Considerations for Optimal Debt Issuance

Treasury Borrowing Advisory Committee

November 2025

Optimal Debt Model: Please present on updated results from the TBAC's Optimal Debt issuance model. How has the optimal issuance strategy changed in recent years and what have been the drivers of that change? What advantages and limitations to the model are most relevant to consider in the current environment? Please elaborate. Are there other approaches or models that Treasury should also consider for thinking about optimal debt issuance? Should Treasury consider other metrics for measuring rollover risk, volatility, liquidity, and term premium. What metrics are most useful and why?

Executive Summary (1/2)

- Treasury's goal is to fund the government at the lowest cost over time. Part of achieving this goal is choosing an issuance mix of securities that minimizes expected costs and volatility.
  - This goal is also served by maintaining the depth, liquidity, and predictability of the Treasury market.
  - Treasury's issuance mix should also consider other interests of the taxpayer, like providing useful products to investors, maintaining liquid benchmark rates, and keeping "dry powder" to be able to borrow quickly during an economic shock.
- To help Treasury achieve this goal, TBAC created the Optimal Debt Model as one input to inform the choice of issuance mix. The Model assesses the impacts of issuance strategies by simulating evolutions of the economy and fiscal flows. The resulting assessments of expected costs can be considered alongside other factors (e.g., demand, liquidity, and refinancing needs) in making issuance decisions.
- We refreshed the Model using recent economic & market conditions and fiscal estimates, which include the impacts of the OBBB and expected tariff revenue. We chose to rely on dealer deficit estimates (from July 2025) rather than CBO estimates to ensure that we were incorporating proper estimates of tariff revenue.
- Relative to 2019, the expected level and volatility of debt service costs have increased significantly, though the change since 2023 is more incremental.
  - Term premium has expanded considerably since 2019.
  - Debt levels and deficits have increased substantially since 2019. In 2025, new policy measures in the OBBB increased expected primary deficits but expected tariff revenue offsets much of those increases.
  - Current issuance mix is near the efficient frontier of debt service costs vs volatility. Treasury's move toward a higher share of debt in T-bills has somewhat reduced expected costs but increased volatility.

Executive Summary (2/2)

- It is important to consider the optimal issuance strategy under a range of plausible macro scenarios, so we added alternatives to the "middle-of-the-road" scenario to the Model.
- Looking across potential macroeconomic environments, Treasury's current issuance mix is well-positioned to balance a low cost of debt with low volatility in a productivity boom. However, especially in adverse scenarios, and to some extent in the baseline scenario, a move out of bills and increases in shorter-maturity coupon issuance would decrease volatility without much increase in expected cost.
- Term premium is a key input to the Model and debt management choices. A notable increase in the supply and decrease in the demand for global long-dated sovereign debt has put upward pressure on term premium.
  - An optimal debt management strategy needs to consider the evolving supply/demand balance at different points on the curve while maintaining regular & predictable issuance patterns.
  - A limitation of the Model is the inability to distinguish the strength or fluctuations of demand across the curve.
- Given higher expected debt service costs, we re-assessed 2018 TBAC work on a dynamic issuance strategy that gradually shifts issuance mix in response to economic conditions. We think that some degree of response to observed term premium shifts could lower costs while remaining consistent with "regular and predictable" principles of debt management. More work needs to be done on designing and assessing such a strategy.

Summary of Model Refresh for 2025

- Debt levels have increased from ~75% GDP to ~94% GDP since 2019.
- The 5yr projection of primary deficits has increased by 1.3% GDP since 2019, with an increase of 0.4% GDP since 2023.*
- Inflation has fallen considerably since 2023 but remains above 2019 levels.
- Since 2019, the projected cost of debt has increased by 1.4% GDP, and the volatility of costs has increased by 0.3% GDP.
- Model uses a single model of economic and fiscal relationships – work in this presentation (shown on subsequent pages) contemplates a range of possible outcomes.

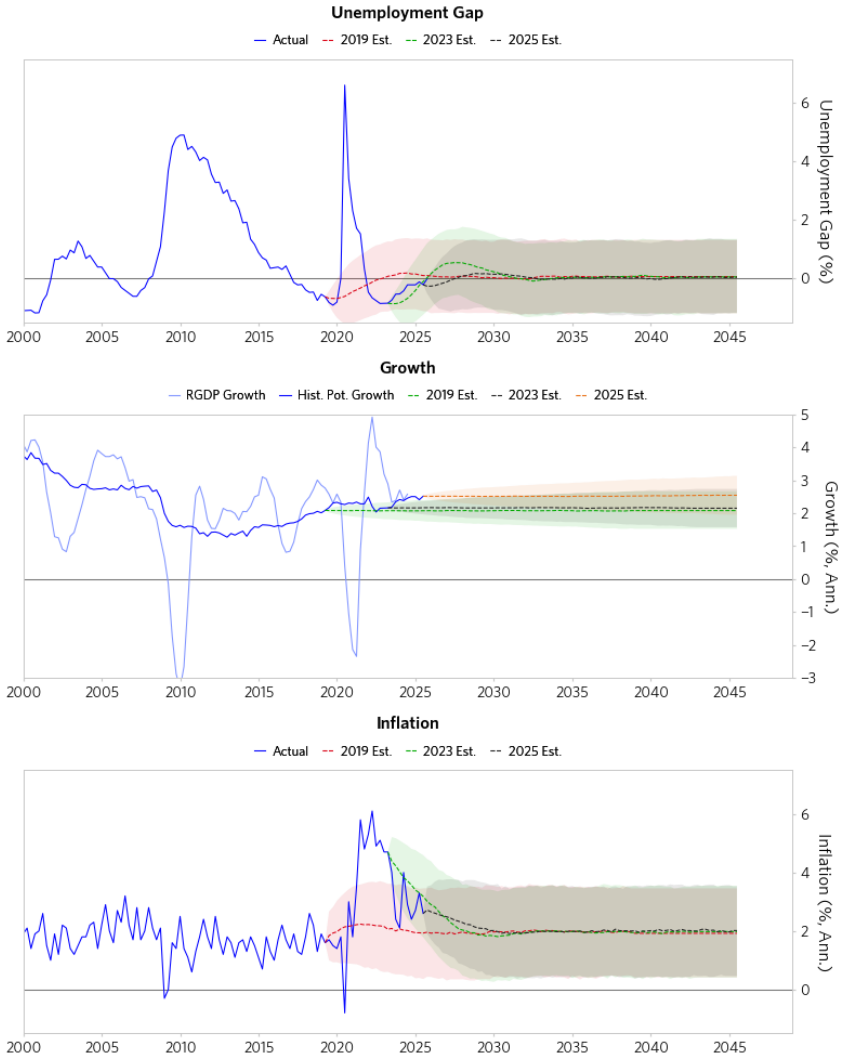
Model As Of	2019	2023	2025
Debt (%GDP)	75%	89%	94%
Primary Deficit (Next 5y Avg)	-2.1%	-3.0%	-3.4%
Trend Growth	2.1%	2.2%	2.5%
Inflation	1.6%	4.7%	2.6%
Annual Debt Service Cost**	3.1%	4.1%	4.5%
Volatility of Debt Service Cost**	0.7%	0.8%	1.0%

** For 2025, we chose to use dealer estimates as of July 2025 rather than the CBO estimates typically used in the Optimal Debt Model. See Appendix slide 29 for details.*

*** Debt service cost and volatility are calculated from interest costs over the 20-year horizon across 3,000 Model simulations using Treasury's recent actual issuance mix.*

Model Inputs and Assumptions: Macro Conditions

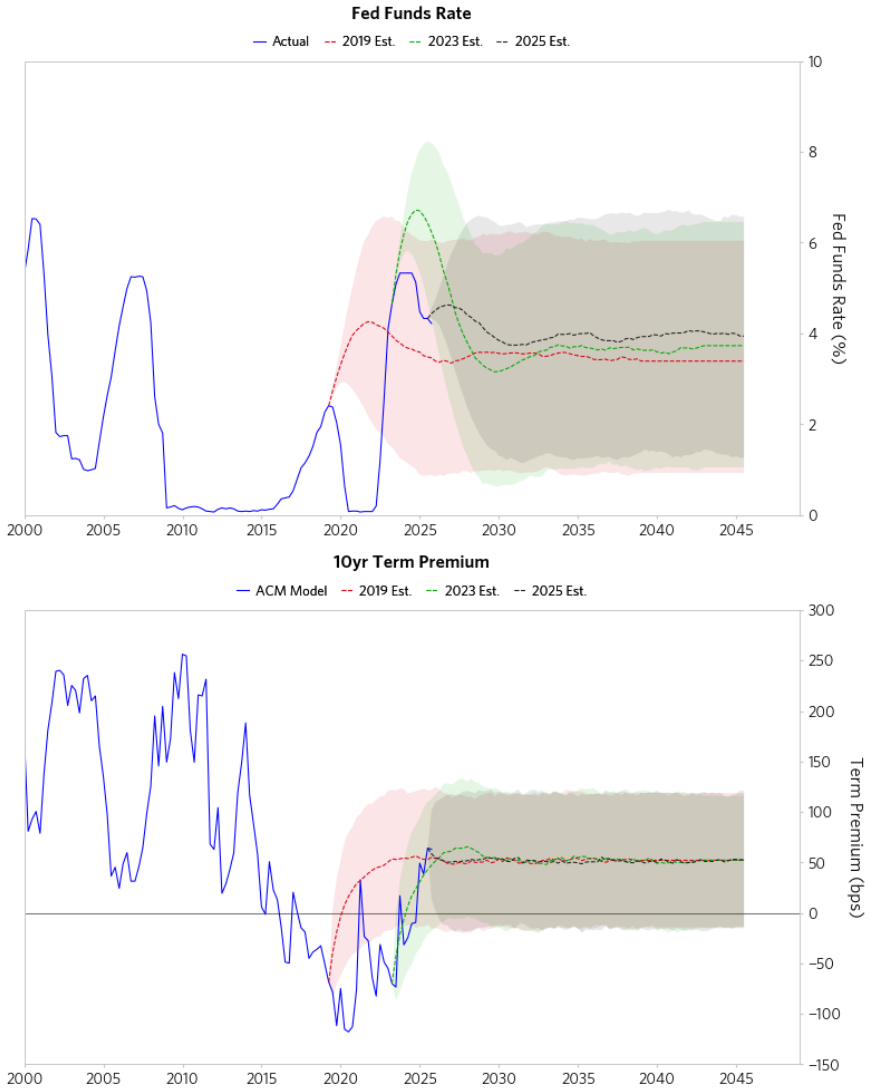
- Optimal Debt Model runs 3,000 simulations of key macroeconomic, fiscal, and market variables.
- Inputs start at current observed levels, then evolve via random shocks and basic assumed relationships, (e.g., higher rates slow growth, that reduces inflation with a lag, and so on).
- Model makes assumptions of linkages that are typical of recent decades in US economy, e.g., that the Fed can successfully manage inflation to 2% by adjusting policy rates.
- Charts at right and on subsequent pages show some key inputs as of 2019, 2023, and 2025 model updates, with colored bands reflecting 15th to 85th percentile range of simulated outcomes.



Sources: BEA, BLS, outputs of TBAC Optimal Debt Model
For a full discussion and access to source code of the Optimal Debt Model, see here.

Model Inputs and Assumptions: Rates

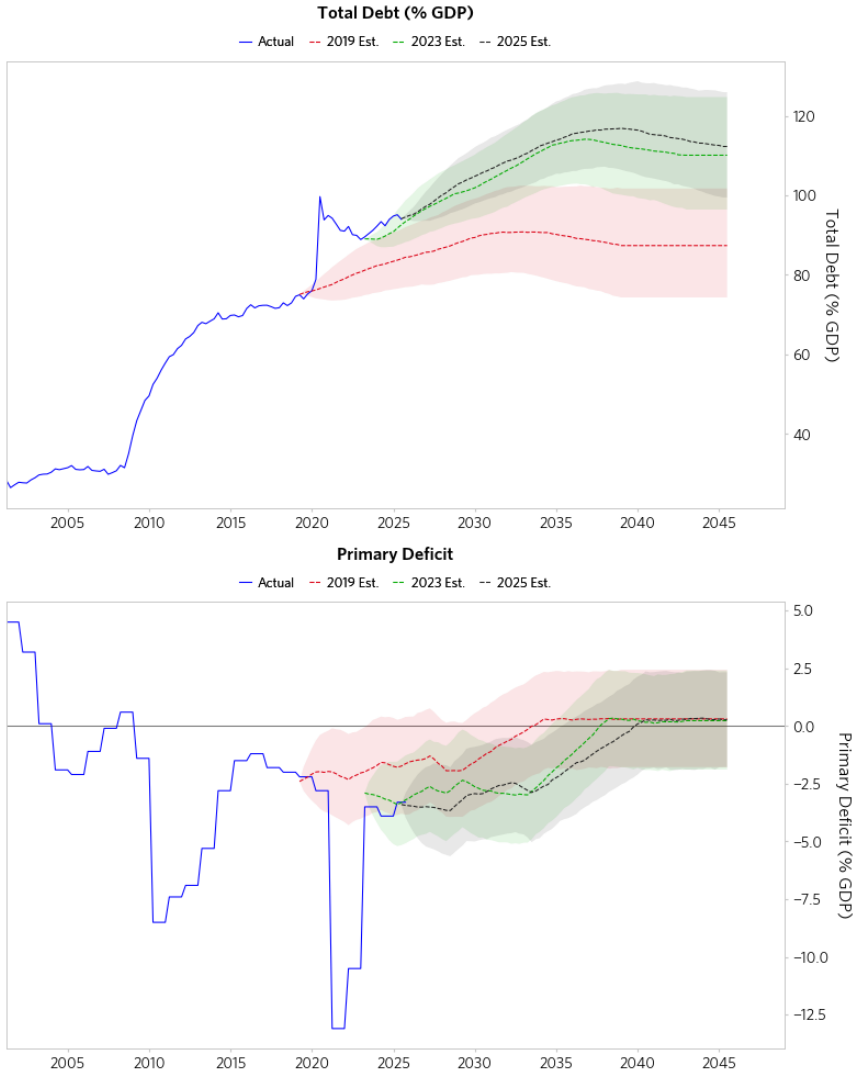
- Fed Funds in Model:
  - Evolves following basic inertial Taylor Rule in response to economic shocks.
  - Is anchored to a neutral real rate that is 0.5% below potential growth.
- Term premium in Model:
  - Starts at current level of ACM term premium model.
  - Evolves with influence of macroeconomic conditions (e.g., inflation expectations) and random shocks.
  - Tends toward ~0.5% at the 10yr point and ~0.0% at the 2yr point. Note that this is not far from current levels in popular ACM model.
- Model does not reflect impact of issuance decisions on term premium level.
- Fed Funds rate + appropriate term premium are used to determine interest rates (and coupon rates at issuance) for different Treasury securities.



Sources: Bloomberg, outputs of TBAC Optimal Debt Model

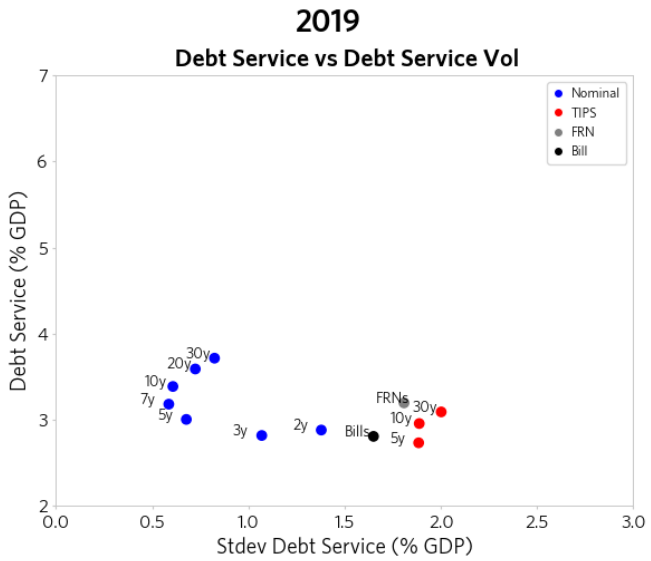
Model Inputs and Assumptions: Fiscal Conditions

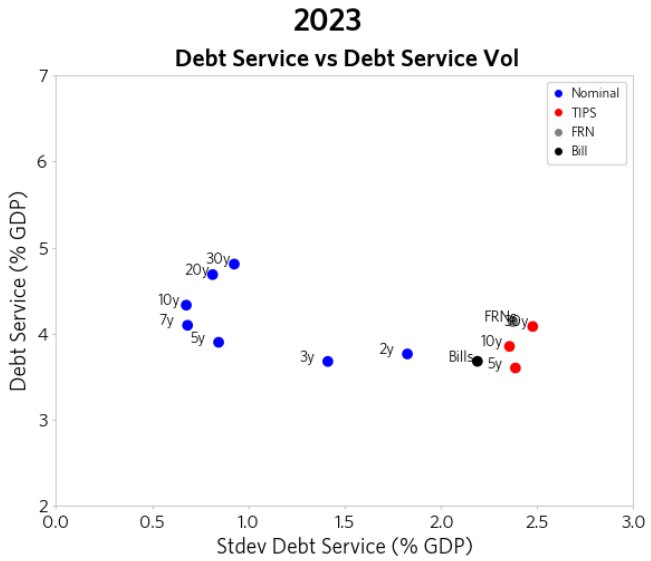
- Model uses projections for primary deficits for next 10 years, then assumes a consolidation to 0% primary deficit by year 15.
  - Typically, the Model sources CBO for these projections. For this update, we chose to use primary dealer estimates (through 2027) to reflect expected tariff revenue that is important to consider but is not reflected in currently available CBO estimates. We extended these with available CBO estimates for out years.*
- Deficits are funded via specified issuance mixes. The model does not consider elasticity of demand at different points on the curve, i.e., it would allow for arbitrary amounts of securities to be issued in a single product without a penalty on the interest rate paid.
- The model then runs through simulations of key fiscal variables (amounts of different securities outstanding, coupon rates, interest burden, debt levels)
- Charts at right show "baseline" scenarios for 2019, 2023, and today, using conditions and Treasury's issuance mix on each date.
  - For today's model, debt levels peak around 120% GDP. This is lower than CBO's projections due to the Model's assumed consolidation to 0% primary deficit.
  - Slide 12 shows model outputs if primary deficit remains elevated.

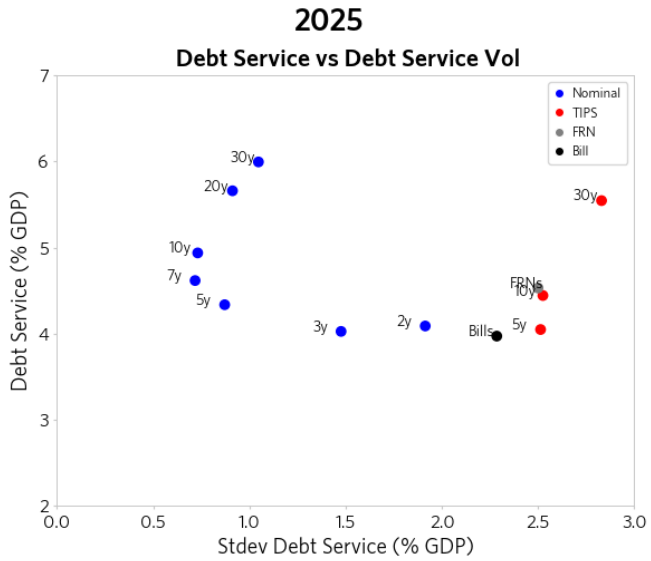


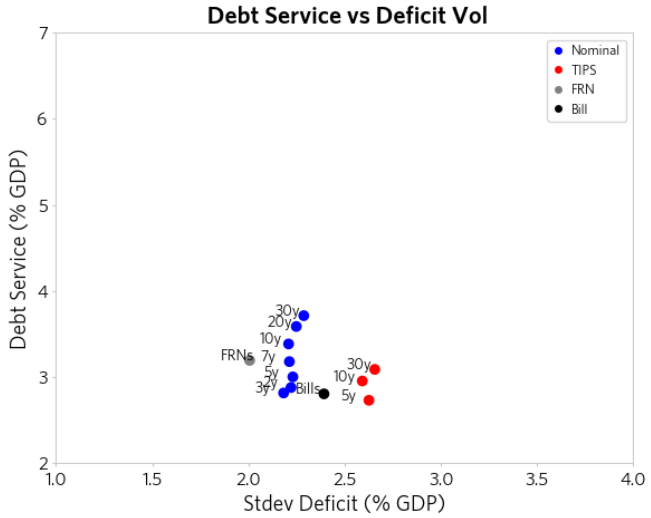
** See Appendix slide 29 for further discussion.*
Sources: Treasury, CBO, outputs of TBAC Optimal Debt Model

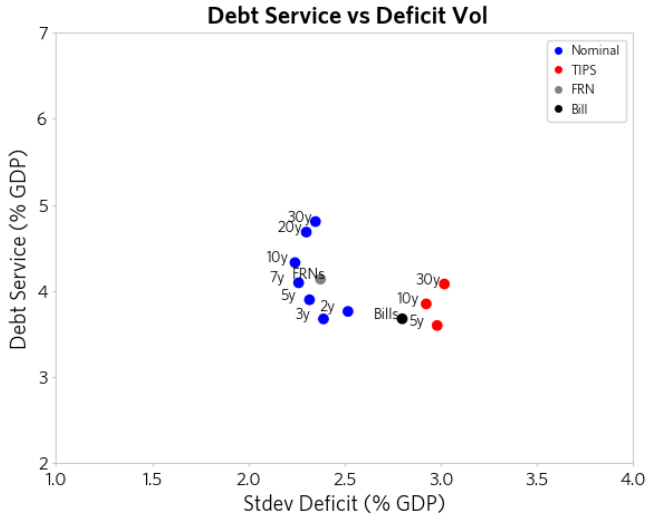
Model Outputs: Debt Service Cost and Volatility if Full Issuance Needs Met with Individual Treasury Products

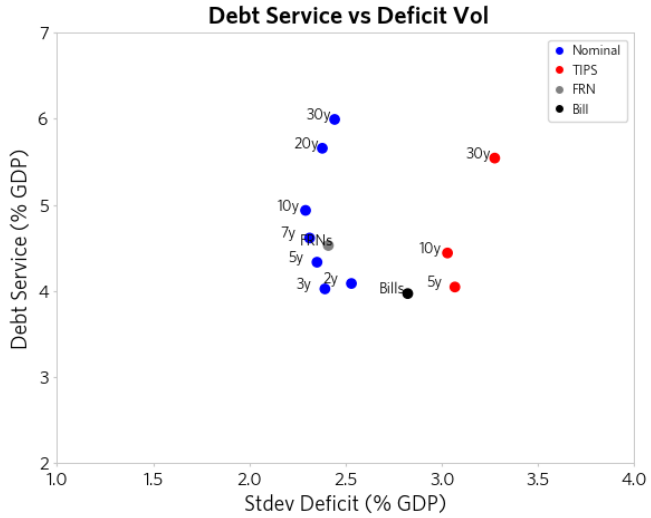












Source: outputs of TBAC Optimal Debt Model

Efficient Frontier of Debt Issuance Mixes

- The "efficient frontier" shows issuance strategies that produce lowest expected debt service cost for each level of debt service volatility (top chart) or overall deficit volatility (lower chart).
- Costs vs. the frontier are a useful reference for the costs of an issuance strategy, but strictly optimizing for being on the frontier misses important considerations not reflected in the model (e.g., not overissuing in a single product).
- Tradeoff between level and volatility of debt cost (i.e., risk tolerance) is core policy choice of debt manager and may vary over time.
- Current issuance mix is close to the efficient frontier. Annotations show several indicative issuance mixes (including Treasury's current mix).

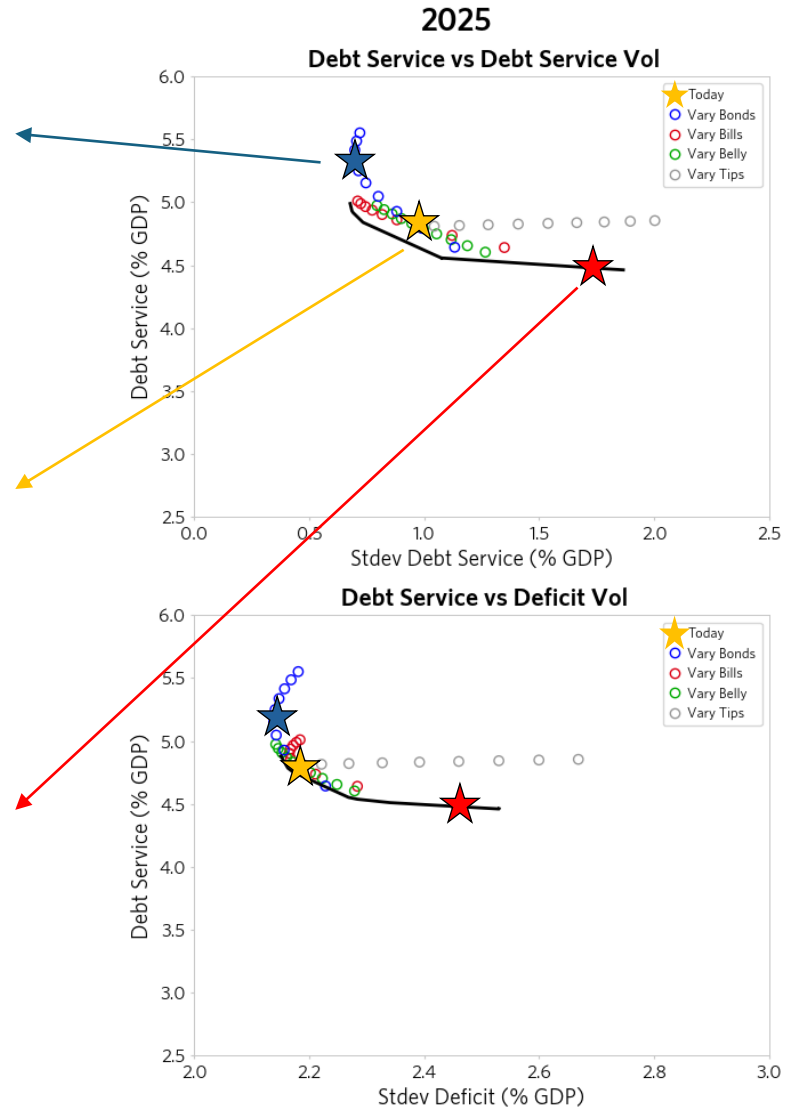
Sample Issuance Mixes

(corresponding to stars on chart)

"More Bonds"	Gross Issuance Share	Long-Run Level Share
Bills	62%	19%
Short Maturity*	9%	23%
Long Maturity*	27%	55%
TIPS	2%	4%

"Today"	Gross Issuance Share	Long-Run Level Share
Bills	62%	36%
Short Maturity*	27%	42%
Long Maturity*	9%	16%
TIPS	2%	6%

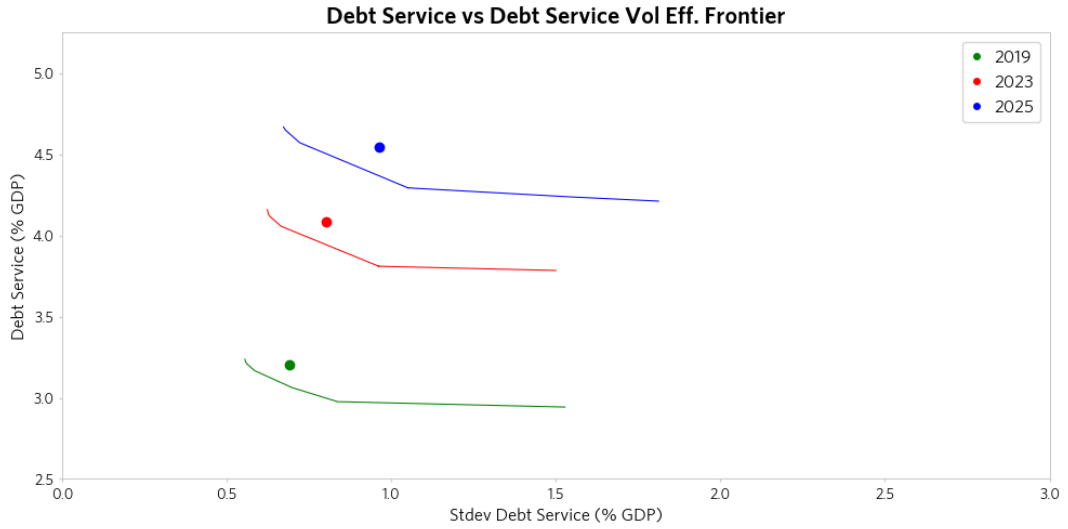
"More Bills"	Gross Issuance Share	Long-Run Level Share
Bills	91%	68%
Short Maturity*	5%	14%
Long Maturity*	2%	8%
TIPS	2%	10%

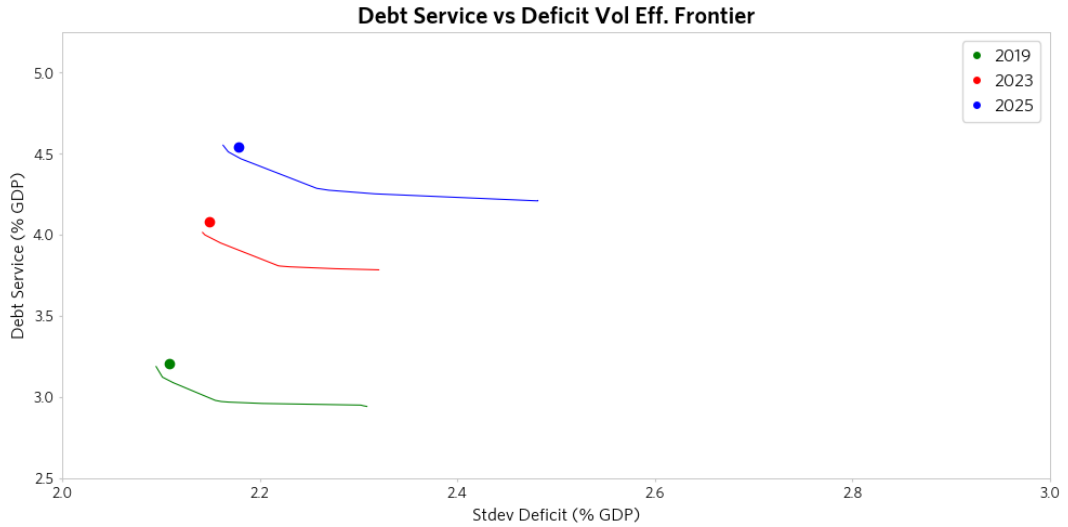


** Short maturities are nominal coupons of 2-, 3-, 5-, and 7-year maturities; long are 10-, 20-, and 30-year. Bills are modeled as issued once per year (regardless of tenor) as a simplifying assumption.*
"Long-Run Level Share" is the median forecasted composition of debt outstanding after 20 years.
Sources: Treasury, outputs of TBAC Optimal Debt Model

Efficient Frontier Evolution over Recent Years

- Since 2019, modeled costs and volatility of issuance have increased considerably. The primary drivers are increases in debt levels, deficit projections, and term premium.
- Treasury's historical issuance mix for each year is reflected with the dots.
- Between 2019 and 2025, Treasury's issuance mix shifted toward a strategy consistent with somewhat lower expected costs and reasonably higher volatility, (i.e., toward the right and a bit down). This was driven by nominal coupon auction sizes remaining fixed after early 2024.
- Appendix slide 30 includes more details of these charts with different issuance kernel shifts.

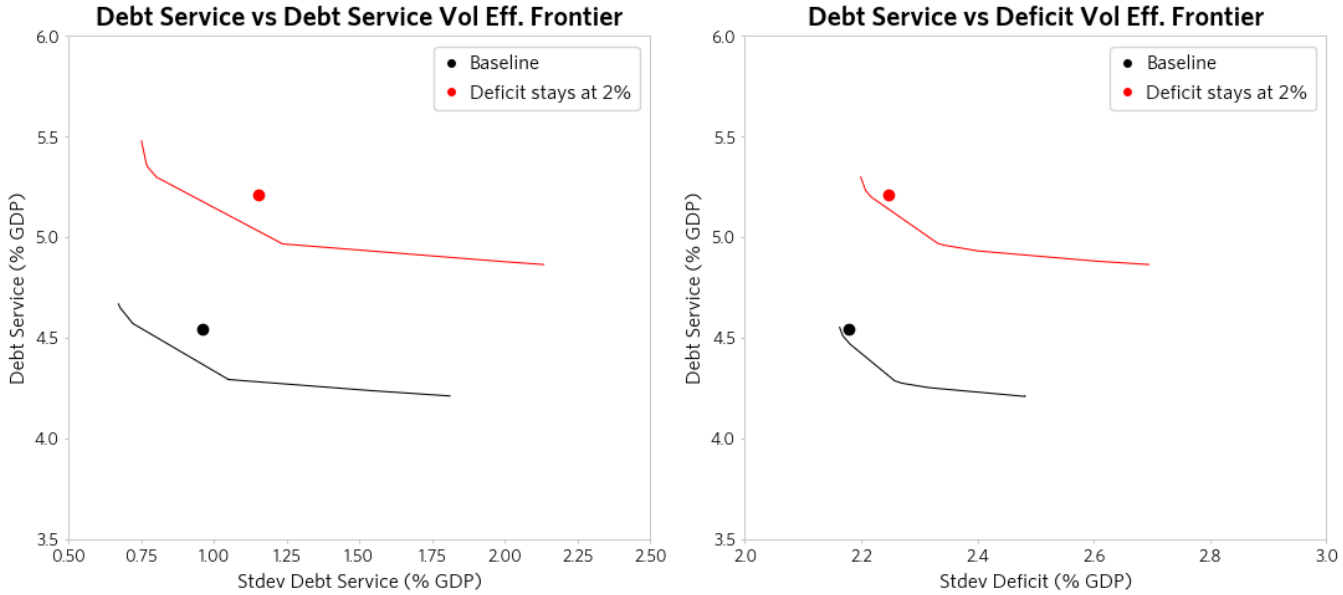


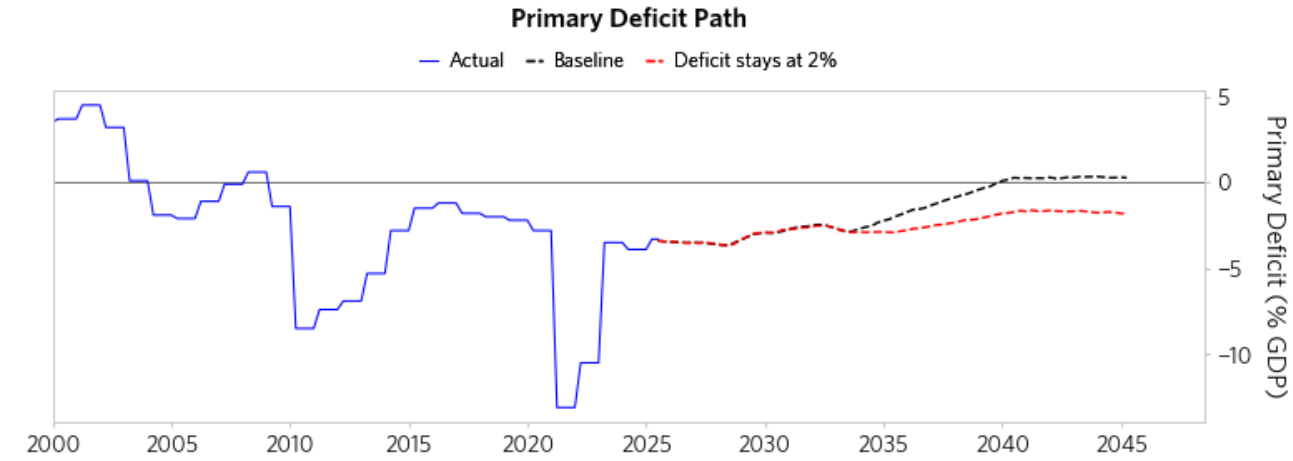


Source: outputs of TBAC Optimal Debt Model

Alternative Assumption Around Primary Deficit Consolidation

- The model assumes that the primary deficit begins consolidating in year 10 and falls to 0% GDP by year 15. Of course there is considerable policy uncertainty 10+ years forward, but this assumption is notably more optimistic than CBO's assessment of current policy.
- We additionally tested the baseline against a case where the primary deficit stabilizes at 2% after 10 years. This is closer to the CBO's 2045 deficit projection of 1.8% as of March 2025.
- In this case, debt service cost increases by 0.9% GDP and debt service volatility increases by 0.25% GDP relative to the baseline.

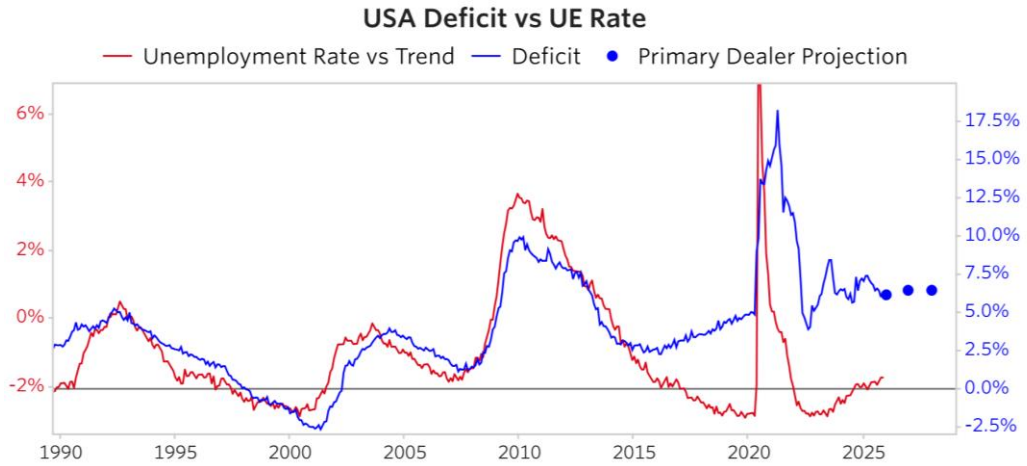


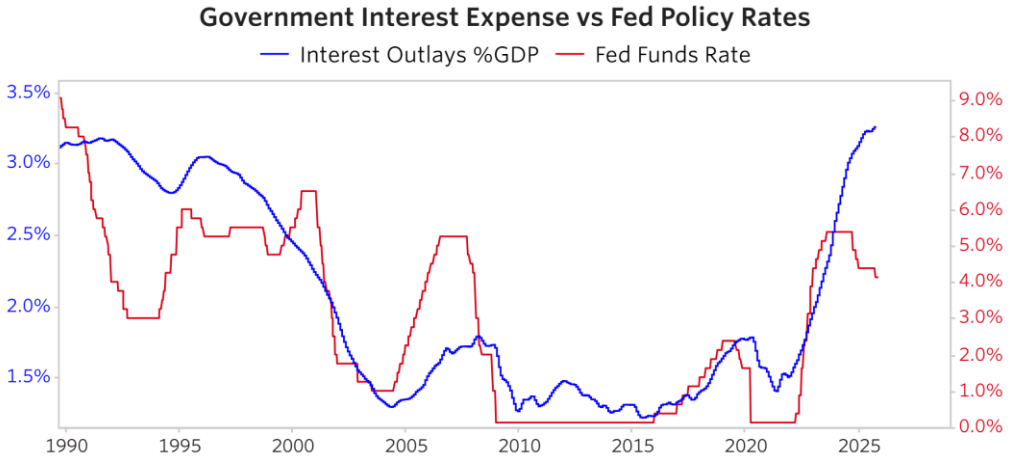


Source: outputs of TBAC Optimal Debt Model

Evolution of Macroeconomy and Fiscal Borrowing Needs, Range of Outcomes

- As shown on prior slides, fiscal dynamics have significantly increased expected debt service costs since 2019:
  - Recent years have featured high deficits and government borrowing, especially relative to low unemployment rates.
  - CBO and dealer projections are above 5% GDP in the coming years.
  - Elevated government support of economy has required restrictive rates to keep inflation under control, adding to interest burden on debt.
- Higher debt levels make interest paid on the debt a more significant consideration for fiscal projections.
- There is a considerable range around expected economic outcomes and fiscal deficits given rapid policy evolution (e.g., tariffs, international trade deals, shifts in global supply chains).
- Robust modeling of deficit requires considering range of outcomes, as shown on subsequent pages.





Sources: Treasury, CBO, author's calculations

Debt Model Should Consider Various Macroeconomic Scenarios

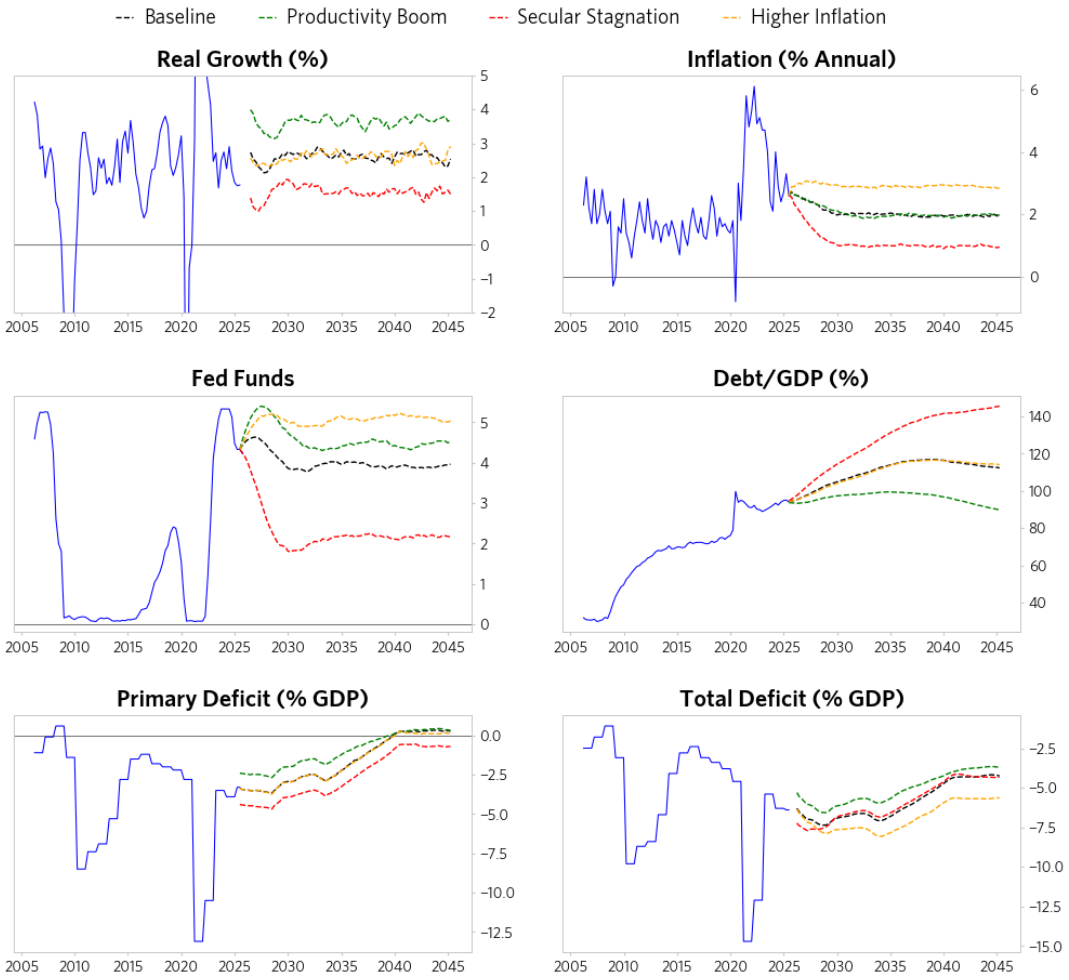
- The Model uses a single model of growth and fiscal scenarios that embeds key assumptions, like:
  - Reverting toward long-term historical growth patterns.
  - Keeping the deficit at current level, then consolidating toward 0% primary deficit.
  - Inflation can be managed to 2% with Fed policy.
- We looked at how the Model responds to several potential plausible macroeconomic scenarios:
  1) Productivity Boom – Surge in non-inflationary growth, lower deficits.
  2) Secular Stagnation – Extended period of low growth and low inflation, higher deficits.
  3) Higher Inflation – Persistent, above-target inflation.

	Baseline	Productivity Boom	Secular Stagnation	Higher Inflation
Potential Growth	2.5%	3.5%	1.5%	2.5%
R-Star	2.0%	2.5%	1.5%	2.0%
Primary Deficit (next 10yrs)	3.0%	2.0%	4.0% *(with 1% terminal)*	3.0%
Inflation	2.0%	2.0%	1.0%	3.0%

Values reflect rounded averages over model horizon

Detail on Macroeconomic Scenarios

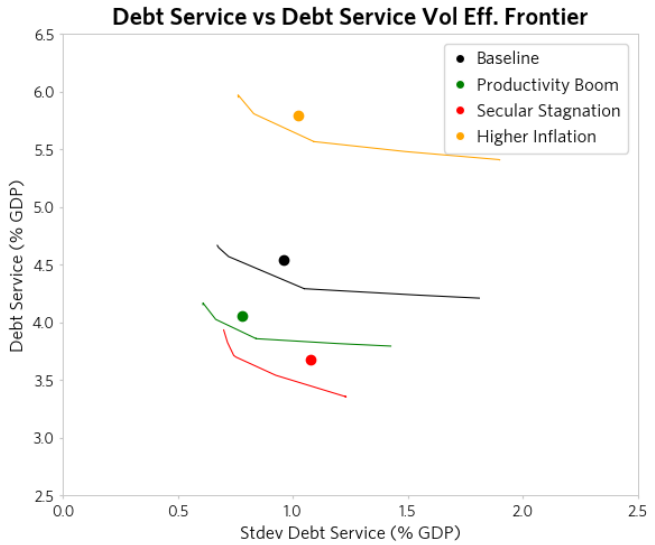
- Charts illustrate key model inputs and simulations under different economic scenarios. Forward lines indicate median simulated case; 15-85 percentile bands omitted for readability.
- More detail on scenarios:
  - **Productivity Boom:** Sustained real growth above the current trend, with no inflationary impact and slightly higher R* & policy rates. Debt/GDP growth limited, with GDP expanding quickly and strong economy supporting government revenues.
  - **Secular Stagnation**: Persistently low growth and inflation, e.g. due to demographic shifts, that does not pick up in response to easy policy. R* somewhat lower. Debt/GDP soars and the deficit widens, with structurally higher unemployment and poor growth.
  - **Higher Inflation:** Inflation moves for exogenous reasons, e.g. due to deglobalization or sustained shift in expectations. No structural change to growth conditions. Higher nominal (but not real) rise in Fed Funds rate raises interest costs, though inflation helps eat through existing debts.

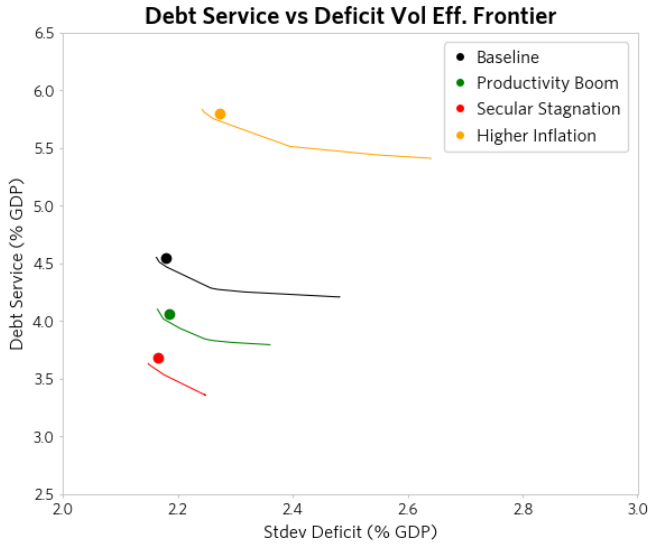


Source: outputs of TBAC Optimal Debt Model

Model Outputs for Macroeconomic Scenario Analysis

- Each macroeconomic scenario was run through the Optimal Debt Model, starting with today's conditions but evolving with the specified scenario. Treasury's current gross issuance mix was used in each of the macro scenarios.
- Looking at the results:
  - Model suggests higher debt service burdens in inflationary scenario due to higher rates to manage inflation.
  - Productivity boom scenario lowers debt levels and deficits to produce lower costs.
  - Lower debt service burdens are also achieved in secular stagnation scenario due to high debt levels being offset by very low rates. This is a similar outcome to Japan's over the past few decades.
- Current issuance mix is close to efficient frontier in productivity boom scenario.
- In other scenarios, and especially a secular stagnation, today's issuance mix is less risk-averse. The model suggests that a decrease in bill issuance, an increase in belly issuance, and a decrease in bonds lowers volatility for not much cost increase in other scenarios*.

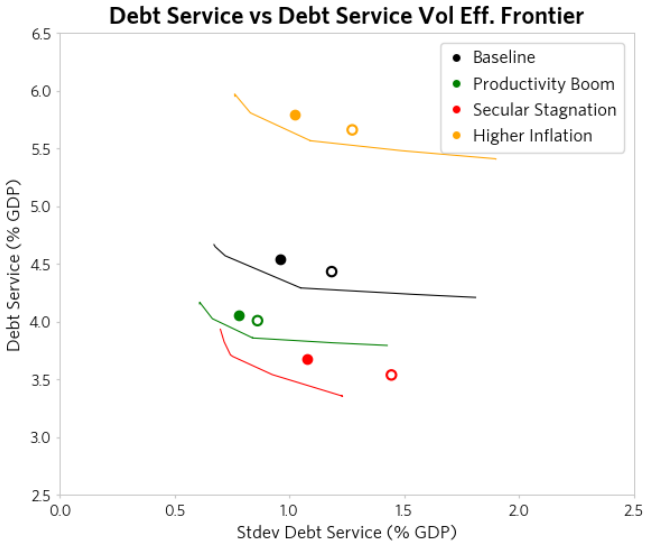


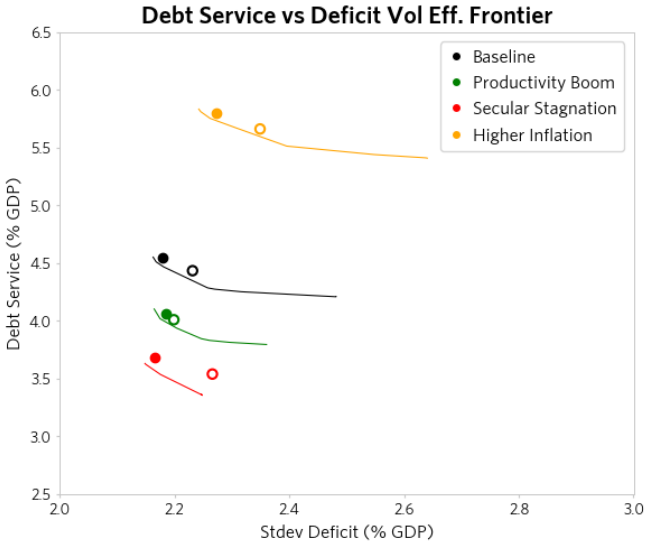


** See Appendix slide 30 for illustration of how different issuance shifts would change this picture.*
Source: outputs of TBAC Optimal Debt Model

Macroeconomic Scenario Analysis with Slower Growing Auction Sizes

- These charts are repeats of the prior page but with hollow dots added to reflect an issuance scenario where coupon auction sizes are indexed to (grow with) GDP.
- When auction sizes only grow with GDP, higher deficit scenarios (e.g., secular stagnation, and to some extent the baseline) automatically rotate toward higher bill shares.
- In those scenarios, keeping auction sizes fixed results in much higher deficit volatility without appreciable debt cost savings.
- These cases also produce bill shares that grow to be considerably larger than TBAC's recommended longer-term level of around 20%.

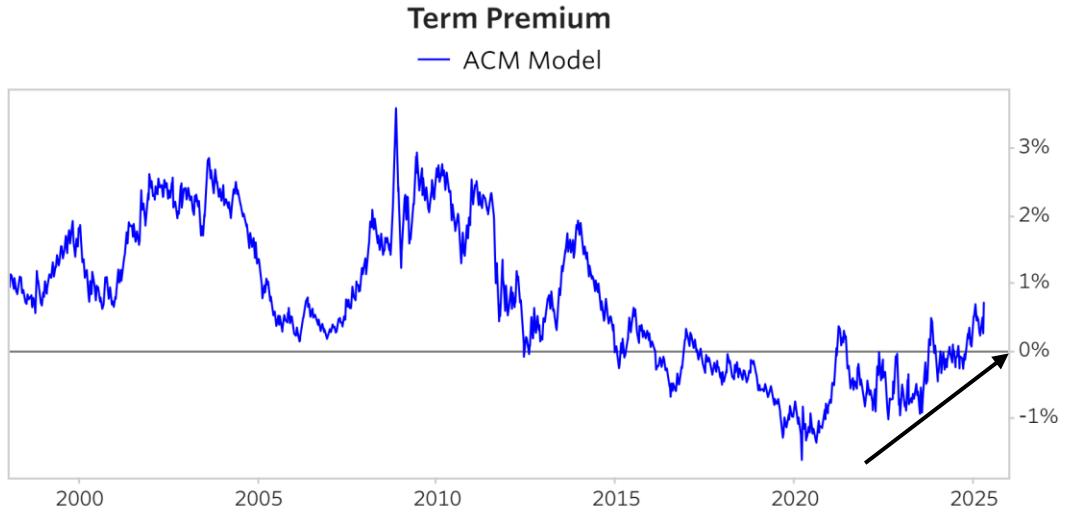


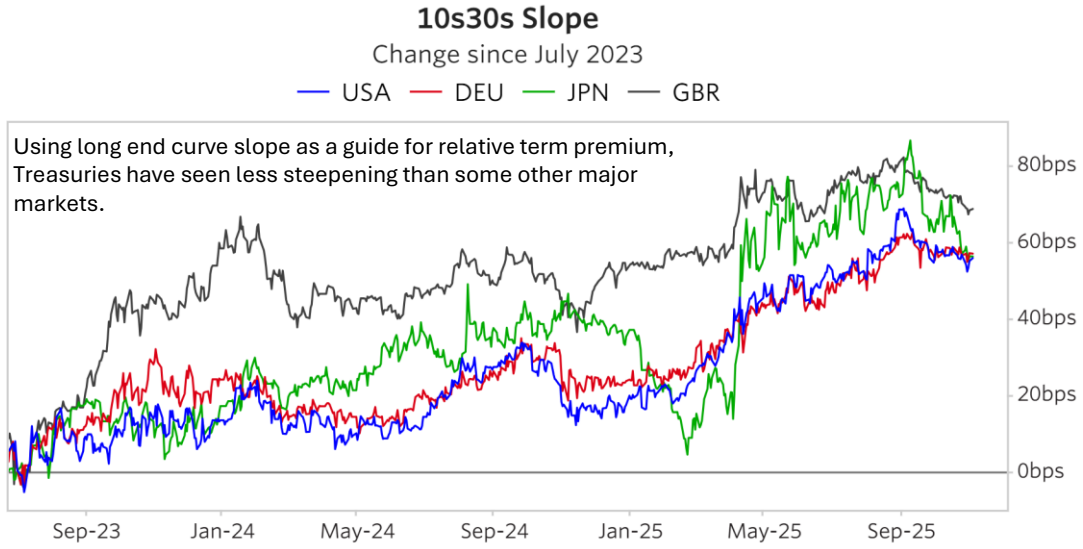


Source: outputs of TBAC Optimal Debt Model

Rising Term Premiums Have Increased Costs and Are Not Well Included in Model

- Since 2020, term premia have expanded globally, from very compressed levels to levels above the past decade. US term premium has risen by somewhat less than other major economies. Note that term premium is unobservable and can only be estimated via a variety of models (which offer different reads).
- This rise, which has brought term premium levels close to the assumed long-run level in the Model, has contributed to higher debt service costs.
- Term premiums have been and will likely continue to be pressured by:
  - Higher global long duration debt supply (see next slide for further discussion).
  - Structural changes in demand (e.g., decreasing pension demand for long duration debt).
- The Optimal Debt Model does not model feedback from issuance choices to interest rates/term premium. It also does not model for structural changes in demand for different Treasury products due to shifting business models of market participants.

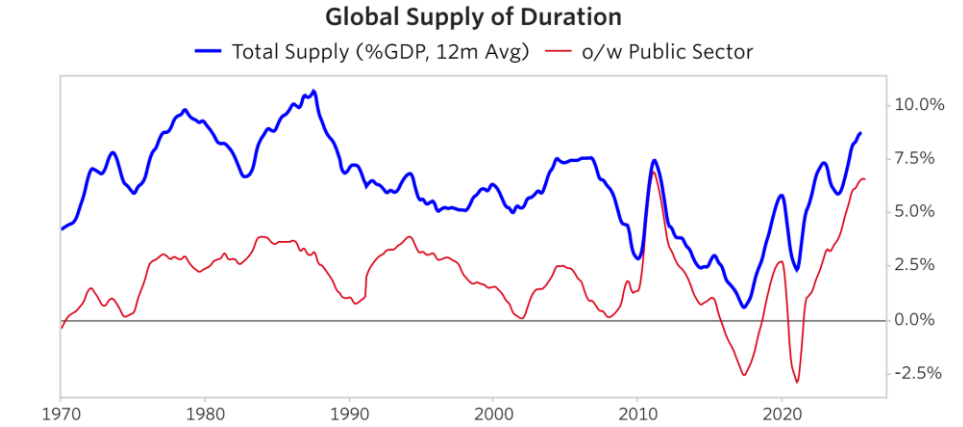


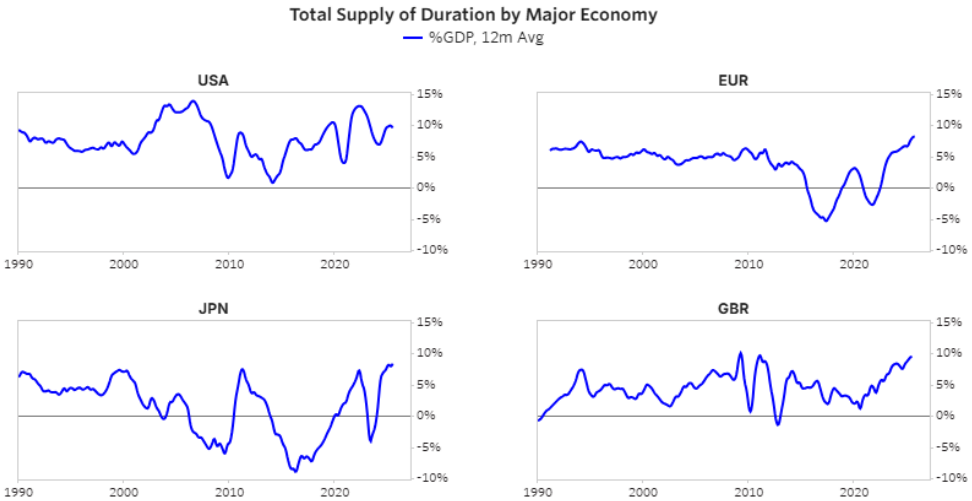


Source: Bloomberg, author's calculations

Global Supply Pressures on Long Maturity Debt

- Globally, supply of long maturity debt has increased. Measures shown include both private and public sector debt.
- Key dynamics include rising public sector deficits and ongoing central bank QT, which are especially pronounced outside the US.
- Because investors view developed market debt as relatively substitutable with currency hedging, global supply dynamics can transmit meaningfully to the US bond market.
- US supply has been roughly stable while supply in other major economies has risen substantially; this has been a material driver of US long-end outperformance

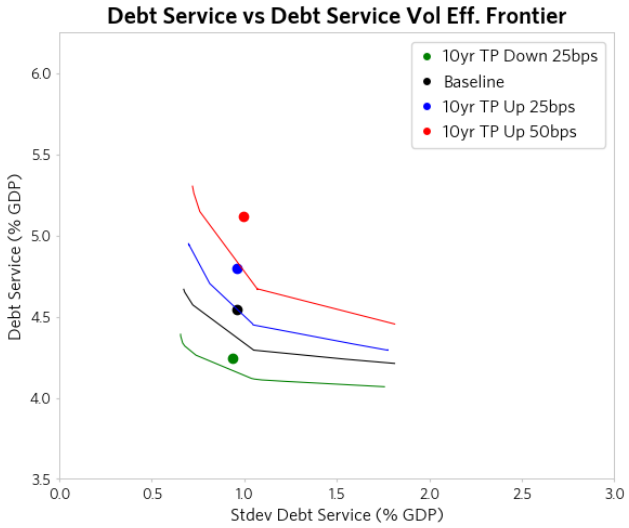


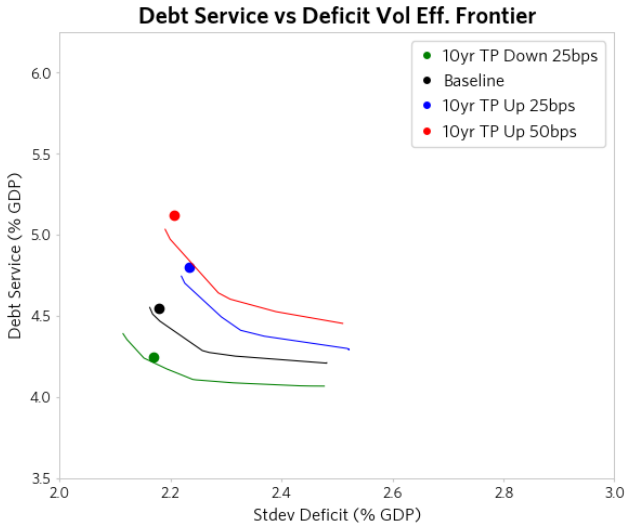


Source: National flow of funds data, author's calculations and assumptions

Sensitivity of the Model to Term Premium

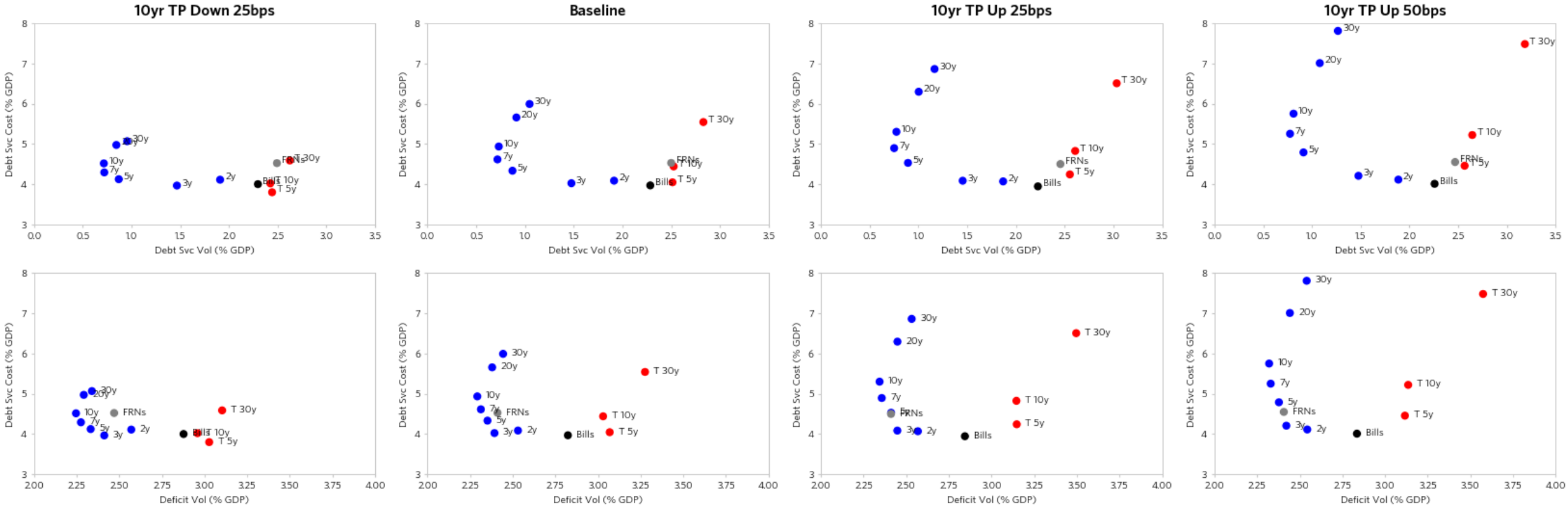
- Term premiums have recently risen to longer-term assumed levels in Optimal Debt Model. Given the potential durability of elevated global debt supply, it is important to consider the impact of further structural increases to term premium from here.
- As expected, increases in term premiums push up expected debt costs, especially for mixes that include more long maturity instruments (see next page for single security cost/volatility detail).





Source: outputs of TBAC Optimal Debt Model

Sensitivity of the Model to Sustained Term Premium Shifts



Source: outputs of TBAC Optimal Debt Model

A Dynamic Issuance Strategy

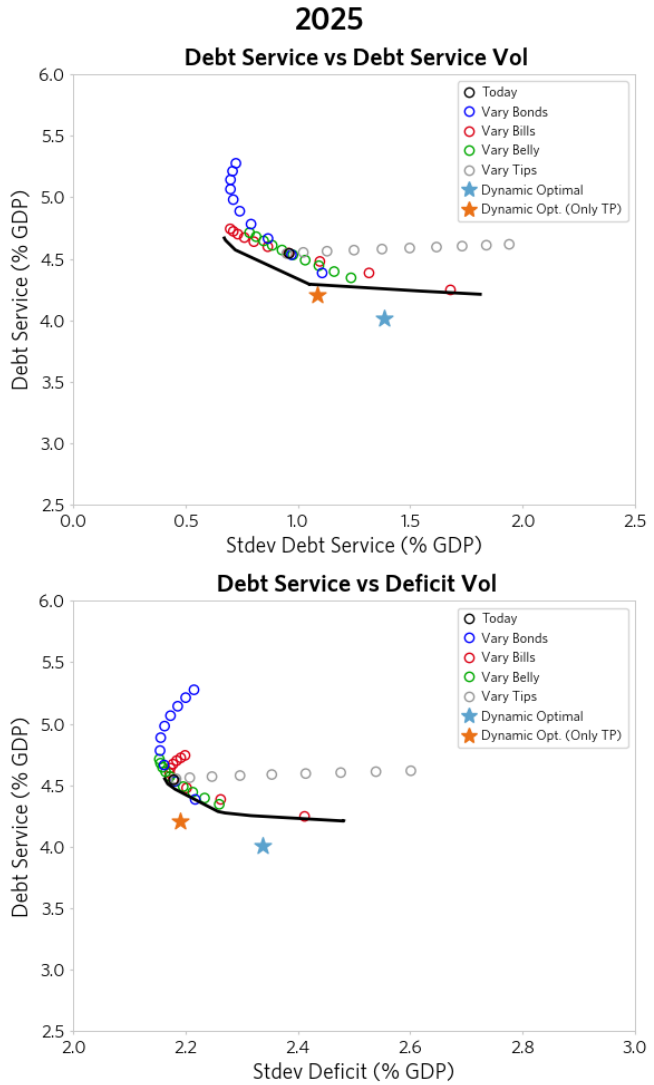
- Prior TBAC work[1] studied a "dynamic issuance strategy" that shifts issuance mix in response to market conditions.
  - Original work tested dynamically responding to 1) term premium, 2) deficit size, 3) level of 2yr real rate.
- Modeling suggests that a dynamic strategy can achieve Treasury costs below the efficient frontier of static issuance mixes and could support goal of financing the government at the lowest cost over time.
- Shifting the issuance mix is not inconsistent with being regular and predictable, and Treasury has historically varied the relative issuance shares of different securities. The key is to move in appropriately sized steps and communicate with the market to allow for smooth digestion of supply.
- In terms of what variables to respond to:
  - Responding to shifts in term premium is more compelling as term premiums are influenced in some degree by Treasury's choices.
  - Responding to factors like the level of 2yr real rates and the size of the deficit entails Treasury taking a view on variables outside its control, like Fed policy choices or legislation. This puts Treasury in competition with market participants in forming views that are better than consensus.
- More work needs to be done on calibrating and assessing a dynamic issuance strategy, including:
  - Choosing measures to respond to.
  - Analytically sizing the costs of fluctuating issuance patterns and calibrating response function in light of those costs.
  - Working through the varying costs/benefits at different levels of debt outstanding, deficit, and other key fiscal variables.
  - Understanding investor response to a dynamic issuance strategy.
  - How to incorporate other goals, like maintaining enough room to quickly issue bills as a "shock absorber" for unexpected financing needs.

[1] *TBAC Charge Q4, 2017: "Debt Issuance Optimization Models"*

Source: outputs of TBAC Optimal Debt Model

Modeled Savings of a Dynamic Issuance Strategy

- Using a dynamic issuance strategy that reacts to term premium reduces costs relative to the baseline and moves them below the efficient frontier of static issuance mixes (orange stars).
- We also ran tests that are dynamic on all three variables (term premium, real 2yr rates, and deficit levels) laid out in prior TBAC work. These produce additional cost savings but an increase in volatility of debt service costs (blue stars).
- Dynamic issuance strategies assume that market conditions mean-revert over time.
  - For conditions like term premium where Treasury's activities are part of the price-forming process, a measured reaction by Treasury can create mean reversion.
  - For exogenous factors, like short-term interest rates, a bet on mean reversion requires more careful assessment of the risks (see, for example, betting on mean reversion of policy rates in externally sensitive emerging economies).



Source: outputs of TBAC Optimal Debt Model

Additional Debt Models and Metrics: Term Premium

- Term premium models exist that attempt to model the term premium directly (e.g., ACM, KW) and via comparisons across market securities (e.g. Treasuries vs swaps, curve butterflies). As noted, these are only indirect models and often disagree with one another.
- As discussed, the Optimal Debt Model treats term premium exogenously, assuming arbitrary amounts of inelastic demand for individual securities.
- A useful perspective for Treasury could be a quantitative assessment of the outcomes of its issuance activity across the curve and in specific sectors. The shaded box below suggests design considerations for such an assessment.
- This assessment could be useful :
  - To give quantitative feedback on Treasury's choices.
  - To build the impact of issuance mix choices into the Optimal Debt Model, accounting for one of its deficiencies.*
  - To calibrate a dynamic response function, as discussed on slide 22.
  - To measure structural shifts in strength of demand in different sectors.

Sample Design Considerations for a Market Impact Assessment

- Core goal is to measure the impact of marginal issuance choices on interest rates / term premiums.
- Challenge of the exercise is distinguishing signal from noise in market data
- Possible approach involves adjusting for known sources of rate market volatility (e.g., moves in oil prices, surprises in economic statistics, moves in other global rate markets) to isolate moves that are idiosyncratic to Treasury market and caused by shifts in supply and demand.
- Those moves can then be compared to normalized measures of Treasury supply and aggregated across time.
- Can include a full curve assessment or local assessment of the effect of supply in a sector.

** Initial Model development included work on an endogenous term premium model, but it is not calibrated to current market conditions or used in the results shown here.*

Additional Debt Models and Metrics: Rollover Risk

- Treasury faces the continuous need of refinancing large amounts of maturing debt, and an inability to do so, or a sharp increase in the interest rate required by investors, would severely impact the government's borrowing costs.
- Treasury and TBAC regularly review various measures of portfolio rollover risk, such as % of debt maturing in <2 years, bill share, and the WAM & WANRR of the portfolio.
- The IMF recently published a working paper on a measure of “Debt-at-Risk,” which quantifies the potential increase in debt levels and debt service costs in a stressed, adverse scenario, e.g., one where economic growth is very weak and financial stress is high. This approach inherently focuses on tail risk and non-linear risks. Such an approach would require more study to assess its usefulness to Treasury.

* *see: IMF Paper*

Additional Debt Models and Metrics: Volatility and Liquidity

- Treasury is negatively affected by an increase in rate volatility and a decrease in liquidity. The effects are both direct, via an increased probability of adverse auction results, and indirectly via a variety of factors including increased risk premiums demanded by investors and heightened systemic risk.
- The most useful external, market-based measure of uncertainty is implied volatility.
- Many measures of liquidity exist, and a combination is useful to assess market conditions. These measures include bid-ask spreads, order book depth, the price impact of secondary market trades, on- and off-the-run trading volumes, yield spreads between on- and off-the-run securities, and Treasury yield curve fitted error.
- TBAC has covered these measures in past charges, e.g. TBAC Charge, Q2 2020, as have many external commentators, e.g., Liberty Street Economics.

Potential Enhancements to Optimal Debt Model

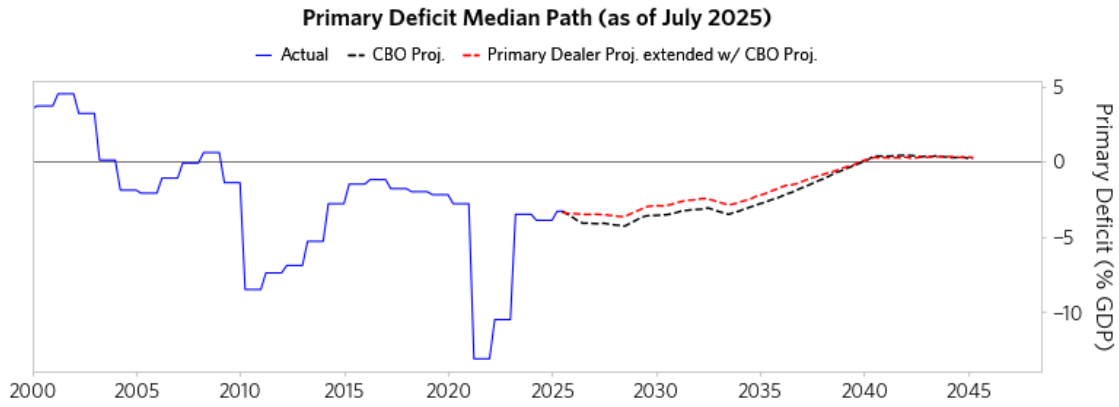
- The Optimal Debt Model is a useful framework for assessing issuance choices, but as with any model it has its limitations. Improvements could help to improve the quality and usefulness of its projections.
- Policy features not included in model:
  - SOMA dynamics, e.g. the effect of Fed remitting profits to Treasury.
  - Buyback operations, which Treasury reintroduced in recent years.
- The model's view on future fiscal conditions is limited in its range of possibilities and the timeframe considered (20 years). The model could model alternative futures (e.g., via random shocks) that simulate legislative or geopolitically driven changes to government tax/spending policy. A longer time horizon would also allow for proper modelling of the fiscal impact of longer-term securities.
- The exogenous treatment of term premiums could be refined to better reflect market dynamics that are increasingly important at higher levels of debt outstanding. Feedback from issuance to term premium, both in individual securities and across the curve, would help build in more realistic constraints around the issuance mix.

Conclusions

- The refreshed Optimal Debt Model projects that higher debt levels, larger deficits and expanded term premium have structurally increased both the cost and volatility of deficit and debt service. The increase in term premium has been driven by a variety of factors, including significant increases in global long-term sovereign debt supply.
- Looking across potential macroeconomic environments, Treasury's current issuance mix is well-positioned to balance a low cost of debt with low volatility in a productivity boom. However, especially in adverse scenarios, and to some extent in the baseline scenario, a move out of bills and increases in shorter-maturity coupon issuance would decrease volatility without much increase in expected cost.
- TBAC has, in the past, studied dynamic issuance strategies that shift the issuance mix in response to market conditions. A strategy that responds to moves in term premium could improve Treasury's cost profile and remain consistent with "regular and predictable" debt management principles. Such a strategy needs further work to design its parameters, assess its impact, and consider market participants' reactions to its implementation.
- We discussed a variety of potential Optimal Debt Model improvements and supplemental models and metrics around term premium, liquidity, volatility, and rollover risk that could help inform debt management choices. In particular, any tools that help assess the impact on term premiums from Treasury's choices and structural changes in other players' behaviors could help Treasury achieve its goal of funding the government at the lowest cost over time.

Appendix: Dealers' Deficit Estimates vs CBO Projections

- Optimal Debt Model typically uses CBO estimates. While comprehensive, they are limited to considering current law.
  - The CBO's full set of estimates from January and update in July do not adequately include the impact of tariff revenue.
  - A CBO August update included a 10-year estimate of $4tn in tariff revenues but did not include the deficit accounting of secondary effects (e.g., offsets of lower taxes or other macroeconomic impacts).
- For this model refresh, we used dealers' median deficit projections (from surveys included in the Q3 refunding materials) to account for the full deficit impact of expected tariff collection.
  - Dealers project for deficits roughly $200bn lower in FY '26 and FY '27 than the CBO's July projection
- We extended the dealer projections beyond their 3-year forecast window using arithmetic changes of the CBO's deficit and interest projections. This method preserved the level-shift impact of tariff revenues in out years.

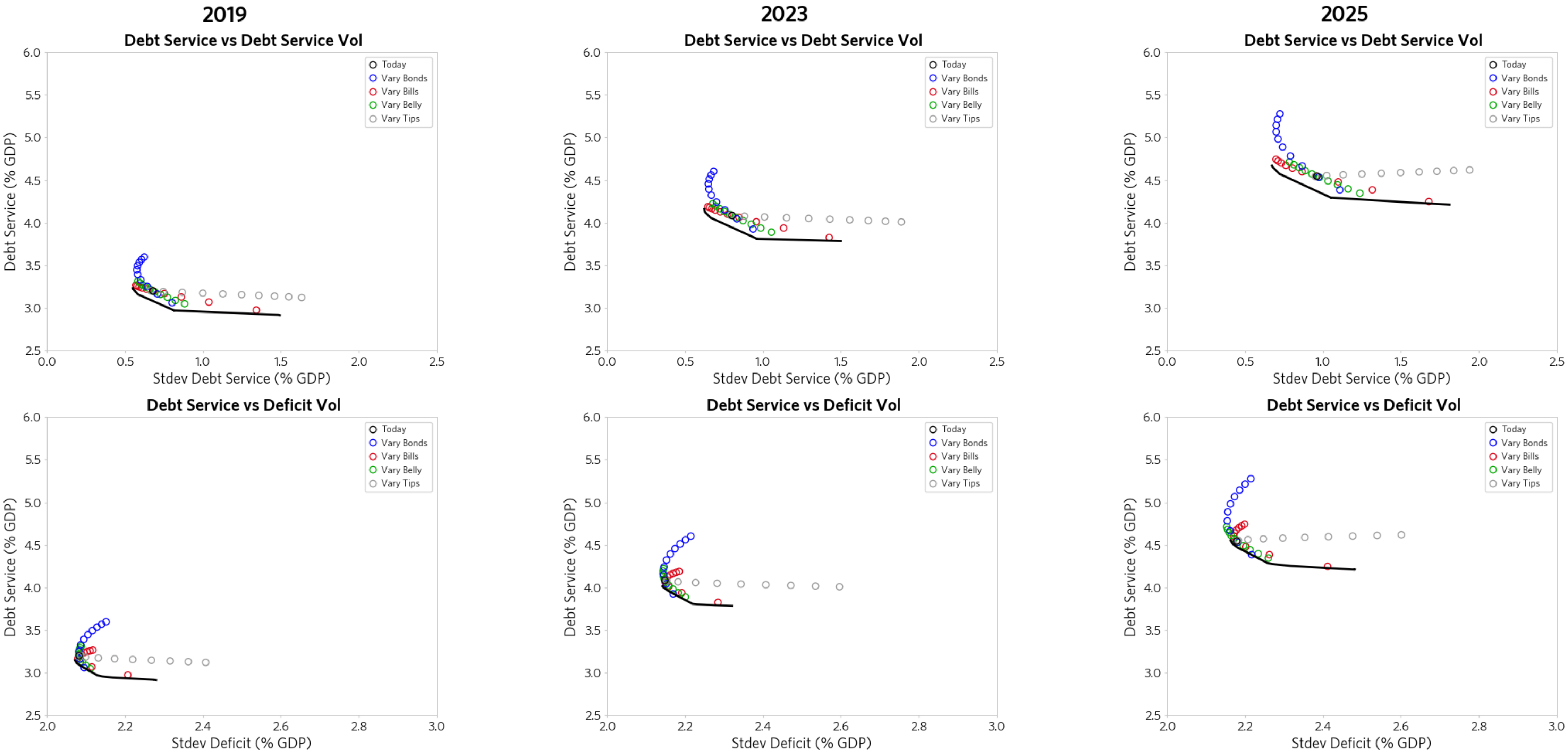


Deficit Estimates ($ billion)	PD 25th Percentile	Primary Dealers (Median)	PD 75th Percentile	CBO
FY 2025	1800	1848	1900	1844
FY 2026	1940	2000	2125	2200
FY 2027	2043	2098	2108	2289
As of date	Jul-25	Jul-25	Jul-25	Jul-25

* Treasury's Presentation to TBAC, Q3 2025

Source: outputs of TBAC Optimal Debt Model

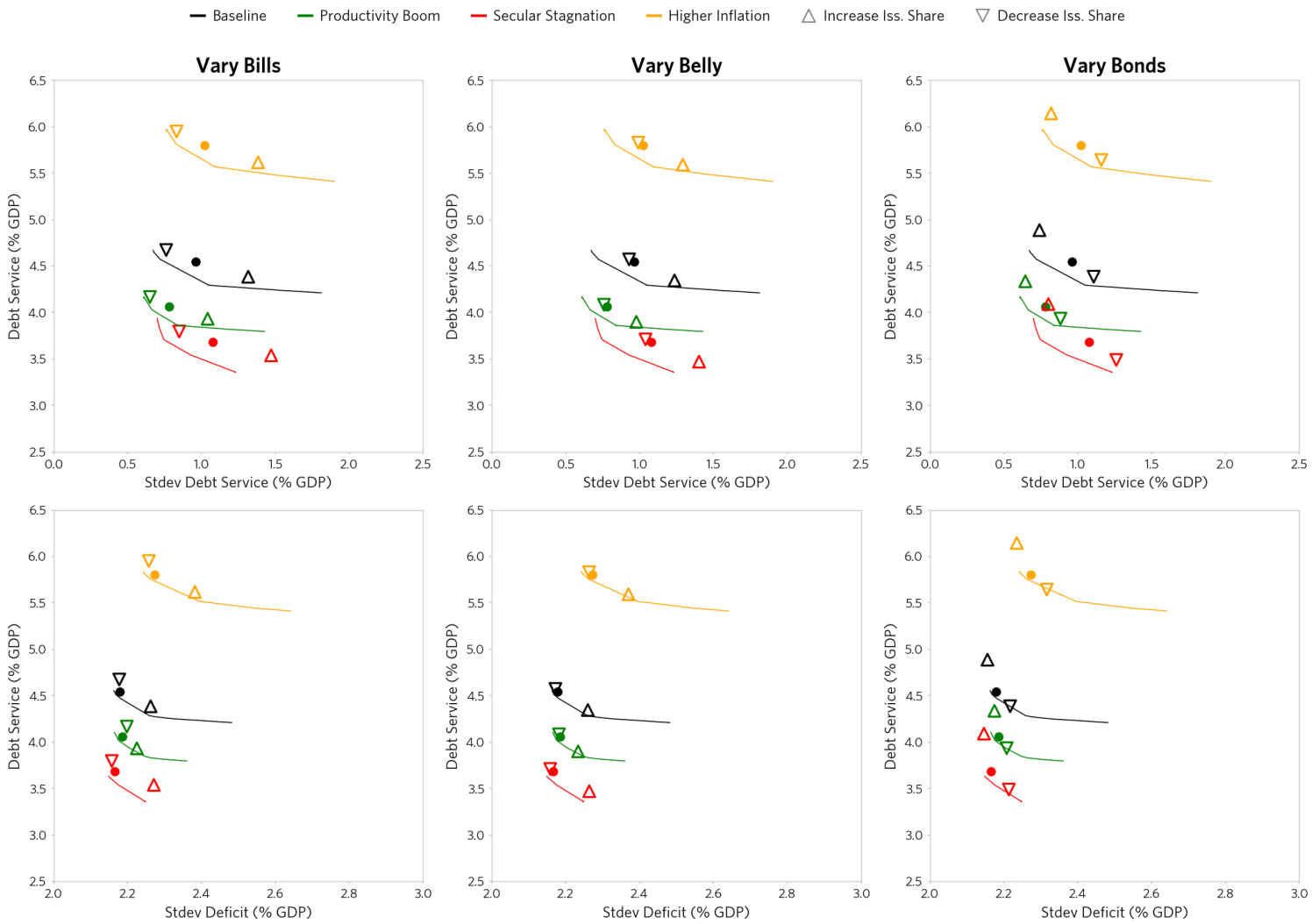
Appendix: Issuance Kernels by Model As-Of Year



Source: outputs of TBAC Optimal Debt Model

Appendix: Kernel Variations in Macroeconomic Scenarios

- These charts illustrate how debt cost and volatility move with different issuance choices across the different scenarios discussed on slides 14-17.



Source: outputs of TBAC Optimal Debt Model