A MODELING PERSPECTIVE ON TREASURY DEBT ISSUANCE

The Evolving Structure of the U.S. Treasury Market:
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Issuance of Treasury securities had to increase meaningfully in order to meet net borrowing needs over coming years.

Source: 2018q1 Treasury Presentation to TBAC
DEBT MANAGEMENT PRACTICES

- An important priority of debt managers is to achieve the lowest possible borrowing cost over time without creating an unacceptable level of fiscal risk.
- Most discussions of the U.S. Treasury’s debt management strategy have focused on maintaining “regular and predictable” issuance.
- However, the regular-and-predictable approach does not specify the ultimate maturity structure that best serves the U.S. Treasury.
- TBAC members have worked towards an analytical framework that can help assess the optimal maturity structure of Treasury debt.
- It is important to consider this issue given the substantial increase in borrowing needs in coming years.
Optimizing the Maturity Structure of U.S. Treasury Debt: A Model-Based Framework

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### MODEL STRUCTURE: ECONOMIC VARIABLES AND INTEREST RATES

**The macroeconomic block is a standard three-equation model**
- An I/S curve for the unemployment gap
- A Phillips curve for inflation
- A monetary policy rule for the short-term interest rate

**The rates block determines Treasury yields across the curve**
- Yields embed the expected path of the short-term rate and a term premium (TP) component
- TP based on the Adrian-Crump-Moench model; allowed to respond to macro variables and to have other dynamics
- Other spreads are present (on-the-run premium, bill premium)

**A few key features of these parts of the model:**
- Macro variables are mean reverting, reflecting effects of Fed policy
- TP has persistent movements but reverts towards historical average
- Steady-state involves an upward-sloping TP
  - 2-year TP of ~0 bps, 10-year TP of ~50 bps
The primary deficit is countercyclical
- Captured with a simple equation tied to the unemployment gap
- Introduces important correlations between financing needs and rates

Treasury issuance is allowed to follow various patterns across maturities
- This version of model incorporates nominal securities at all relevant maturity points from bills to 30-year bonds
- Model keeps track of the outstanding distribution of debt maturities

Run simulations to see the distribution of outcomes for funding cost
- Captures uncertainties about funding needs and the interest rate environment faced when having to meet those funding needs
- Can measure debt performance (cost and risk) at a given horizon
RESULTS UNDER STATIC ISSUANCE STRATEGIES

- The model can be used to assess the trade-off between expected funding cost and the variation in funding cost or budget deficit.
- Intermediate maturities (especially 2-year to 5-year) perform quite well.

Average debt cost/variability trade-off under two measures (20 years ahead)
POSSIBLE OUTCOMES UNDER STATIC ISSUANCE STRATEGIES

- Can trace out the frontier of possibilities under static issuance strategies
- In these strategies the distribution across maturities does not respond to economic or financial variables

Frontier for average debt cost/variability trade-off (20 years ahead)
OPTIMIZATION BY THE DEBT MANAGER

- Treasury would prefer to reach outcomes as far down and left as possible on the trade-off chart, as represented by indifference curves.
- With assumed preferences, can determine the optimal issuance patterns.
ASSESSMENT OF ACTUAL DEBT MANAGEMENT DECISIONS

- Treasury increased the WAM through a set of changes from 2009 to 2015
- That change appears to have been relatively efficient when variation is measured by debt service
ALTERNATIVE TP ASSUMPTION: SUPPLY EFFECTS

- Assume feedback from the supply of duration to term premia
- This assumption makes heavy long-end issuance more problematic

Alternative frontiers incorporating supply feedback on the term premium
ALTERNATIVE TP ASSUMPTION: NO MEAN REVERSION

- Assume term premia remain at current levels on average
- Results in much better outcomes for debt manager, bonds look attractive

Alternative frontiers assuming no term premium reversion
DYNAMIC RESPONSE FUNCTION AND THE POLICY FRONTIER

- Fully optimal strategy allows issuance to shift with economic conditions
- Performance is notably better than the static issuance frontier

Frontier under static issuance vs outcome of dynamic optimization
Dynamic strategy would have had Treasury issue more securities with maturities of 2 to 5 years, as in the static issuance strategy.

It would have varied issuance patterns in response to market conditions.

1. Bill issuance across varying tenors are all scaled to 1-year (52-week) tenor, i.e. 100B of 26-week Bills scales to 50B of 1-year equivalent Bills.
TIPS AND THE POLICY FRONTIER

- Charge at most recent TBAC meeting extended the model to TIPS
- Results suggest some role for TIPS as risk aversion increases

Results from adding TIPS to the model
SUMMARY OF MODEL RESULTS

- Model is just one input into TBAC’s discussion of debt management issues
- The model yields several important conclusions
  - Issuance of intermediate maturities appears attractive, as it provides significant reduction in the variation of funding costs with little additional expected cost
  - Short-end issuance is also attractive when variation is measured by the budget deficit, given the favorable correlation of short rates with the primary deficit
  - Issuance at the long-end is not attractive unless current levels of the term premium are expected to persist indefinitely
- The model indicates that significant gains can be achieved by varying issuance in a systematic manner
  - Response to term premium appears most important in that regard