

ECB Foreign Exchange Contact Group

Review of recent markets developments and outlook

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Global Markets Division

Confidential

21st September 2021

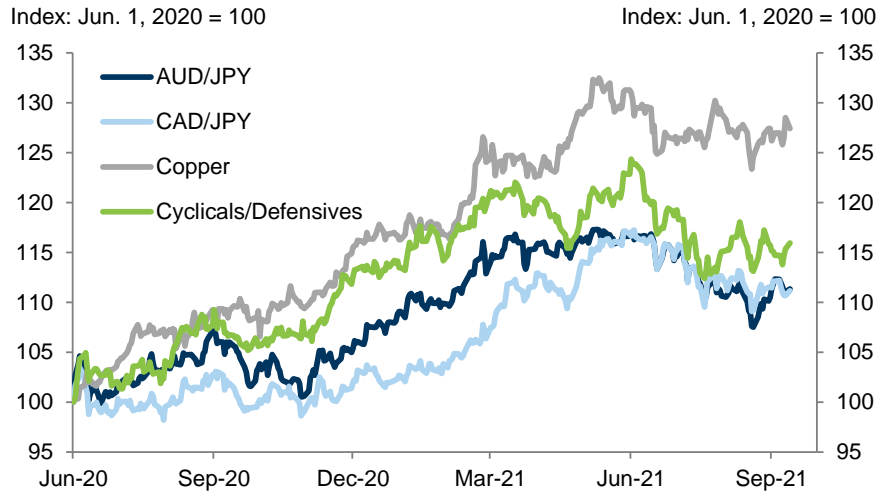
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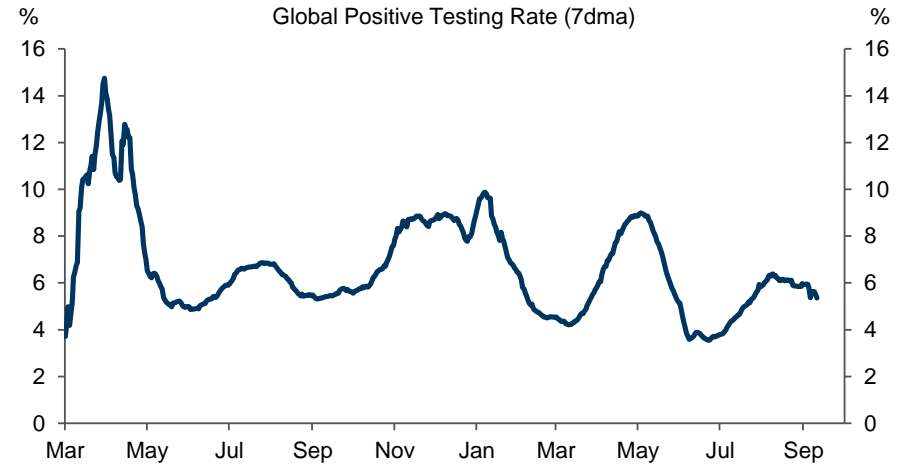
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FX performance, backdrop and outlook

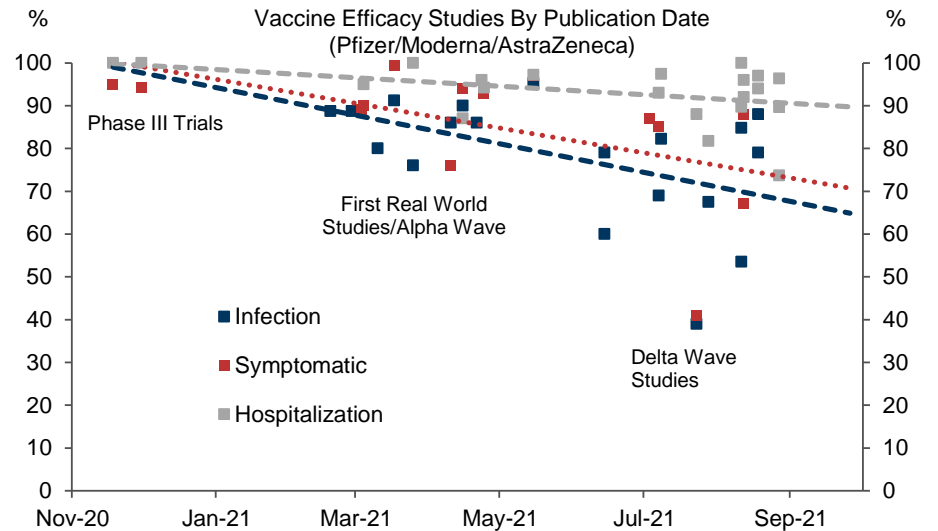
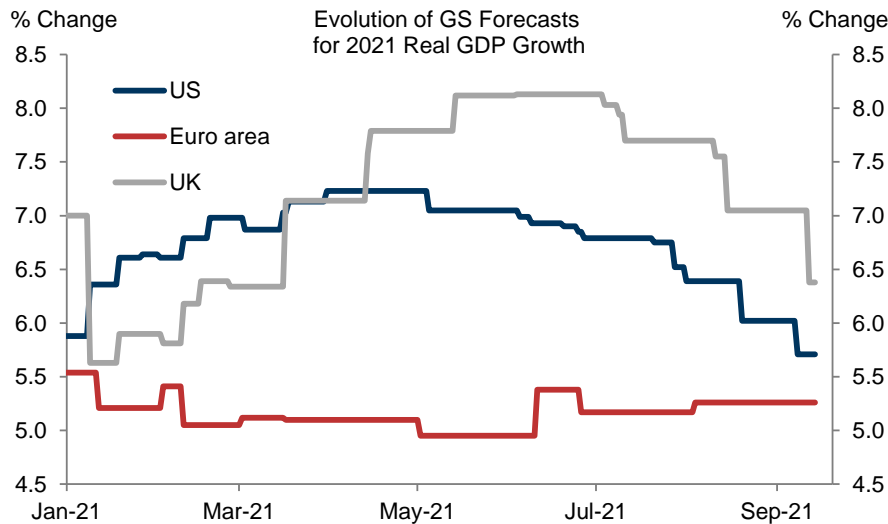
Setbacks for the reflation trade on outbreaks of Delta variant



Note: Series scaled to equal vol.



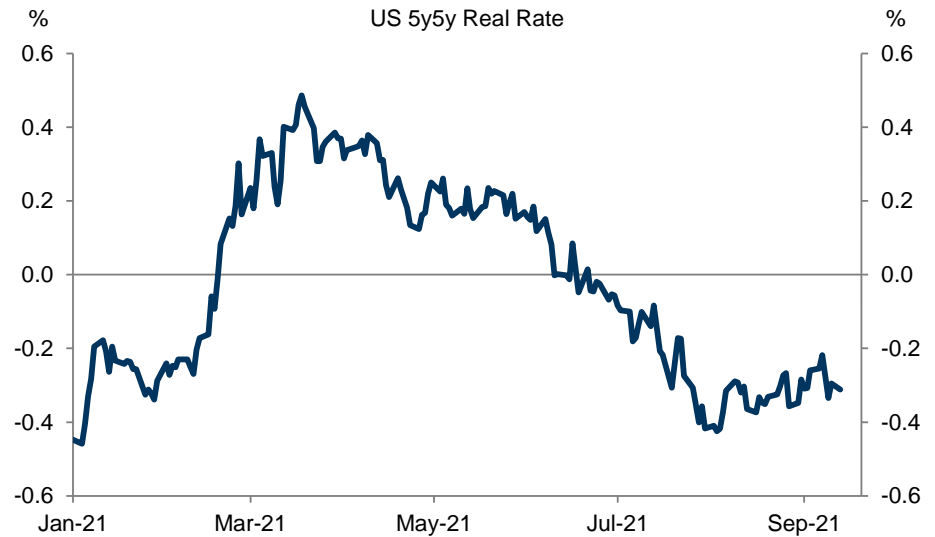
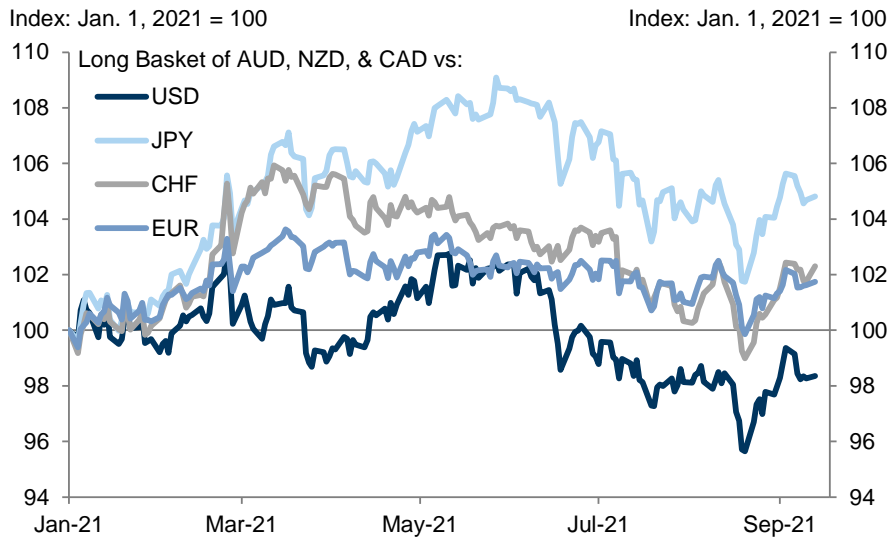
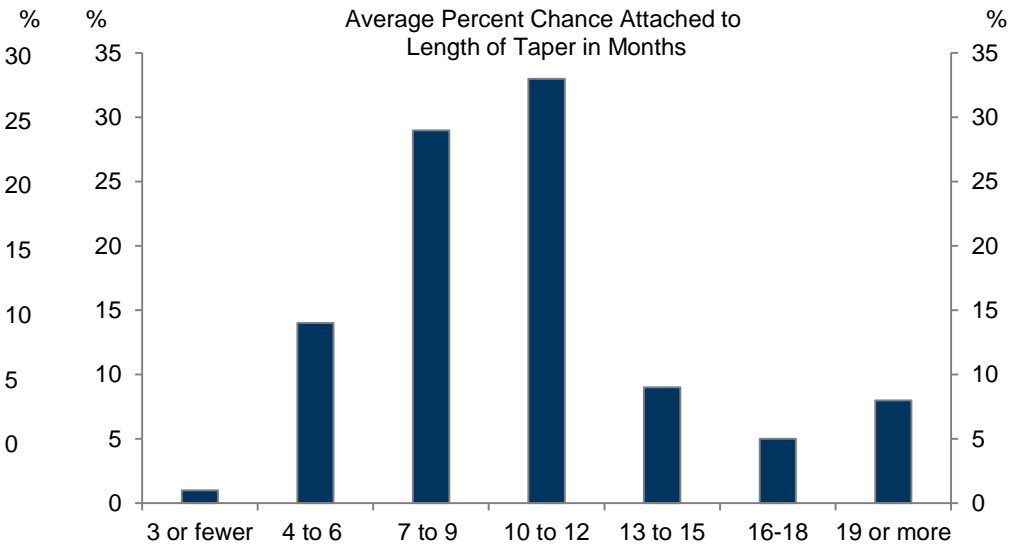
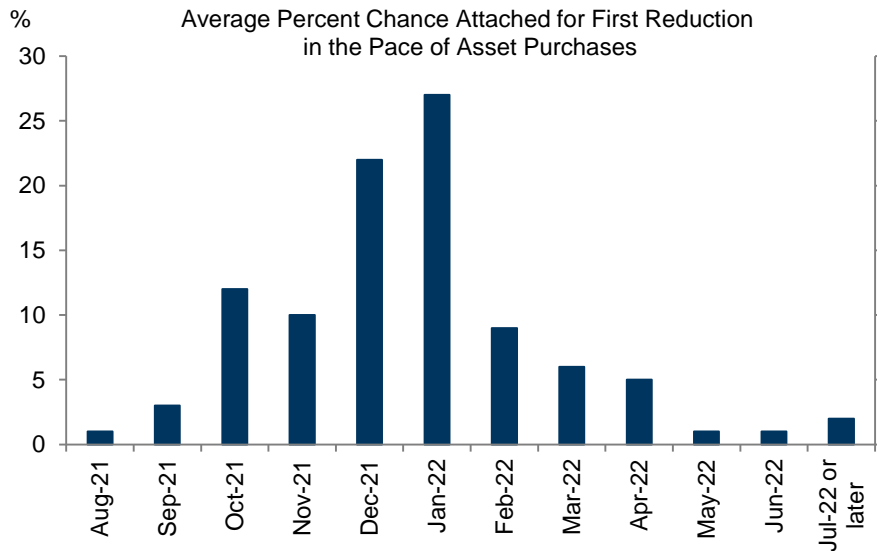
*Includes all countries with available testing data.
**Values for the latest two weeks include imputed testing volumes.



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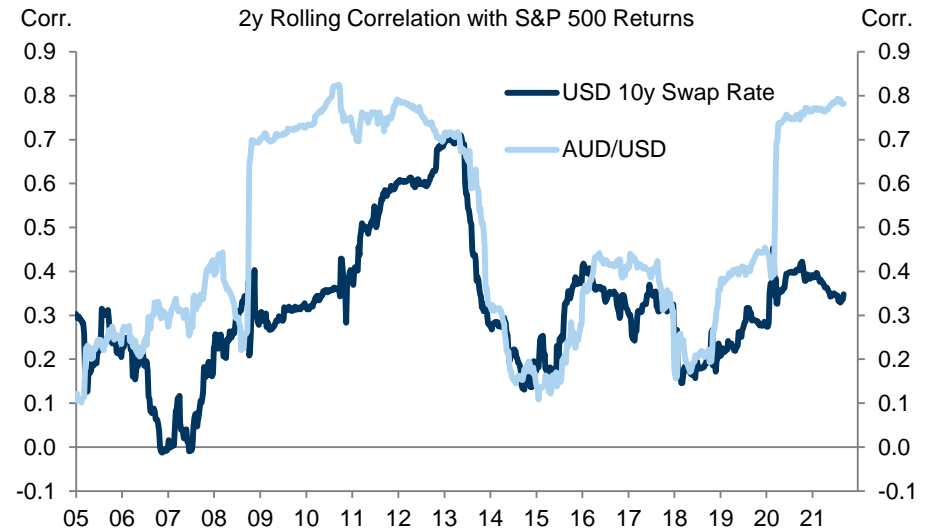
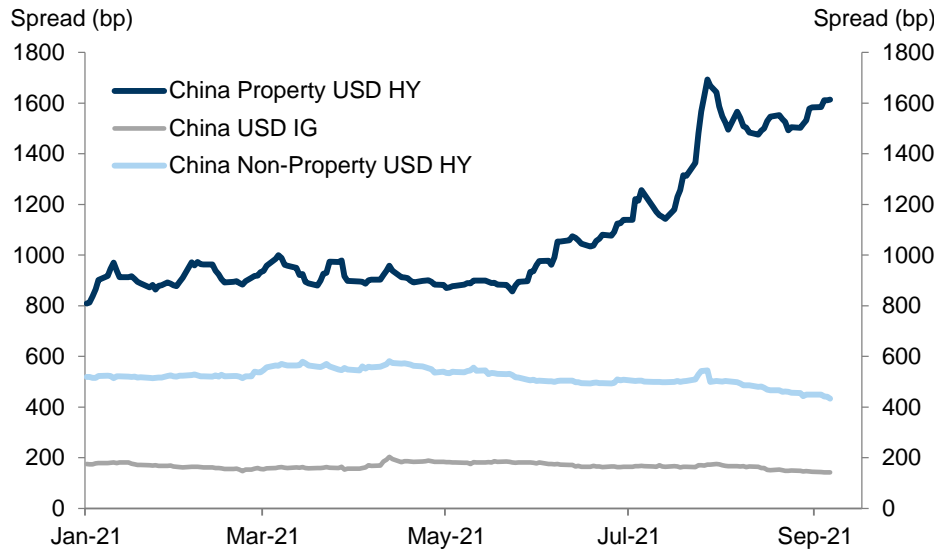
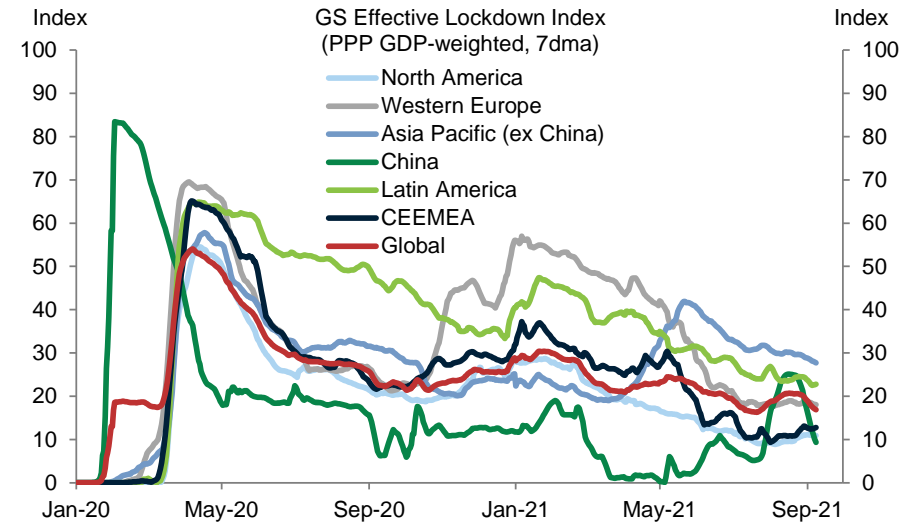
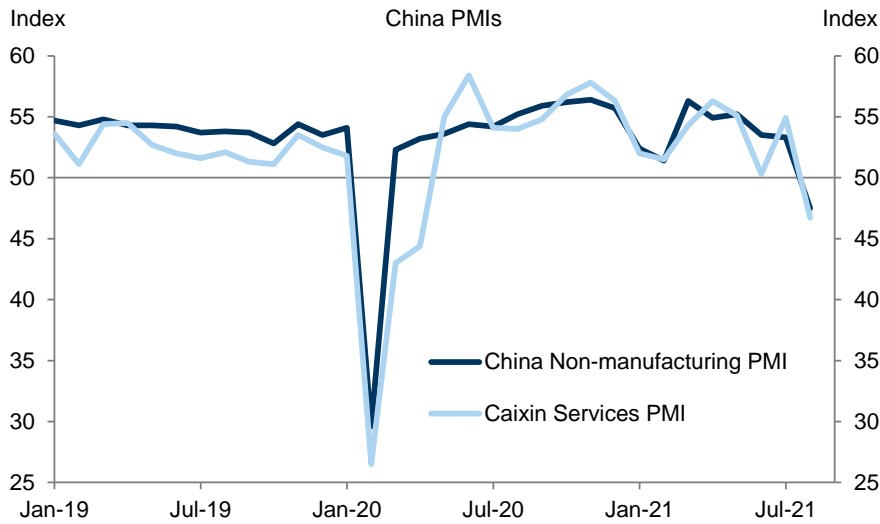
Rate market volatility resulting in focus on funders



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FX performance, backdrop and outlook

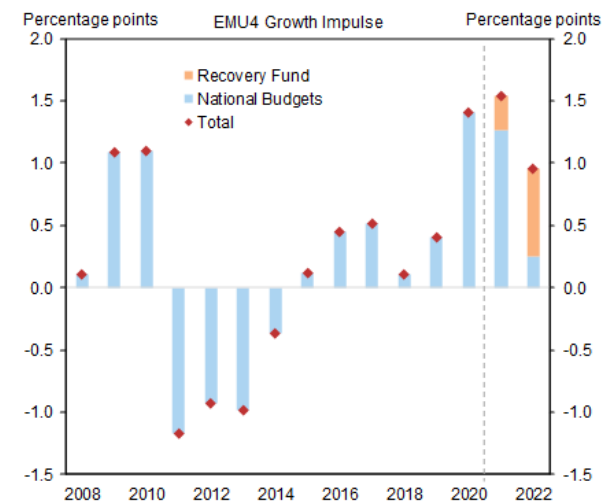
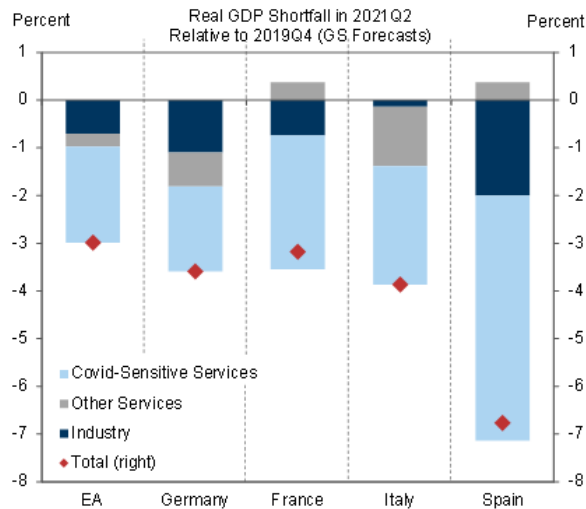
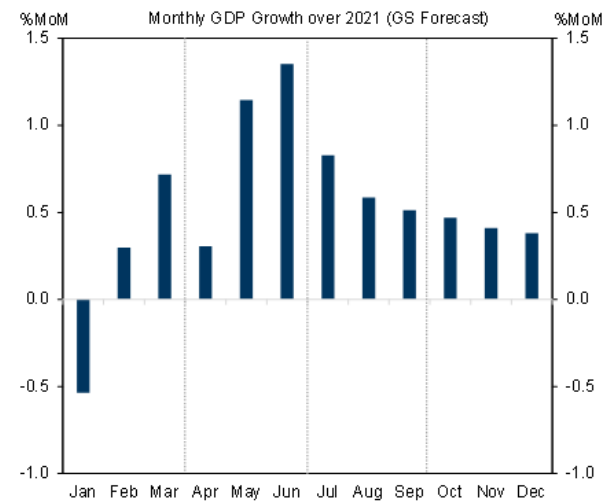
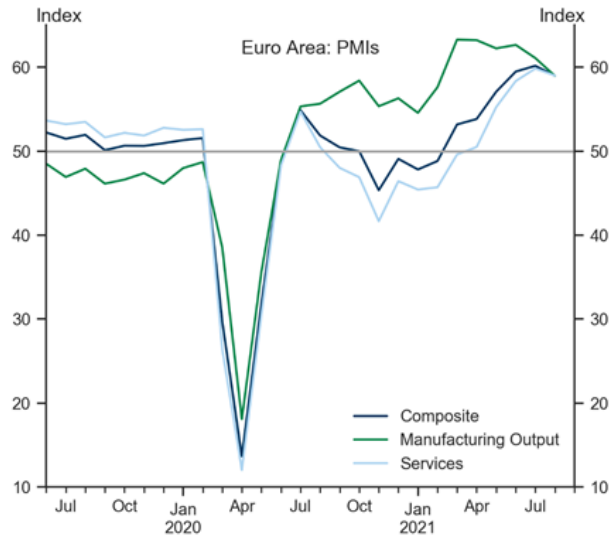
Investors using FX as a risk hedge, especially for China & growth worries



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European economic and political summary

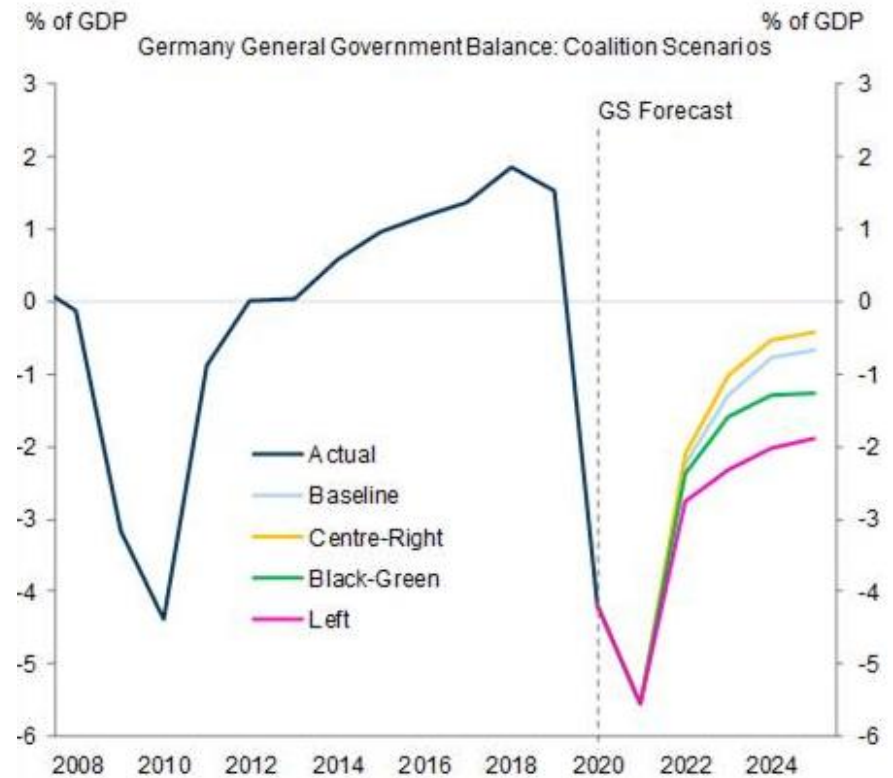
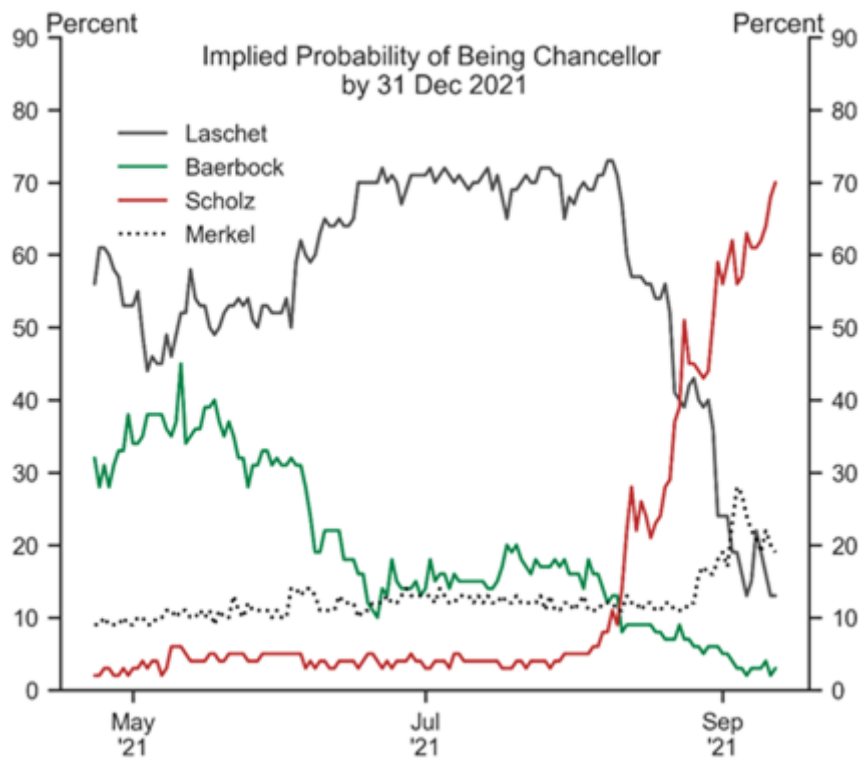
European growth past the peak, but deceleration to be more gradual than elsewhere



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European economic and political summary

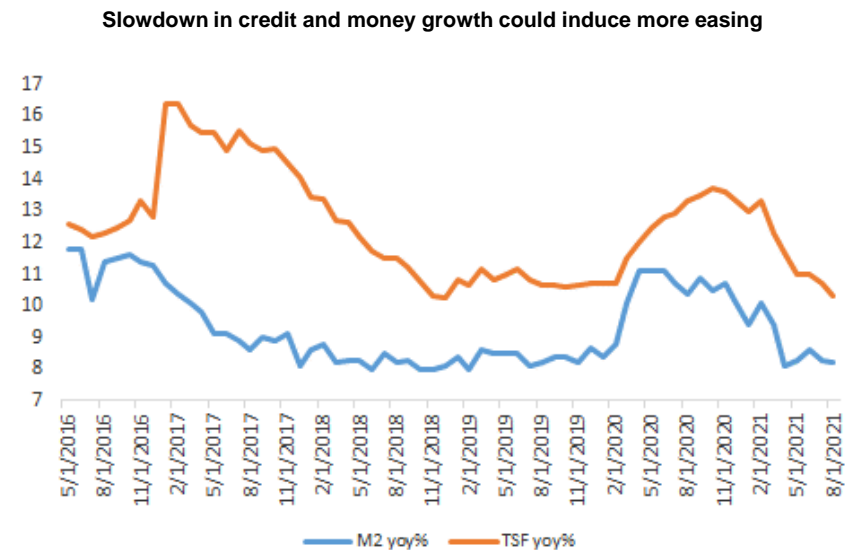
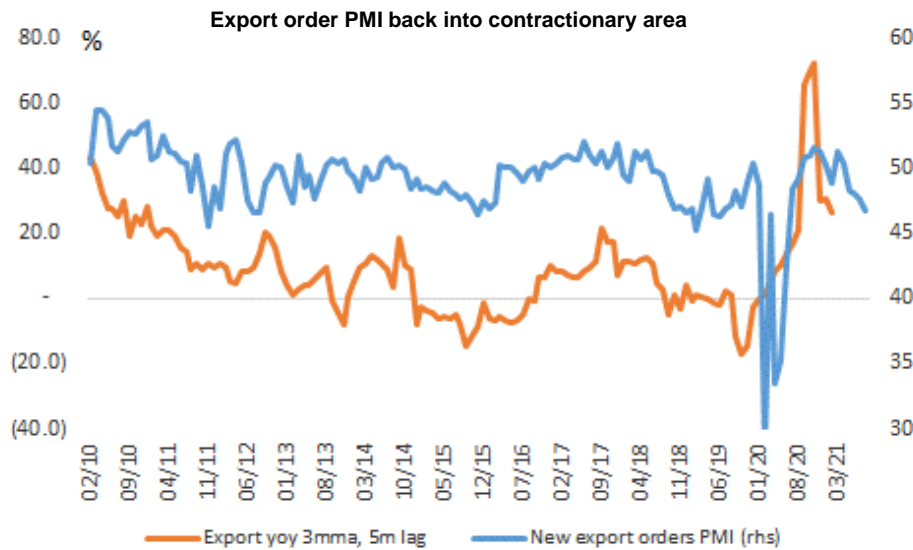
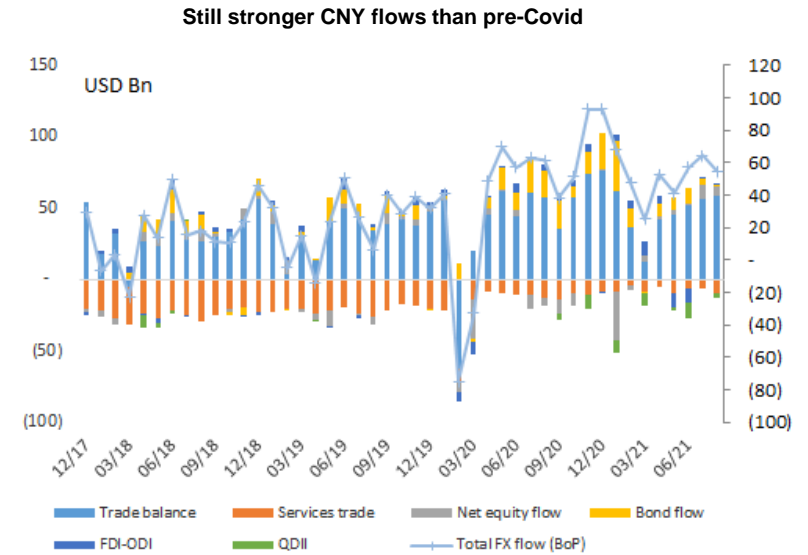
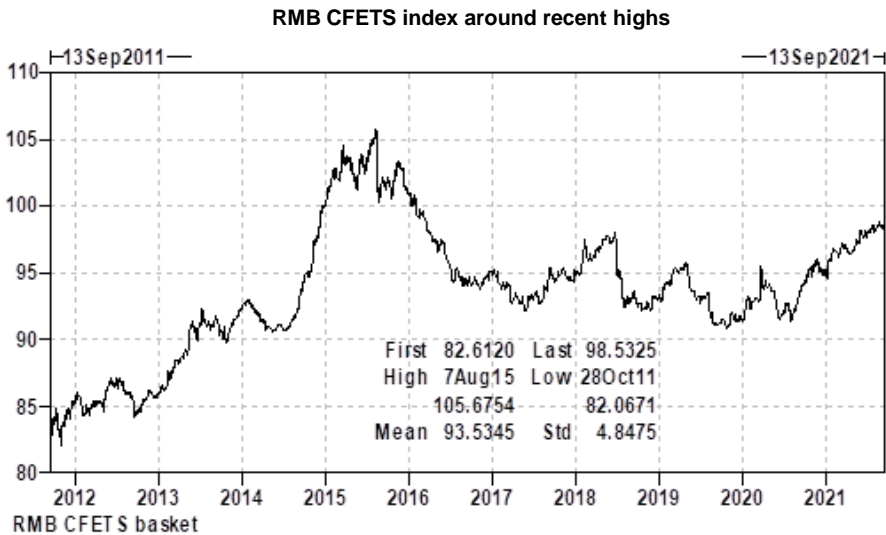
SPD-led coalition looking more likely post the German elections. Could lead to more expansionary fiscal outcomes



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China developments and FX markets

Stronger CNY on net exports, room for policy easing on slowing activity

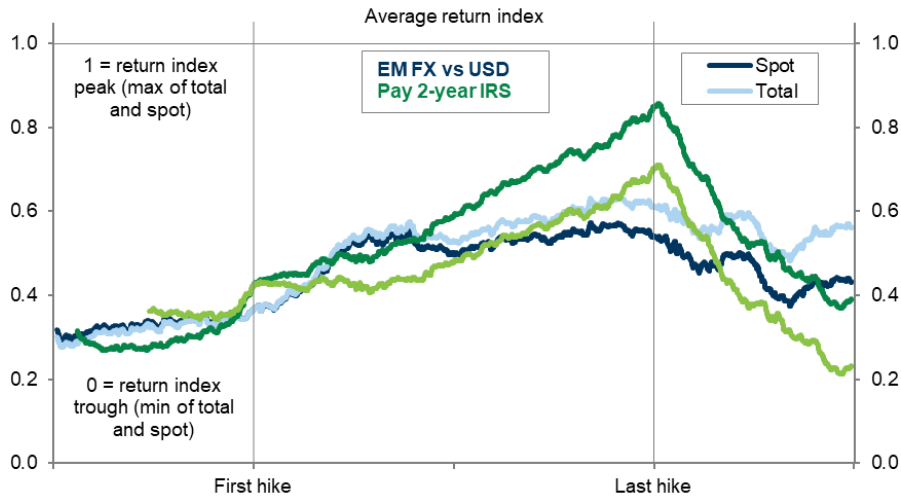


Source: WIND, Bloomberg, CEIC, GS Global Markets Division. Note: Terms contained in the presentation are for discussion purposes only and do not impose a legally binding obligation on any party. Goldman Sachs does not provide tax, accounting, or legal advice to our clients, and all clients are advised to consult with their own advisers regarding any potential investment/transaction. This material is for discussion purposes only.

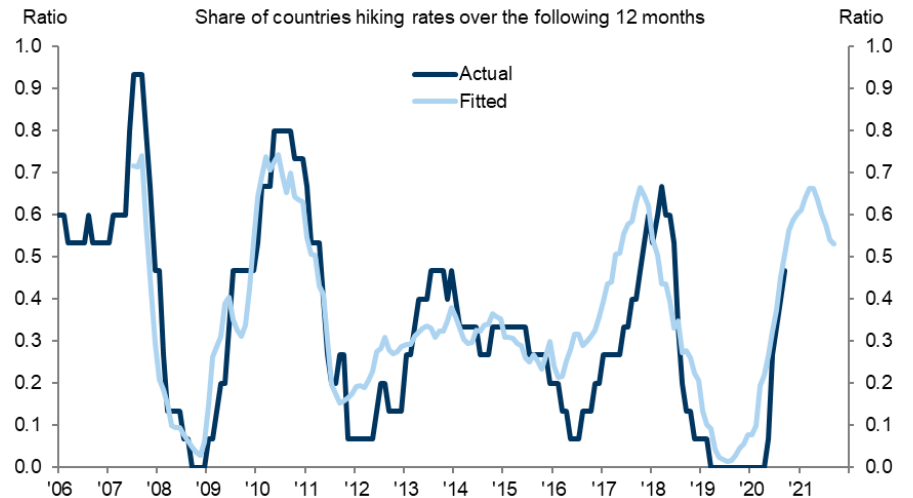
EMFX performance and drivers

Monetary tightening is rebuilding carry and impulse for positive performance

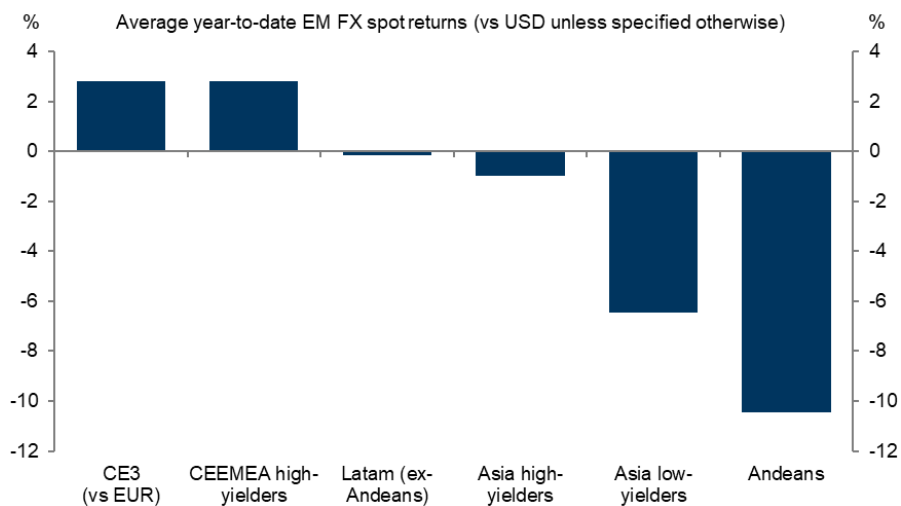
EMFX can perform as well as shorting rates in reflationary hiking cycles



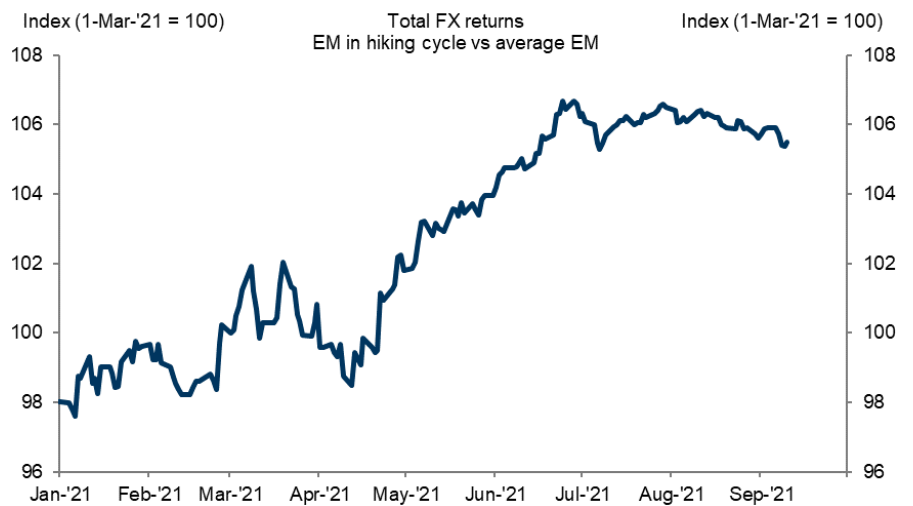
EM monetary tightening likely to persist and broaden



A variegated EMFX performance year-to-date across jurisdictions



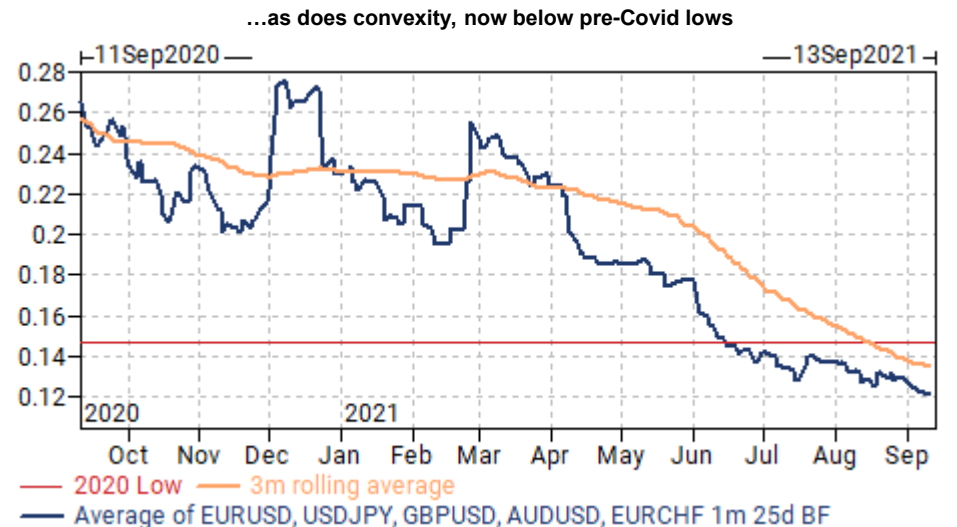
Currencies of 'early hikers' have been outperforming



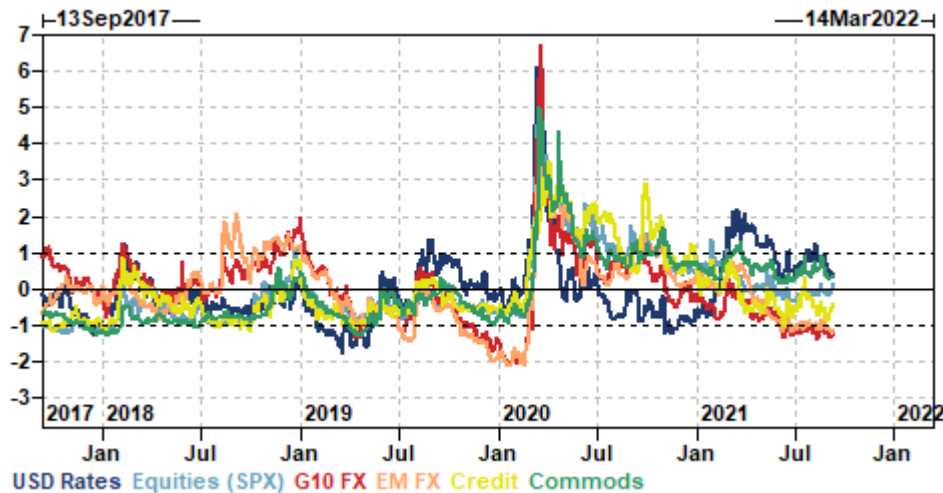
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FX vol market developments

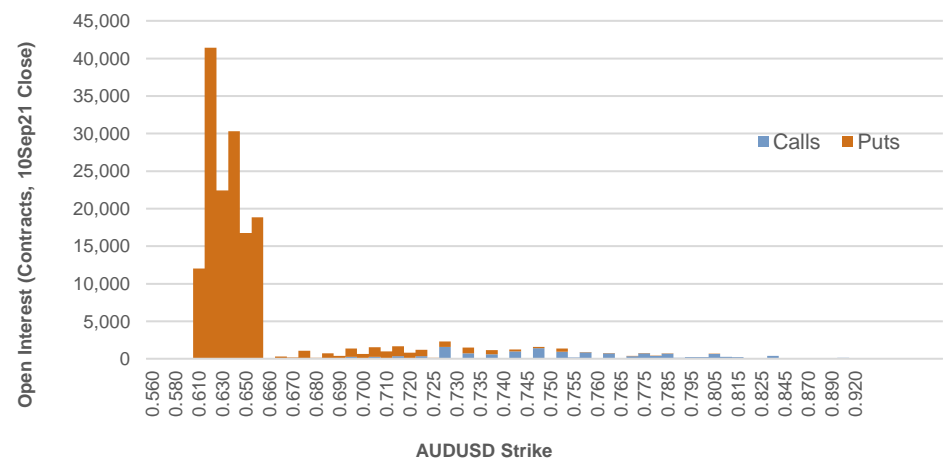
Low and falling G10 FX vol and convexity – now a cheap hedge for other assets



FX vol is also low compared to other asset classes... (Z-scores of 6m implied volatility)



...leading to demand for convexity in risk-sensitive pairs (AUDUSD CME OI by strike, Oct-Jan expiries)

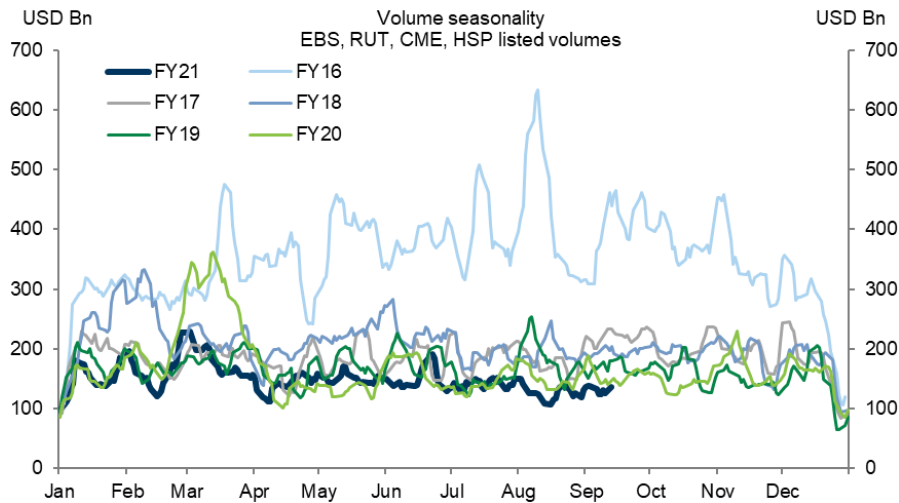


Source: CME, Bloomberg Finance L.P., GS MarketStrats (Global Markets Division) as of 13-Sep-'21. Note: Terms contained in the presentation are for discussion purposes only and do not impose a legally binding obligation on any party. Goldman Sachs does not provide tax, accounting, or legal advice to our clients, and all clients are advised to consult with their own advisers regarding any potential investment/transaction. This material is for discussion purposes only.

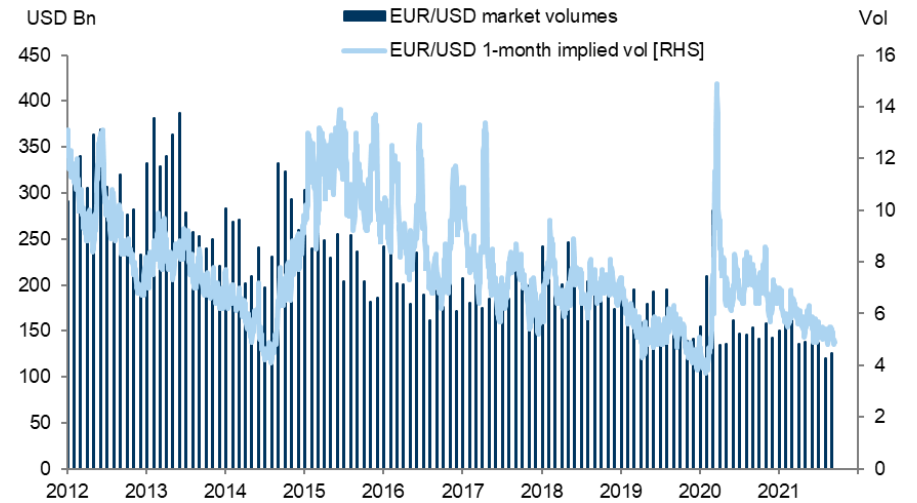
Latest on FX market structure

Steady low base line in volumes and shrinking primary venues

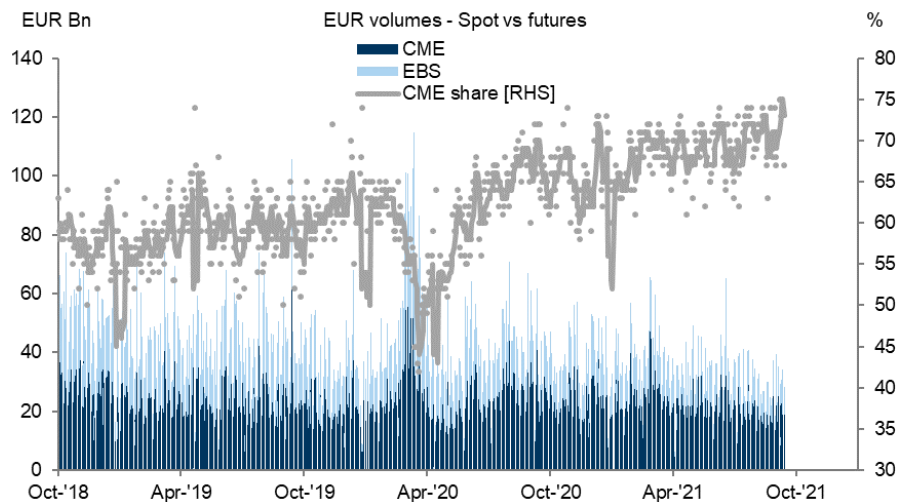
No seasonality in FX volumes, but a 'steady low base line'



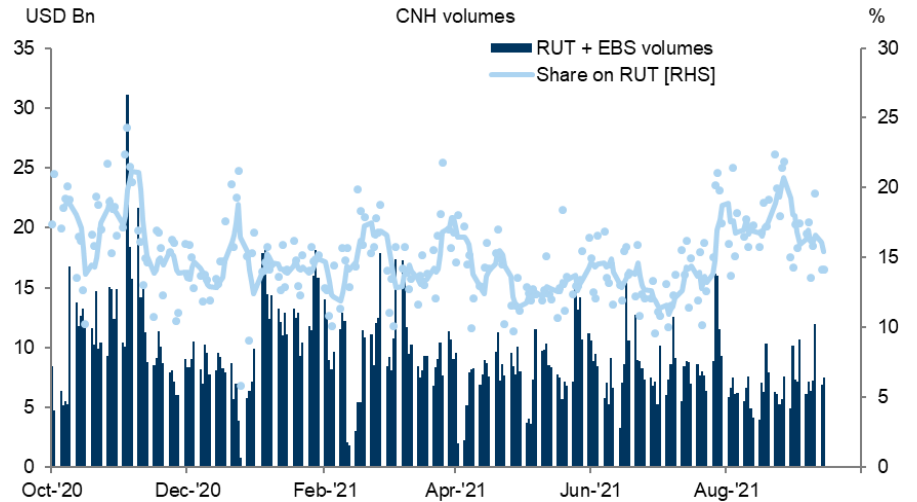
FX volumes at historical lows together with low FX implied vols



Activity pushed away from primary markets, futures continue to show strength



CNH primary market activity

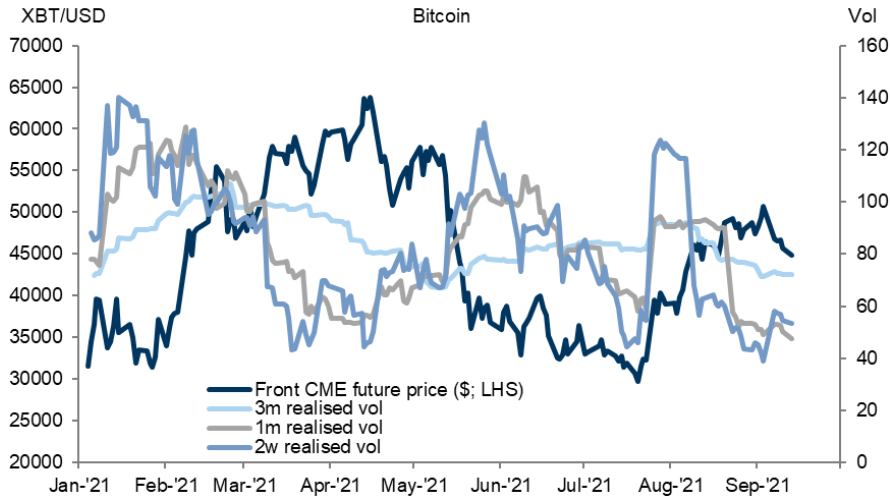


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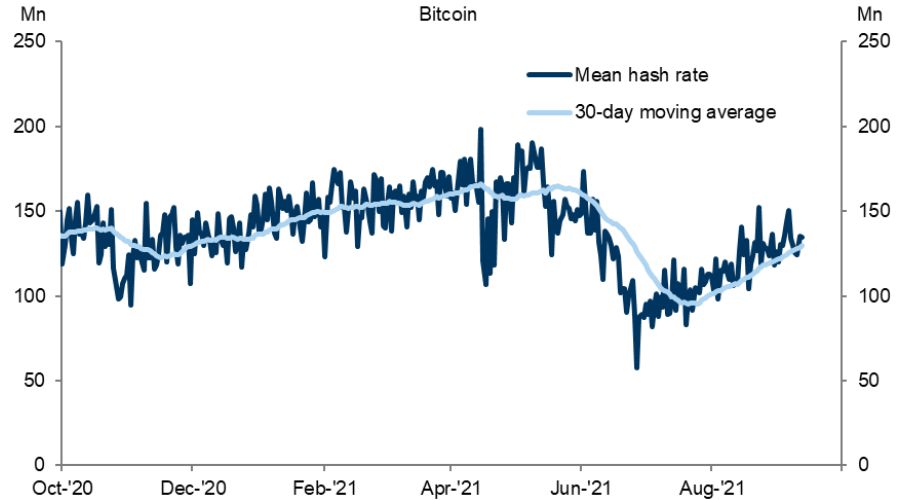
Crypto currency update

Volatile price action in Bitcoin, with network structure changes

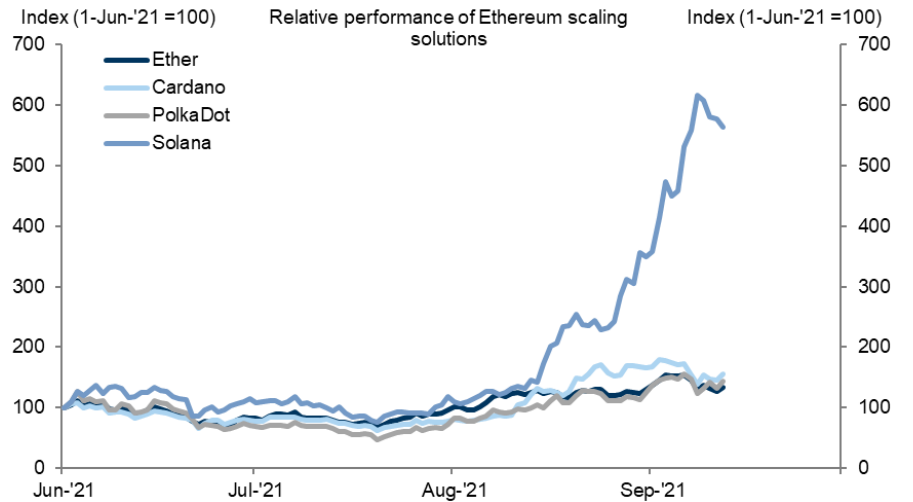
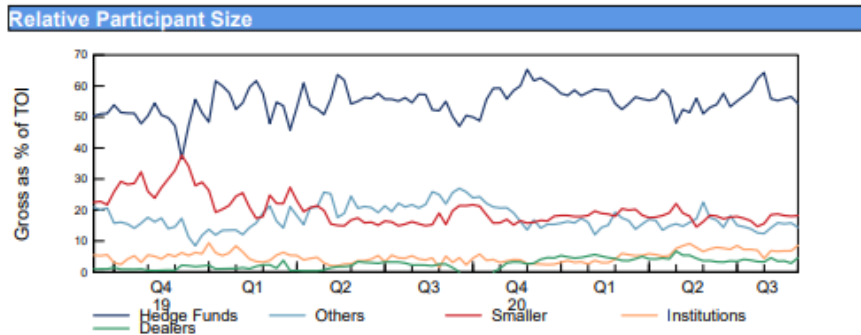
Bitcoin price action remained volatile in Q3 2021



Recovery in the Bitcoin hash rate as crypto miners rebuilt capacity away from China



Institutional activity in Bitcoin CME futures remains low despite growing interest in the space



Source: CME, coinmetrics.io, coinmarketcap.com, GS Global Markets Division. Note: Terms contained in the presentation are for discussion purposes only and do not impose a legally binding obligation on any party. Goldman Sachs does not provide tax, accounting, or legal advice to our clients, and all clients are advised to consult with their own advisers regarding any potential investment/transaction. This material is for discussion purposes only.

References

Referenced publications by Goldman Sachs Global Investment Research

1. [Tracking Virus and Vaccines: September 16th – 16 September 2021](#)
2. [Effective Lockdown Index: September 13 Update – 13 September 2021](#)
3. [Macro FAQ: German Election Update—Many Options for Scholz – 13 September 2021](#)
4. [Asia Views: Moving through the delta dip – 10 September 2021](#)
5. [Global Economics Comment: Waning Vaccine Efficacy and Boosters: A Review – 31 August 2021](#)
6. [European Views: Past the Peak – 24 August 2021](#)
7. [Global Markets Daily: Rates Versus FX Across a Sample of EM Reflationary Hikes – 7 July 2021](#)
8. [European Economics Analyst: German Elections—Let’s Talk Money – 27 June 2021](#)
9. [European Economics Analyst: European Fiscal Policy—From Relief to Recovery – 29 March 2021](#)

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