Considerations for Designing a Regular and Predictable Treasury Buyback Program

Treasury Borrowing Advisory Committee

January 31, 2023

TBAC Charge

Treasury continues to gather information regarding possible use cases and considerations for designing a potential buyback program. Most feedback to date has suggested that if Treasury were to consider a buyback program that it should be conducted in a regular and predictable manner, be used for liquidity support and cash management, and be neutral to the maturity structure of marketable debt outstanding.

Please discuss in more detail how Treasury could design a regular and predictable buyback program that could provide liquidity support as well as improve cash management. In your discussion, please outline the factors or indicators Treasury should consider when determining which Treasury securities to buy back. In addition, are there certain liquidity metrics that Treasury could monitor to consider whether buybacks are helping support liquidity? From a cash management perspective, what metrics could be used to measure the benefits? How should Treasury monitor whether buybacks are reducing costs for the taxpayer over time?

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Executive Summary

- Treasury buybacks could create significant value for Treasury and the taxpayer, but designing and executing a buyback program is highly complex and requires careful consideration.
- In keeping with overall debt management objectives, a buyback program should be regular and predictable and preserve the maturity structure of the debt.
- A Treasury buyback program could support overall Treasury market liquidity and provide cash management benefits.
- Buybacks could provide direct liquidity support to specific securities and sectors, but the ultimate liquidity goal should be to foster liquidity across the Treasury market.
- Buybacks could smooth large receipts / outlays throughout the year, reduce bill issuance volatility and support a liquid benchmark curve.
- Many sovereign issuers regularly conduct buybacks, largely concentrated in the front end of the curve.
- Buybacks in the <1y maturity and >1y maturity segments of the curve should be considered separately given the replacement funding impact on bills and on-the-run coupons, respectively.
- Effectiveness of buybacks should be monitored closely to assess support for both broad market liquidity and off-the-runs liquidity.
- Appropriate scale of buybacks should consider size and valuation of off-the-run securities, size of on-the-run securities, and specific cash management needs.

Recent TBAC Analysis on Buybacks and Guiding Principles

Recent TBAC Analysis on Buybacks

The August 2022 TBAC presentation, which encapsulates the 2015 study, concluded that:

- Potential benefits of buybacks include bolstering market function and thereby indirectly lowering the cost of Treasury financing, and directly saving taxpayers money by purchasing higher-yielding off-the-run securities and issuing lower-yielding on-the-run securities.
- The case for buybacks may have increased recently as debt outstanding has increased and market liquidity has deteriorated coincident with regulatory changes that have impacted dealers' intermediation capacity.
- Buybacks may help achieve other debt management goals including managing the debt maturity profile, managing the TGA, and reducing debt maturity peaks.
- Further study is warranted, in particular on the cost of larger auction sizes to the on-the-run liquidity premium. More analysis is also needed on how a program could be designed to provide Treasury flexibility while still operating within the well-established regular and predictable framework.

Guiding Principles

1. Operate within the "regular and predictable" framework to minimize negative externalities.
2. Main purposes are liquidity support and cash management.
3. Maintain neutrality to the maturity structure of marketable debt outstanding.
4. Be accretive to the taxpayer, through direct or indirect benefits.
5. Do no harm: mitigate uncertainties by approaching gradually and analyzing carefully.
6. Treasury buybacks are intended to support healthy market functioning but not mitigate episodes of acute stress in markets.

Guiding Principles: Buybacks for Liquidity Support

Two distinct aspects of liquidity support, both are valuable to Treasury market function:

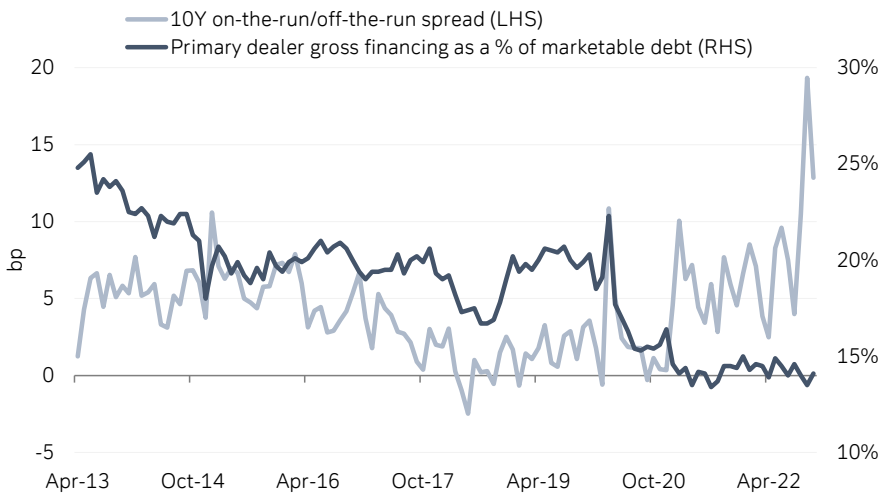
Indirect

- A successful buyback program should support Treasury market liquidity. Improving Treasury market liquidity reinforces a key feature of Treasuries, that they can be readily converted into cash with minimal market impact.
- An improvement in investor perception of Treasury market liquidity should make all Treasuries (including on-the-runs) more desirable, and in turn incrementally reduce Treasury's cost of financing.

Direct

- Buybacks can dampen the risk of any given off-the-run issue trading at idiosyncratically cheap levels.
- Historically, dealers played a larger role in achieving this outcome, but in recent years they are constrained by the size of their balance sheets relative to the size of the Treasury market.
- Treasury may generate small gains for the taxpayer by purchasing higher-yielding off-the-runs and replacing them by issuing lower-yielding on-the-runs, but the more important result is the expected improvement in Treasury market liquidity.

Dealers have lower capacity to finance USTs during acute market mispricing given the growth of Treasury market



Source: Treasury, Federal Reserve

Guiding Principles: Buybacks for Cash Management

Both short-term calendar-related and long-term cyclical reasons why buybacks can be an effective tool for cash management:

Calendar

- Treasury revenues and outlays may be lumpy, for reasons such as the timing of tax receipts or debt maturities.
- Buybacks of near-maturity securities can help to smooth the timing of these outlays, reducing volatility of the TGA and volatility of bills outstanding.
- This has come up from time to time in TBAC discussions with Treasury (e.g. Q1-2008 TBAC minutes: “A few members stated that Treasury should consider the repurchase of Treasury securities during particularly large debt maturity periods using seasonal large cash balances”).

Cyclical

- When the Treasury runs a surplus (for example 1998-2001), it may need to make decisions about how to best maintain its role as a regular and predictable issuer without overfunding.

Guiding Principles: Neutral to the Maturity Structure of Debt

- A buyback program should not meaningfully impact the maturity structure of the marketable debt outstanding.
    - Longer-term adjustments to the Treasury debt WAM profile are best carried out by adjusting the size and distribution of issuance.
- Treasury could replace buybacks of off-the-run securities in a given sector of the curve with additional on-the-run issuance in the same sector.
- Buybacks in the <1y sector could be funded by issuing more bills with maturities that can best match the seasonal swings of funding needs.
- Buybacks of off-the-runs could be financed primarily with increased issuance of on-the-runs.
- Treasury should balance this guiding principle with practical considerations involved in the debt issuance process. The potential for *de minimis* changes in the maturity structure of marketable debt should not be an impediment to enacting a buyback program.

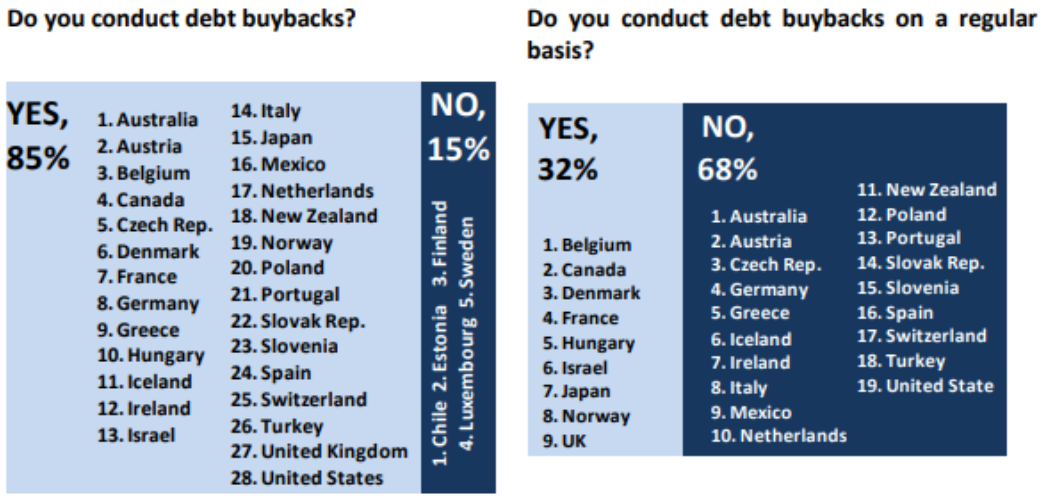
Observations from Global Sovereign Buyback Programs

Overview of Buyback Programs Across OECD Countries

A 2012 OECD working paper provides helpful historical guidance on the role of buybacks across OECD sovereign bond markets. Our recent conversations with DMOs suggest that the broad conclusions remain accurate.

- Most sovereign issuers have a buyback program in place, and many conduct buybacks on a regular basis.
- Primary reasons for buybacks are to smooth redemption profile, followed by liquidity enhancement and cash management.
- Buybacks tend to be focused on shorter dated (<2y) maturities. 25 of 27 DMOs (93%) reported targeting bonds that are nearing redemption. 12 DMOs (44%) indicated using some measure of illiquidity as a criterion.

Table 2: Regularity of the use of buybacks in OECD countries



Source: 2012 Survey on Buyback and Switches by OECD WPDM

Table 6: Reasons for buybacks in OECD countries

	To increase liquidity	To smooth the redemption profile, mitigate the refinancing risk	To offset large cash income and remove small stocks	To correct distortions in the secondary market due to Central Bank purchases of government securities
Austria		X	X	
Belgium	X	X	X	
Canada		X		
Czech Rep.		X		
Denmark	X	X		
France		X		
Germany		X		
Greece	X	X	X	
Hungary		X		
Iceland	X			
Israel	X	X	X	
Italy		X		X
Japan	X			
Mexico		X		
Netherlands			X	
New Zealand	X		X	
Poland		X		
Portugal		X		
Slovak Rep.		X		
Slovenia	X	X	X	
Spain		X		
Turkey		X		
United Kingdom		X	X	
United States	X		X	
TOTAL	**9**	**19**	**9**	**1**

Source: 2012 Survey on Buyback and Switches by OECD WPDM

This refers to previous surplus era program.

Size, Scale from Four Representative Sovereign Issuers:

- Canada, France, Belgium and Australia have regularly bought back 20-30% of gross issuance or more.
- WAM of buybacks is short, predominantly < 1.5 years.
- On the subsequent slides are further details on two of the programs as representative case studies.

Annual Buybacks, Bn Local Ccy

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Canada	24.1	33.9	35.7	30.2	32.7	24.0	29.7	42.8	47.1	31.1	14.1	-	1.5
France	2.4	5.7	6.6	5.2	16.1	18.6	14.1	26.7	30.6	45.5	29.3	25.1	26.1
Belgium	9.2	11.1	9.6	10.1	6.7	7.1	7.1	8.2	6.9	5.9	1.6	2.7	1.7
Australia	-	-	-	-	2.1	9.0	17.9	20.2	26.3	15.9	2.4	-	-

Annual Buybacks, % of Gross Issuance

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Canada	26%	34%	41%	33%	35%	27%	24%	31%	45%	28%	4%	-	1%
France	2%	5%	7%	3%	9%	9%	7%	14%	15%	20%	11%	10%	10%
Belgium	23%	29%	22%	25%	21%	20%	19%	23%	20%	20%	4%	7%	4%
Australia	-	-	-	-	3%	11%	18%	21%	41%	31%	1%	-	-

Buyback WAM

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Canada	1.41	2.00	1.50	1.37	1.34	1.08	1.08	1.22	1.23	1.47	2.77	-	0.38
France	0.59	1.07	1.65	1.08	1.19	1.06	1.20	1.21	1.35	1.29	0.84	0.85	0.61
Belgium	0.60	0.71	0.58	0.56	0.57	0.55	0.54	0.55	1.25	1.85	0.83	1.13	1.16
Australia	-	-	-	-	1.31	0.30	0.77	1.05	1.18	1.39	1.67	-	-

Source: Refinitiv, Presenting Member Calculations

Canada: Three Forms of Buybacks

Buyback Type	Goals	Eligibility	Implementation
Cash management bond buybacks (CMBB)	1. Manage cash balances 2. Smooth variation in bill issuance	1. CGBs < 18m maturity 2. Amount outstanding > $12B 3. Free float (ex-BOC) > $8B	Weekly process
Outright (bond buybacks on a cash basis)	1. Enhance liquidity	1. Illiquid high coupon bonds 2. Large off-the-run bonds 3. Maturities 1y to 25y, excluding OTR benchmarks	Typically, on Wednesday following nominal bond auction
Switches	1. Enhance liquidity 2. Maintain issuance of on-the-run benchmarks	1. Illiquid high coupon bonds 2. Large off-the-run bonds 3. Maturities 1y to 25y, excluding OTR benchmarks	Duration neutral exchange of illiquid bonds into benchmark bonds

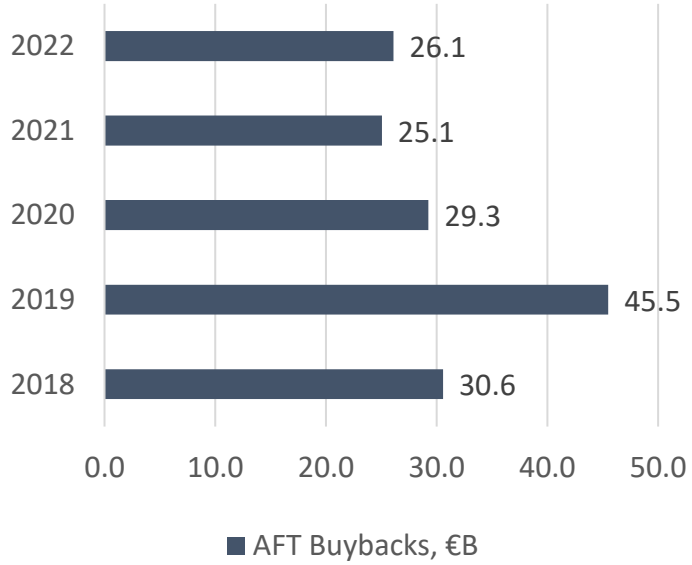
France: OTC Buybacks for Smoothing Redemptions

France's AFT has been conducting buybacks since 2000:

- The initial goal was to increase issuance and ensure sufficient liquidity for benchmark maturities. Over time, the objective has shifted to smoothing redemption profiles and spreading future issuance more evenly.
- Limited to 2 years or shorter maturities.
- Buybacks conducted via secondary market OTC operations or as reverse auctions, although only OTC buybacks in recent years.
- Buyback decisions factor in market conditions, including liquidity and price.

Other France debt-management programs:

- Securities swaps (inactive since 2008): Replace old, illiquid securities with those in higher demand via auctions or syndicated deals.
- Interest-rate swaps (suspended since 2002): Reduce average maturity of residual debt, achieving a balance between lower interest expense and greater variability of expense.

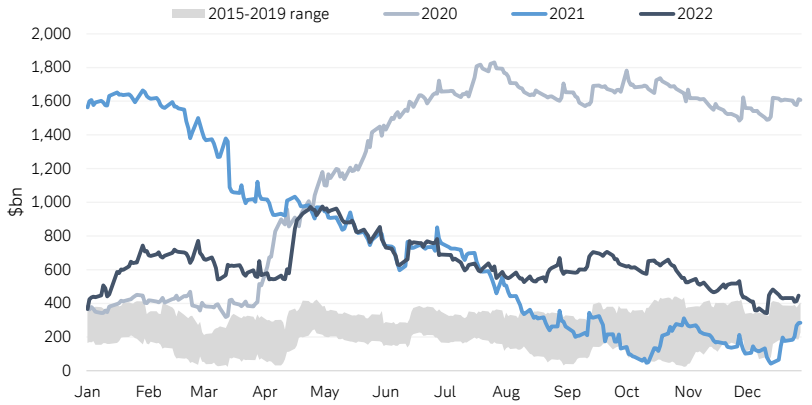


Buybacks From a Cash Management Perspective

An Additional Tool for Treasury's Cash Management Strategy

- Treasury's cash balance policy is to hold sufficient funds to cover its one-week ahead cash needs (including the gross volume of maturing marketable debt), subject to a minimum balance of roughly $150bn.
- Bills are used as an issuance "shock absorber"; Treasury's cash above its policy minimum is effectively funded by bill supply.
- Viewed narrowly from a debt management perspective, the cost of carrying a TGA balance materially in excess of the policy minimum could be viewed as being the full cost of bill issuance to fund the excess balance, as the TGA does not earn interest.
    - That said, additional TGA balances displace Fed liabilities that otherwise would earn IORB. Since the Fed remits its net income to the Treasury, on a consolidated basis the cost of excess TGA balances is limited to the difference between the rate Treasury pays on marginal bill issuance and IORB.
    - However, the interaction of changes in the size of the TGA with bank reserve balances could contribute to short-term funding market strains, particularly if the level of reserves is low. This is an additional factor making a more stable level of the TGA desirable.
- In recent years, economic and policy uncertainty has increased the frequency of Treasury holding elevated cash balances, while structural changes have increased overall demand for bills.
- Circumstances when debt limit suspensions were not granted on a timely basis have created the need for Treasury to shed cash balances quickly.
- Buybacks could be an effective tool to reduce excess cash balances without relying solely on shrinking bill supply, which could help Treasury achieve a smoother pattern of bill issuance. This could be especially important when bill-share is approaching the bottom of TBAC's 15-20% recommended range.

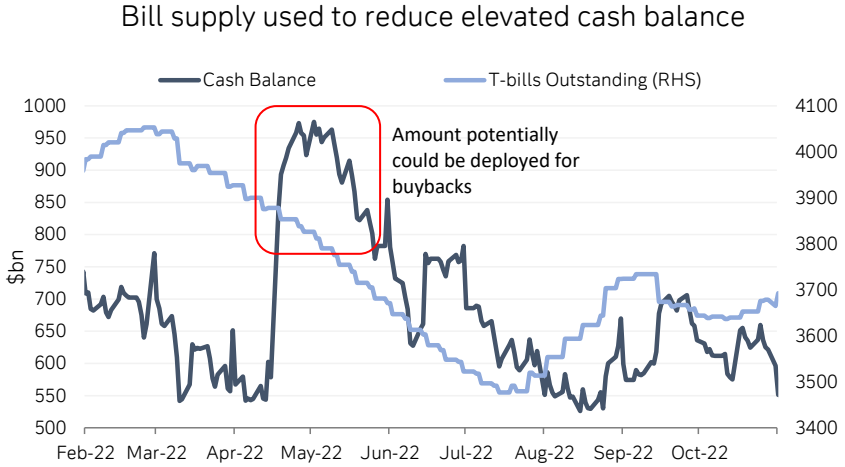
TGA balances have been elevated and more volatile in recent years



Source: Treasury

Case Study: Buybacks After a Record Tax Season in 2022

- April 2022's tax receipts were the largest on record, driven by strong wage gains and pandemic-related legislation. This helped push the TGA balance to $975bn at its peak.
- Between March and July, Treasury paid down more than $500bn of bills to reduce its cash balance closer to target. This caused a decline in bill share of total marketable debt from 17.5% to 15.1%, near the bottom of the TBAC's recommended range.
- Treasury could have bought back short coups to shed its excess cash more quickly while minimizing the impact to bill supply.
- We estimate that completing $300bn in hypothetical buybacks during this period could have lowered Treasury's interest expense by ~$225mm*.
- Alternatively Treasury could have combined short coup buybacks with a similarly fast reduction in bill supply, which would have allowed for a faster reduction in TGA balances.



Source: Treasury

*Calculations: *$300bn buyback of short coups between 6m and 12m maturity (average 9m maturity) * 0.10% spread between short coups and bill auction rate; $300bn*0.001*9/12 = $225mm*

Additional Use and Measuring the Benefits

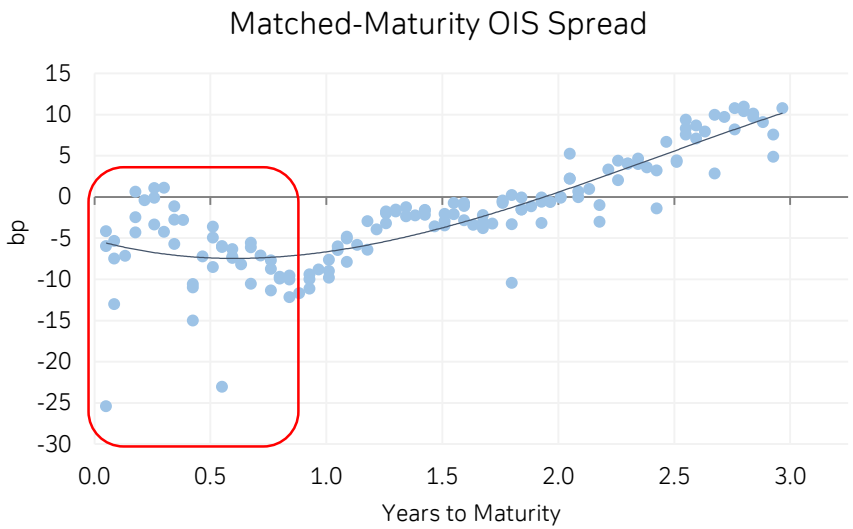
- Treasury can pursue cash-management buybacks as an independent objective. Alternatively, it can step up purchases of short coups during calendar periods of excess cash inflows, such as late April and after quarterly corporate tax payment dates.
- Treasury could also use buybacks to reduce the maturity peaks in outstanding debt, which can help smooth its redemption profile.
- Buybacks for cash management purposes (a) could be conducted proportionally across the curve; or (b) if the expectation is that the cash management would later be funded by bill issuance, then buybacks should primarily be maturities < 1yr.
- Overall capacity for buybacks of short coups is large, as there is currently ~$2T privately-held short coups outstanding and a steady supply ($100bn-200bn per month) rolling into the 12m maturity window over the next several years.
- Effectiveness of cash management buybacks could be measured by observing:
  - Smaller seasonal variation in bill issuance sizes.
  - Bill-share more consistently staying within TBAC's recommended 15-20% range.
  - Less feed-through of volatility in bill rates into other money market rates.
  - More efficient Treasury cash balances relative to cash balance policy.
  - More closely matched actual versus assumed end-of-quarter balances.

Buybacks for Liquidity Support, Maturities <1y

A Dichotomy Between Bills and Short Coups

- Notes and bonds that have rolled down to a maturity of < 1y (often referred to as “short coups”) with maturities between 6m and 1y tend to trade at wider spreads while exhibiting significant yield dispersion compared to like-maturity bills.
- The increased dispersion of asset-swap spreads for issues below the 1y maturity point also indicates idiosyncratic trading behavior and is consistent with poor liquidity.
- Yield spreads of 10 to 20bp between short coups and bills of comparable maturities are not uncommon.
- Investors who own short coups often confront wide spreads if they try to sell large sizes, which in some cases could affect desired investment decisions.
- Buybacks in this sector could reduce yield dispersion while increasing liquidity for holders of short coups.
- If six to twelve month short coup buybacks were funded with any combination of maturities across the bills curve, the impact on WAM would be *de minimis*. We estimate the WAM impact to be less than 0.05 months for even large buyback programs.

Wide dispersion of ASW spreads below 1y maturity

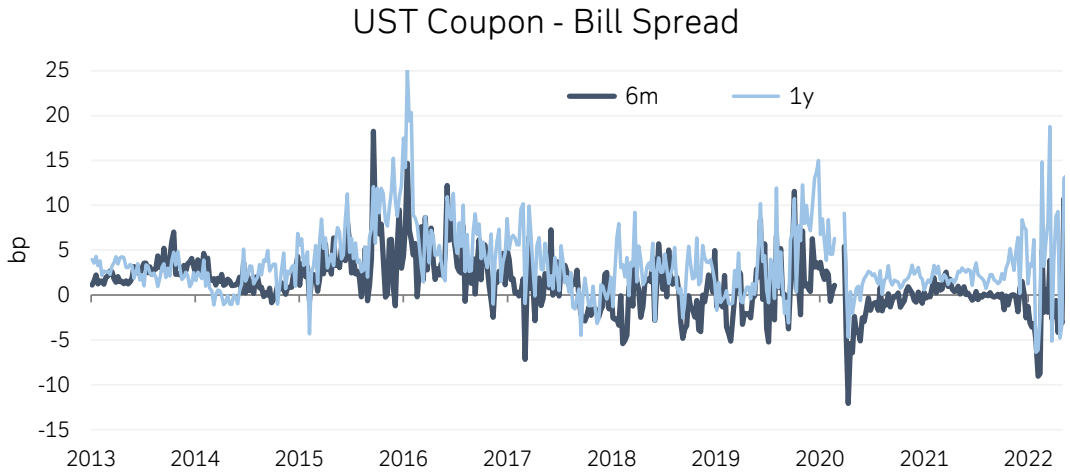


Source: Deutsche Bank (Jan 27, 2023 snapshot)

Enhance Liquidity by Freeing Up Dealer Balance Sheet

- Indexers managing against the Bloomberg US Aggregate Index (the “Agg”) become forced sellers of short coups when these securities shorten to maturity <1y and drop out of the index.
- Short coups absorb valuable space on dealer balance sheets, as the velocity of dealer balance sheet in bills is higher than in short coups.
- Front end purchases are the most common focus of other DMOs conducting buybacks in sovereign markets, both for cash management and liquidity support purposes.
- Treasury is uniquely positioned to convert less liquid short coups into more liquid bills. This would enhance liquidity not only for the short coups, but also for the entire Treasury market, as it would free up dealer balance sheet that could be deployed further out the yield curve.

Short coups tend to trade cheap to similar bill maturities, with some notable exception periods, including recently.



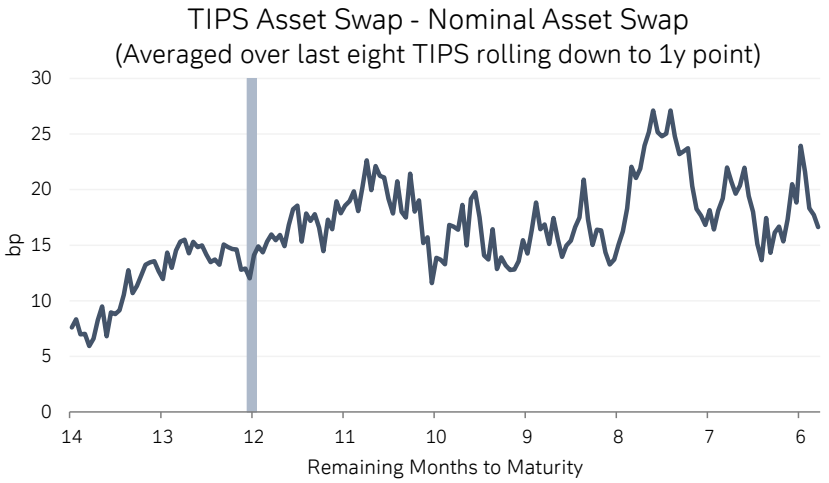
Source: Deutsche Bank par spline series for coupons; Bloomberg GB6 and GB12 series for bills.

Buybacks of Short Maturity TIPS

- TIPS with maturity < 1y pose a similar or perhaps greater liquidity challenge than short coups.
- The returns of TIPS with maturity < 1y are highly sensitive to short term fluctuations in inflation, while providing minimal diversification for investors to changes in longer term inflation expectations. As a result, there is minimal real demand for these securities.
- Instead, the short maturity TIPS market is dominated by arbitrageurs who demand high expected returns in exchange for holding these bonds and hedging with gasoline futures and other short term inflation proxies.

- By conducting buybacks of short-maturity TIPS funded by issuing bills, Treasury could effectively enhance liquidity to the broader TIPS sector, potentially creating additional demand for longer maturity TIPS. We suggest funding with bills instead of TIPS for practical reasons, since currently the shortest newly issued TIPS is five-year maturity.
- Treasury can evaluate short dated TIPS valuation by monitoring asset-swap levels versus CPI swaps; there is no need to do additional inflation modeling.
- Given that the short maturity TIPS sector is relatively small, this could be a topic that Treasury marks for further evaluation, rather than a priority to implement in an initial buyback program.

TIPS cheapen to nominals (on asset swap) as they roll to less than one year to maturity

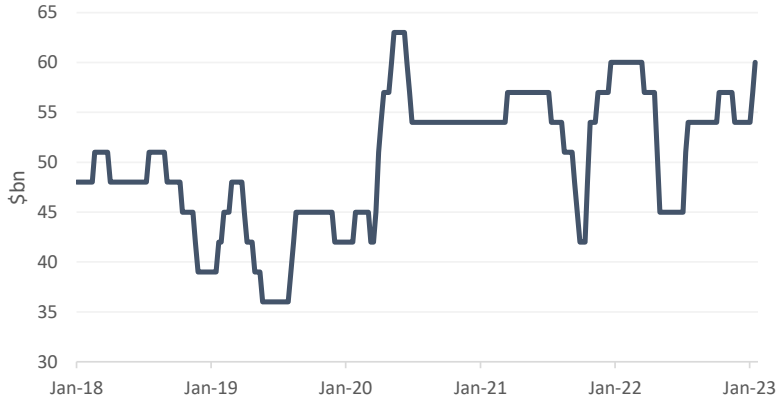


Source: Deutsche Bank

Funding Buybacks of Short Maturity Treasuries

- Although there are ~$2.6 trillion of short coups outstanding (31% of which is held in SOMA), it is unclear how large the supply of available free float is after accounting for securities that may have been stashed away and are unlikely to ever be traded.
- It is possible, however, that there could be significant supply as some investors who currently feel constrained to hold these positions to maturity might instead choose to sell if there were enhanced liquidity.
- The main constraint on Treasury's ability to absorb this supply would be demand for the additional bills that Treasury would need to issue to fund these purchases.
- Treasury could choose to fund these purchases with additional issuance across the bills curve. Historically there has been more variability in sizing of shorter maturity bills than 52-week bills, but Treasury could take into account supply demand dynamics at the time, including the potential impact of the buybacks themselves on demand for various maturity bills.

13-week bill issuance, 2018-2023



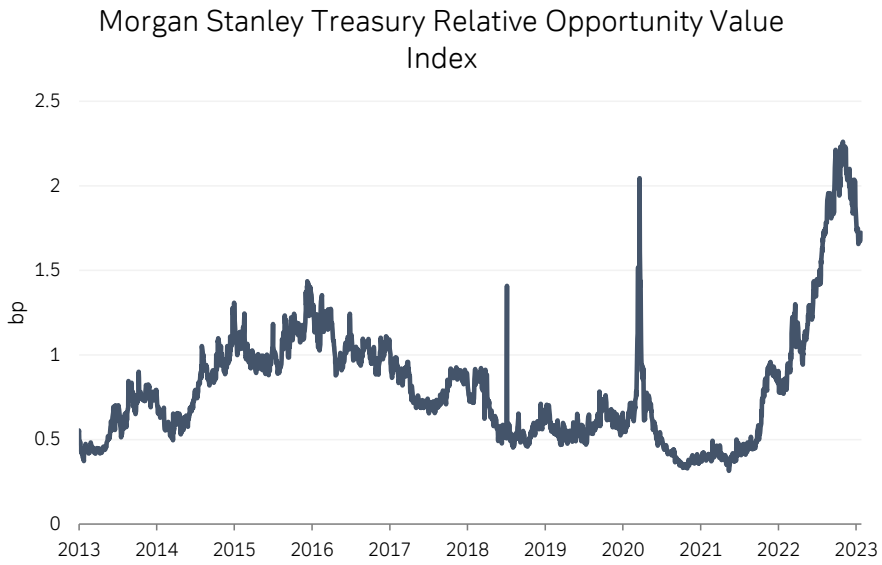
52-week bill issuance, 2018-2023

Source: Treasury

Buybacks for Liquidity Support, Intermediate and Long Maturities

Buybacks of Intermediate and Long Maturities

- TBAC presentations at both the May-2022 and Nov-2022 meetings highlighted increased macro uncertainty and volatility and corresponding to more challenging liquidity conditions for the Treasury market during 2022.
- Average cheapness of off-the-run securities as indicated by the Morgan Stanley Treasury Relative Opportunity Value Index (MSTVI) increased significantly during 2022, with a subsequent modest recovery after peaking in Oct-2022. This increase was likely exacerbated by heightened macro volatility.
- Historically, off-the-runs have traded at an average spread of about 0.5bps wider than the on-the-run spline as measured by this index. More recently, that spread is 3x to 4x as wide.
- Using off-the-run spreads as an indicator of liquidity, Treasury could improve overall market functioning and create value for the taxpayer by focusing purchases on affected off-the-run issues.
- Treasury could consider buybacks of off-the-run intermediate and long maturity TIPS. The TIPS sector might benefit even more than nominals from liquidity support through buybacks. But Treasury would need to be comfortable that TIPS on-the-run auction sizes could be increased sufficiently to fund those buybacks. This could be a topic for future study.



Source: Bloomberg

Buybacks of Intermediate and Long Maturities

- Conducting buybacks of intermediate and long maturity Treasuries poses more risk and complexity for Treasury than buybacks at the front end of the curve.
- Longer maturity Treasuries have greater duration risk, increasing the exposure of Treasury to potentially large yield swings between executing buybacks and when it issues on-the-run securities to finance those purchases.
- Some foreign DMOs manage this duration risk by executing buybacks as switches, simultaneously buying off-the-run securities and exchanging new benchmark on-the-run securities.
- However, switches create tension between reducing noise in buyback execution versus keeping issuance regular and predictable. It could be operationally complex to repeatedly reopen Treasury issues to accommodate each switch transaction.
- Executing switches would likely require Treasury to build out additional infrastructure, while funding buybacks with additional on-the-run issuance relies on an already existing process.
- In our view, the more important consideration is the impact of buybacks on Treasury's WAM. The day-to-day fluctuations in yields between when Treasury conducts buybacks vs financing those buybacks should tend to cancel out over time.
- The WAM impact of conducting buybacks across the curve and correspondingly increasing issuance is likely to be quite small, not inconsistent with multiple other short-term factors affecting WAM.
- Therefore, we believe that Treasury could better adhere to the guiding principles by executing buybacks and financing those buybacks separately.

Funding Buybacks of Intermediate and Long Maturities

- To maintain neutrality to the market structure of marketable debt outstanding while acting in a regular and predictable manner, Treasury could indicate a buyback size for each maturity sector at the time of the Refunding Announcement.
- Treasury could then incorporate additional issuance of on-the-runs to finance the anticipated purchases of off-the-runs. Additional considerations related to this topic are discussed in the later section, *Considerations for Structuring a Buyback Program*.
- Treasury could reserve the right not to purchase securities in an announced buyback operation. Alternatively, Treasury could conclude that it would be more desirable to follow through on all announced purchases except in exceptional circumstances. Ultimately Treasury will need to strike a balance between pricing sensitivity in any given buyback versus the guiding principle of a buyback program being regular and predictable.
- A potential concern is the impact on WAM and the cost of term premium incurred due to buying back off-the-runs funded by issuing longer maturity on-the-runs.
    - We believe that the term premium concern is minor, as Treasury is both paying and receiving term premium of similar maturity in the process of buying back off-the-runs and issuing on-the-runs.
    - As previously mentioned, the impact on WAM is expected to be *de minimis*, well within the scope of WAM perturbations that Treasury routinely encounters due to the timing of maturities, issuance, etc.

Evaluating the Market Liquidity Impact of Treasury Buybacks

Evaluating the Market Liquidity Impact of Treasury Buybacks

- If Treasury chooses to enact a buyback program, we expect there would be some observable improvement in the liquidity of off-the-runs and short coups, starting with an anticipatory announcement effect and continuing as the program moves forward.
- Dealers would likely become more willing to provide liquidity in off-the-runs and short coups, and Treasury investors would likely accept a smaller amount of yield liquidity premium to hold those securities.
- We recommend that Treasury actively monitor the observable resulting changes in market liquidity for several reasons:
  - To evaluate the success of the buyback program in improving overall Treasury market liquidity.
  - To help inform decisions about future adjustments to the size or focus of the buyback program.
  - To help guide decisions about individual buyback operations.
- Treasury could evaluate the offers it receives in each buyback operation as indicative of whether Treasury is effectively providing liquidity support. If those offers suggest that there are only reluctant sellers, it could imply that Treasury's buybacks in that instance might not be constructive for improving market liquidity.
- Treasury could consider the factors on the following page as measures of market liquidity. Treasury could use other indicators to correct for movements in liquidity measures due to non-buyback factors such as general macro stress or LSAPs.

Evaluating the Market Liquidity Impact of Treasury Buybacks

Treasury could consider a variety of indicators to evaluate liquidity conditions.

Quantitative Measures		
Overall Treasury market liquidity, including on-the-runs	**Off-the-run liquidity**	**Treasury funding liquidity**
Bid/offer spreads	Off-the-run/on-the-run spreads (vs asset-swap or fitted spline curve)	Repo specialness
Top of book (TOB) order size	FINRA bid/offer width of off-the-runs vs on-the-runs	Changes in swap spreads
Market depth (e.g., transaction cost of executing a specific-sized trade)	Aggregate index of off-the-run spreads, such as MSVTI or JPM RMSE	Availability and spreads of term repo
Total trading volumes	Off-the-run trading volumes	
Size and frequency of auction tails	Sector indices of off-the-run spreads, such as MSVTI sectors	
Dealer inventory sizes and sector composition	First three off-the-run / on-the-run spreads	
	Dispersion of off-the-run spreads	
Qualitative Measures		
Use the quarterly refunding questionnaire to solicit qualitative feedback from primary dealers		
Feedback from market participants through regular communication or investor RFIs		
Macro Liquidity Drivers (to control for in identifying buyback-related effects)		
Treasury market volatility (e.g. MOVE Index)		
Dollar funding premia (e.g. cross-currency bases)		
Monetary policy/LSAPs		
Regulatory changes and effects on market intermediation		

Framework for Sizing Treasury Buybacks

Framework for Sizing Treasury Buybacks

- Sizing of buybacks can be measured:
  - As a proportion of gross issuance.
  - As a proportion of debt held by the public.
  - As a proportion of the size of off-the-runs in each sector broken down by maturity.
- Note that these proportions would not be static – during periods of lower financing needs, a larger buyback program could be supported and vice versa.
- Context is important:
  - If the primary goal of buybacks is liquidity support, then the available float of off-the-runs in each sector should be considered, along with the market capacity to support increases in the size of the on-the-run for each corresponding sector.
  - In periods when financing needs are lower and on-the-run issue sizes are relatively small, there is likely to be more capacity to increase auction sizes and support a larger buyback program.
  - In periods when the Treasury is running a surplus (such as 1998-2001), Treasury could consider what size of cash management buybacks is required to maintain sufficiently large-sized benchmark on-the-run issuance.
  - Sizing of a buyback program could be bifurcated between <1y maturities (funded by issuing bills) and >1y maturities (funded by issuing on-the-run coupons).
  - Treasury could evaluate how much leeway is acceptable in matching the WAM of buybacks with the WAM of issuance to finance those buybacks. In the context of Treasury's overall debt profile, modest mismatches between buybacks and issuance will not have a material impact on the maturity structure of marketable debt outstanding.

Framework for Sizing Treasury Buybacks

- Boundary conditions for sizing:
    - Lower bound: A buyback program should be large enough to have some observable impact on liquidity support and/or cash management, or else it will only serve the purpose of testing operational procedures.
    - Upper bound: Buybacks should not be so large that they cause the market or auction process for on-the-run Treasuries or bills to be overwhelmed with excessive supply. This could result in destruction of the on-the-run liquidity premium.
        - A buyback program also should not be so large that it threatens to significantly erode the tradable float of off-the-run securities targeted for purchase, rendering the residual issue sizes disproportionately small and therefore less liquid.
- On-the-runs at different points on the curve may have differing capacities to absorb issuance increases to fund buybacks, even after adjusting for duration differences.
- We would recommend initiating a buyback program at the lower end of the range of potential sizing, so that Treasury could learn from the initial implementation and then choose to increase the sizing if that became desirable.
- An example of an initial sizing framework reflecting current auction sizes could be $5B-$10B <1y maturities per month, along with $5B-$10B > 1y maturities per month.
- These sizes would require modest increases in the size of on-the-run issuance and bill issuance.
- They are sufficiently large to have some measurable impact on Treasury market liquidity.

Considerations for Structuring a Buyback Program

Considerations for Structuring a Buyback Program

- Buybacks could be bifurcated into maturity <1y and maturity >1y programs:
  - Maturity <1y for (a) liquidity support and/or (b) cash management.
  - Maturity >1y for (a) liquidity support and/or (b) cash management in periods of fiscal surplus.
- Maximum ("up to") buyback amounts for each could be announced as part of the Quarterly Refunding process.
  - These maximum amounts would leave Treasury with flexibility if propositions received in buyback operations are inconsistent with achieving liquidity support or cash management goals.
  - That said, Treasury would need to balance the guiding principles of regular and predictable, providing liquidity support, and doing no harm. Treasury could conclude that while it would be desirable to conduct buybacks in a regular and predictable manner, there may be a lower threshold for departures from that than for Treasury auctions, given the other competing considerations.
- Treasury could take into account the expected size of buybacks when determining and announcing the sizes of upcoming bill and coupon auctions.
- See the earlier section, *Framework for Sizing Treasury Buybacks,* for more on sizing considerations.

Considerations for Structuring a Buyback Program

- Buyback operations could be conducted by sector, with offers evaluated both on attractiveness versus market pricing as well as based on valuation metrics. Treasury would likely be better served by maintaining flexibility in how it makes these decisions, as market liquidity conditions and other dynamic factors could be important to consider.
  - The Fed's experience with LSAPs could inform the design of purchase sectors.
  - Valuation metrics could include discount to spline, yield-based ASW, zero-coupon ASW, and on- vs off-the-run spreads (if considering only the first three off-the-runs).
- Treasury should establish securities exclusions and concentration limits.
  - Exclude on-the-run securities. It may also be appropriate to exclude the futures cheapest-to-deliver (CTD), given the CTD is typically a liquid point on the curve not requiring additional liquidity support. Treasury could also consider excluding Treasuries trading very special in repo, but such issues tend to trade at richer spreads in any case.
  - Set limits on the % of a purchase operation allocated to a given CUSIP and on cumulative % of a CUSIP outstanding (less SOMA holdings and stripped securities) that can be bought back.
- Schedule operations to balance effectiveness, risk, and operational complexity.
  - It would be preferable if Treasury could schedule buybacks on days (and at times) that are least likely to conflict with Treasury market auctions, or with important data releases or policy decisions.
  - If <1y buyback operations have a cash management purpose (i.e., purchases are not being financed through bill issuance or otherwise), the timing of cash receipts or outlays should also inform scheduling.

Considerations for Structuring a Buyback Program

- Reverse auction methodology:
  - Since Treasury would be evaluating offers of multiple securities simultaneously in each sector, a single-price auction (like the Treasury auction process) is not feasible. Treasury could consider using a single-price for each CUSIP but would need to evaluate whether this creates value versus using a multi-price model within as well across CUSIPs.
  - Treasury would need to define minimum offer size and increment, and the number of offers that can be submitted per security, considering trade-offs between flexibility and operational cumbersomeness.
  - Turning around results quickly is important, as participants will view making fixed-price offerings as being short an option and will build more cushion into their offerings if it takes longer to know if their offerings are accepted.

- Eligible counterparties:
  - An important issue to consider is which counterparties can sell to Treasury in the buyback operations.
  - Conceptually the same set of market participants that can participate in Treasury auctions could also participate in buybacks. However, operational constraints may limit participation to primary dealers.

Conclusion

Conclusion

- Treasury should consider buybacks to provide liquidity support to the overall Treasury market and to achieve cash management goals.
- Designing a buyback program is complex, as it requires myriad operational, analytical, and market judgements. Treasury should carefully consider whether to move forward.
- If Treasury does decide to move forward, the suggestions below should all be subject to substantial additional analysis to enable Treasury to design an implementation plan that best meets its goals.
- Buybacks of <1y maturity are good candidates for most cash management purposes and can be funded by additional issuance across the bill curve. Buybacks of <1y maturity TIPS could be considered along with nominals.
- Buybacks of >1y maturity could be broken down by sector and funded by corresponding issuance of on-the-runs. TIPS could possibly be included, subject to capacity to increase on-the-run TIPS auctions sizes to fund purchases.
- Treasury can use a variety of valuation measures to assess which securities and sectors would most benefit from liquidity support and to select offers to accept during buyback operations. These, along with other broad measures of market liquidity, can be used to assess the liquidity support impact of buybacks.
- A key consideration in sizing buybacks is the capacity to issue additional benchmark on-the-runs to fund purchases. This capacity is time-varying and context-specific.
- While buybacks should be consistent with the regular and predictable framework, Treasury should reserve flexibility on whether to execute any specific buyback operation.
- Treasury would need to consider a number of operational aspects to facilitate a buyback program, including determining eligible participants, timing of buybacks, size limitations, and other operational constraints.
- A successful buyback program should result in benefits for the taxpayer, either through providing liquidity support to the market that results in lower financing costs, by giving Treasury an additional tool for efficient cash management, or both.