

Considerations for T-bill Issuance

Treasury Borrowing Advisory Committee

July 2024

“In November 2020, following the surge in Treasury bill issuance to finance the pandemic response, “the Committee recommended allowing the share of T-bills to decline gradually to a range of 15% to 20% of outstanding debt.”

In November 2021, when T-bills represented 17% of outstanding debt, the Committee recommended gradual reductions in coupon auction sizes to avoid the T-bill share falling considerably below 15% but highlighted the flexibility to fall below 15% or rise modestly above 20% to help maintain regular and predictable coupon issuance.

Please discuss factors relevant to bill supply in markets, regulations, and Treasury issuance.

In light of these factors, what considerations should inform Treasury bill issuance going forward?

Could additional metrics enhance the Committee’s recommendations for Treasury bill issuance? Please elaborate.”

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Executive Summary

Executive Summary (1/2)

Treasury bills are a useful tool to achieve Treasury's goal of funding the government at the lowest cost to the taxpayer over time

Four key factors with which to consider Treasury bills (T-bills) issuance include:

1) Financing Costs Over Time

- While TBAC's Optimal Debt Model (the 'Model') suggests that larger T-bill issuances may reduce average funding costs over the long term, benefits are dependent on the size of the unobservable and volatile term premia in interest rates
- The Model suggests that overall deficit volatility is reasonably contained for lower T-bill shares and begins increasing with larger T-bill shares. Although, as with any simulation model limitations could exist, thus an appropriate overlay from Treasury over the course of a cycle is appropriate

2) Regular & Predictable Issuance:

- T-bills are critical shock absorbers allowing Treasury to adjust issuance for short-term funding surprises, thereby avoiding rapid and costly fluctuations in Coupon auction sizes
- Shock absorbers have and will continue to be critical due to elevated volatility in funding needs due to factors such as high debt stock, interest rates, legislative changes, and the debt ceiling

3) Market Structure & Investor Demand:

- In the recent past, T-bill markets appear to be functioning well. Increases in T-bill issuance have been met with robust demand from investors including money funds, households, and businesses. This demand is likely due to a combination of structural factors such as evolving money market fund regulations, and cyclical factors such as elevated levels of current interest rates
- A meaningful stock of T-bills outstanding supports a broad and diverse investor base and market functioning; changes in the structure and investor base should be closely monitored over time

4) Debt Maturity Distribution:

- Increased reliance on T-bills creates a shorter debt maturity profile and increases share of debt that rolls over each year
- Increases could result in the need for a larger Treasury General Account (TGA) to maintain the cash buffer that is currently maintained to guard against a potential loss in market access

Executive Summary (2/2)

T-bills are a useful tool to achieve Treasury's goal of funding the government at the lowest cost to the taxpayer over time

Given these factors and considerations, TBAC has the following observations:

- T-bill issuance should continue to serve as an optimal shock absorber to allow Treasury to issue Coupons in a Regular & Predictable manner, supporting lower funding costs, lower term premia, distribution to a broad and diverse set of investors, and an overall deep & liquid market
 - Factors to consider when evaluating short- and medium-term T-bill shares should include balance being Regular & Predictable, changes in the structural demand for T-bills, funding costs, deficit volatility, and market functioning
 - Currently, we estimate 15% as a lower bound that supports healthy market functioning, but that may evolve over time as a function of the size of Money Markets and other structural demand factors
 - Substantially increasing the share of T-bills outstanding increases the volatility of deficit financing. A T-bill share averaging around 20% over time appears to provide a good trade-off between cost and volatility
 - The appropriate amounts of T-bills should be monitored and updated in the context of structural market and regulatory developments. Helpful metrics include measures of market conditions (e.g., swap spreads) and the structural demand for short-end risk free assets (e.g., the size and nature of the money fund universe)
- However, it is important to retain flexibility for moves away from these levels based on the need to absorb shocks in the financing outlook, to support Regular & Predictable Coupon issuance, to account for changes in market structure and investor demand, and to effectively manage TGA levels

Background & Context

2015, 2020, 2021 & 2024 Charges

Background & Summaries

2015, 2020, 2021 & 2024 TBAC Charges

May 2015 Charge: Treasury Bill supply as a percentage of the total Treasury debt outstanding is currently about 11%, a multi-decade low. At the same time, with \$1.4 trillion in Treasury bills outstanding, the total volume of Treasury Bills outstanding remains near historically high levels. What are the drivers of potential demand for high-quality, short-dated securities? [...]

- Prior Treasury observations from the 2015 Q2 Quarterly Refunding statement; [...] “The supply of Bills outstanding as a percentage of the total Treasury portfolio is at a multidecade low of approximately 11 percent... Treasury believes that it is prudent to increase the level of Treasury Bills outstanding... should not be interpreted as changing Treasury’s debt issuance strategy of extending the weighted average maturity of the debt.”

November 2020 Charge: In light of unprecedented borrowing needs, Treasury has more than doubled the supply of T-Bills over the past year amid a surge in demand for high-quality, short-term assets. T-Bills currently represent approximately 25% of total Treasury debt outstanding, exceeding the historical average of 23%, and are at the highest proportion since 2009. [...] As outlined in the last two quarterly refunding announcements, Treasury has been gradually shifting its financing from Bills to longer dated tenors as a prudent means of managing its maturity profile. Please discuss considerations for Treasury as it evaluates the appropriate level of Treasury bills issuance for the medium- and long-term.

- [...] Maintaining the share of T-Bills in outstanding debt at levels modestly above its historical average may be appropriate for a time, as T-Bills can continue to act as an important channel for meeting unexpected funding needs, and adjustments to coupon issuance only gradually raise their net supply
- [...] Over the longer term, T-Bills outstanding can be lowered as a percentage of marketable debt, as Treasury moves to a more optimal debt profile [...] Lower T-Bills share of outstanding would give Treasury ‘space’ in the event of future crises. [...] T-Bills outstanding averaged ~15% of marketable debt in several years leading up to Covid-19; while there is room to comfortably run T-Bills at a higher percentage share of outstanding marketable debt, a return to 15-20% would allow T-Bills to retain their efficacy as a shock absorber.”

November 2021 Charge: In November 2020, the Committee recommended that Treasury, over the medium to longer term, strive to maintain T-Bills in a range of 15 to 20 percent of outstanding debt. How should Treasury consider this recommended range within the context of future adjustments to coupon auction sizes and the evolving fiscal outlook, including in the short-term? What other metrics could complement Treasury’s understanding of the appropriate size of the bill market?

- [...] “There is flexibility in the TBAC’s recommended range for T-Bills to either fall below 15% of outstanding stock (in which case excess cash will likely get absorbed by the RRP facility) or for T-Bills to rise modestly above 20% while still maintaining financing flexibility for Treasury”
- [...] “Given there is (1) an increasing amount of demand for T-Bills coming from MMFs coupled with (2) an excess amount of cash sitting in the RRP waiting to earn yields greater than 5bp and (3) lack of other front-end assets, the share of T-Bills in outstanding debt could likely increase above 20% without dislocating the T-Bill market.”

April 2024 Charge: Treasury has regularly been issuing the 6-week cash management bill since June 2023 and last refunding stated it would announce a decision on whether to change the 6-week to benchmark status at an upcoming refunding. Based on your recommendations for the appropriate level of Bills outstanding in the medium to long term, should Treasury change the 6-week to benchmark status? [...]

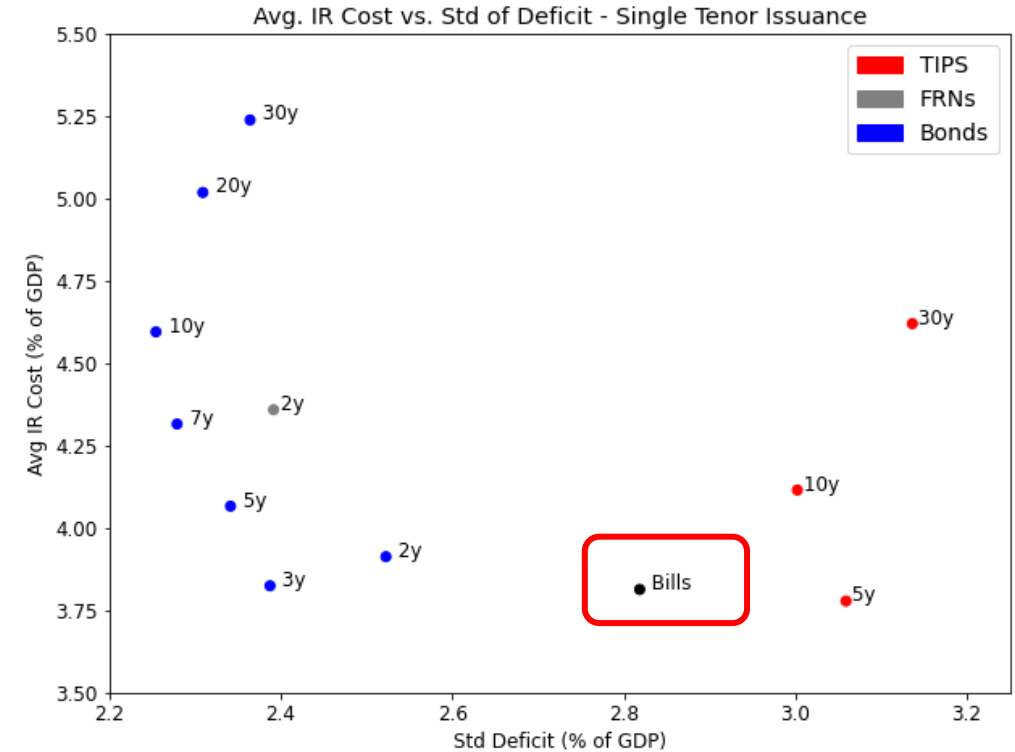
- [...] “Treasury’s Bill issuance is anticipated to grow in accordance with the deficit trajectory” [...]
- [...] “6-Week Treasury Bill size has been consistent with other benchmark Bills, and investor demand of this product remains strong, with Money Market Funds being a primary buyer” [...]

Financing Cost Over Time

Financing Cost Over Time

T-bill issuance in the Optimal Debt Model

- Over short time periods, T-bills are optimally used as a shock absorber for deficit volatility management, which could create fluctuations in the T-bill share
- Over longer time periods, T-bill issuance is part of the equation in achieving Treasury's desired debt service cost profile
- TBAC has leveraged the Model as a framework to determine and assess different issuance strategies. The Model expresses Treasury's decision function as a tradeoff between average interest costs and volatility of interest cost
- Within the context of the Model, T-bills provide:
 - Lower average costs than other securities, though the benefit varies significantly based on the level of term premia, which can be volatile and difficult to observe
 - Higher volatility of debt service costs and higher contribution to overall deficit volatility given short duration and frequent rate resets



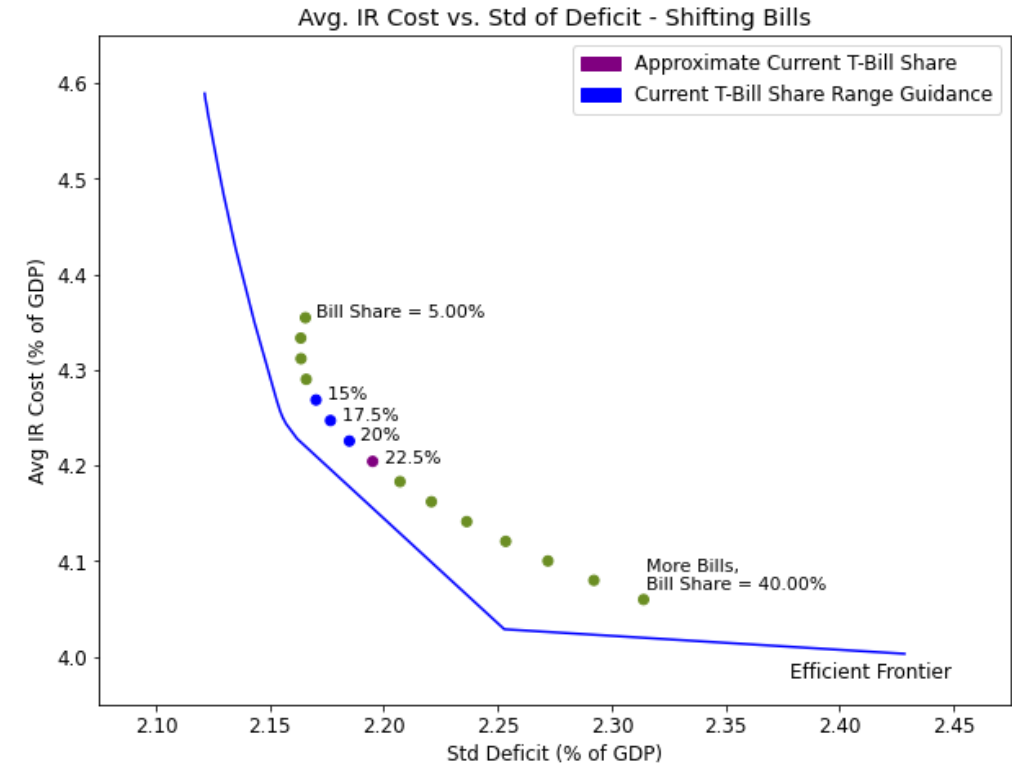
Analysis in this section uses the Optimal Debt Model referenced in various recent TBAC Charges and the most recent data inputs as of July 2024

For more information on the model, please see <https://www.brookings.edu/articles/optimizing-the-maturity-structure-of-u-s-treasury-debt/>

Financing Cost Over Time

Impact of changes in T-bill issuance on the profile of financing costs

- Multiple Model simulations with varying degrees of T-bill usage (and other factors remaining constant) demonstrate the trade-off with higher amounts of T-bills
- The results show,
 - Costs reducing with more T-bill usage, but are sensitive to term premia assumptions therefore should be interpreted and discounted accordingly (see discussion on next slide)
 - Volatility around funding costs and overall deficits remain generally within a tight range when shares are at or below 20%, above which the Model expresses more rapid increases with higher shares
 - > Whilst there is limited precision to the 20% threshold, this analysis is an important consideration when calibrating the appropriate long-run T-bill share
- As discussed in prior TBAC presentations, the Model tends to prefer issuance in the belly of the curve (e.g., 3yr and 5yr notes) over both T-bills and longer-maturity securities, with the caveat that this framework underrepresents the value of meeting the need for a diverse investor base and market functioning considerations

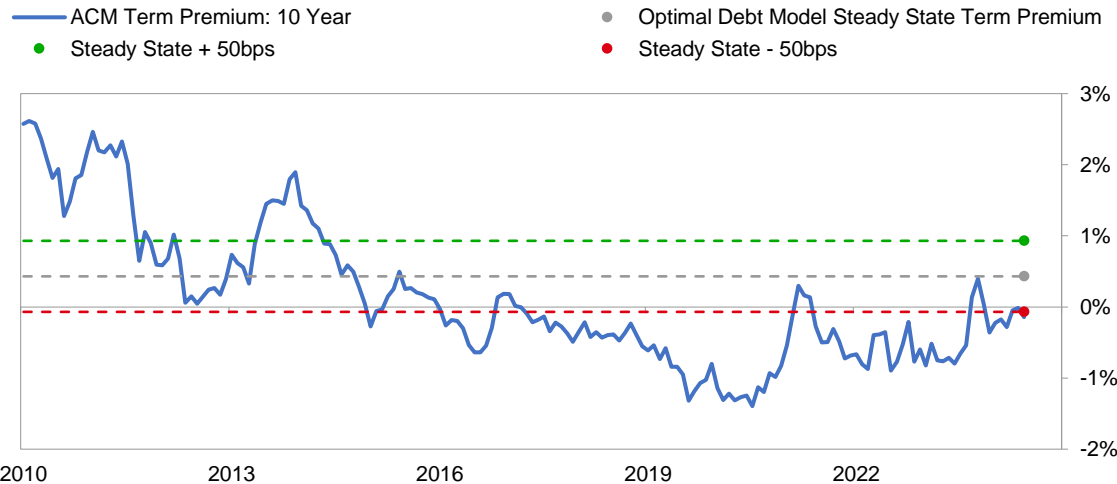


Calculations used the Model described and referenced on page 9, using the latest inputs available for the Model as of July 2024

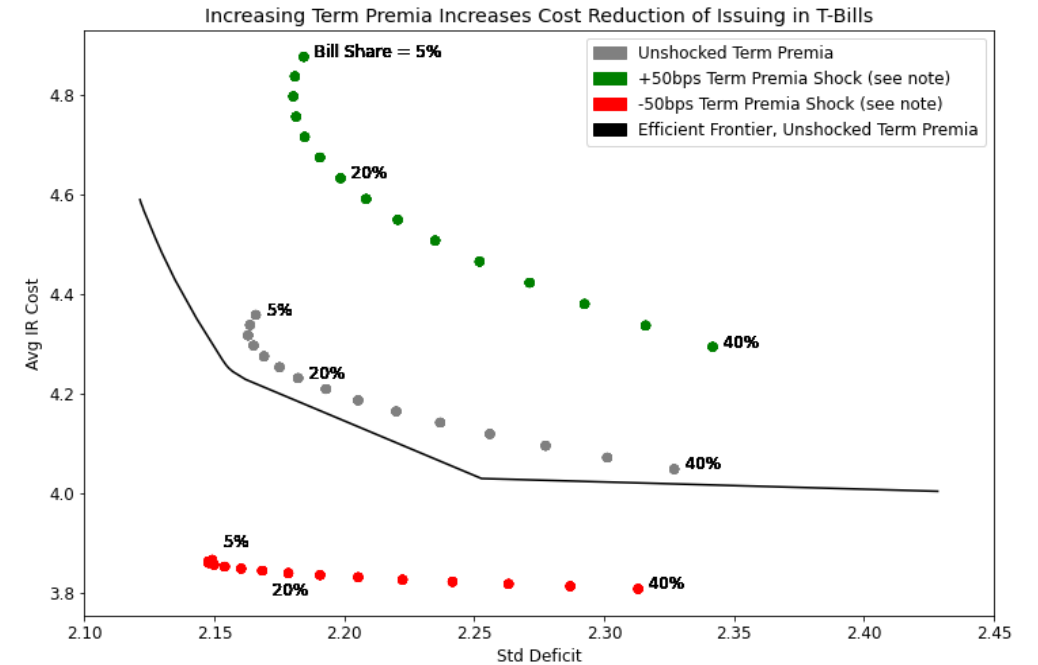
Financing Cost Over Time

Cost savings from using more T-bills are meaningfully reliant on term premia assumptions (and should be interpreted with care)

- Savings from T-bills suggested by the Model are assumption dependent based on the levels of term premia.
 - Term premia are difficult to observe and volatile, as shown below and discussed in a 2023 TBAC charge¹
- The chart on the right repeats the prior analysis with varying term premia (e.g., increased and decreased by 50 basis points), showing that the cost savings from higher T-bill share become negligible with a downward shock
- Evidence of a structural and persistent increase in the term premia could increase the appropriate range for T-bill usage (and vice-versa). Treasury should prioritize being Regular & Predictable rather than timing shorter-term moves in term premia



Sources: ¹TBAC Charge ([4Q'2023](#)); Federal Reserve Bank of New York



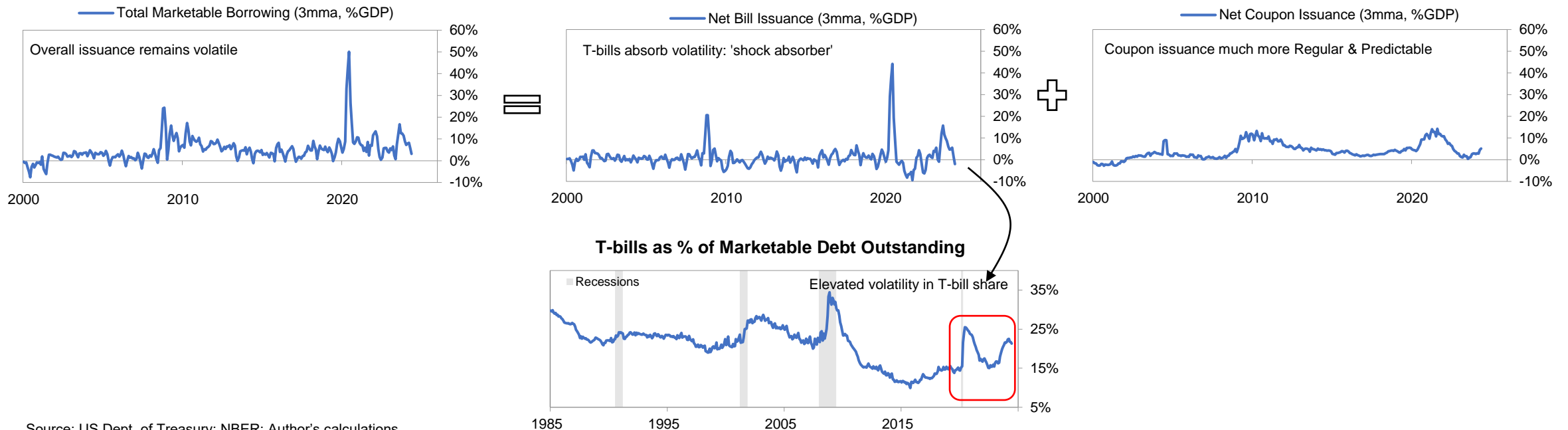
Note: Term premia are linearly interpolated from 0bps at maturities less than or equal to 2 years, to (+/-) 50bps at maturities greater than or equal to 10 years

Regular & Predictable Issuance

Regular & Predictable Issuance

T-bills aid with being Regular & Predictable and are an optimal shock-absorber in times of uncertainty

- Treasury's funding needs can be inherently volatile and unpredictable due to factors such as the economic cycle, passage of new legislation, unexpected events like wars or natural disasters, and/ or through the calendar year due to seasonality (e.g., tax collection dates)
- Due to their low duration and fungibility with other cash-like assets, T-bills are the most optimal 'shock-absorbing' tool at Treasury's disposal, i.e., the best way to meet unexpected short-term fluctuations in financing needs, while minimizing market impact
- Investors view T-bills as a prudent investment instrument; there is generally robust demand, including during recessions and in times of stress, given its 'safe-haven' stature
- By leveraging T-bills as a 'shock absorber', Treasury has managed to contain a relatively volatile funding backdrop over the past five years, enabling Regular & Predictable Coupon issuance



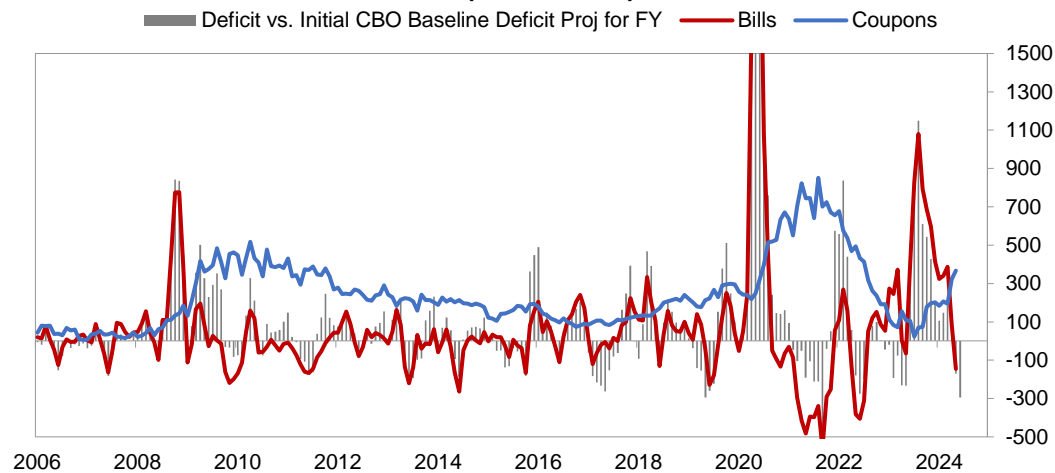
Source: US Dept. of Treasury; NBER; Author's calculations

Regular & Predictable Issuance

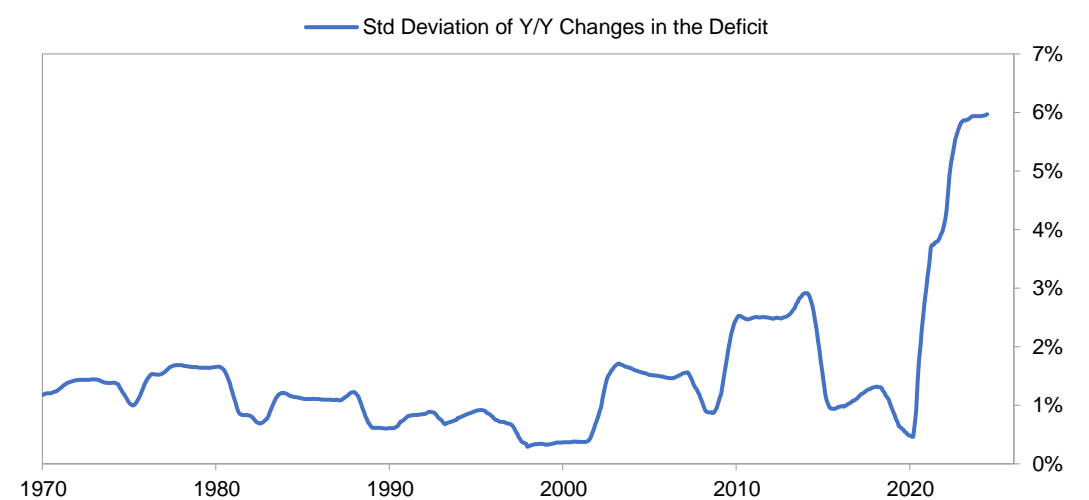
Government financing needs to likely remain volatile

- Treasury's financing needs have been more volatile over the past five years than in recent decades
- Recent drivers of volatility include COVID's impact on economic conditions (and corresponding stimulus), elevated inflation, volatile interest rates, and instances where the Government reached statutory debt limits, and fluctuations in the Fed's SOMA balances
- The gap between initial deficit projections (e.g., from CBO; from Treasury) and actual deficit results have been notably divergent and large
 - Deficit 'surprises' have been absorbed by rapid fluctuations in T-bill issuance; in 2008 and during COVID these 'surprises' were correlated to increases in investor appetite for safe-haven assets supplementing T-bill demand
 - Adjustments in T-bill issuance have enabled Treasury to gradually alter Coupon auction sizes rather than making rapid adjustments to manage deficit surprises

Surprises in Financing Needs vs. T-bill & Coupon Issuance
(\$bn, 3mma)



Volatility in Federal Financing Needs

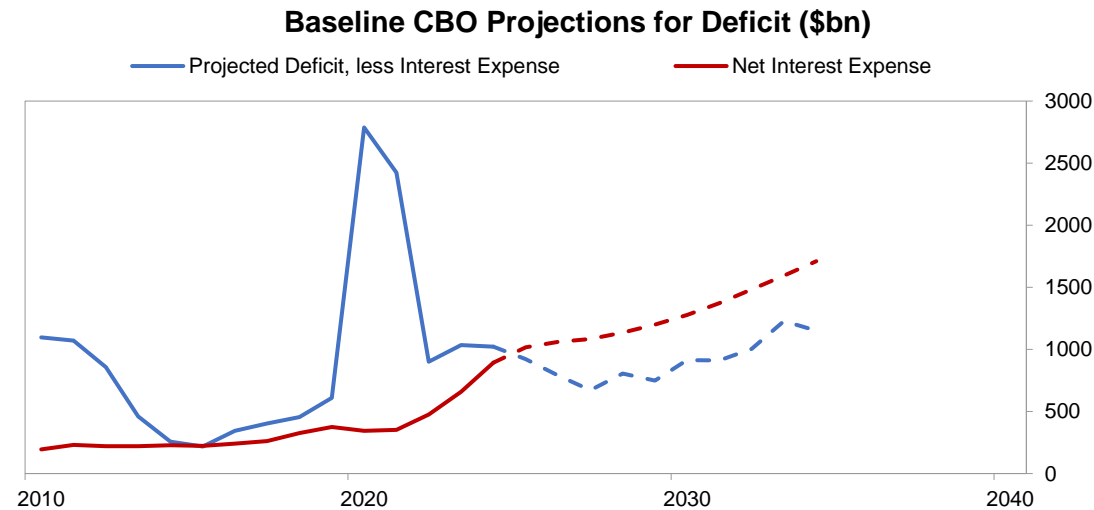


Source: US Dept. of Treasury; CBO; Author's calculations

Regular & Predictable Issuance

T-bills will remain a critical financing management tool given the expectation for continued volatility in financing needs

- Treasury should prepare for sustained volatility in its financing needs given foreseeable market conditions:
 - CBO projects sustained high deficits for the foreseeable future
 - Volatility in financing needs from legislative and executive actions is likely to persist
 - Interest costs have risen, both outright and as a portion of the deficit
 - Interest rate volatility remains elevated and is forecasted to remain elevated
 - COVID and elevated inflation contributed to deficit volatility over the past five years but appear to be subsiding
- TBAC continues to believe that T-bills are an optimal shock absorber to respond to unexpected financing shocks while preserving Regular & Predictable Coupon issuance



Source: CBO

Market Structure & Investor Demand

Market Structure & Investor Demand

Investor demand & market functioning is important factor for Treasury to consider

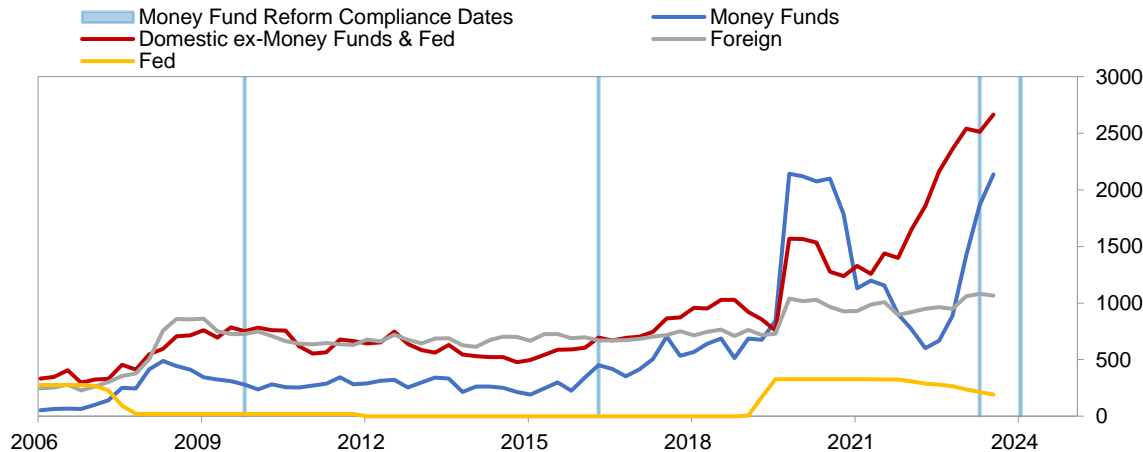
- T-bill demand has considerably increased in recent years
 - A portion of the strong demand is likely structural (e.g., Money Fund reform & transition away from Prime Funds; lower availability from other forms of short-term debt instruments such as Federal agency paper or private commercial paper), but some is likely cyclical (e.g., strong retail interest in holding short-term instruments due to high short-term interest rates and an inverted yield curve)
 - While it is always in Treasury's interest to issue products consistent with market demand, there are particular consequences to market functioning from issuing too few T-bills;
 - > Issuing too few T-bills may shift government Money Funds into the Fed's ON RRP facility (and vice-versa). During periods of abundant bank reserves, this rotation has been seamless. In periods where bank reserves are less abundant, this could have unintended consequences for market functioning
 - > Large ON RRP balances could indicate unmet demand for T-bills. Over 2023-24, ON RRP drained as Money Funds shifted nearly one-for-one into T-bills. This rotation facilitated seamless digestion of record T-bill issuance
 - Some studies¹ have suggested that increasing the supply of public short-term safe instruments could reduce the need for privately issued short-term instruments and help improve the stability of the financial system

Market Structure & Investor Demand

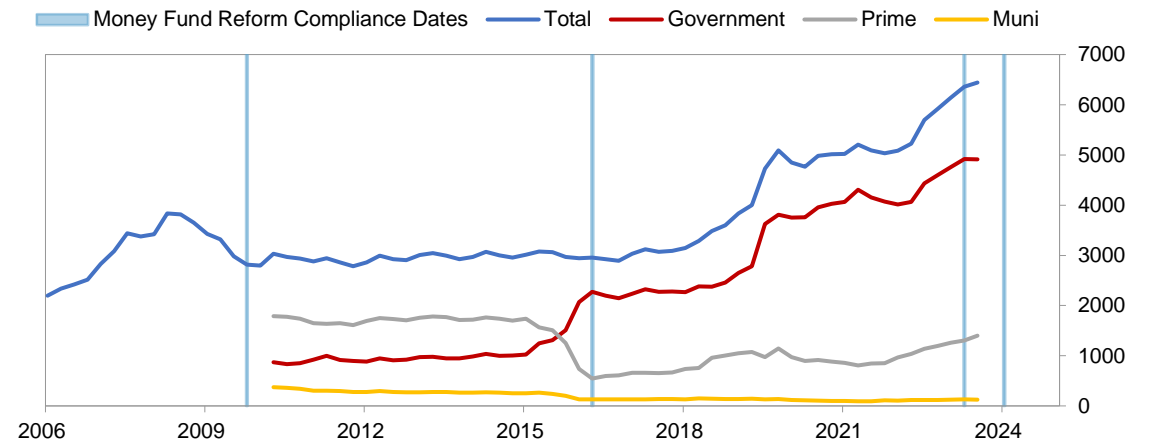
Robust money supply growth has been a support to T-bill demand

- Since the 2015 Q4 TBAC Charge, T-bill supply has quadrupled, with \$3.6 trillion of the increases occurring since 2019
 - Money Funds have absorbed ~\$2 trillion of T-bills over the past two years, and non-money fund domestic holders (e.g., households, businesses, etc.) have absorbed another ~\$2 trillion
- Absorption of large T-bill issuances have been assisted by a meaningful expansions in the deposit base, which provides a stock of (low-yielding) money which might translate into T-bill demand either directly, or via inflows into MMFs
- MMF Reform has enabled a transition in the composition of the industry towards government funds, increasing structural demand from MMFs for T-bills
 - For these funds, T-bills are one of the few types of eligible collateral and are particularly important as a way of terming out their holdings, given the shrinking sizes of GSE balance sheets and the reduced size of the agency paper market

Major Holders of T-bills (\$bn)



Money Funds by Type (\$bn)

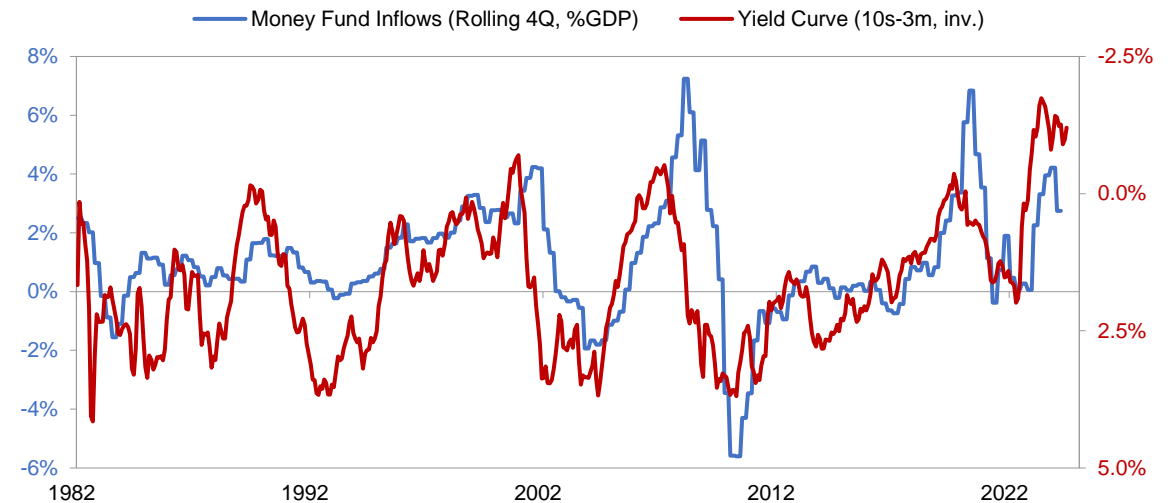
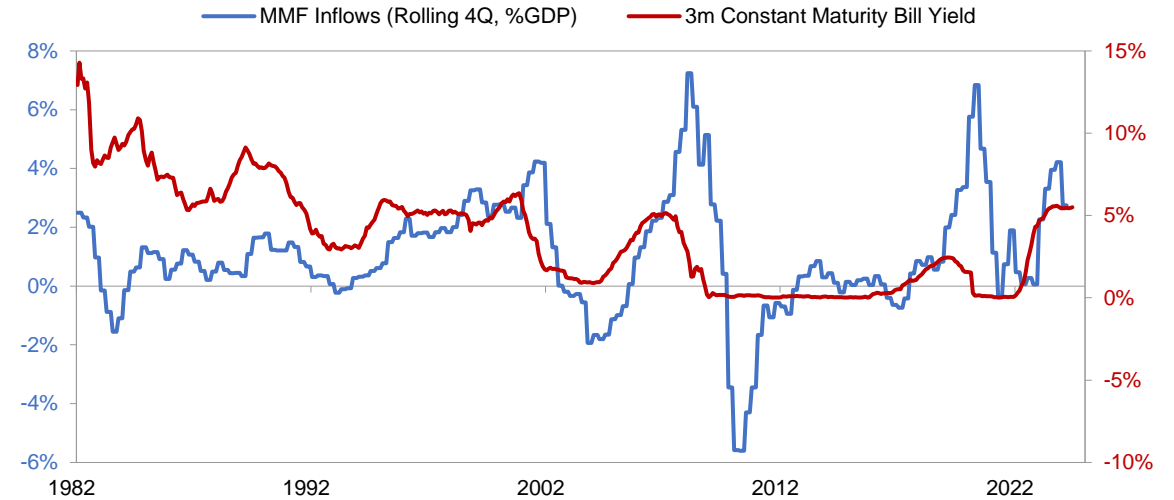


Sources: Federal Reserve Z.1; SEC; Federal Register

Market Structure & Investor Demand

Cyclical factors affecting T-bill demand

- Cyclical factors are also likely to affect T-bill demand
- Money Fund inflows are responsive to short rates and the shape of the curve
- The recent rate hiking cycle has elevated short-term rates, inverted the curve, and created a wedge between deposit rates and other cash rates. All these factors have pulled cash into money market funds and thus far have been supportive to T-bill demand
- If/ when the Fed eases, the curve normalizes, or banks continue competing for deposits/ increase deposit remuneration, MMF inflows may reduce from where they are today

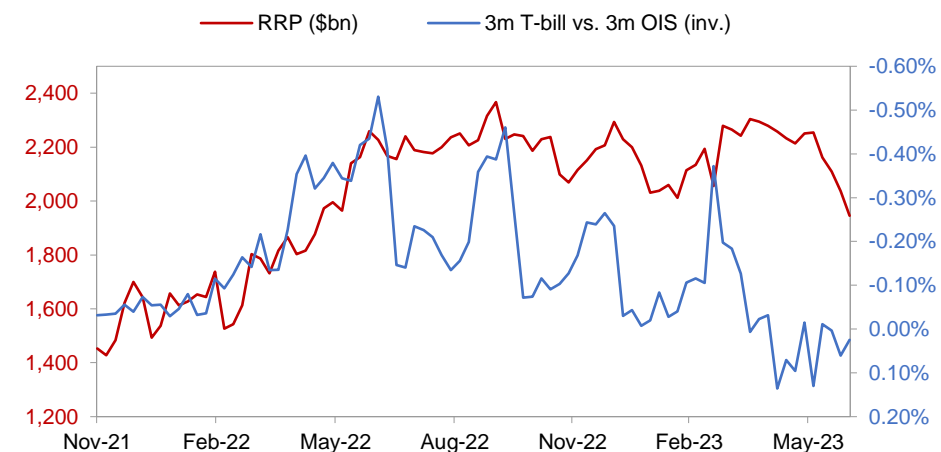
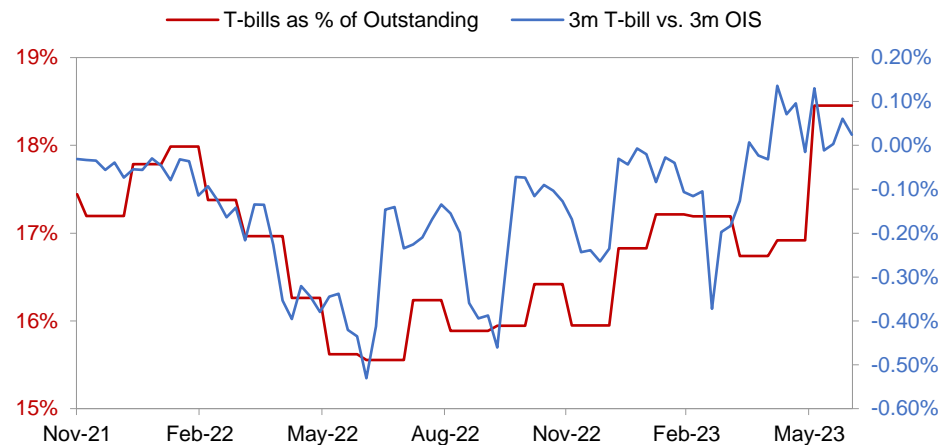


Sources: Federal Reserve Z.1, H.15, Author's calculations

Market Structure & Investor Demand

Retaining a minimum amount of T-bills is important to market functioning

- As the Q4 2021 TBAC Charge noted, relatively low T-bill supply could have negative consequences for market functioning. Including price dislocations in T-bills and a recalibration of money flows that may have knock-on effects
 - Circumstances where Money Funds may not get adequate T-bill allocations (and T-bill prices trade rich) could transition their resources into the RRP
 - > Treasury should particularly be conscious of this relationship when the banking system is close to the Lowest Comfortable Level of Reserves
 - > E.g. when T-bill supply contracted in 2022 to ~15% of outstanding debt, T-bills traded as rich as ~60bps to swaps, drawing money flows into the RRP
- Additionally, an issuance mix that is too bond-heavy could incrementally cause pressures in funding markets, particularly as an increasing portion of the cash bondholder base relies on repo markets for funding
- Debt ceiling/ limit related events could have consequences, in relation to the amounts of T-bills issued, although “*failing to increase the debt limit would have catastrophic economic consequences.*”¹
 - T-bills are a nimble funding mechanism, enabling Treasury to adjust issuances during/ after such events, rather than altering Coupon issuance schedules, thereby adhering to their Regular & Predictable practices
 - In the recent past, TBAC has expressed² deep concerns around the lack of resolution of the statutory debt limit



Note: Charts zoomed in on a historical period from December 2021 through June 2023 and do not reflect latest data points

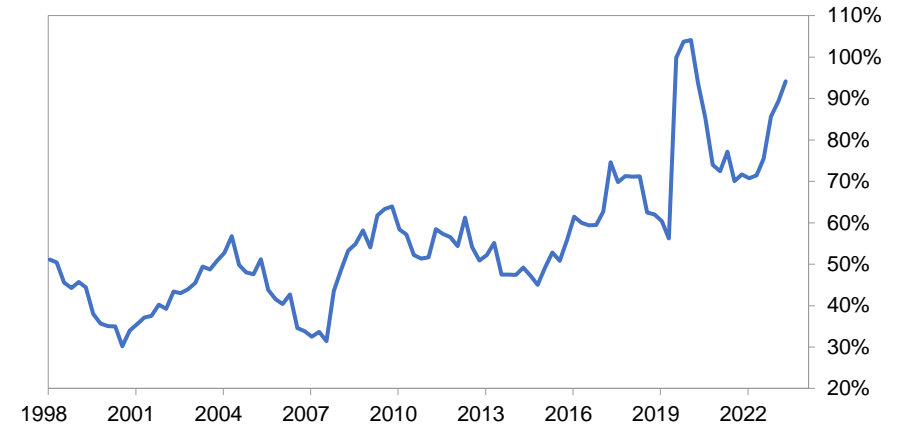
Sources: ¹US Treasury ([link](#)); ²TBAC Letter to the Treasury Secretary ([link](#)), Federal Reserve; US Dept. of Treasury; Bloomberg

Market Structure & Investor Demand

Indicators and factors for consideration when determining cyclical and structural appetite for T-bills

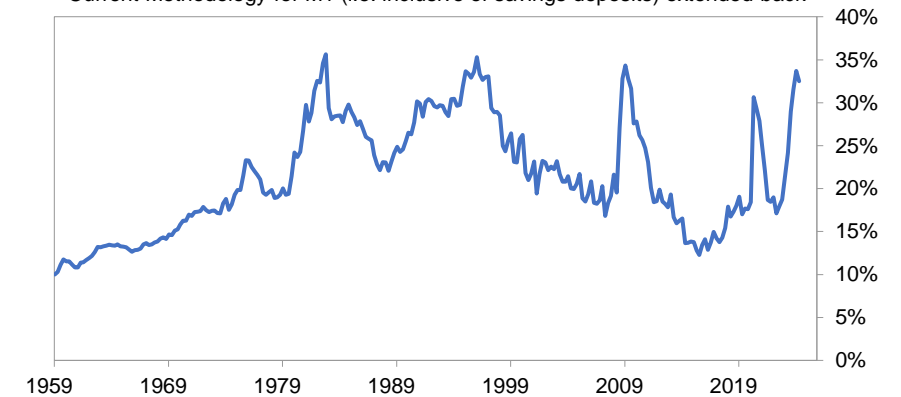
- Minimum amounts of T-bills needed for stable market functioning could fluctuate as a function of market structure, and TBAC encourages Treasury to monitor indicators of market functioning and potential demand to determine whether appropriate levels remain adequate
- Market based measures like spreads between T-bills and equivalent swaps could provide evidence of T-bill supply being too accommodative/ restrictive
- Comparisons between T-bill supply and the size of Money Fund industry could be helpful in calibrating whether adequate supply exists for investors that are required to hold 2(a)7 compliant securities
 - Caution should be exercised when accounting for Money Fund regulations changing the structural nature of their demand. Today's elevated readings may be appropriate given added incentives for Money Funds to hold government securities
- Comparing T-bills to the size of the money supply (e.g., the M1 monetary aggregate) calibrates T-bills to the pool of short-term assets in the economy
- The size of the ON RRP and velocity of flows could provide a barometer of unmet T-bill demand

T-Bills Outstanding (% of MMF Shares Outstanding)

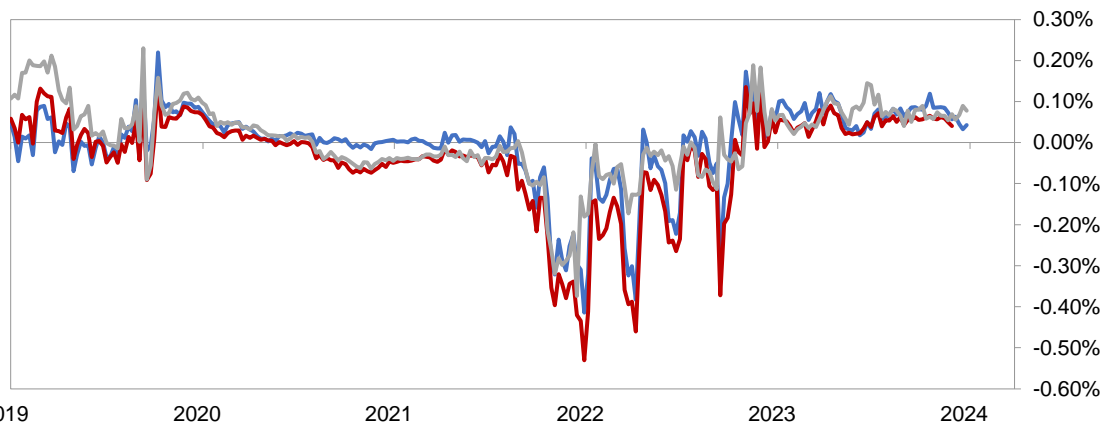


T-Bills Outstanding (% of M1)

Current Methodology for M1 (i.e. inclusive of savings deposits) extended back



— 3m T-bill vs. 3M SOFR Swap — 3m T-bill vs. OIS — 6m T-bill vs. OIS



Sources: Bloomberg; US Dept. of Treasury; Federal Reserve Z.1 & H.6

Debt Maturity Distribution

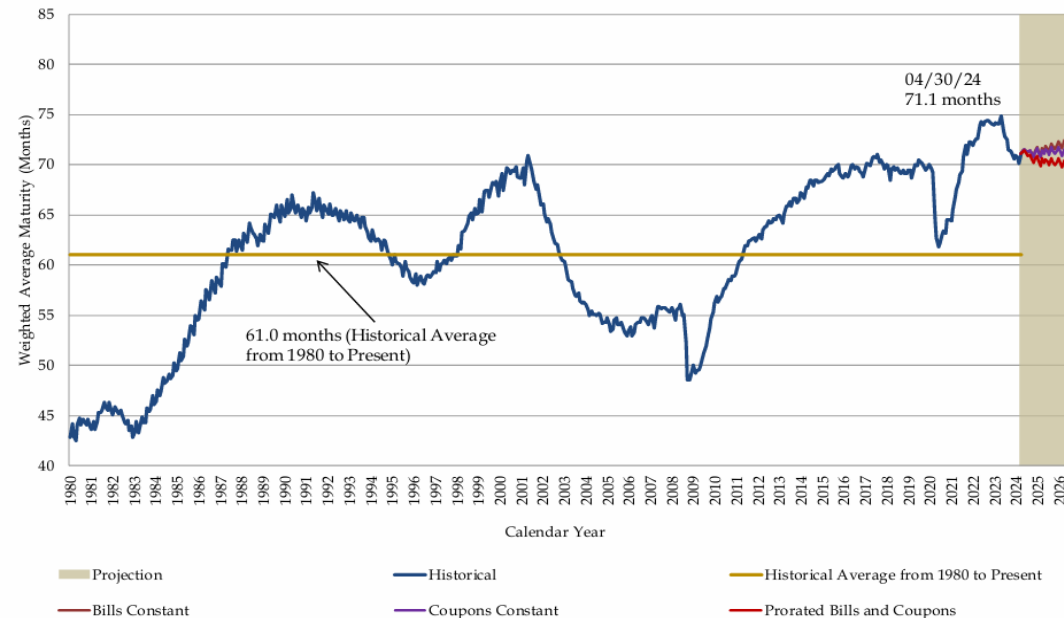
Roll Over Risks

Debt Maturity Distribution

Impacts of T-bill shares on TGA balances & measures to effectively monitor the debt stack

- All else equal, increasing the share of T-bill issuance would increase the total amount of debt maturing in a given period, resulting in the need to hold a higher TGA
- Under Treasury's cash balance policy¹, the TGA maintains sufficient cash to cover one week of outflows, including the gross volume of maturing debt
- Weighted average maturity (WAM) is one way to measure the duration of outstanding US Treasury securities; WAM is only one measure and should be considered along with a range of other measures
- Despite recently elevated T-bill issuance, WAM has remained near multi-decade highs, suggesting there may be room for additional flexibility in T-bill issuance

Weighted Average Maturity of Marketable Debt Outstanding



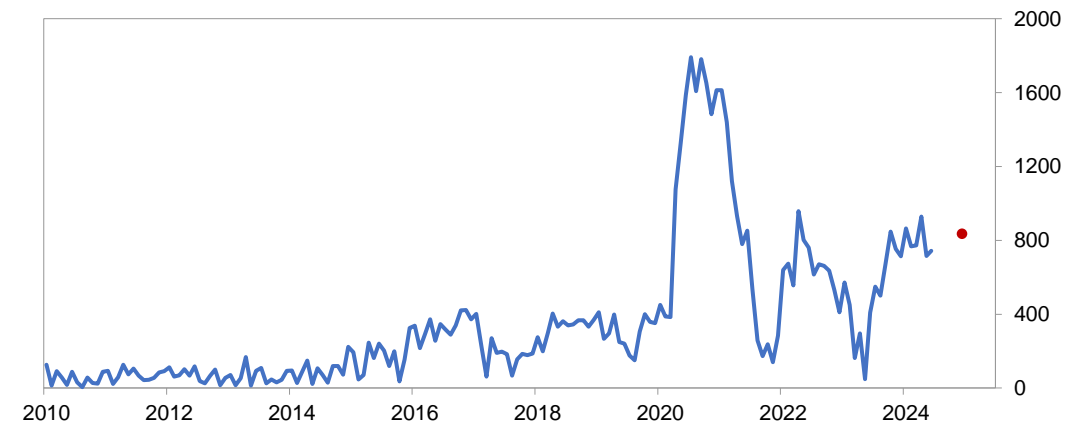
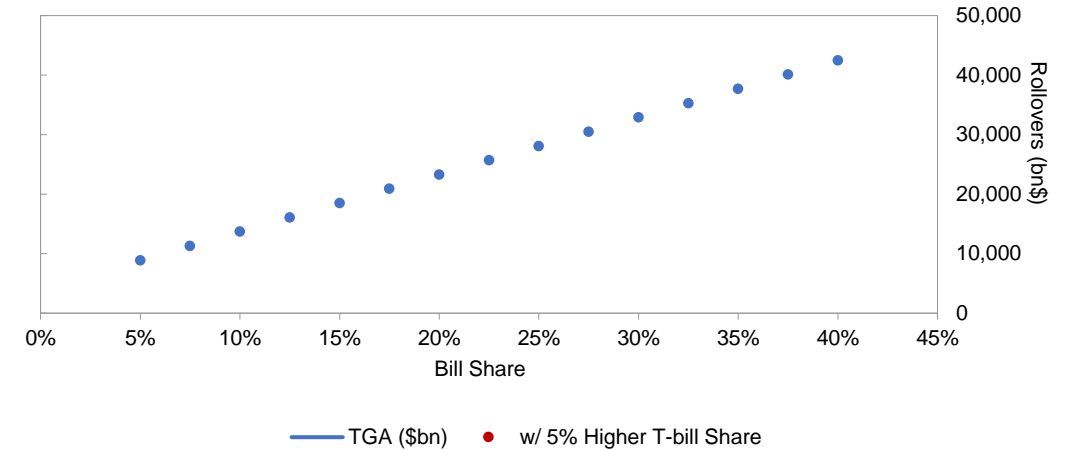
Source: ¹Quarterly Refunding Statement ([link](#))

Debt Maturity Distribution

Larger reliance on T-bills creates more substantial debt rollovers

- Increased use of T-bills creates larger and more frequent debt rollovers, but there is minimal evidence suggesting larger rollovers solely are inherently unstable, risky, or more expensive for Treasury
- All else equal, increasing T-bill share by 5% increases annual debt rollovers by around \$5 trillion at the current debt levels
 - This calculation assumes that the different tenors of T-bills outstanding increase proportionately as the overall T-bill share increases
- Higher T-bills share does require a larger TGA balance given Treasury's current practice of calibrating TGA size to cover one week of outflows. This is a small consideration in the context of T-bills that is worth weighing appropriately
 - Given above considerations, 5% higher T-bill share would suggest a TGA size that on average is \$90 billion larger, which may have to be funded with higher debt levels and accompanying interest costs (though interest costs of a higher TGA may be offset by increased Fed remittances)

Relationship Between T-bill Share and Annual Rollovers at Current Debt Level



Sources: US Dept. of Treasury; Federal Reserve H.4.1; Author's calculations

Conclusions, Observations & Future Considerations

Conclusions, Observations & Future Considerations

- **Conclusions & Observations:**

- T-bill issuance should continue to serve as an optimal shock absorber to allow Treasury to issue Coupons in a Regular & Predictable manner, supporting lower funding costs, lower term premia, distribution to a broad and diverse set of investors, and an overall deep & liquid market
- T-bills facilitate an important role for many market participants, and maintaining adequate amounts of T-bills is important for market functioning. That share could evolve over time as structural supply & demand for money market investments, and the total amount of outstanding debt evolves
- Factors to consider when evaluating short- and medium-term T-bill shares should include balance being Regular & Predictable, changes in the structural demand for T-bills, funding costs, deficit volatility, and market functioning
 - > Currently, we estimate 15% as a lower bound that supports healthy market functioning, but that may evolve over time as a function of the size of Money Markets and other structural demand factors
 - > Substantially increasing the share of T-bills outstanding increases the volatility of deficit financing. A T-bill share averaging around 20% over time appears to provide a good trade-off between cost and volatility
 - > The appropriate amounts of T-bills should be monitored and updated in the context of structural market and regulatory developments. Helpful metrics include measures of market conditions (e.g., swap spreads) and the structural demand for short-end risk free assets (e.g., the size and nature of the money fund universe)
- However, it is important to retain flexibility for moves away from these levels based on the need to absorb shocks in the financing outlook, to support Regular & Predictable Coupon issuance, to account for changes in market structure and investor demand, and to effectively manage TGA levels

- **Looking ahead, numerous factors may warrant further study in considering the share of future T-bill issuance:**

- Evolution and continued evaluation of the banking regulatory landscape (spanning liquidity & capital reforms, among others), and implications for banks and dealers to meaningfully participate in primary Treasury markets to intermediate and warehouse (anticipated) future US Treasury duration & supply
- Market structure evolutions and their impacts on Treasury market's resiliency initiatives including,
 - > SEC's central clearing rule, which will require significant increases in margin to be posted to covered clearing agencies
 - > Future (anticipated) US Treasury auction sizes and predictability across cash management and Benchmark T-bill issuances
 - > Future Money Fund reform and potential incremental structural demand for T-bills