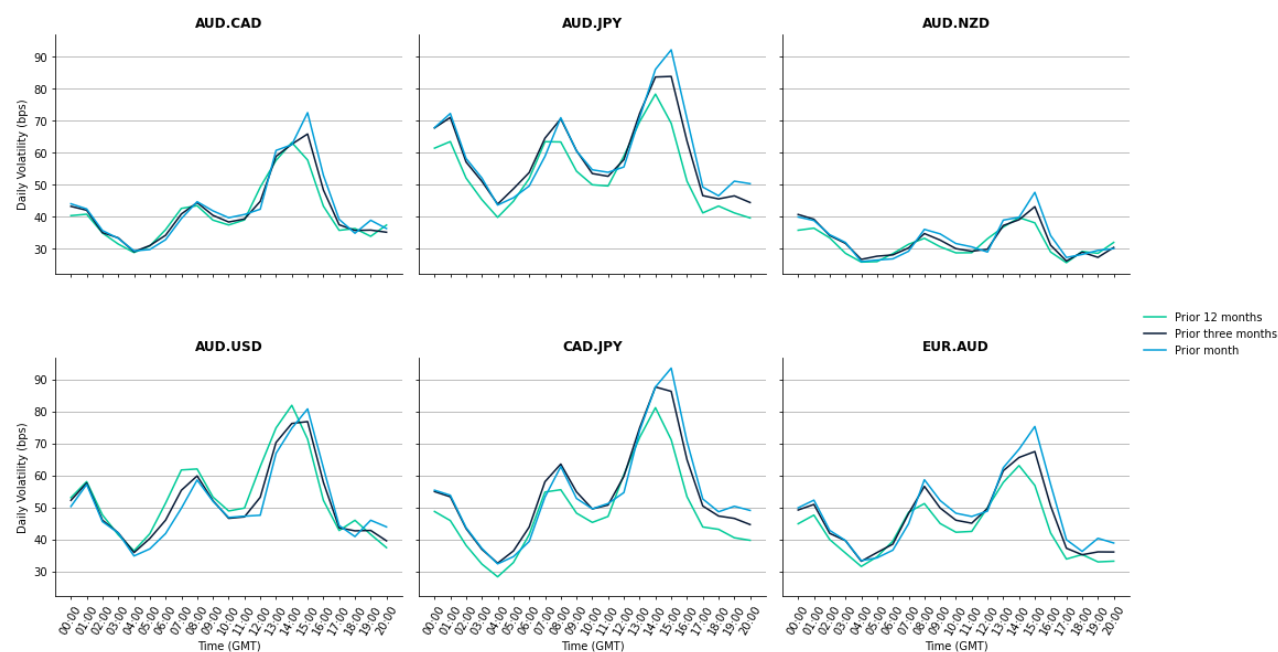


VOLATILITY

- Hourly volatility increased throughout the trading day for 20 of the 23 pairs. Only EUR.GBP and AUD.NZD recorded lower volatility during most of the Tokyo, London, and New York desk hours.
- Over the 12:00-16:00 GMT pre-WMR Fixing trading window, volatility increased for 20 of 23 pairs compared to last month. Relative to three or six months ago, volatility during the pre-WMR Fixing trading window is higher for 19 and 15 pairs, respectively.
- Among the Scandinavian pairs, volatility rose for all four pairs during both pre-WMR Fixing trading window with the largest increase recorded by USD.NOK. Intra-day volatility for all four pairs is higher now than three or six months ago.
- Compared to three or six months ago, FX volatility has decreased during late Tokyo hours, from 06:00–08:00 GMT and at the start of the pre-WMR Fixing trading window, from 12:00–14:00 GMT.

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

Comparison over the past month, three months and year



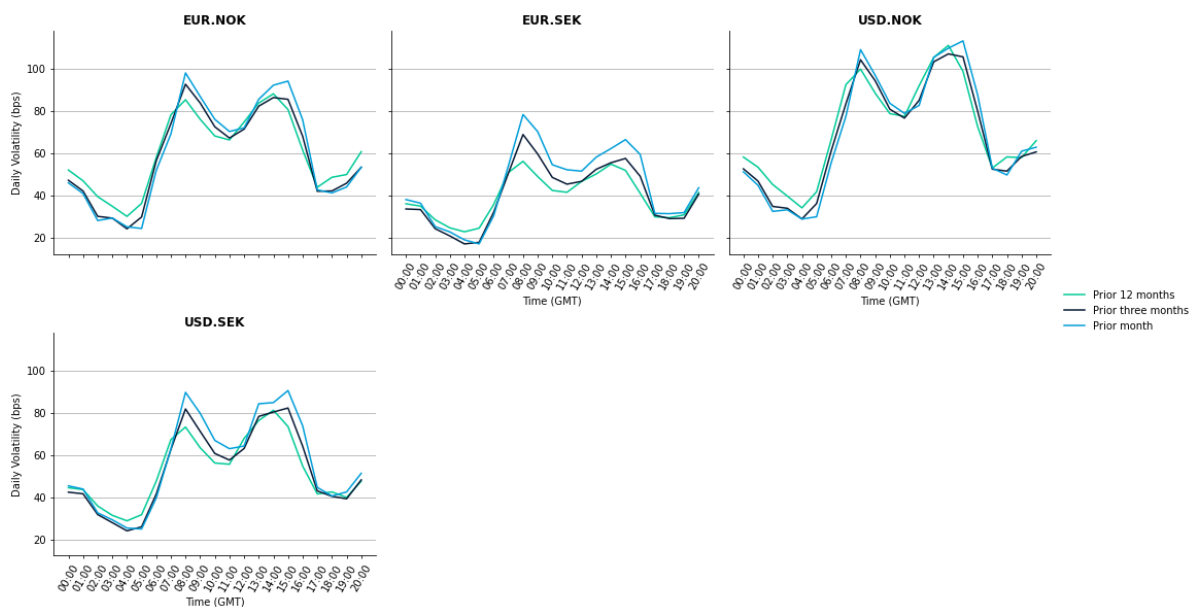
Continued next page...



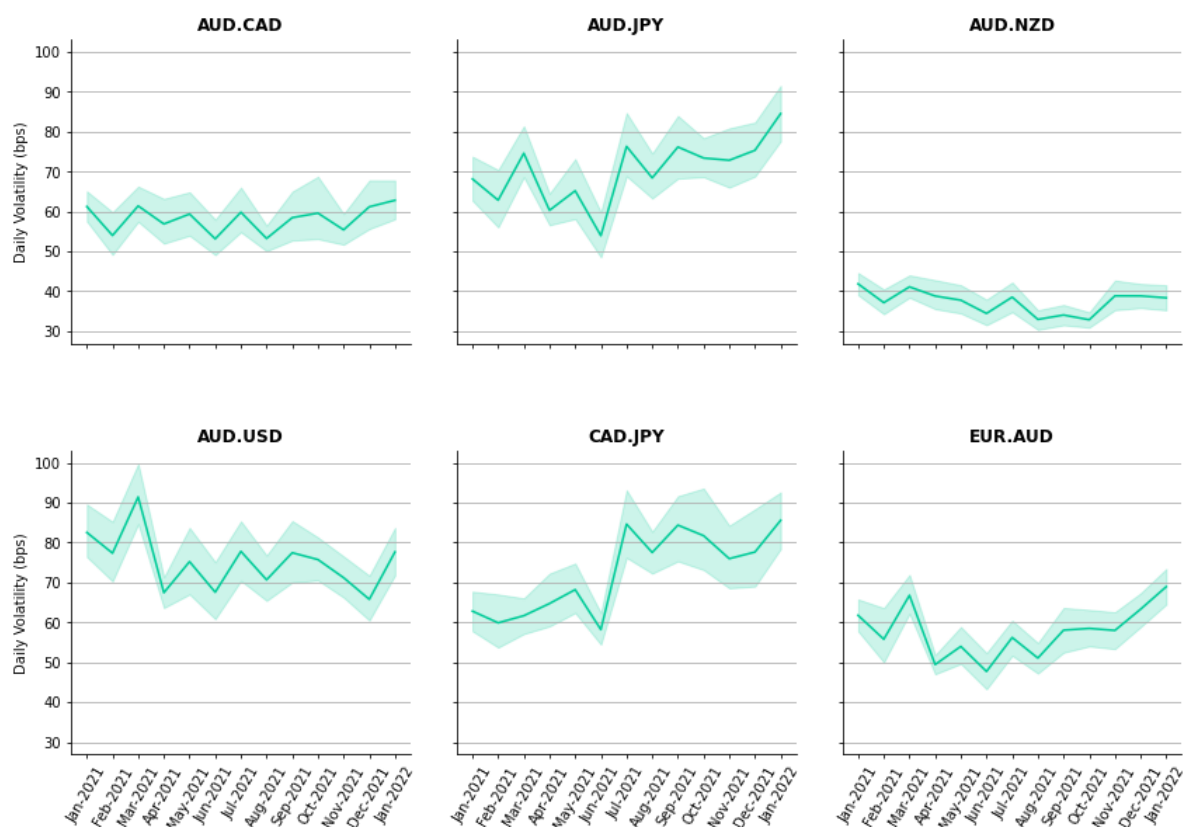
All chart sources: Virtu Financial, 2022. Spread and volatility calculations are derived from sources that Virtu believes to be reliable, but Virtu does not make any claims to its accuracy. USD.NOK, USD.SEK, EUR.NOK and EUR.SEK are shown in separate exhibits.



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



G-10 Currencies: Average Daily Volatility, 12:00-16:00 GMT January 2021-January 2022



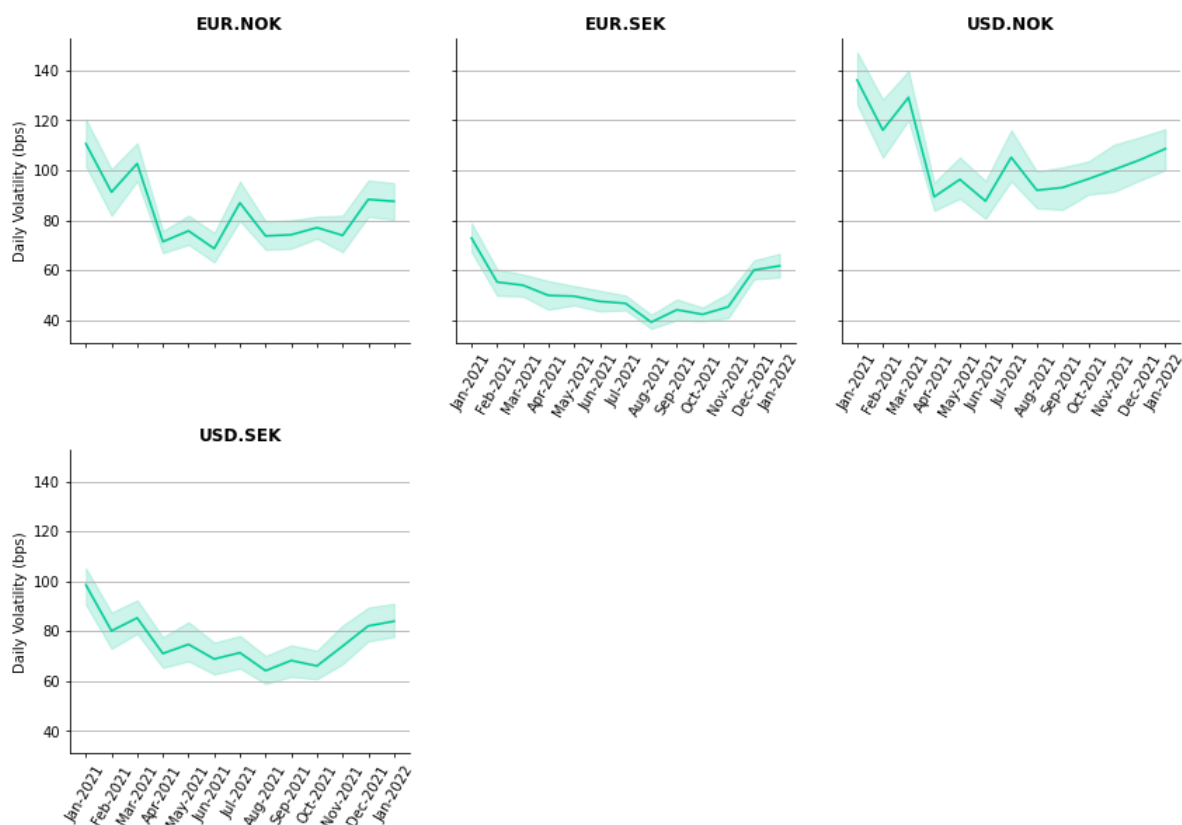
Continued next page...



All chart sources: Virtu Financial, 2022. 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 Volatility, 12:00-16:00 GMT January 2021-January 2022



Have questions? To learn more, contact your regional Virtu Analytics representative.
AMERICAS +1.866.265.4519 | **APAC** +852.3405.3755 | **EMEA** +44.20.7670.4000
analytics@virtu.com | www.virtu.com

© 2022 Virtu Financial, Inc. All rights reserved. Not to be reproduced or retransmitted without permission. These materials are for informational purposes and are not intended to be used to make trading or investment decisions, they are not intended as an offer to sell or the solicitation of an offer to buy any security or financial product, and are not intended as advice (investment, tax or legal). The information contained herein includes Virtu proprietary information and/or has been taken from sources we believe to be reliable, but we do not represent or warrant that such information is accurate or complete and it should not be relied upon as such.

Analytics products and services referenced herein may not be subject to oversight by regulatory authorities in one or more jurisdictions, including in Europe, where such products and services are offered by Virtu ITG Ventures Limited, registered in Ireland No. 295549 ("VIVL"). VIVL does not engage in regulated activity.

Securities products and services are offered by the following subsidiaries of Virtu Financial, Inc. In the U.S., Virtu Americas LLC, member FINRA and SIPC; in Canada, Virtu ITG Canada Corp., member Canadian Investor Protection Fund and Investment Industry Regulatory Organization of Canada; in Europe, Virtu ITG Europe Limited, registered in Ireland No. 283940 ("VIEL") (VIEL is authorized and regulated by the Central Bank of Ireland), and Virtu Financial Ireland Limited, registered in Ireland No. 471719 ("VFIL") (VFIL is authorized and regulated by the Central Bank of Ireland). The registered office of VIEL and VFIL is Whitaker Court, Whitaker Square, Sir John Rogerson's Quay, Dublin 2, Ireland; in Asia, Virtu ITG Hong Kong Limited (SFC License No. AHD810), Virtu ITG Singapore Pte Limited (CMS License No. 100138-1), and Virtu ITG Australia Limited (AFS License No. 219582).

All chart sources: Virtu Financial, 2022. 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.