Please discuss Treasury market trading conditions since the beginning of the year. How have evolving monetary policy expectations and heightened geopolitical tensions affected Treasury market volatility and liquidity conditions? Has the change in liquidity conditions been consistent with change in volatility? How have different types of liquidity providers been affected by these conditions, and to what extent have they changed their liquidity provision in response?

Agenda

- Realized volatility in the Treasury market has gone up sharply in 2022
  - The rise in monetary policy uncertainty seems to be a big driver
  - Market expectations around the path of future inflation are very dispersed

- Treasury trading conditions have worsened on some metrics in 2022, but not on others
  - The deterioration in liquidity seems driven largely by higher levels of volatility
  - Funding markets are not showing any meaningful worsening in liquidity

- We do not currently see a meaningful market functioning problem in the Treasury market
  - Despite the worsening of some measures of liquidity, the market seems to be functioning normally
  - However, with the much higher bond volatility observed so far in 2022, Treasury trading conditions bear close watching.

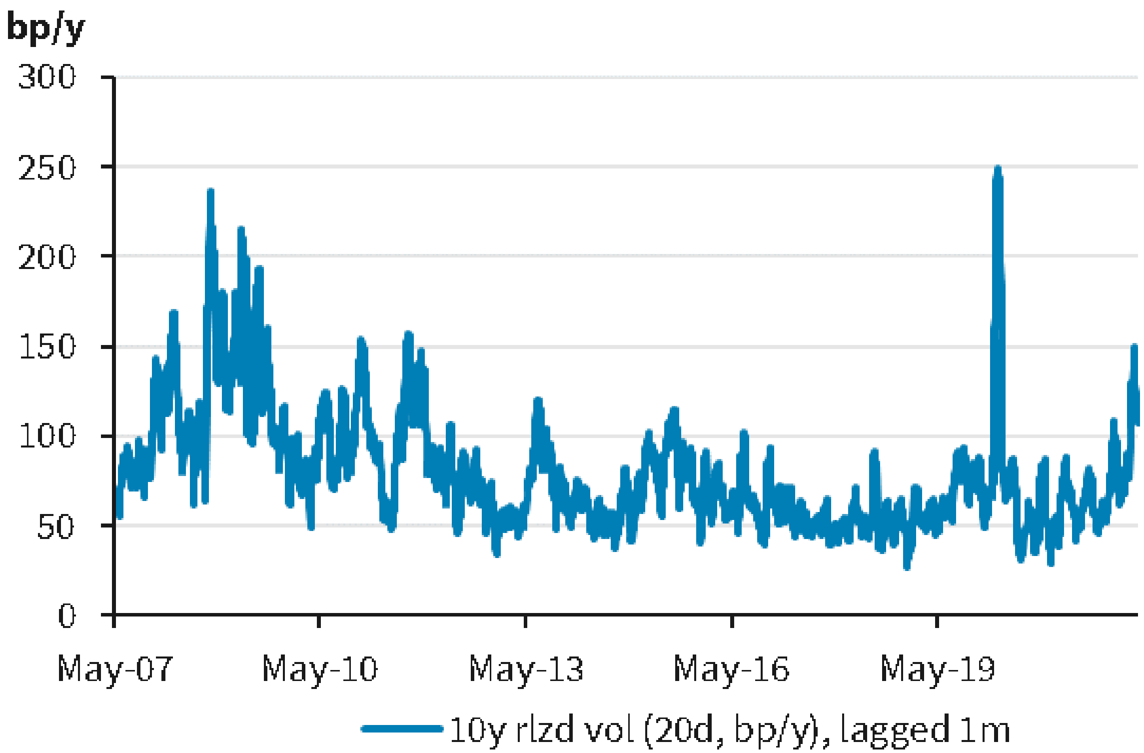
Higher Treasury market volatility, and higher policy uncertainty

Summary of the section

- Treasury volatility has been very high in recent months
  - 1m realized volatility has been higher than ex-ante 1m*10y implied volatility
  - Similarly, 1m*10y implied volatility has been higher than implied by ex-ante forward vol
- This volatility has been driven in part by economic factors
  - Economic data surprises are not much higher in 2022 than in past years
  - But the global economy has had to deal with considerable disruptions to production and supply chain problems
  - The Russia-Ukraine war has been a significant new supply side shock to the world economy
  - The result has been increased uncertainty about the path near- and medium-term inflation
- Monetary policy uncertainty has risen greatly over the last few months
  - The Fed's expected fed funds rate path has shifted greatly, and so has the market's
  - In both cases, the reason seems to be a sharp shift in the view on inflation
  - At the same time, expectations of future inflation are now far more dispersed than in the past

Realized volatility has been very high in recent months

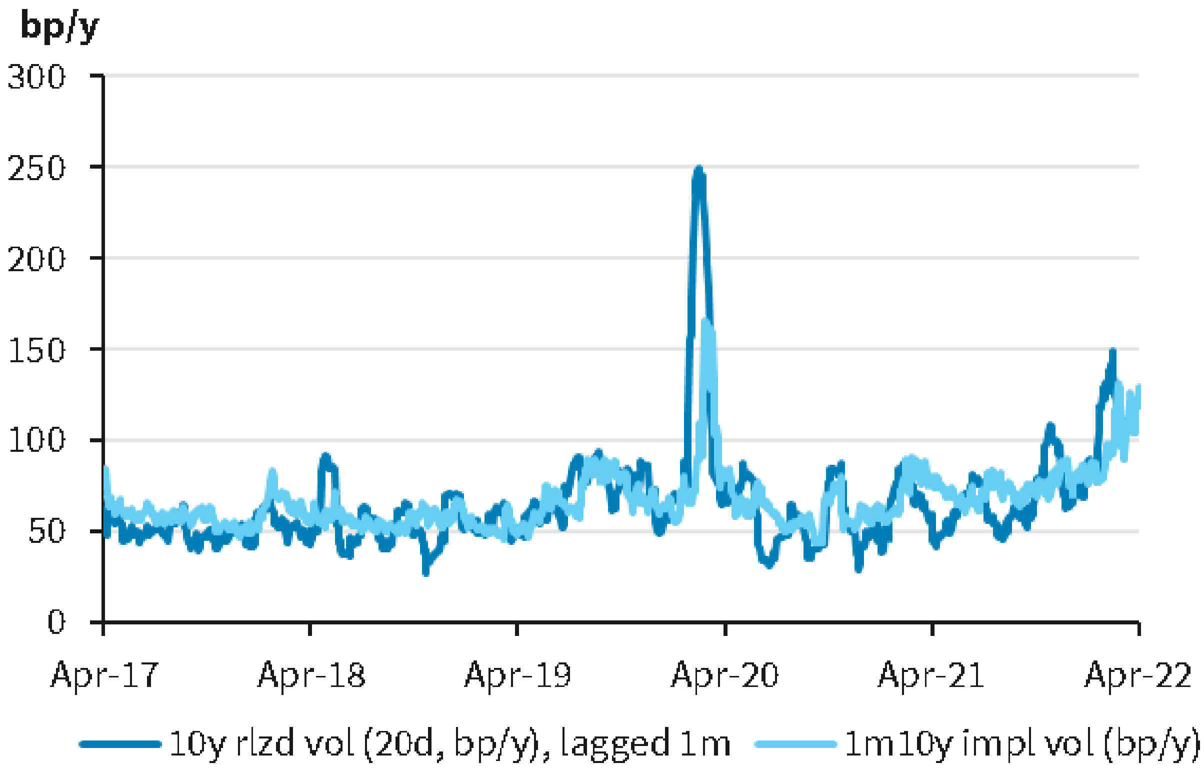
- Realized volatility of 10y treasury yields over 2022 has been higher than at any point over the last decade, with the exception of March 2020. The current level of volatility is also significantly higher than in 2007, pre the GFC



Source for all charts: Presenting Member Calculations

Realized volatility higher than ex-ante implied volatility

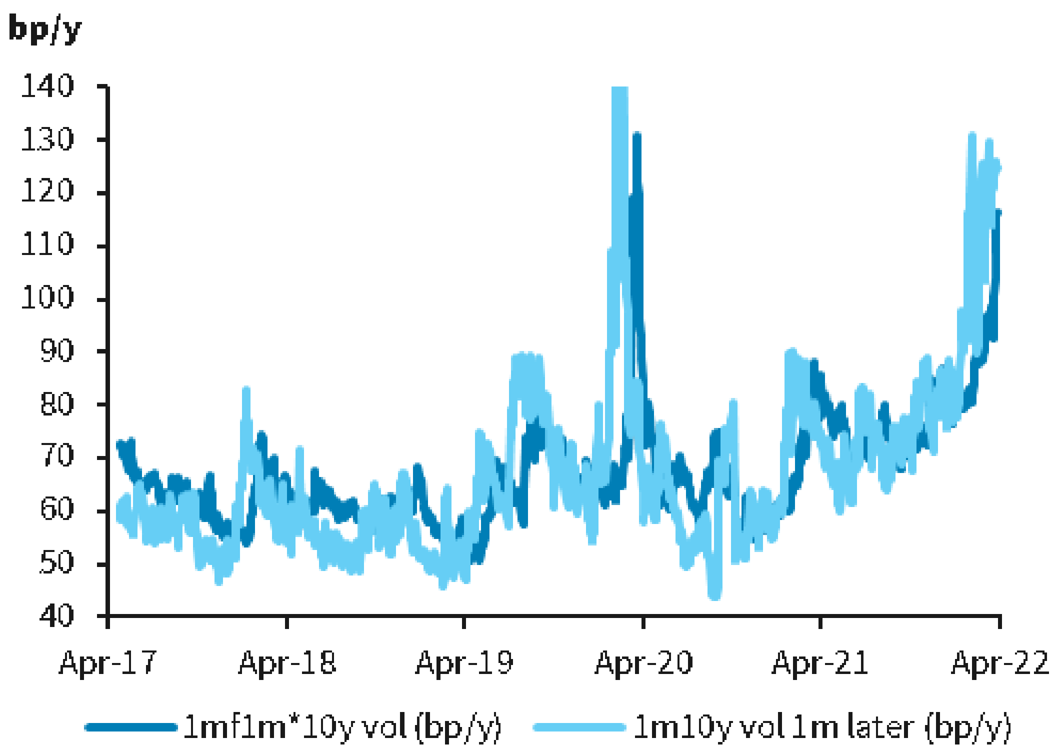
Realized 10y volatility over subsequent month higher than ex-ante 1m10y implied volatility



Source for all charts: Presenting Member Calculations

Implied volatility higher than ex-ante forward volatility

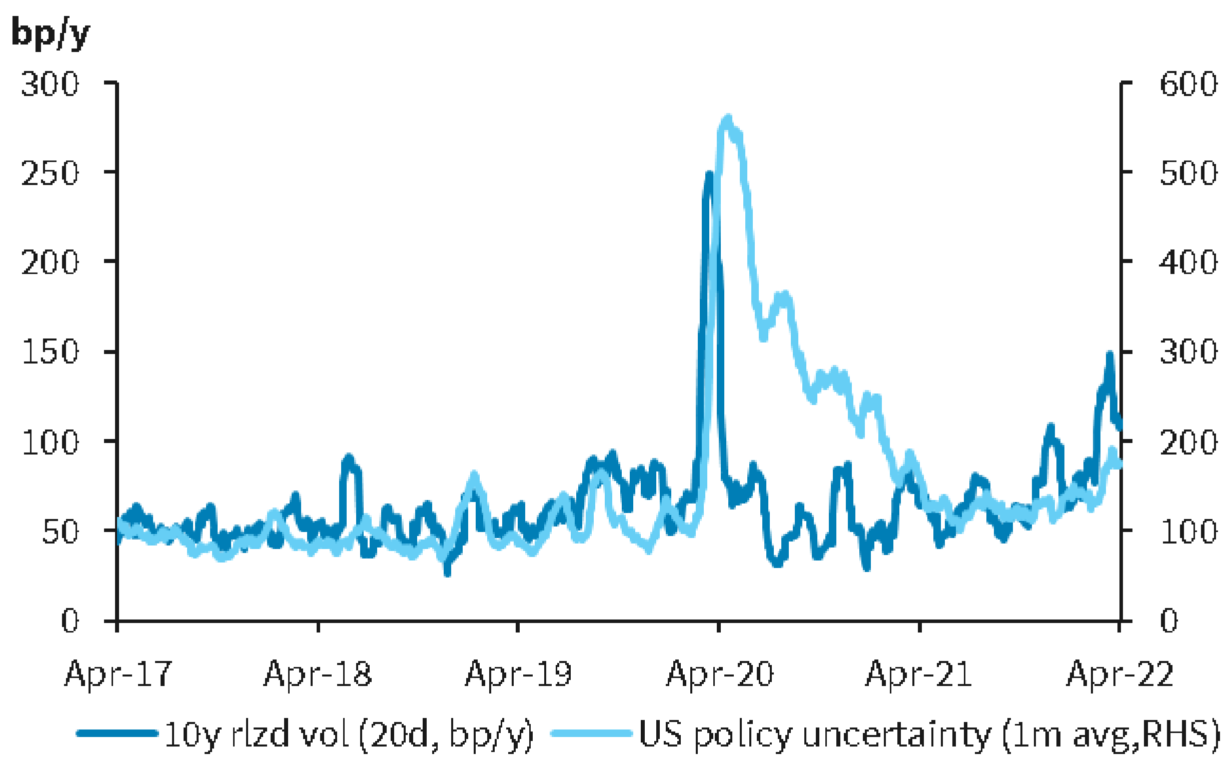
1m10y volatility after one month has been higher than implied by ex-ante forward vols



Source for all charts: Presenting Member Calculations

Policy uncertainty ‘tax’ has increased

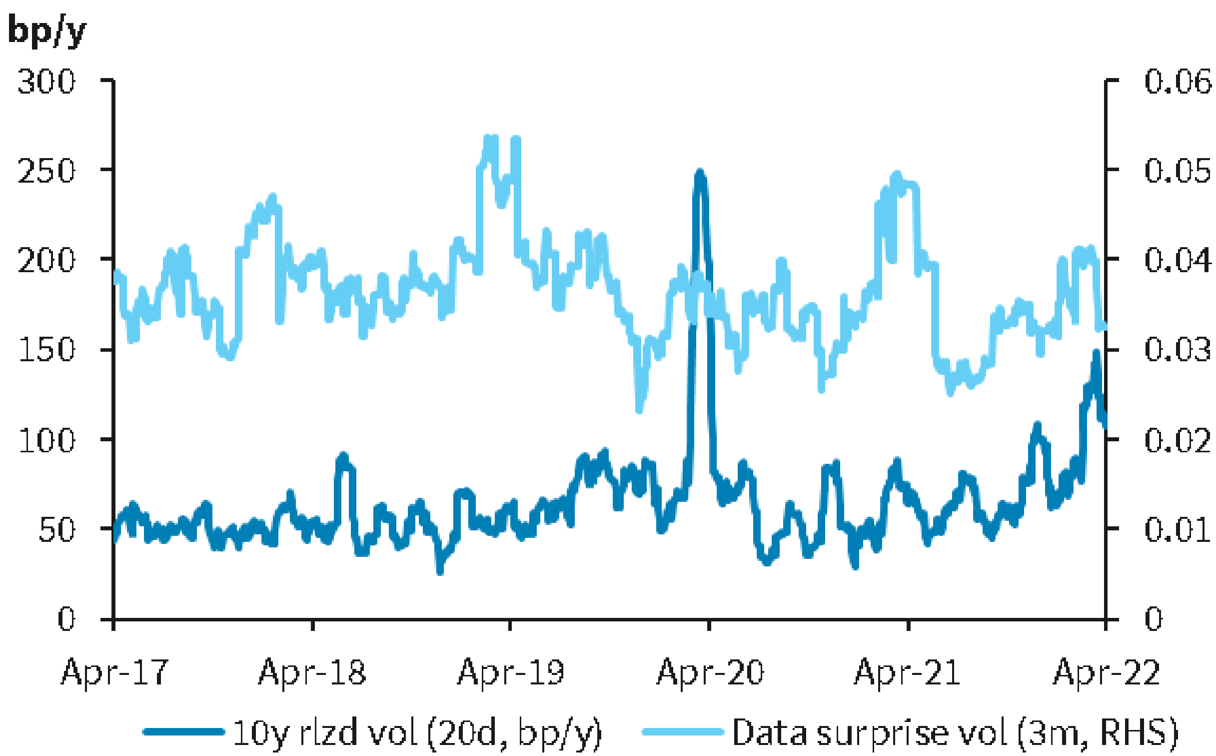
Policy uncertainty has gone up in recent months



Note: Policy uncertainty uses the Baker et al index, Source : Presenting Member Calculations, Bloomberg

Economic data surprises are not especially high

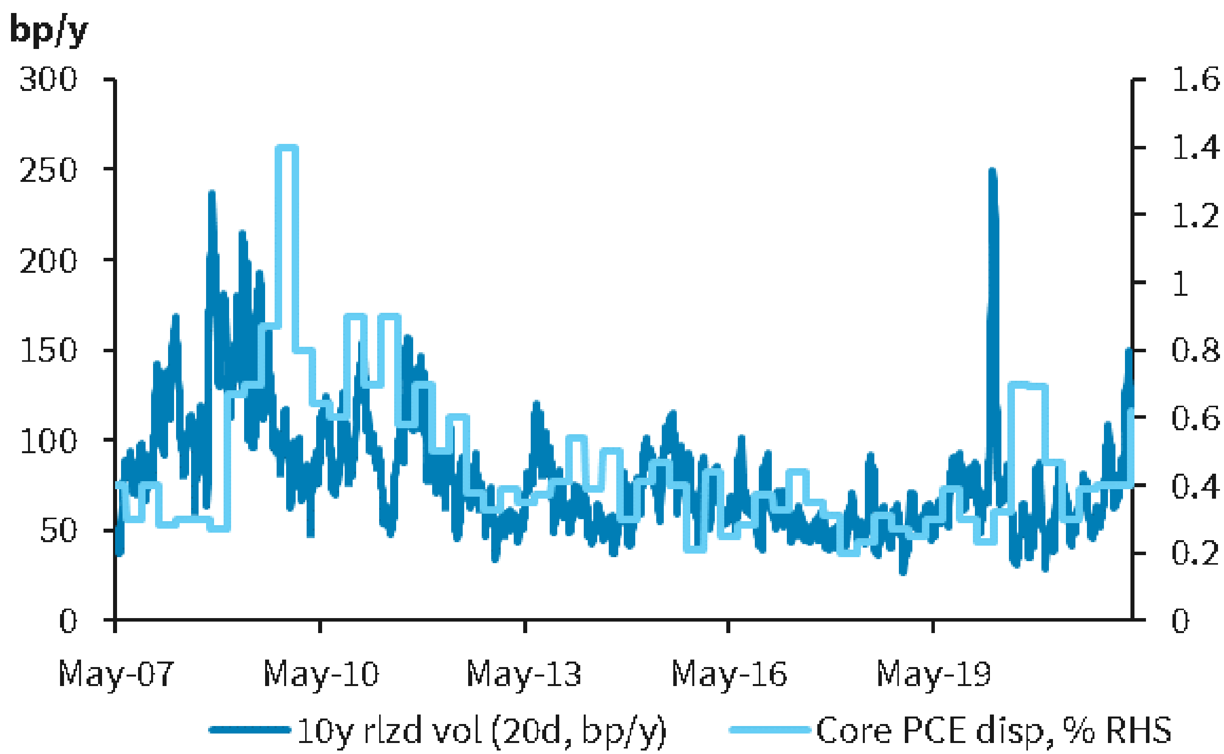
Data surprises are in line with recent years



Note: Data surprise based on the Bloomberg data surprise index. Source : Presenting Member Calculations, Bloomberg

There is greater uncertainty about future inflation

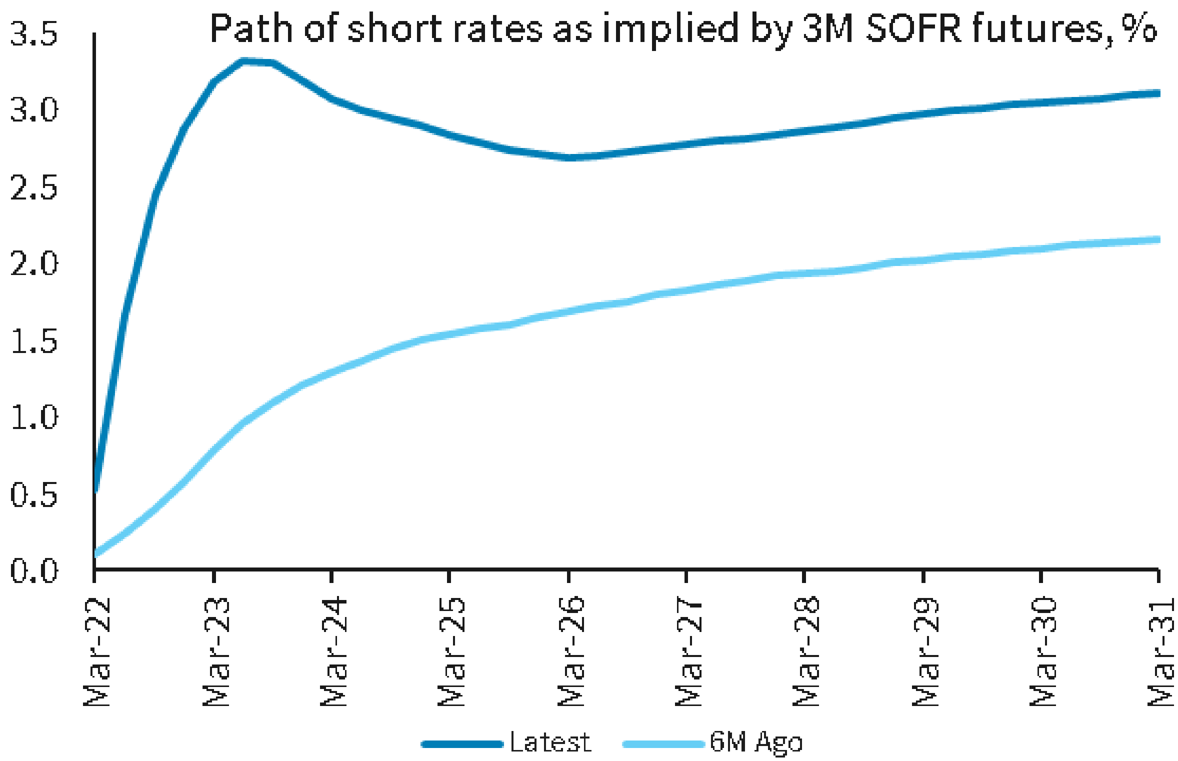
Realized volatility and dispersion around core PCE forecasts



Note: 4q forecast dispersion of 10y yield forecasts and Core PCE inflation from SPF. Source for both charts: Presenting Member Calculations, Federal Reserve

Market has significantly repriced the path of short rates

Investors now expect an overshoot

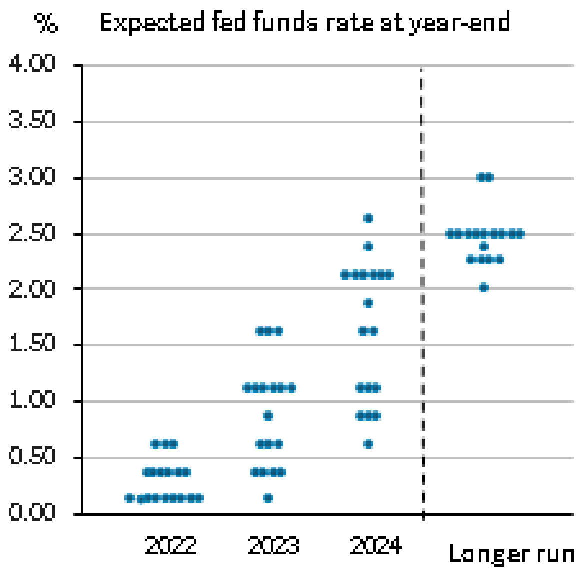


Source: Bloomberg, Presenting Member Calculations. Note: As of April 18, 2022

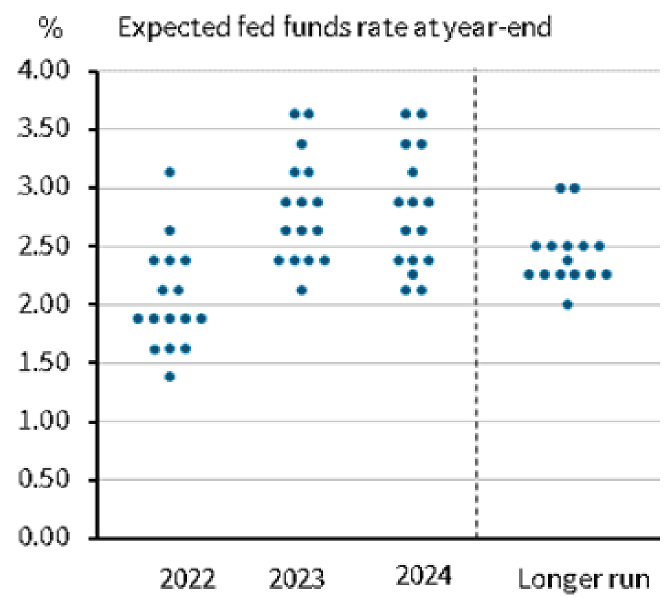
A massive shift in the Fed dot plot from a few months ago…

- FOMC shifted expectations of fed funds rate higher

Sep 2021 FOMC



March 2022 FOMC



Source: Federal Reserve, Presenting Member Calculations

…driven by a sharp change in the inflation forecast

Q4/Q4 % chng	2022	2023	2024	Longer run
Change in real GDP				
March projection	2.8	2.2	2.0	1.8
December projection	4.0	2.2	2.0	1.8
September projection	3.8	2.5	2.0	1.8
Unemployment rate				
March projection	3.5	3.5	3.6	4.0
December projection	3.5	3.5	3.5	4.0
September projection	3.8	3.5	3.5	4.0
PCE inflation				
March projection	4.3	2.7	2.3	2.0
December projection	2.6	2.3	2.1	2.0
September projection	2.2	2.2	2.1	2.0
Core PCE inflation				
March projection	4.1	2.6	2.3	
December projection	2.7	2.3	2.1	
September projection	2.3	2.2	2.1	
Fed funds rate				
March projection	1.9	2.8	2.8	2.4
December projection	0.9	1.6	2.1	2.5
September projection	0.3	1.0	1.8	2.5

Source: Federal Reserve, Presenting Member Calculations

Trading conditions

Summary of the section

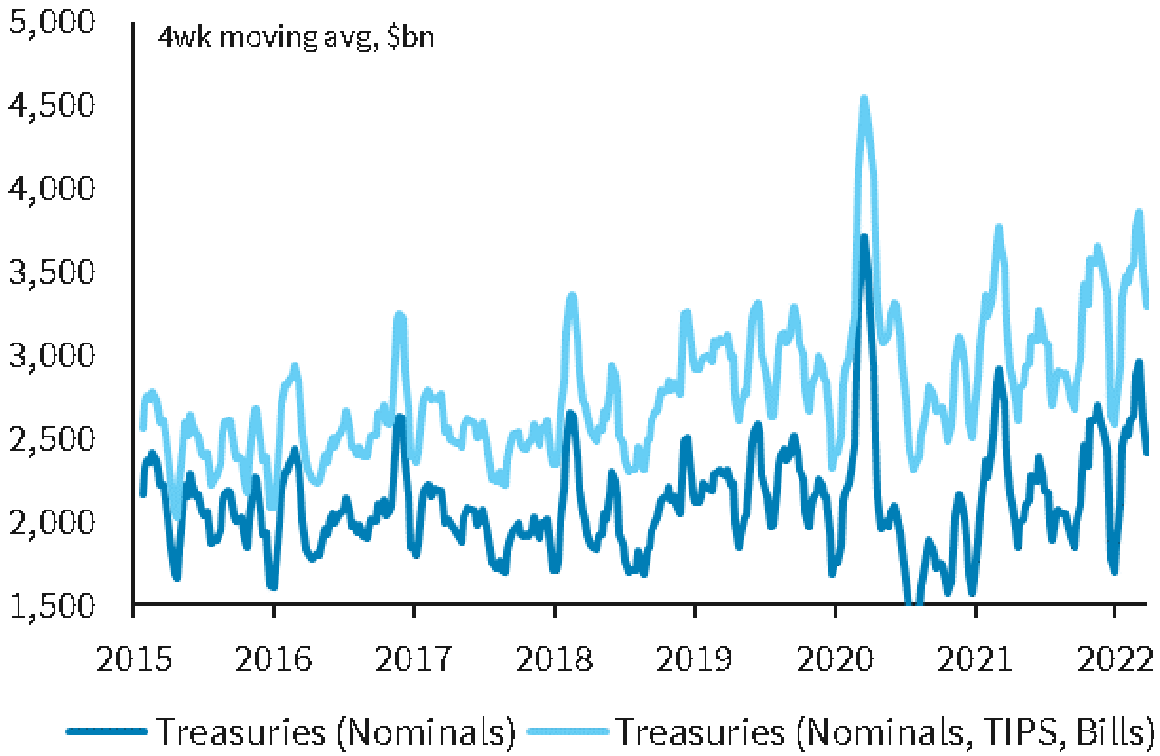
- Trading volumes haven't changed much in 2022 from prior years
  - Primary dealer volumes have trended a little higher
  - But turnover has been steady, despite a sharp rise in outstanding Treasuries
  - Volumes have risen most in shorter maturities, consistent with monetary policy uncertainty

- On the other hand, market liquidity has worsened on some other metrics
  - Bid-ask spreads have widened across tenors, but especially in 7s and 20s
  - Even as outstanding Treasuries have increased, intermediation capacity has not

- This worsening of liquidity appears to be in line with higher volatility in rates
  - Wider bid-ask spreads may, in turn, be contributing to the volatility of rates

Treasury trading volumes have risen, as outstandings have grown

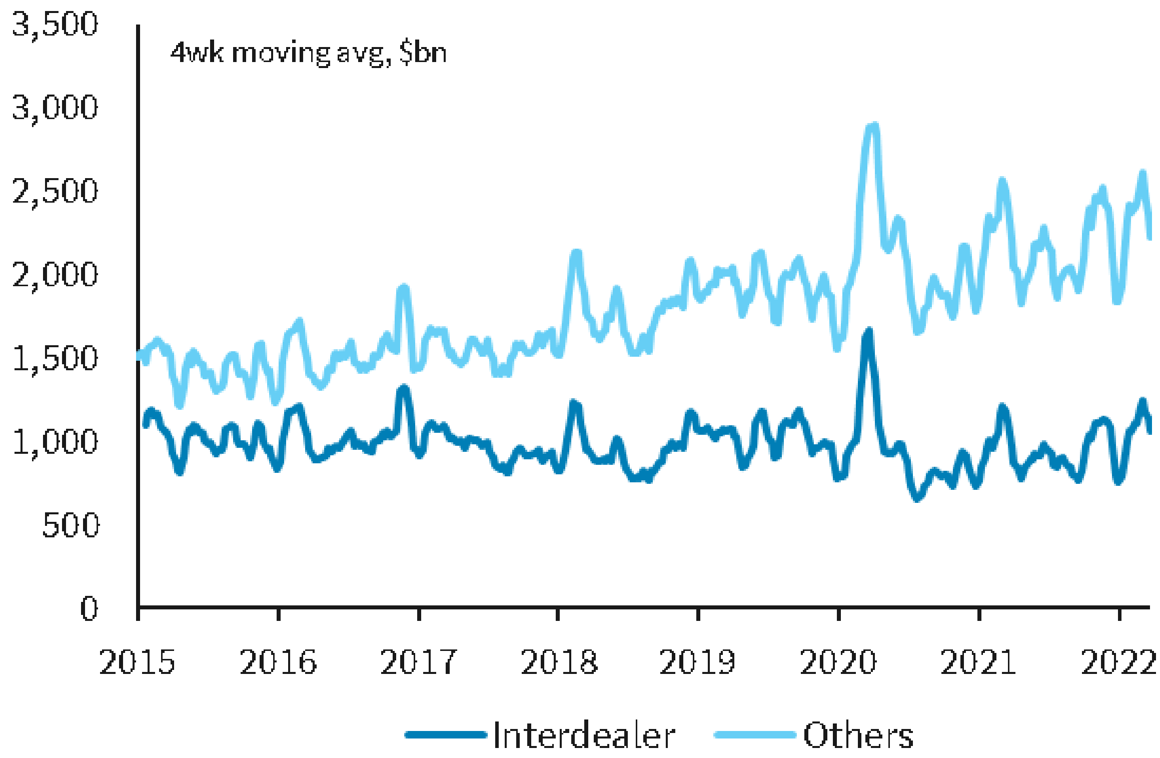
Aggregate primary dealer volumes



Note: Treasuries, TIPS and bills included in counterparty data, Source: NY Federal Reserve, Presenting Member Calculations

Dealer to customer transactions a bit higher in recent years

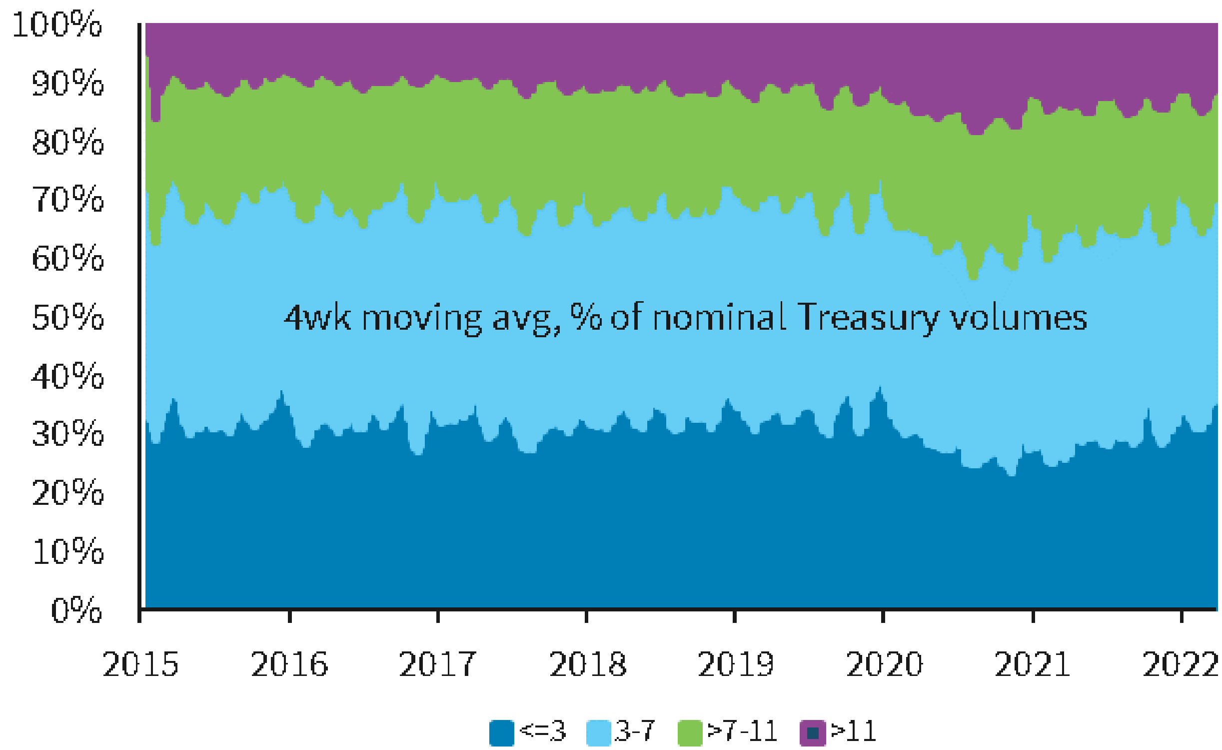
Dealer volumes with counterparty*



Note:Treasuries, TIPS and bills included in counterparty data *, Source: NY Federal Reserve, Presenting Member Calculations

Breakdown by tenors – 2022 looks similar to prior years

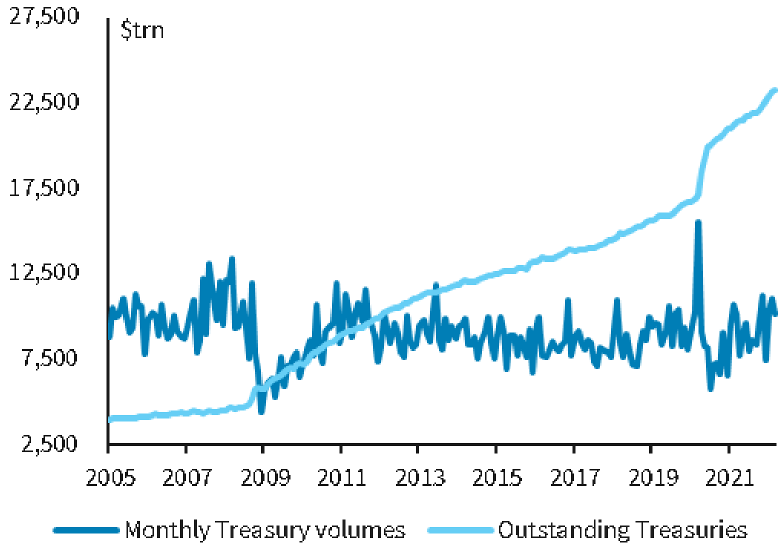
% of nominal Treasury volumes by tenor*

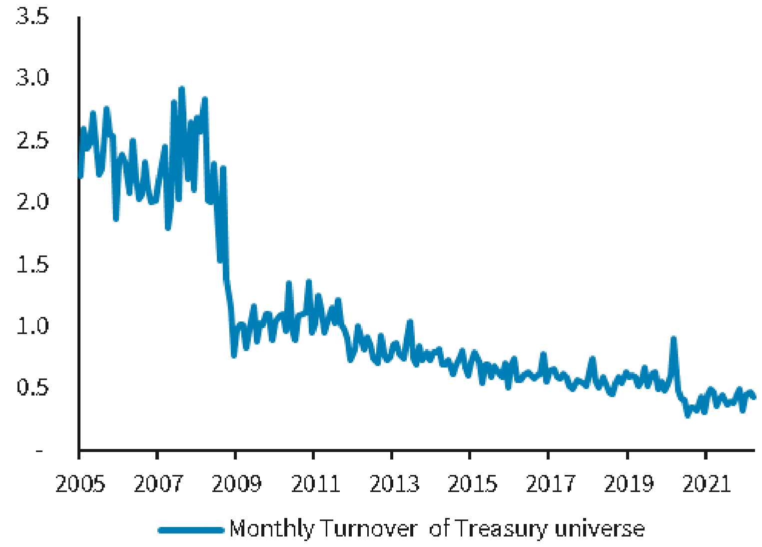


Note: Nominals only*, Source: NY Federal Reserve, Presenting Member Calculations

Turnover has dropped post Covid, but stabilized at lower levels

Average daily volumes as % of outstanding Treasuries

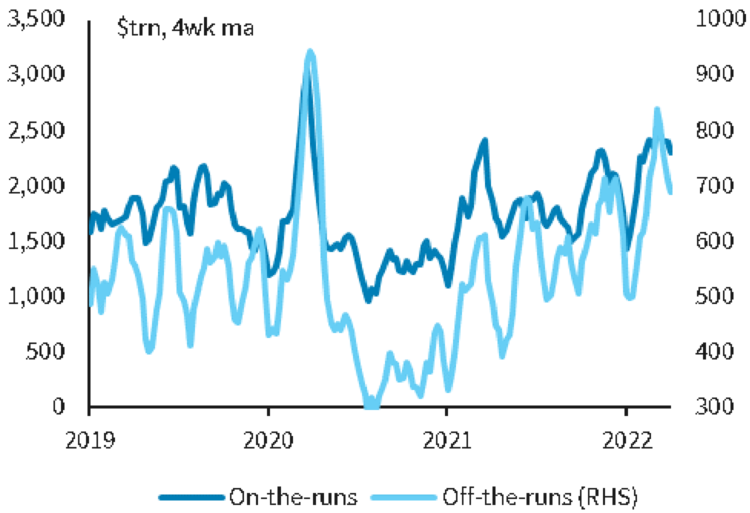




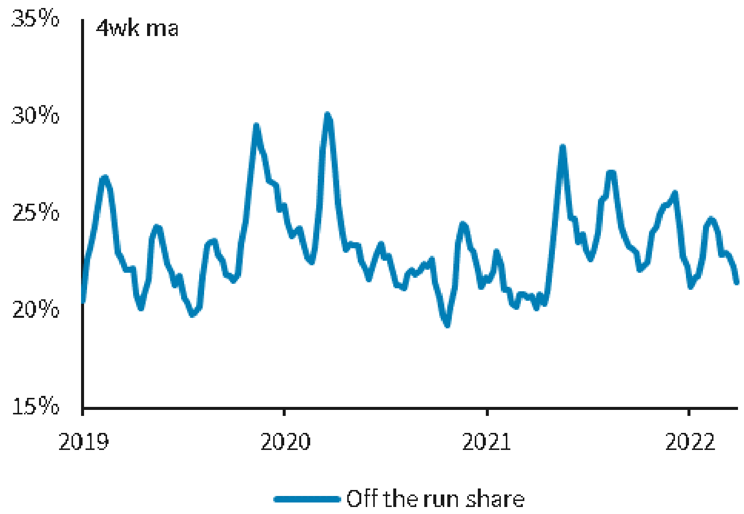
Note: Turnover = Monthly Treasury volumes / Outstanding Treasuries Source: US Treasury, Presenting Member Calculations

Off-the-run volumes have held up despite higher volatility

On-the-run vs off-the-runs volumes



Ratio vs Aggregate volumes

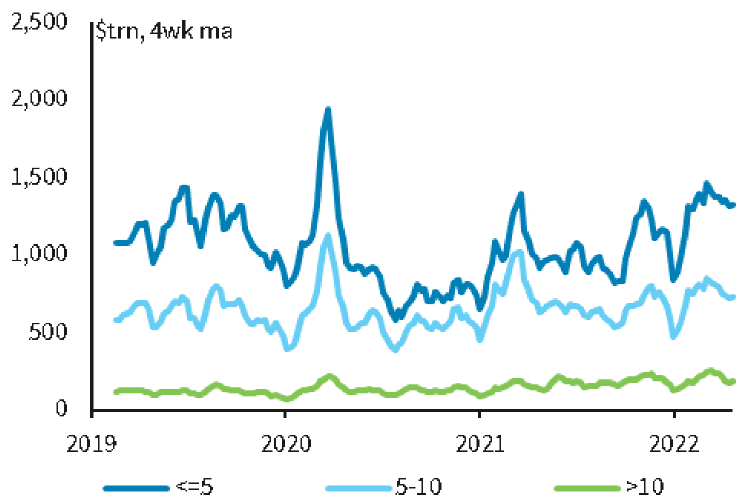


Note: Nominals only, Source: TRACE Treasury Aggregate Statistics

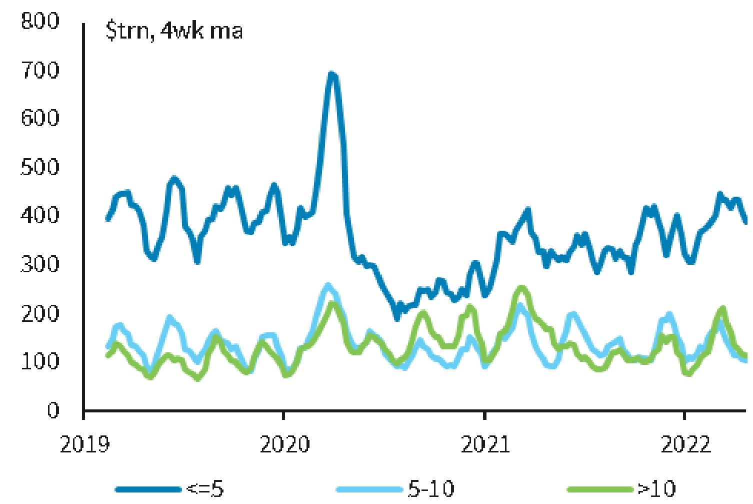
• Volumes have been elevated in shorter maturities

- Shorter maturities are more likely to react to greater monetary policy uncertainty

On-the-runs by tenor



Off-the-runs by tenor

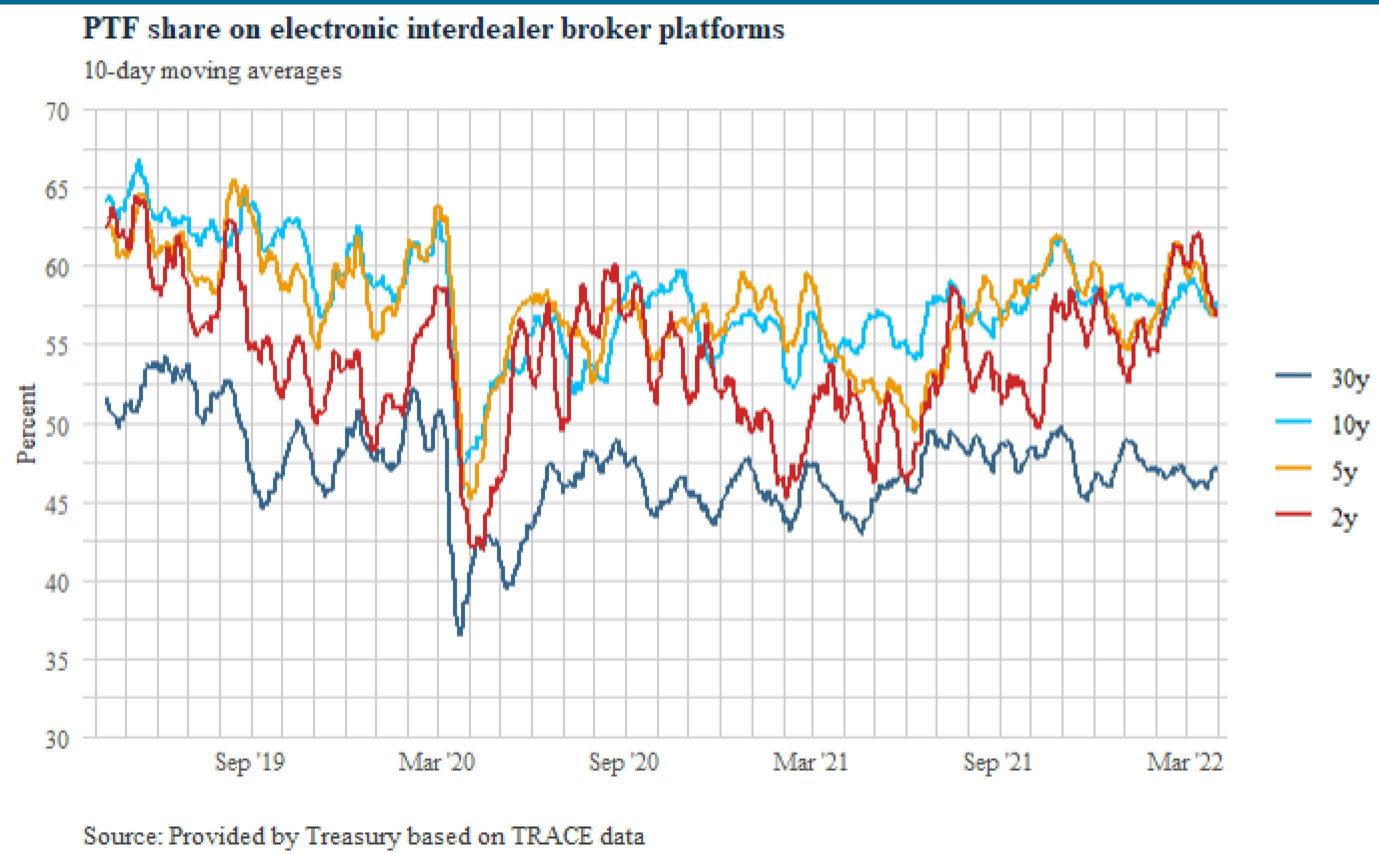


Note: Nominals only, Source: TRACE Treasury Aggregate Statistics

PTF share has been steady across tenors

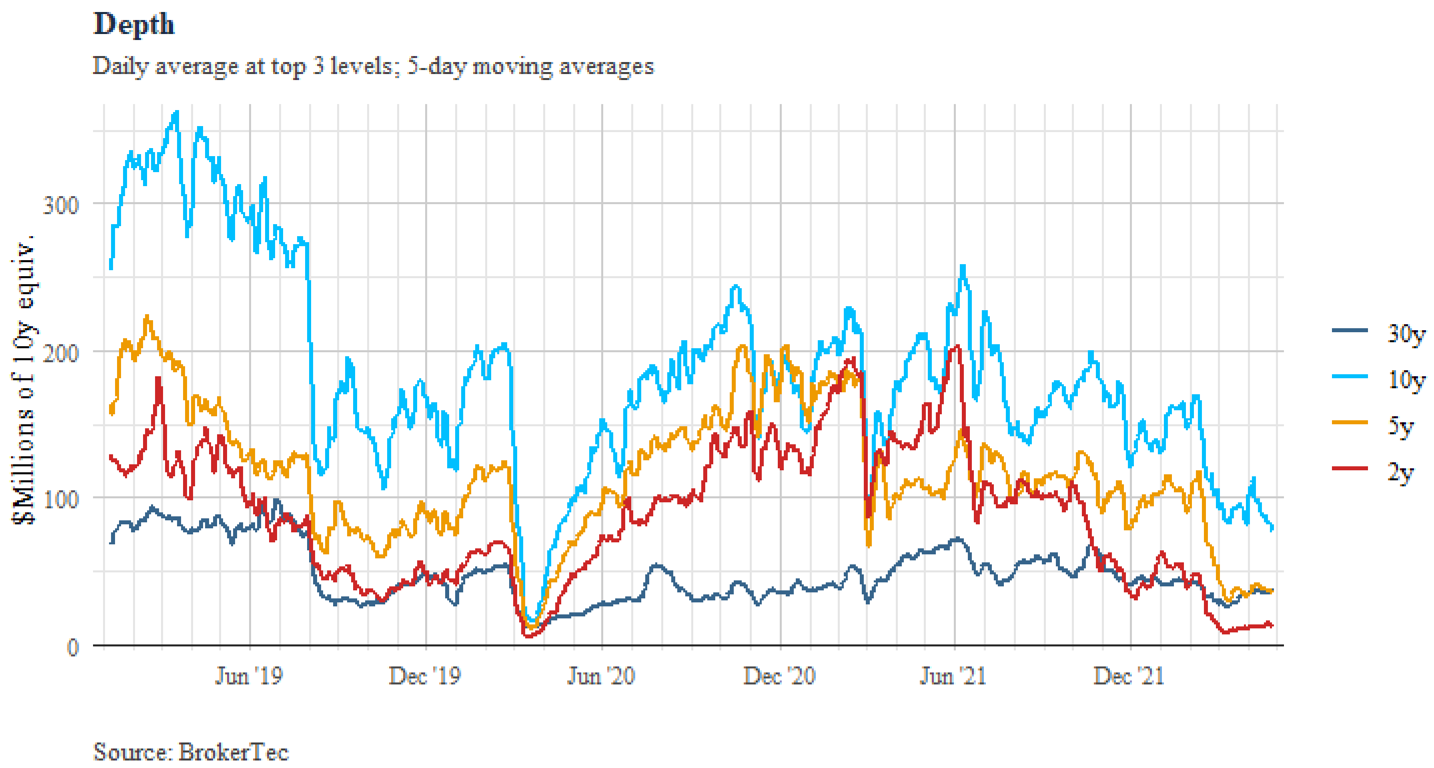
- PTF (principal trading firms) share of trading volumes in 2022 is in line with recent years

PTF share of trading volumes



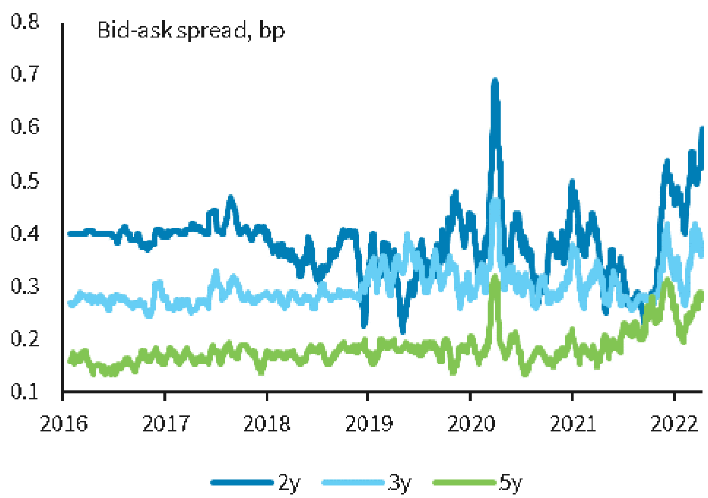
However, market depth has declined in recent months

Measure of market depth across tenors

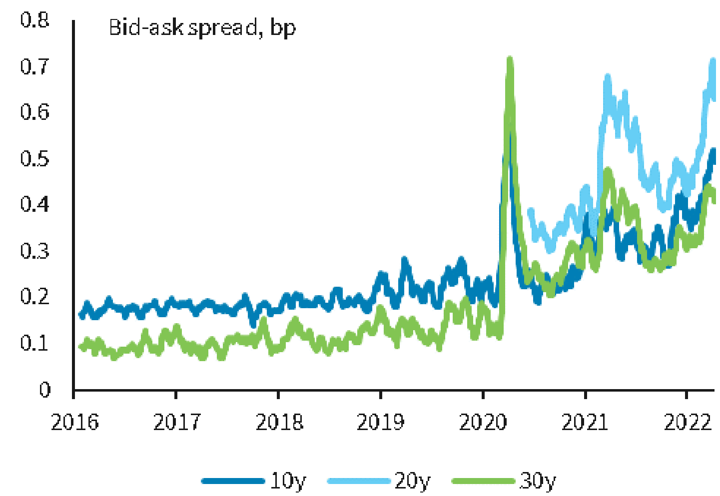


Bid-ask spreads have widened noticeably

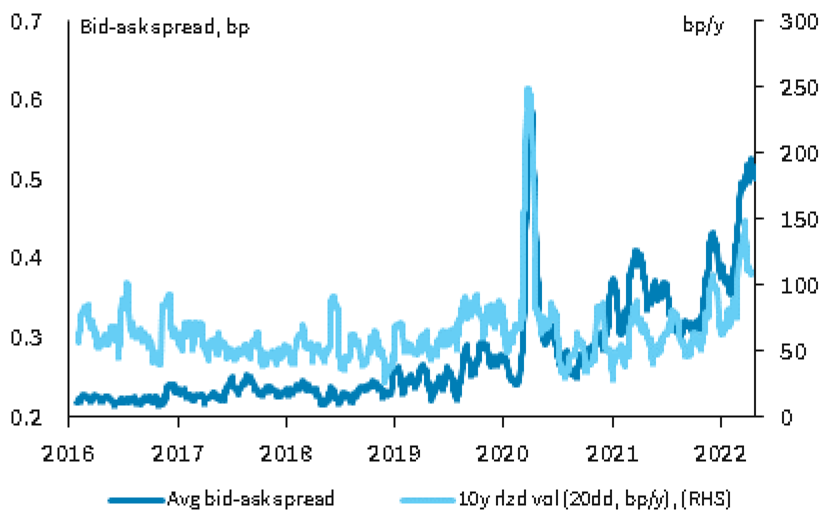
Front to intermediate on the run bid-ask spreads

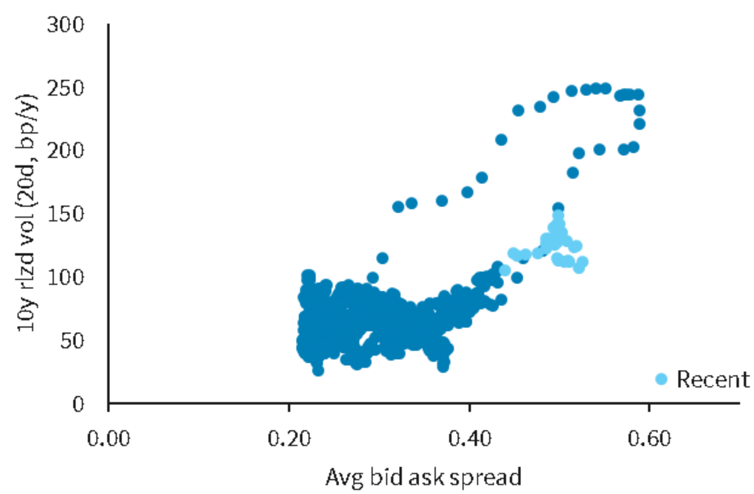


Long-end on the run bid-ask spreads



Bid ask spreads versus realized volatility

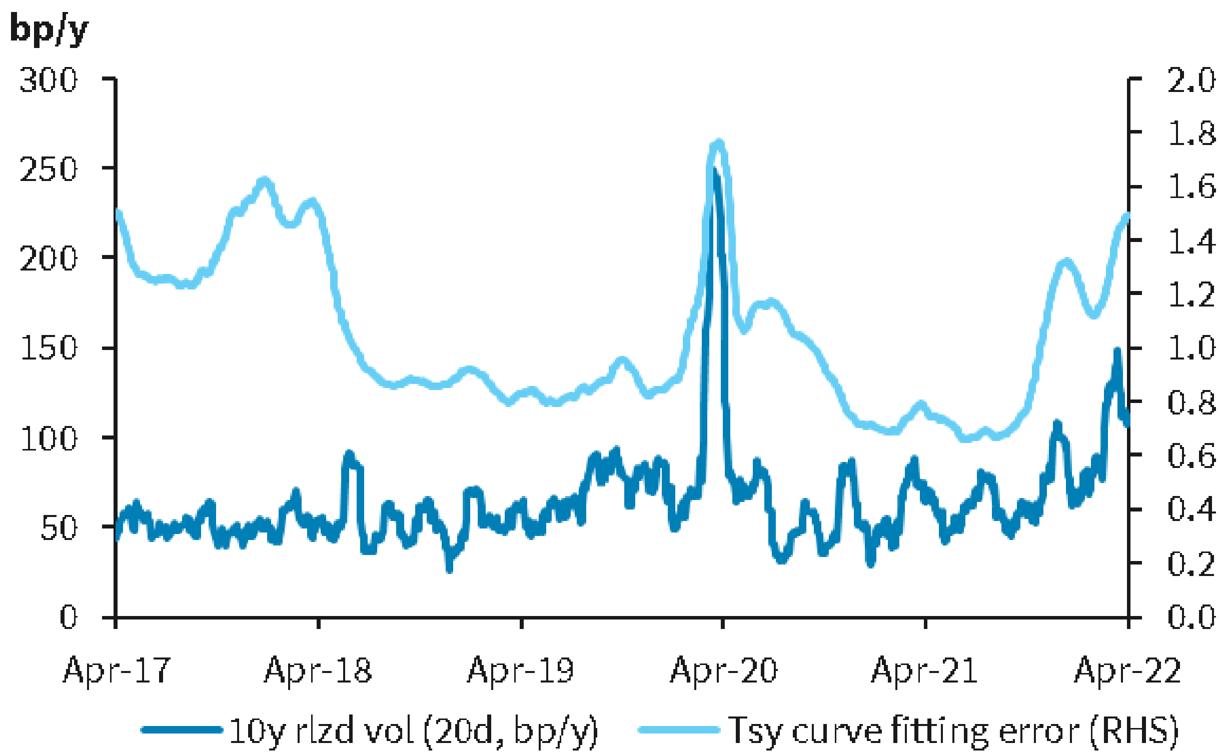




Note: Nominals only, 1m moving average shown, Source: NY Federal Reserve, Bloomberg, Presenting Member Calculations

Dispersion has risen in 2022 and is near March 2020 levels

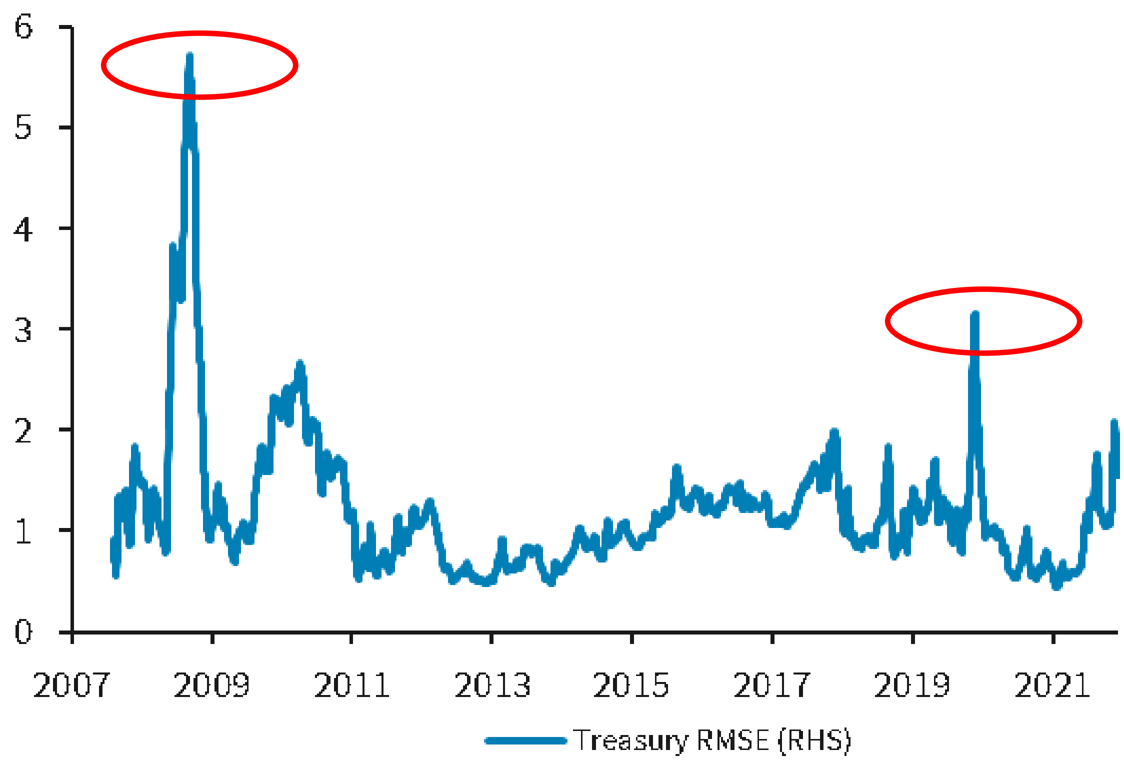
Bond volatility isn't always high when dispersion is elevated



Source: Presenting Member Calculations, Federal Reserve

Dispersion is not high by historical standards

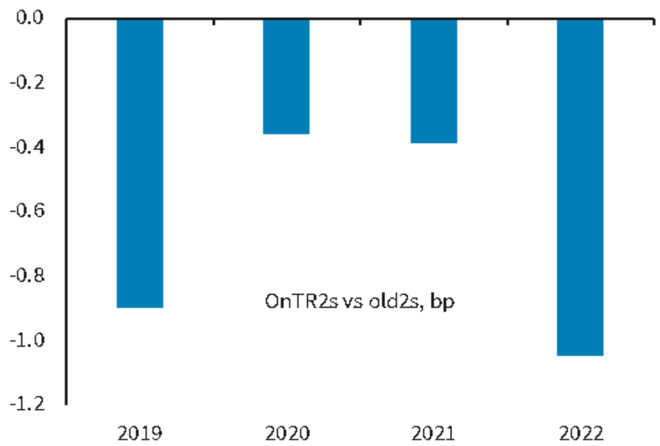
Dispersion in 2020 vs GFC



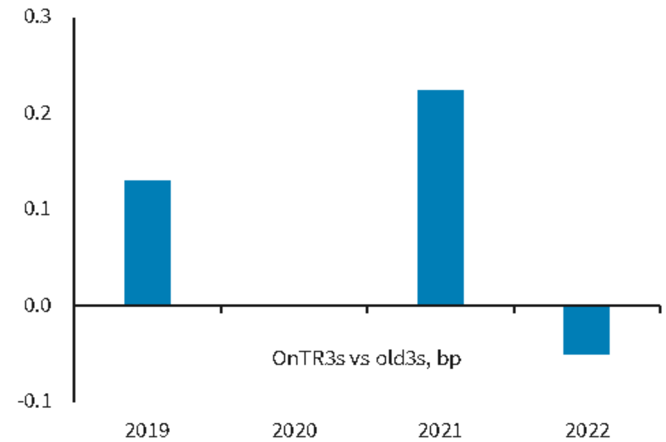
Source: Presenting Member Calculations, Federal Reserve

Liquidity premium has gone up across tenors

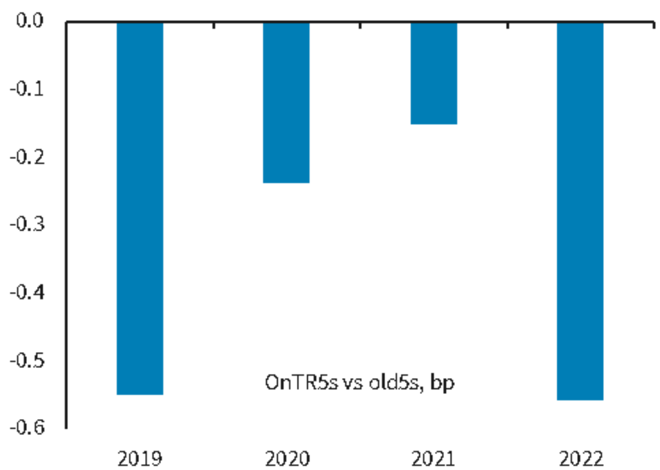
2y on-the-run liquidity premium



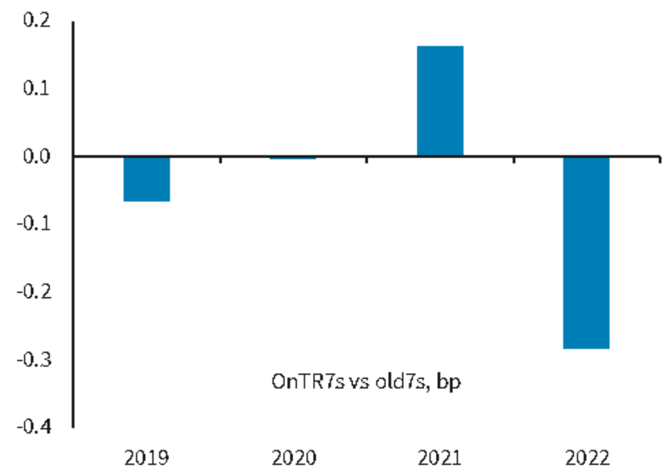
3y on-the-run liquidity premium



5y on-the-run liquidity premium



7y on-the-run liquidity premium

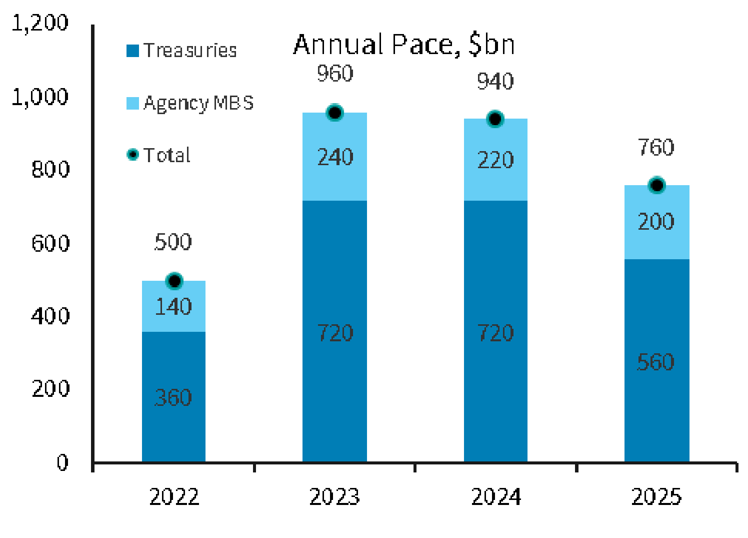


Liquidity premium estimated using swap curve, Source: Presenting Member Calculations

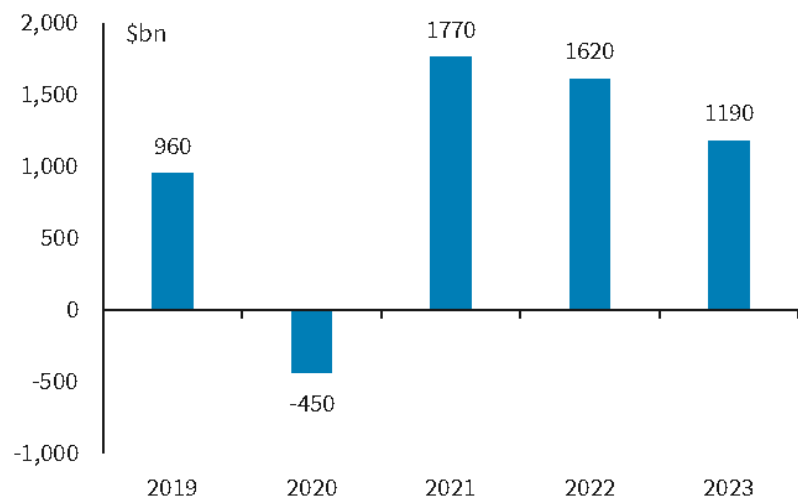
Upcoming balance sheet roll-off not a major factor for liquidity

- The Fed's portfolio could shrink by around $3trn by YE-25
- Despite balance sheet roll-off, net coupon supply to private sector is dropping next year

Pace of run-off



Coupon supply to private sector

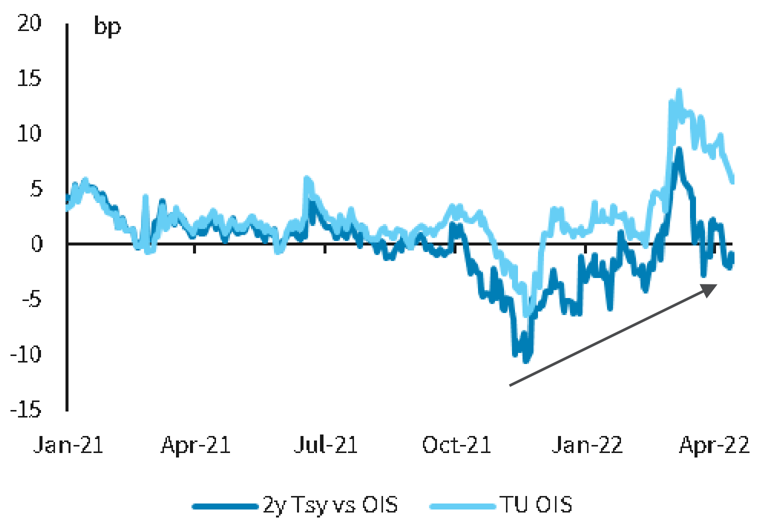


Source: NY Federal Reserve, Presenting Member Calculations

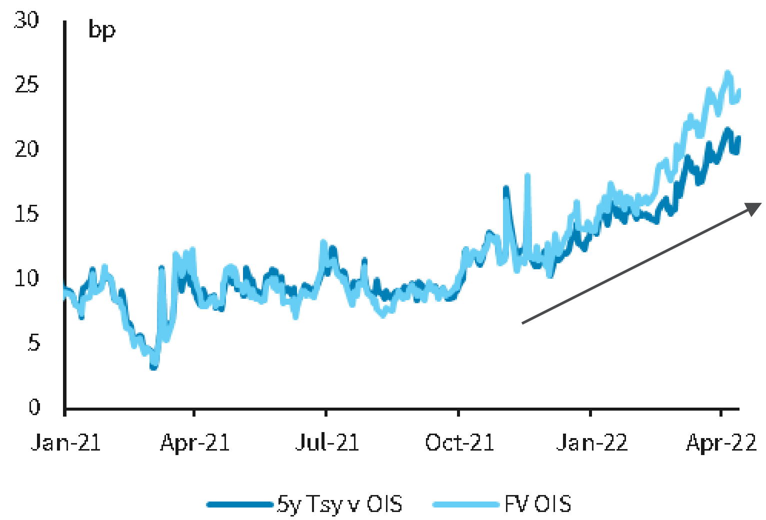
Markets have been preparing for the end of asset purchases for months

- Treasuries have been cheapening vs OIS since Q4'21
- Balance sheet roll-off is not a market functioning problem, it is simply an increase in coupon supply

On-the-run 2s and TU (vs OIS)



On-the-run 5s and FV (vs OIS)

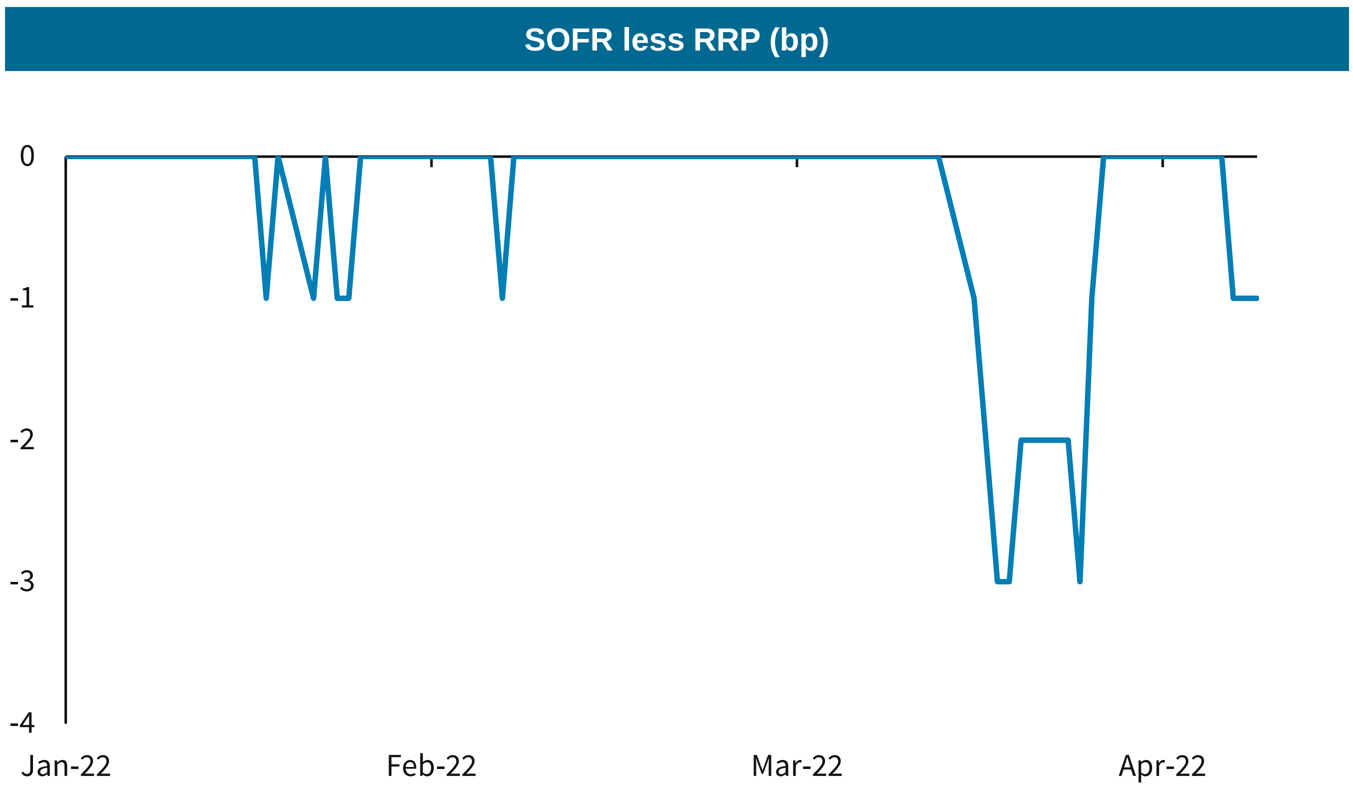


On-the-run vs OIS compared with TU futures invoice spread vs OIS, Source:, Bloomberg, Presenting Member Calculations

Funding market functioning is not a major concern

Investors need collateral, not cash

- Repo is trading below RRP floor because investor are awash in cash but need to borrow collateral

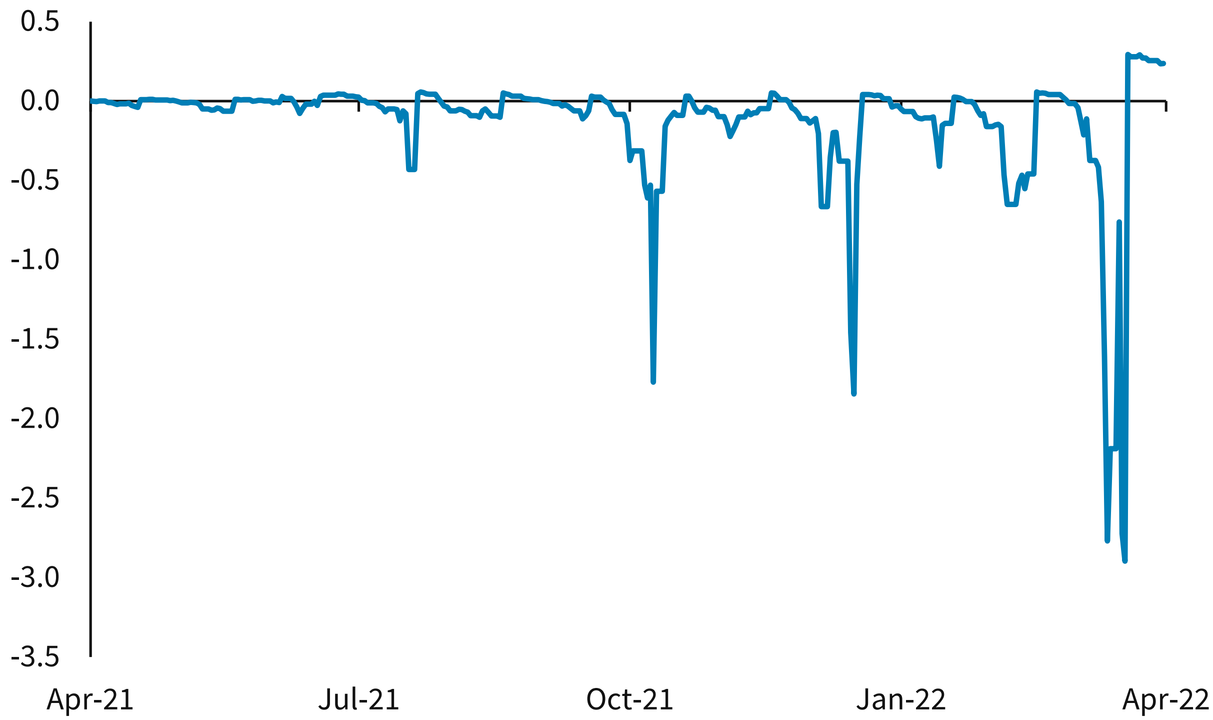


Source: Presenting Member Calculations, Federal Reserve

Deep short base in shorter tenors, and demand for collateral

- 2s do not normally trade rich in repo. Current richness is driven by an elevated short base driving a search for collateral, not cash

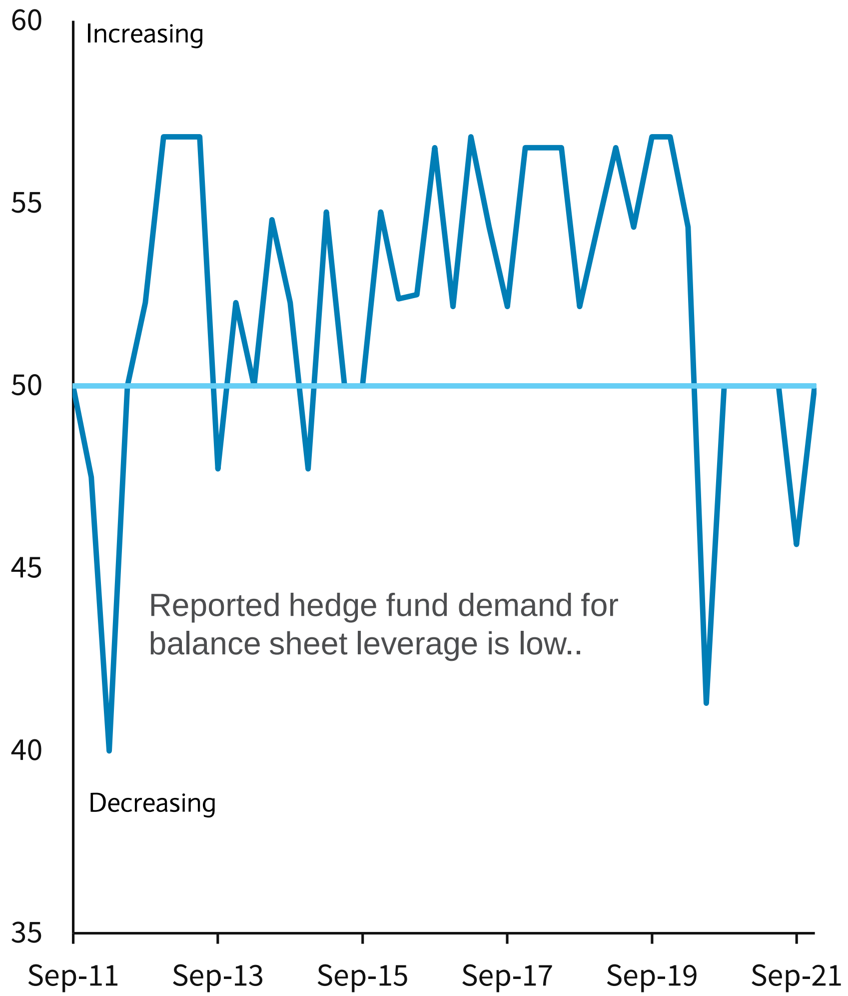
Treasury 2y OTR repo rate (%)



Source: Presenting Member Calculations, Federal Reserve

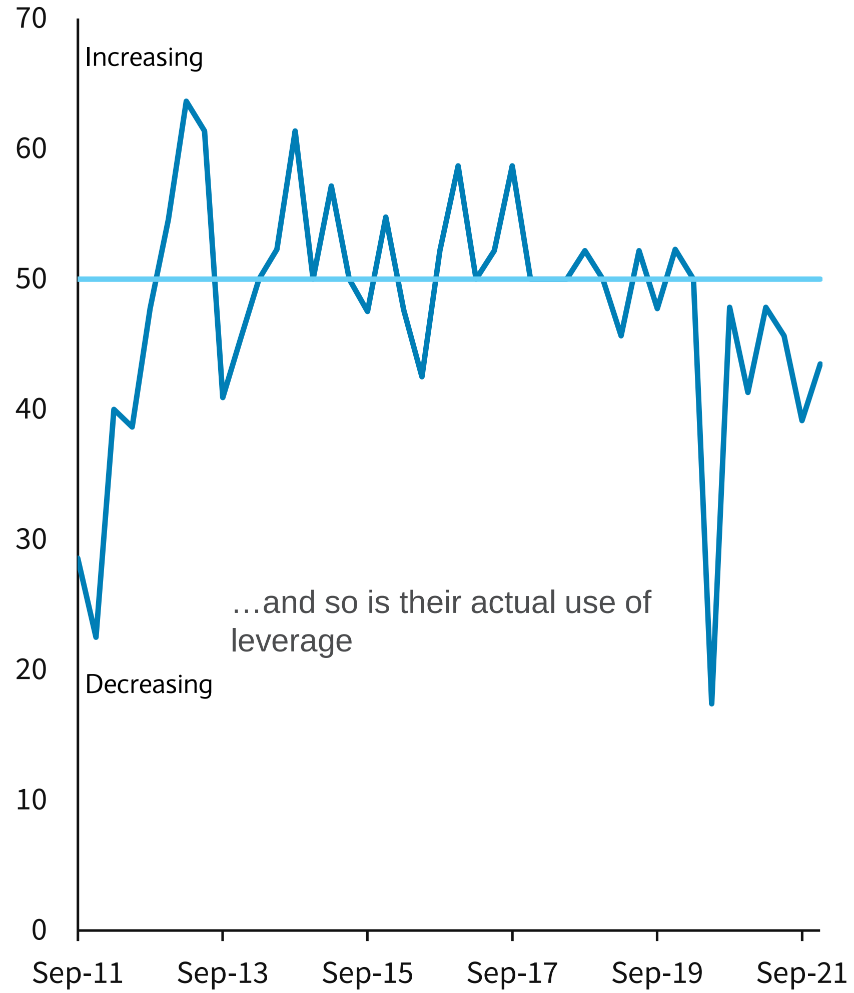
Levered investors' demand for balance sheet is low

Change in demand for leverage



Note: Diffusion index. Source: Federal Reserve, Presenting Member Calculations

Change in leverage use

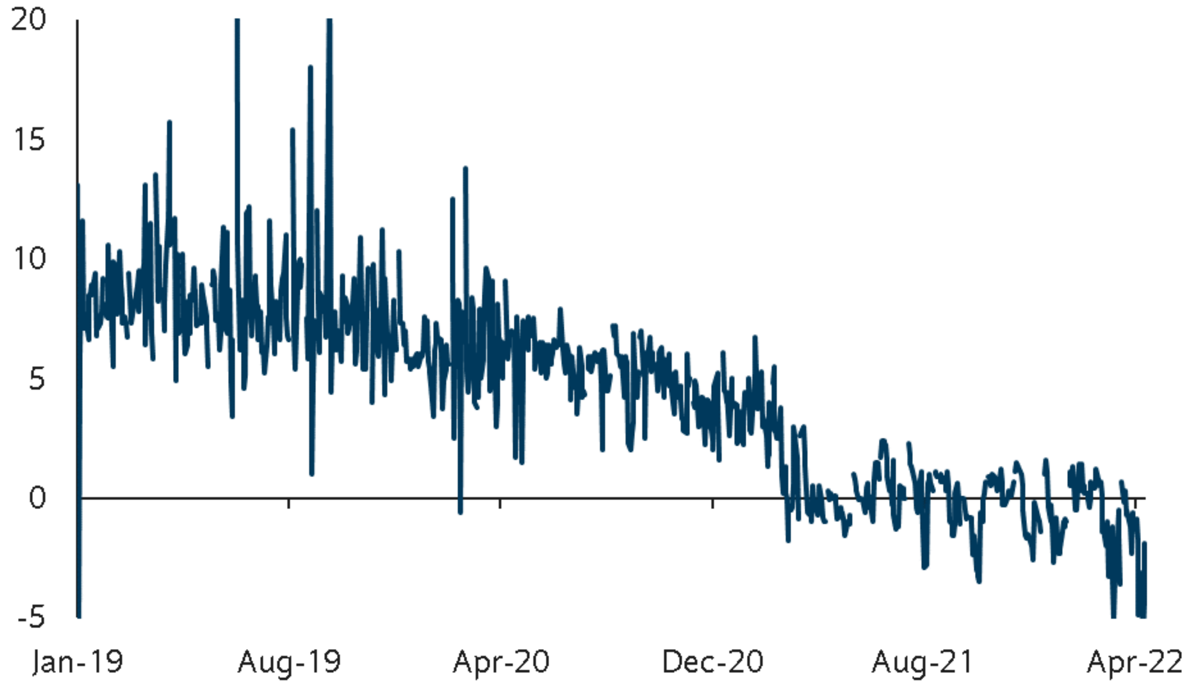


Note: Diffusion index. Source: Federal Reserve, Presenting Member Calculations

Balance sheet proxy shows no funding concerns

- Spread between overnight GCF and tri-party rates has evaporated. In other words, the spread between where dealers fund themselves and where levered investors borrow has shrunk dramatically.

GFC – triparty (bp)



Source: Presenting Member Calculations, Federal Reserve

Conclusion

Conclusion

- Realized volatility in the US Treasury market has risen in 2022
  - But much of the move is due to higher monetary policy and geopolitical uncertainty

- Most measures of traded volume do not suggest a significant worsening of trading conditions
    - PTFs' (and other liquidity providers) share of trading volumes is similar to past years
    - Bid-ask spreads have risen but are largely in line with the rise in policy uncertainty

- Funding markets show that investors are awash in cash, but need to borrow collateral
  - The spread between dealer funding costs and those of levered investors has dropped
  - Funding concerns are very low, and thus not a factor driving the rise in Treasury volatility

- But trading conditions and liquidity are admittedly hard to gauge precisely
  - And in prior periods of stress, intermediation demand has sometimes overwhelmed capacity
  - Treasury should remain vigilant, but we do not see an issue with market functioning at present