Pre-Refunding Announcement Gains in U.S. Treasurys*

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Abstract

We document substantial and intensifying positive returns in medium- and long-term Treasury bonds on the day before the Treasury Refunding Announcements (TRAs), an important quarterly fiscal event where future issuance plans are unveiled. Pre-TRA gains are distinct from known calendar effects, account for a sizable portion of annual yield and term premium changes, and cannot be attributed to information leakage. We show that reduction in Treasury market uncertainty—particularly fiscal-related uncertainty—prior to TRAs is the key driver. Consistent with this, pre-TRA gains are stronger when immediately following an FOMC meeting, and when national debt approaches the debt ceiling.

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Refunding overshadows Fed rate hike: In a week in which the FOMC meeting was to be the main event for the Treasury market, the announcement of supply cuts at the refunding clearly dominated trading.

—Deutsche Bank, 4 February 2000

1 Introduction

This paper documents a striking and persistent anomaly in the U.S. Treasury market: bond prices systematically rise on the day immediately preceding the Treasury's quarterly announcements of its borrowing plans. These pre-scheduled announcements, known as Treasury Refunding Announcements (TRAs), are fiscal policy events that reveal the government's financing needs for the upcoming quarters. Despite the TRA's importance in managing the world's largest and most liquid debt market—with over $28 trillion in outstanding securities as of the end of 2024—the market's behavior around these announcements has received surprisingly little attention in academic finance, especially when compared to the extensive literature on monetary policy events like FOMC meetings.[1] This represents a significant gap in our understanding of how fiscal uncertainty affects price formation in the world's most important debt market, particularly in an era of unprecedented government debt and heightened concerns about fiscal capacity.[2]

Our central finding is a powerful pre-announcement drift: medium- to long-term Treasury bonds earn substantial positive returns on the day before a TRA. Using hand-collected data from 1991 to 2023, we show that this effect is economically and statistically significant, monotonically increasing with maturity, and has strengthened over time. **Figure 1** offers a graphical representation of the pre-TRA gains by charting the intraday cumulative returns on 10-year Treasurys (in blue) from the start of New York trading hours on the pre-TRA day. There is a sharp increase in bond prices starting shortly after trading begins, leading to a sizable gain of over 12 basis points (bps) by the day's close. This elevated price level then persists through the announcement day (TRA) and

[1] See SIFMA's quarterly statistics for the latest figures on U.S. Treasury securities outstanding.

[2] See Jiang et al. (2023) for a detailed discussion of fiscal capacity.

into the subsequent post-announcement day (Post-TRA). In stark contrast, the average cumulative returns are essentially zero on non-TRA days, as illustrated by the red line.



Figure 1 Cumulative Returns of 10-Year Treasurys Around Treasury Refunding Announcements

This figure shows the average cumulative intraday returns for 10-year Treasury notes during New York trading hours (07:30-17:00 ET). The blue lines plot returns over a three-day window around Treasury Refunding Announcements (TRAs), starting from the pre-TRA day. The red lines show the average returns on all other, non-TRA-related days for comparison. The shaded areas represent 95% confidence intervals. The sample period is from 2006 to 2023.

The magnitude of the pre-TRA return is economically significant and increases monotonically with bond maturity. At the shorter end, 2-year Treasury note returns on pre-TRA days are about twice as high as their unconditional average. Moving up the maturity spectrum, 10-year Treasury notes earn 12.6 bps, accumulating 11% of their annual returns on these four pre-scheduled days. The effect peaks at the longest end of the curve: 30-year Treasury bonds earn an average return of 24.3 basis points (bps) on pre-TRA days—over 12 times their daily average on other days. These four days alone account for over 15% of the 30-year bond's total annual return. Consequently, a simple trading strategy that goes long on 30-year Treasury bonds only on these days yields an

annualized Sharpe ratio exceeding four.

To confirm that these pre-TRA gains reflect genuine price appreciation rather than mechanical effects from accrued interest, we examine daily yield changes of zero-coupon Treasury bonds with fixed maturities from Gürkaynak, Sack, and Wright (2007, GSW). Consistent with the main results, we find that GSW yield changes are significantly negative on pre-TRA days, confirming that price movements are a primary driver of positive pre-TRA returns. We further single out the term premium component of the zero-coupon yields using the method of Kim and Wright (2005). We find that changes in the term premium drive much of the observed changes in zero-coupon bond yields, with the 10-year term premium dropping by 0.60 bps on pre-TRA days. This term premium compression suggests that the compensation investors demand for bearing interest rate risk systematically decreases as the refunding announcement approaches.

The magnitude and persistence of the pre-TRA effect vary significantly with market conditions, strengthening during periods of heightened fiscal stress. The effect is especially strong after 2002, a period that coincides with a fundamental shift in U.S. fiscal dynamics. Following the budget surpluses of the late 1990s, the federal government has since run persistent deficits, causing the public debt-to-GDP ratio to climb from 55% in 2001 to over 100% by 2023. This structural change helped elevate TRAs from routine administrative events into critical signals of the government's capacity to finance its growing deficits. Most tellingly, we find that pre-TRA gains are largest precisely when fiscal uncertainty peaks—when national debt approaches its statutory ceiling. During these episodes, 30-year Treasury returns average 60 basis points (bps) on pre-TRA days, nearly triple their usual pre-TRA gain. The concentration of returns during fiscal stress periods also helps explain why this substantial anomaly persists: it compensates investors for bearing heightened uncertainty risk that clusters around specific, hard-to-diversify fiscal events.

Having established that pre-TRA returns are both statistically and economically significant, we investigate the mechanism behind this striking pattern. A natural starting point is to examine information leakage of the actual refunding estimates, a mechanism with theoretical support and empirical evidence in the equities market around other major announcements like FOMC meetings

(e.g., Ai and Bansal, 2018; Cieslak, Morse, and Vissing-Jorgensen, 2019; Bernile, Hu, and Tang, 2016). However, a leakage-based explanation for the positive drift would require the Treasury to systematically surprise the market with lower-than-expected borrowing needs. Our analysis finds no such pattern; in fact, there is no significant correlation between pre-TRA returns and the subsequent refunding estimates, which strongly argues against leakage as the primary driver.

Instead, our findings point to a different mechanism: the pre-TRA drift reflects the resolution of uncertainty about the Treasury's upcoming financing decisions. Unlike the leakage story, which requires systematic directional surprises, the uncertainty resolution mechanism can generate positive returns regardless of the announcement's actual content. We provide three complementary pieces of evidence supporting this channel.

First, we examine the relationship between changes in Treasury market volatility and pre-TRA returns using the Treasury implied volatility (TIV) measure from Choi, Mueller, and Vedolin (2017). Consistent with uncertainty resolution, we find that this proxy for uncertainty drops significantly on pre-TRA days, and pre-TRA days with larger drops in TIV are associated with higher returns. This parallels findings in the equity market where resolution of uncertainty correlates with higher pre-announcement returns (Hu, Pan, Wang, and Zhu, 2022).

Second, we demonstrate that the uncertainty being resolved is specifically fiscal in nature. Pre-TRA returns are elevated when national debt is close to the debt ceiling—precisely when fiscal uncertainty is most acute—and when there is a pronounced drop in the dispersion of professional forecasts about federal budget balance. These patterns suggest that TRAs serve as focal points that discipline market expectations about near-term fiscal conditions.

Third, we provide evidence on a possible mechanism through which this uncertainty resolves: active information acquisition by market participants. The Deutsche Bank quote opening this paper suggests that some market participants have long recognized the importance and paid close attention to TRAs. Consistent with Ai, Bansal, and Han (2021)'s theoretical predictions that investors optimally acquire public information ahead of announcements, we find that investors' attention to TRAs, proxied by Bloomberg News Trends and Google search volume, surges in the

days before the announcement. This elevated attention begins on pre-TRA days, before any official information release, indicating that investors are actively processing existing public signals to form more precise expectations about the Treasury's likely actions.

In the final part of the paper, we offer another test of the uncertainty reduction mechanism by exploring the interaction between fiscal and monetary policy announcements. We leverage variation in the timing between TRAs and FOMC meetings to show that pre-TRA returns are particularly elevated when the TRA immediately *follows* an FOMC announcement—a sequence that allows monetary policy uncertainty to be resolved first, thereby isolating and amplifying the market's focus on the resolution of fiscal uncertainty. Turning to the reciprocal effect—the impact of TRAs on nearby FOMC announcements—we find that elevated Treasury returns in the 3-day window surrounding FOMC meetings as documented in Hillenbrand (2025) are notably stronger when the FOMC announcement occurs after a TRA compared to when it precedes a TRA. This evidence demonstrates that the fiscal and monetary announcements are likely complementary, with their sequential timing being critical for the market's ability to resolve uncertainty about the Treasury market.

Related Literature. This paper contributes to several important strands of the macro-finance literature.

First, we contribute to research on predictable return patterns in the Treasury market. While previous work identifies calendar effects such as day-of-the-week or end-of-month patterns (Birru, 2018; Etula et al., 2020; Hartley and Schwarz, 2019), our findings reveal a distinct phenomenon driven by fiscal policy signals. Our paper also relates to Hillenbrand (2025)—who finds systematic Treasury yield declines around FOMC announcements—by showing how fiscal and monetary policy events interact to shape Treasury pricing.

Second, our work relates to the literature on Treasury supply effects and bond risk premia. Prior studies, often highlighting limited risk bearing capacity of the marginal investors, find that an increase in the *realized* Treasury supply raises risk premia and lowers bond prices (Krishnamurthy

and Vissing-Jorgensen, 2012; Lou, Yan, and Zhang, 2013; Greenwood and Vayanos, 2014; He, Nagel, and Song, 2022). We document inverse dynamics related to the *anticipation* of supply announcements: the resolution of uncertainty ahead of actual supply announcements reduces risk premia and raises prices. This finding highlights that uncertainty about future supply is a distinct and economically significant factor affecting bond pricing, separate from the effects of supply itself, and connects our work to the broader literature on the impact of implied volatility on bond prices (Cieslak and Povala, 2016; Choi, Mueller, and Vedolin, 2017).

Third, we contribute to the growing literature linking fiscal activities to government debt valuations (e.g., Dai and Philippon, 2005; Croce, Kung, Nguyen, and Schmid, 2012; Bretscher, Hsu, and Tamoni, 2020; Cochrane, 2022; Campbell, Gao, and Martin, 2023; Gomez Cram, Kung, and Lustig, 2023; Jiang, Lustig, Van Nieuwerburgh, and Xiaolan, 2024a; Wiegand, 2025). While many studies in this area focus on the bond market's reaction to news about budget surpluses or granular spending bills, we analyze pre-scheduled announcements about the government's overall financing strategies under current fiscal conditions. Our findings demonstrate that uncertainty about near-term fiscal policy significantly affects Treasury pricing, complementing both Jiang, Lustig, Van Nieuwerburgh, and Xiaolan (2024b), who find limited Treasury responses to future surplus news, and Gomez Cram et al. (2023), who document strong reactions to granular spending bill information.

Finally, our findings speak to the literature on announcement effects in asset prices. While existing research has extensively documented such effects around macroeconomic and monetary policy announcements (Jones, Lamont, and Lumsdaine, 1998; Savor and Wilson, 2014; Lucca and Moench, 2015; Mueller, Tahbaz-Salehi, and Vedolin, 2017a; Guo, Kontonikas, and Maio, 2020) and corporate earnings announcements (e.g., Savor and Wilson, 2016), bond market studies have focused almost exclusively on monetary policy events (e.g., Gürkaynak, Sack, and Swanson, 2005; Brooks, Katz, and Lustig, 2018; Savor and Wilson, 2013; Hillenbrand, 2025; Haddad, Moreira, and Muir, 2024; Lou, Pinter, Üslü, and Walker, 2025). To our knowledge, we are the first to identify TRAs as a distinct class of fiscal policy announcements that systematically influence

bond prices. Furthermore, whereas pre-announcement drifts around FOMC meetings or earnings announcements are often attributed to information leakage or temporary price pressures, we provide evidence for a different mechanism rooted in uncertainty reduction, as in Hu, Pan, Wang, and Zhu (2022). This aligns with the theoretical framework of Ai, Bansal, and Han (2021), which posits that investors optimally acquire public information before scheduled announcements, leading to uncertainty resolution and predictable price appreciation.

Organization. The remainder of the paper is organized as follows. Section 2 introduces institutional details on the quarterly Treasury Refunding Announcements. Section 3 describes the data. Section 4 presents our main empirical findings. Section 5 investigates the underlying drivers and provides several pieces of evidence for our proposed uncertainty reduction mechanism. Section 6 further tests this mechanism by examining the interplay between fiscal and monetary policy announcements. Section 7 concludes.

2 Treasury Refunding Announcements

The Office of Debt Management (ODM) within the U.S. Department of the Treasury is responsible for funding the government through the issuance of bills, notes, bonds, Treasury Inflation-Protected Securities (TIPS), and floating rate notes. While Treasury securities are auctioned on a regular schedule, the overall supply is determined by ODM and can vary over time. ODM's objective is to fund the government at the lowest possible cost to taxpayers through "regular and predictable" issuance, aided by consultations with primary dealers and the Treasury Borrowing Advisory Committee (TBAC).[3] Once per quarter, during the Treasury Refunding Announcements (TRAs), the Treasury announces its expected net borrowing needs for the current and upcoming quarters.

TRAs are held four times per year, typically during a pre-scheduled week between the first and second months of each quarter. During these events, the Treasury announces its plans to issue

[3] A list of primary dealers is available on the New York Fed website, and the current TBAC members are listed on the Treasury website.

new debt and refinance existing debt, along with any changes in debt management policy. As such, TRAs are an important tool the Treasury uses to fund the government in a predictable manner and to promote stability in the Treasury market. **Figure 2** illustrates the suite of documents and their release timing for the Q4 2023 TRA. **Table 1 Panel A** lists all TRA announcement dates beginning in Q4 1991.

Each refunding cycle centers around four key events:

1. **Preliminary Distribution** of data on debt outstanding and the primary dealer meeting agenda. This occurs about two and a half weeks before the primary release, typically on a Friday at noon. The preliminary distribution includes two documents with limited new information: (1) an Excel file with details on outstanding debt, such as maturity distributions and net marketable borrowing for the current quarter, and (2) the agenda for the upcoming primary dealer meetings, including discussion topics and a survey for primary dealers to submit borrowing estimates.

2. **Primary Dealer Meetings** with ODM. These one- or two-day meetings, held on the Thursday and/or Friday before the primary release, allow the Treasury to meet directly with primary dealers to discuss the primary dealers' estimates of the Treasury's borrowing needs and to address timely topics affecting the Treasury market. For example, the Q4 2023 meetings included discussions on the new 6-week cash management bill and considerations for Treasury buybacks.

3. **Primary Release** of marketable borrowing estimates. This announcement, typically released on a Monday between the first and second months of a quarter at 3 PM ET, provides material information on the Treasury's borrowing needs for the current and upcoming quarters (see **Figure 3 Panel A** for the Q4 2023 release). The format and content of this announcement have changed little since Q4 1991 (see **Figure 3 Panel B** for the Q4 1991 release). This announcement is our main focus, and we define the Treasury Refunding Announcement date as the date of the Primary Release for the remainder of this paper.

4. **Secondary Release** of financing details and TBAC documents. On the day following the primary release, the ODM meets with the TBAC. In this meeting, the TBAC presents its recommendations, after which the Treasury finalizes the maturity composition of the upcoming issuance. Subsequently, on the Wednesday at 8:30 AM ET (two days after the primary release), a suite of documents is released to the public. These include the TBAC meeting presentations and minutes, a revised auction schedule, and the finalized details of the maturity mix.

The scheduling, structure, and information content of the TRAs have remained largely consistent since Q4 1991. However, financial market attention to TRAs has increased in recent years, driven by higher yields, tighter monetary policy, rising budget deficits, and credit rating downgrades.[4]

2.1 Relationship with FOMC Announcements

The Federal Open Market Committee (FOMC) holds regular meetings to announce decisions regarding monetary policy. FOMC meetings are typically scheduled every six weeks, resulting in two per quarter and eight per year. Frequently, FOMC meetings and TRAs occur within a week of each other. **Table 1 Panel B** shows the timing relationship between TRAs and FOMC announcements. Since 1991, 81 out of 129 TRAs have occurred within one week of an FOMC meeting, and 81 out of 267 FOMC announcements have occurred within one week of a TRA. There is also variation in the order of these events: among the 81 two-week windows containing both a TRA and an FOMC meeting, the TRA preceded the FOMC on 45 occasions and followed it on 36 occasions.

3 Data

All data used in this study are obtained from standard academic sources or are publicly available from the U.S. Department of the Treasury and related institutions.

[4] See Bloomberg: Why Treasury's Borrowing Plan Has Market's Attention.

3.1 Treasury Refunding Announcement Dates

We hand-collect Treasury Refunding Announcement information from the official Treasury website. We extract the announcement date from the press release accompanying the announcement for each primary release dating back to Q4 1991, the earliest Quarterly Refunding Financing Estimate publicly available on the Treasury website. TRAs are typically scheduled on a Monday between the first and second months of each quarter, following a regular and pre-announced cadence. The complete list of TRA dates, along with their proximity to FOMC announcements, is shown in **Table 1**.[5]

3.2 Treasury Market Data

Treasury market data are from standard sources. We get data on daily returns and characteristics for Treasurys from the CRSP US Treasury Database. Our analysis focuses on the most liquid, fixed term Treasury securities, with maturities of 1, 2, 5, 7, 10, 20, and 30 years. Specifically, price and return data are sourced from the Fixed Term Indexes file, while bond characteristics are drawn from the Issue Descriptions and Daily Time Series file. Although the CRSP database provides data from 1961 onward, our sample period is restricted to Q4 1991 through Q4 2023 to align with the availability of TRA dates.

For intraday analysis, we use Tradeweb Market Data from Datascope, which provides minute-level dealer bid and ask quotes, as well as the number of dealers quoting Treasurys with maturities of 2, 5, 10, and 30 years. Tradeweb coverage begins in 2006, limiting our intraday sample to the latter half of the daily sample period. Because Tradeweb does not report actual transaction prices, we compute the mid-quote (the midpoint of the closing bid and ask) for each minute as our measure of the prevailing Treasury price and calculate the return as the percentage change in prices.

We supplement these data with daily constant-maturity zero-coupon Treasury yields constructed by Gürkaynak, Sack, and Wright (2007, GSW), obtained from the Federal Reserve Board.

[5]TRAs are announcements of the Treasury's financing plans, which are distinct from the Treasury auctions where securities are issued. Additionally, our pre-TRA windows do not coincide with auction dates.

These fitted yields, which are not affected by accrued interest or declining maturities, provide a clean measure of price movements attributable to yield curve fluctuations. We also use term premium estimates derived from the canonical affine term structure model of Kim and Wright (2005), also available from the Federal Reserve Board.

To broaden the scope of our analysis, we collect daily returns for Treasury Bond ETF, Corporate Bond ETF, and Equity ETF returns from CRSP. These ETFs originated in the early to mid-2000s and have become more prominent in recent years. Among all the available bond ETFs, we focus on those with relatively long time series and large assets under management, from short to long maturities. The ETFs we study are SHY (1-3 year Treasury Bonds), IEI (3-7 year Treasurys), IEF (7-10 year Treasurys), TLH (10-20 year Treasurys), TLT (20+ year Treasurys), and SPY (Equity Index).[6] We additionally source equity market index returns from Ken French's website.

For market uncertainty, we use daily option-implied volatility data for 10-year Treasury futures between October 1991 to December 2023 from Choi, Mueller, and Vedolin (2017).[7] This Treasury Implied Volatility (TIV) measure serves as a forward-looking indicator of uncertainty in the Treasury market, analogous to the VIX Index for equities. Additional uncertainty proxies include the daily close of the MOVE Index (from Bloomberg), the VIX Index (from FRED), and Baker, Bloom, and Davis (2016)'s Economic Policy Uncertainty (EPU) index for the United States (from FRED).

3.3 Summary Statistics

Table 2 presents some summary statistics for our sample, split between pre-TRA days and all other days. Over the 33-year sample starting in 1991, there have been a total of 129 Treasury Refunding Announcements.

[6] In Appendix Tables, we also show results for TIP (Inflation Protected Treasurys), LQD (Investment-Grade Corporate Bonds), VCSH (Short-Term Corporates), VCIT (Intermediate-Term Corporates), and VCLT (Long-Term Corporates).

[7] Implied volatilities are computed from at-the-money options with a 40-day maturity. We thank Hoyong Choi for providing this data.

Table 2 Panel A reports average Treasury returns split by maturity for pre-TRA and non pre-TRA days. For shorter maturities, returns are similar across the two groups. For example, 1-year Treasury Bills have a return of 0.7 bps on pre-TRA days versus 1.2 bps on all other days. As maturity increases, a difference between returns on pre-TRA days and all other days emerges. 10-Year Notes have a daily return of 12.6 bps on pre-TRA days compared to 1.8 bps on other days, resulting in 11% of annualized returns being earned solely on the four pre-TRA days. For 30-year Bonds, the difference becomes even more striking: 24.3 bps on pre-TRA days compared to 1.9 bps on other days, with over 19% annualized return earned on the four days. Interestingly, Treasury returns are not more volatile on pre-TRA days compared to other days. For example, 30-year Bonds have a standard deviation of 84.4 bps on pre-TRA days compared to 89.4 bps on other days.

Table 2 Panel B reports summary statistics of daily yield changes from Gürkaynak, Sack, and Wright (2007), again split by pre-TRA and other days. As yields move in the opposite direction of returns, the average daily yield changes on pre-TRA days are negative, with the magnitude notably increasing with maturity. For maturities above two years, yield changes on pre-TRA days are much larger than on other days, though standard deviations are similar. Constant-maturity yields capture price variations exclusive of accrued interests and diminishing maturities, making them a more precise metric for assessing price/yield fluctuations. Remarkably, for all maturities beyond two years, yield changes accumulated on just four pre-scheduled days are comparable to those observed across all other trading days within the same year. For instance, the 30-year yield's decline on pre-TRA days accounts for approximately 64% (0.07/(0.07+0.04)) of its average annual decrease.

4 Empirical Results

In this section, we present our main finding: Treasury returns are significantly positive on the day prior to Treasury Refunding Announcements (TRAs). We demonstrate that a substantial portion of annual Treasury returns is concentrated on these four days per year. This pre-TRA effect is monotonic with respect to maturity and is primarily driven by a decline in term premia and not by

calendar effects or coinciding macroeconomic events.

4.1 Treasury Returns Around TRAs

We begin by quantifying the behavior of Treasury returns around TRAs using the following baseline regression:

$$ret_t = \alpha + \beta_1 \times \mathbb{1}_t(\text{pre-TRA}) + \beta_2 \times \mathbb{1}_t(\text{TRA}) + \beta_3 \times \mathbb{1}_t(\text{post-TRA}) + \epsilon_t, \tag{1}$$

where $\mathbb{1}_t$(pre-TRA), $\mathbb{1}_t$(TRA), and $\mathbb{1}_t$(post-TRA) are indicator variables equal to one on the day before, the day of, and the day after a TRA, respectively. We estimate the regression separately for Treasury bonds with maturities of 1, 2, 5, 10, 20, and 30 years. The dependent variable, ret_t, is the daily return on these bonds, measured in basis points (bps).

Table 3 Panel A presents the results. The coefficient on the pre-TRA indicator, β_1, is positive and statistically significant for all maturities from 2 to 30 years. The economic magnitude of this effect increases monotonically with maturity. For instance, 2-year Treasury notes earn an additional 1.4 bps on pre-TRA days, approximately double their unconditional average return. For 10-year notes, the pre-TRA return is 10.8 bps higher, over six times the unconditional average. For 30-year bonds, the effect is even more pronounced, with a pre-TRA return of 22.3 bps, more than ten times the unconditional average. Importantly, these excess returns do not reverse on the announcement day or the day after; the coefficients on the TRA and post-TRA indicators are statistically insignificant across all maturities.

Figure A.3 visualizes the distribution of daily returns for various Treasury maturities, comparing pre-TRA days to all other trading days. The distribution of pre-TRA returns is clearly shifted to the right, particularly for longer-maturity Treasurys. This shift highlights that the high average pre-TRA return is a broad-based phenomenon, not driven by a few outliers. **Figure 4** plots the time series of pre-TRA day returns for 10-, 20-, and 30-year Treasurys. While no obvious long-term trend is apparent, the returns are consistently positive on average and appear to strengthen in the

latter part of the sample.

To ensure that our findings are not driven by known calendar anomalies, we augment our baseline specification with controls for day-of-the-week and end-of-month effects. First, since most TRAs occur on Mondays, the pre-TRA day is typically a Friday. Birru (2018) documents that Treasury returns are, on average, lowest on Fridays, making it unlikely that a simple day-of-the-week effect drives our results. As shown in **Table 3 Panel B**, including day-of-the-week fixed effects leaves the pre-TRA coefficients for longer maturities virtually unchanged while increasing their magnitude for shorter maturities. For example, the return for 2-year notes nearly doubles to 2.7 bps. This is consistent with the finding in Birru (2018) that low Friday returns are most pronounced for shorter-term bonds. **Figure A.4** further confirms that pre-TRA returns are distinct from a general Friday effect, showing that average 10-year Treasury returns on pre-TRA Fridays (12.4 bps) are substantially higher than on other Fridays (near zero).

Second, TRAs are typically scheduled in the week falling between the first and second months of a quarter, often causing pre-TRA days to coincide with the end of the month (EOM). Previous research shows that Treasury returns are elevated during the last five days of the month (Etula et al., 2020; Hartley and Schwarz, 2019). To isolate the pre-TRA effect, we control for an EOM indicator, which equals one for the last five trading days of the month. The results, presented in **Table 3 Panel C**, show that while the magnitude of the pre-TRA coefficient is slightly attenuated, it remains positive and statistically significant for all maturities. **Figure A.5** reinforces this finding, illustrating that pre-TRA returns significantly exceed those on other month-end days. This confirms that the pre-TRA drift is not a manifestation of the end-of-month effect, but a distinct phenomenon.

4.1.1 Zero-Coupon Bond Yields and Term Premium

To ensure that the observed high returns on pre-TRA days reflect genuine price appreciation rather than accrued interest or diminishing maturities of coupon bonds, we analyze changes in zero-coupon

bond yields from Gürkaynak et al. (2007). We estimate the following regression:

$$y_t^{(n)} - y_{t-1}^{(n)} = \alpha + \beta_1 \times \mathbb{1}_t(\text{pre-TRA}) + \beta_2 \times \mathbb{1}_t(\text{TRA}) + \beta_3 \times \mathbb{1}_t(\text{post-TRA}) + \epsilon_t, \tag{2}$$

where the dependent variable is the daily change in the n-year zero-coupon yield.

The results in **Table 4 Panel A** show that on pre-TRA days, zero-coupon yields for maturities of two years and longer fall by more than 1 bp, a statistically significant decline. In contrast, yield changes on other days are small and statistically insignificant. These results are robust to the inclusion of day-of-week and end-of-month fixed effects, confirming that the positive pre-TRA returns are driven by price appreciation.

To understand the source of this yield decline, we examine the term premium component of zero-coupon yields using estimates from Kim and Wright (2005). The regression results in **Table 4 Panel B** show that daily changes in term premia ($tp_t^{(n)} - tp_{t-1}^{(n)}$) are significantly negative on pre-TRA days across all available maturities (1–10 years), both with and without fixed effects. The effect strengthens with maturity: the 1-year term premium falls by 0.21 bps, while the 10-year term premium falls by 0.60 bps. Unlike the yield changes, the term premia show no reversal on TRA days and are more statistically significant at shorter maturities. These findings indicate that the pre-TRA price appreciation is driven by a reduction in the compensation for interest rate risk, a result that contrasts with Greenwood and Vayanos (2014), who suggest that *realized* Treasury supply shocks increase risk premia due to marginal investors' limited risk-bearing capacity. Our findings suggest a different dynamic: it is the *anticipation* of the supply announcement and the associated resolution of uncertainty (which we will detail in the next section) that drives down the risk premium.

4.1.2 ETFs

To assess the tradability and generalizability of the pre-TRA effect, we extend our analysis to exchange-traded funds (ETFs) that track Treasury and other fixed income indices. This approach

allows us to evaluate whether the return patterns observed in individual securities are also present in more accessible, market-traded instruments. **Table A.1** repeats the main analysis using daily returns of Treasury ETFs, with ETFs ordered from left to right by the average maturity of their underlying Treasurys. Although the ETFs have a shorter time series relative to individual bonds—with most bond ETFs originating in the early to mid-2000s—a similar pattern emerges even with this reduced sample. Treasury ETFs earn significantly positive returns on pre-TRA days, with ETFs holding longer-maturity Treasurys (TLT and TLH) exhibiting larger positive returns compared to those holding shorter-maturity Treasurys (SHY and IEI). We also find positive and significant returns for the ETF holding inflation-protected Treasurys (TIP) and some corporate bond ETFs. The consistent pattern of returns across bond ETFs suggests that the pre-TRA drift is not driven by idiosyncratic characteristics of individual Treasury securities (such as liquidity or specialness), but rather represents a systematic phenomenon across the bond market that is tradable by both institutional and retail investors.

As a placebo test, Column (11) shows returns around TRAs for an aggregate equity market ETF, SPY, which tracks the S&P 500 Index. We find insignificant coefficients on pre-TRA, TRA, and post-TRA for SPY, with the coefficient on pre-TRA being negative. This suggests that pre-TRA gains are not a general phenomenon affecting all asset classes, but rather are specific to the bond market. While this insignificance might initially seem surprising—given that Treasury yields represent the risk-free component of discount rates used in equity valuation—several factors explain it. First, the yield declines on pre-TRA days stem from reductions in term premia rather than changes in expected short rates. Term premia exhibit only a weak positive correlation with equity returns in our sample (0.17 unconditionally, 0.04 on pre-TRA days using daily changes in the 10-year term premium and SPY returns). This unstable relationship is consistent with a large literature showing that the sign of the bond-stock correlation depends critically on the underlying macroeconomic regime (Campbell, Pflueger, and Viceira, 2020). Second, Gormsen and Lazarus (2025) find that equity returns correlate primarily with the pure discounting component of Treasury yields, which likely remains stable on pre-TRA days. Finally, many equity investors may not pay

close attention to upcoming TRAs, as these events typically receive limited coverage outside of fixed income markets.

4.2 Trading Strategy

The pronounced price appreciation preceding TRAs suggests the potential for a profitable trading strategy, at least before transaction costs. The simplest approach to capitalize on this predictable price movement is to buy longer-maturity Treasurys on pre-TRA days, a strategy executed four times per year. We calculate the trading profit from this strategy for all Treasury bonds in our main sample, using the 1-month Treasury bill as the risk-free rate.

The mean and standard deviation of the daily excess returns and the corresponding Sharpe ratios for these trading strategies are detailed in **Table 5**, with all metrics annualized. **Panel A** showcases the performance for Treasury bonds. With the exception of the shortest maturity (one year), the pre-TRA trading strategy yields positive and significant excess returns for all maturities, achieving annualized Sharpe ratios exceeding 4. An equally weighted portfolio of all Treasury bonds delivers a mean annualized excess return of 27% with a 6% standard deviation, corresponding to an annualized Sharpe ratio of 4.65. For perspective, we compare this to a strategy of longing the respective Treasury bonds on all other non-pre-TRA days. Trading Treasurys on pre-TRA days significantly outperforms this alternative for all maturities other than the 1-year, with Sharpe ratios an order of magnitude higher.

It is important to note that these results do not account for trading costs. Following Lou, Yan, and Zhang (2013), one might finance long positions in Treasury bonds via overnight repos while accounting for bid-ask spreads. Factoring in transaction costs would inevitably diminish trading profits. Nonetheless, based on the estimated daily return differential of approximately 4 bps between strategies with and without transaction costs reported by Lou, Yan, and Zhang (2013), our pre-TRA strategy remains highly profitable for maturities beyond two years. A back-of-the-envelope calculation indicates that, even with a 4 bps transaction cost, the equally weighted pre-TRA strategy would sustain an annualized Sharpe ratio close to 4, notably higher than that of many well-known

anomalies.

To address potential concerns regarding the practicability of this strategy, we extend our analysis to a set of Treasury ETFs. The results, presented in **Table 5 Panel B**, show that the pre-TRA trading in the six bond ETFs yields Sharpe ratios ranging from 3.9 to 6.6, whereas the Sharpe ratios for trading on all other days are all below one.[8] Additionally, we assess the equity ETF SPY's performance during and outside pre-TRA days in **Table 5 Panel C**. For SPY, the pre-TRA strategy yields a negative excess return with a Sharpe ratio of -0.1. This suggests that the pre-TRA trading strategy is unique to the Treasury market and does not extend to the stock market.

4.3 Intraday Dynamics

To gain further insight into the timing and nature of the pre-TRA effect, we analyze intraday price dynamics using high-frequency data. This allows us to pinpoint when, within the trading day, the bulk of the pre-TRA return is realized and to assess the persistence of these gains. We start by depicting Treasury bond returns around TRAs using intraday pricing information from Tradeweb. We calculate three-day cumulative intraday returns, encompassing the day before the TRA (Day -1), the TRA day (Day 0), and the day following the TRA (Day +1), focusing on 5-, 10-, and 30-year maturities.

The U.S. Treasurys market is an over-the-counter market with round-the-clock trading, where activity is concentrated in New York, London, and Tokyo. However, the majority of trades take place during New York trading hours. Fleming (1997) notes that "more than 94 percent of that trading occurs in New York, on average, with less than 4 percent in London and less than 2 percent in Tokyo." Accordingly, we follow the practice of Fleming (1997) and Adrian et al. (2023) by confining our analysis to New York trading hours (07:30 to 17:00 Eastern Time). Since Tradeweb

[8]The persistence of a strategy with such a high Sharpe ratio raises the question of why the anomaly has not been arbitraged away. One possibility is that the market is not fully aware of this anomaly. Alternatively, as we will detail in Section 5, the large positive average return on pre-TRA days arises from the resolution of heightened fiscal uncertainty (the second moment). However, a trader reaping this premium is fundamentally exposed to the realization of the underlying fiscal risk (the first moment). An adverse outcome—such as a larger than expected borrowing need or a disruptive change in debt management—represents a negative draw from the return distribution. The potential for such infrequent but severe losses may deter the arbitrage capital, allowing the premium to persist.

contains dealer quotes rather than actual trades, we take the midpoint of the closing bid and ask quotes in each period as the Treasury price.

Figure 5 illustrates the pronounced trend of Treasury cumulative returns around TRAs, with the shaded area indicating the 95% confidence interval for the average return. A significant upward price movement in Treasurys begins early in the New York trading session on the day preceding the TRA (Day −1). Prices increase notably in the morning, with the 10-year Treasury rising by over 10 bps, and then continue to increase marginally for the remainder of New York trading hours. During the TRA day (Day 0) and the subsequent day (Day +1), prices remain at this elevated level, displaying no significant fluctuations around the typical 15:00 announcement time on Day 0. Notably, the magnitude of this pre-TRA drift increases with maturity, with 30-year Treasurys rising by over 20 bps by the end of the pre-TRA day. To contextualize the economic magnitude of this pre-TRA drift, we calculate the average cumulative returns on all other days in our sample, excluding days around TRAs. On average, cumulative returns on these non-event days are essentially zero.

Our intraday data also reveals a significant improvement in market liquidity around TRAs, an effect that peaks on the pre-TRA day. **Figure A.6** plots the bid-ask spread for the 5-, 10-, and 30-year Treasurys on the pre-TRA, TRA, and post-TRA days, overlaid on the average bid-ask spread on non-TRA days. Bid-ask spreads are systematically narrower across the three-day TRA window compared to other non-TRA days. **Figure A.7** plots the number of bids and asks across dealers. For all three maturities, the total number of bids and asks among dealers is higher on days in the three-day TRA window compared to non-TRA days. This enhancement is economically meaningful: on pre-TRA days, 30-year Treasurys have on average 0.5 bps lower bid-ask spread and 50 more dealer quotes per 10-minute interval compared to non-TRA days.[9]

[9]The graphical evidence is further supported by a formal test shown in **Table A.2**. Market liquidity remains significantly higher on the pre-TRA day, especially for longer maturity Treasurys, after including day-of-week, end-of-month, and time-of-day fixed effects.

4.4 When is the Pre-TRA Effect Stronger?

Recognizing that market conditions and fiscal policy regimes have evolved, we conduct a series of subsample analyses. These tests examine whether the magnitude and significance of the pre-TRA effect vary across different periods, economic environments, and policy settings.

In contrast to the declining pre-FOMC drift in equity markets documented by Kurov, Wolfe, and Gilbert (2021), the pre-TRA effect has intensified in recent years. This divergence can be attributed to the mounting uncertainty surrounding U.S. government debt, particularly after the federal government began running persistent deficits in 2002 (Section 5.2.2 provides a detailed discussion of the link between fiscal uncertainty and pre-TRA returns).[10] Although pre-TRA returns are positive for both the 1991–2001 and 2002–2023 periods, they are generally higher in the later period. In **Table 6**, we show that the average return on 30-year Treasurys on the pre-TRA day was 17.4 bps before 2002 and rose to 27.6 bps during 2002–2023. This temporal difference is also prevalent for short- to medium-maturity Treasurys. For example, the return on 5-year Treasurys on pre-TRA days increased from 4.6 bps to 10.0 bps in the later period, while the 10-year Treasury return rose from 6.5 bps to 15.5 bps.

The remainder of **Table 6** details results for other subsamples where pre-TRA returns exhibit heterogeneity. Consistent with the observation that TRAs have taken on additional importance in recent years, we find that pre-TRA returns are stronger when the federal government is running a deficit, when the short-term interest rate is at the zero lower bound, and when total borrowing approaches the debt ceiling. Conversely, pre-TRA returns are weaker during recession periods, when the yield curve is downward sloping, and in the second quarter of the year. Notably, the seasonal pattern in pre-TRA returns aligns with the findings in Kamstra, Kramer, and Levi (2015), suggesting that returns around TRAs may contribute to the observed seasonality in Treasury returns.

[10] Only twice in history has one of the three major credit rating agencies—Moody's, Standard & Poor's, and Fitch—lowered its credit rating for the U.S. Federal Government. The first instance was in 2011 when S&P reduced its rating to AA+. The second was in 2023, when Fitch lowered its long-term credit rating to AA+.

4.5 Other Macroeconomic Announcements

To isolate the pre-TRA effect from confounding factors related to other scheduled news releases, we control for the presence of and surprises from major macroeconomic announcements that may coincide with TRAs. This analysis helps to confirm the unique informational role of TRAs in driving Treasury return patterns. To do so, we compile a comprehensive set of macroeconomic announcements, their release dates, and associated surprises from Refinitiv.[11] We restrict the sample period to 2004–2023 to ensure consistent coverage across most announcements.

Table 7 examines how pre-TRA returns are affected when other macroeconomic announcements coincide with TRAs. **Panel A** presents baseline results for the 2004–2023 sample, controlling for day-of-week and end-of-month fixed effects. The results show that 10-year and 30-year Treasurys earn about 13.5 and 16.7 bps higher returns, respectively, on pre-TRA days—consistent with our full-sample findings. **Panel B** adds a fixed effect for the presence of any macroeconomic announcement on a pre-TRA day (an indicator that equals one if at least one macro announcement occurs). While the magnitudes for longer-term Treasurys decrease slightly, pre-TRA returns remain positive and significant, especially for the 10-year Treasury. **Panel C** instead controls for the actual surprises associated with macro announcements, defined as the difference between actual outcomes and consensus forecasts from Refinitiv (with surprises set to zero on non-announcement days).[12] Across all maturities, pre-TRA returns remain largely unchanged after controlling for these surprises. In summary, neither the presence of other macroeconomic announcements nor their surprises explains the observed pre-TRA returns, highlighting the unique importance of TRAs for Treasury market behavior.

[11] The macroeconomic announcements include Industrial Production, Nonfarm Payrolls, Consumer Price Index (CPI), Producer Price Index (PPI), Purchasing Manager Index (PMI), Unemployment Rate, Gross Domestic Product (GDP), University of Michigan Consumer Sentiment Final, Initial Jobless Claims, Retail Sales, Durable Goods Orders, Housing Starts, Construction Spending, Capacity Utilization, The Leading Index, Trade Balance, Factory Orders, New Home Sales, and US Federal Budget Balance. We provide an in-depth analysis of the interaction between TRAs and FOMC meetings in Section 6.

[12] **Appendix Table A.3** reports the coefficients on surprises for each macro announcement.

5 What Drives the Pre-TRA Gains?

Having established that pre-TRA returns are both statistically and economically significant—and distinct from calendar effects and other macroeconomic news—we now turn to potential explanations for this striking pattern. In this section, we systematically evaluate candidate mechanisms and present evidence supporting uncertainty reduction as the primary driver of pre-TRA gains.

5.1 Information Leakage

A natural hypothesis is that pre-TRA returns stem from leaked information about the Treasury's borrowing plans, which would trigger a corresponding price reaction before the official release.[13] For instance, news of unexpectedly large borrowing needs should lead to negative returns, as the market prices in a larger-than-anticipated supply shock. To explain the persistent positive drift we document, information leakage would have to be systematically negative, with the Treasury consistently surprising markets with lower-than-expected borrowing—an unlikely scenario given the secular rise in U.S. deficits.

While information leakage has been discussed in other contexts, particularly in monetary policy announcements (e.g., Lucca and Moench, 2015; Ai and Bansal, 2018; Vissing-Jorgensen, 2020), there is little anecdotal or empirical evidence to suggest it is a significant factor for TRAs. We formally test this hypothesis from two perspectives: the content of the actual announcements and the timing of primary dealer meetings.

5.1.1 Actual Refunding Announcements

We begin by examining whether the observed pre-TRA return patterns are explained by the actual refunding estimates announced by the Treasury. Specifically, we test if pre-TRA returns are

[13] While leakage could theoretically extend to information on the maturity mix from the Secondary Release, the Treasury's decision-making process makes this unlikely. The final maturity composition is determined only after the Treasury receives and discusses recommendations from the Treasury Borrowing Advisory Committee (TBAC) on Tuesday. This consultative process ensures the specific mix is not established—and thus unavailable to be leaked—during the pre-TRA window.

systematically related to the size or direction of the borrowing estimates released at TRAs, available from the Sources and Uses tables. Each quarter, we calculate the dollar amount of the Marketable Borrowing estimate for the upcoming quarter (MB_t) and the Treasury's revision of this estimate from the previous to the current quarter ($FR_t(MB)$). To address seasonality due to fiscal cycles, we adjust estimates by subtracting the previous year's same-quarter estimate and normalize them by lagged GDP. We analyze three seasonally adjusted, GDP-normalized variables: (1) the previous quarter's refunding estimates ($\Delta MB_{t-1}/GDP_{t-2}$); (2) the forecast revision of refunding estimates ($FR_t(MB)/GDP_{t-1}$); and (3) the current quarter's refunding estimates ($\Delta MB_t/GDP_{t-1}$). The first variable represents information available before the pre-TRA day, while the latter two, available at quarter t announcements, serve as a proxy for ex-post supply shocks to market participants. The data spans from 1997 to 2023.

Figure 6 illustrates the time series of these adjusted marketable borrowing estimates. The large spikes and subsequent drops in the estimates occurred during the COVID-19 pandemic in 2020. Apart from the pandemic, the estimates are relatively stable over time. The summary statistics indicate that all three variables are positive and close to zero on average (means of 0.15%, 0.22%, and 0.17% of GDP and standard deviations of 1.18%, 1.61%, and 2.04%, respectively).

Two key implications emerge from these properties of the marketable borrowing announcements. First, the near-zero means across all refunding estimates indicate that Treasury supply shocks are not systematically biased in one direction. Crucially, the absence of systematically negative surprises in borrowing needs rules out the possibility that leakage of actual announcements drive the positive pre-TRA drift. Second, the substantial standard deviations reveal that, despite the Treasury's commitment to "regular and predictable" debt management, considerable variation and unexpected supply shocks remain in practice.

We regress pre-TRA Treasury returns on these three variables, respectively. Note that the first variable is available before the pre-TRA day, while the latter two are available after. Results in **Table 8** show that almost all refunding estimates have positive signs (**Panels A** and **C**), while forecast revisions for maturities between 2 and 20 years are negative (**Panel B**). However, nearly all beta

coefficients are statistically insignificant, and all constant terms remain positive and significant, indicating that the pre-TRA drift is not driven by actual refunding estimates or shocks to these estimates, ex-ante or ex-post. This finding suggests that the positive pre-TRA drift is driven by anticipation rather than actual refunding estimates, challenging a leakage-based explanation.

5.1.2 Primary Dealer Meetings

A unique feature of the Treasury Quarterly Refunding process is that the Office of Debt Management (ODM) holds meetings with primary dealers (PDs) in the days leading up to the TRA, often coinciding with our pre-TRA window. We collect PD meeting dates from the meeting agendas posted on the Treasury website, which are available from Q1 2003 onward.[14]

A potential concern is that these meetings could be a conduit for information transmission from the ODM to PDs regarding the actual refunding estimates. To test this, we exploit the variable timing of the PD meetings to see if pre-TRA returns are realized specifically on days when these meetings occur. **Figure A.8** shows the 10-year Treasury return on Thursdays and Fridays, split by whether they fall on the week prior to the TRA and whether there is a PD meeting occurring on that day. The evidence is clear: returns are consistently elevated on the Friday before the TRA (the pre-TRA day), regardless of whether a PD meeting is taking place. This finding indicates that the pre-TRA return is unlikely a consequence of information being shared in closed-door meetings.

5.2 Uncertainty Reduction

A prominent explanation for the pre-announcement drift in the literature is that uncertainty resolves prior to macroeconomic announcements, generating positive realized returns (e.g., Lucca and Moench, 2015; Hu et al., 2022). This uncertainty reduction can occur through two distinct channels: information leakage (Ai and Bansal, 2018; Cieslak et al., 2019), which we rule

[14]PD Meeting Agendas are available on the Treasury Website. The meetings are normally scheduled for the end of the week prior to the Monday TRA. Depending on the exact meeting, these can be either a one-day meeting on Thursday (15 occurrences), a one-day meeting on Friday (11 occurrences), or a two-day meeting spanning Thursday and Friday (58 occurrences).

out in the previous section, or active information acquisition by market participants during the pre-announcement period (e.g., Ai et al., 2021). Both mechanisms share a common premise: uncertainty about the announcement's impact on asset prices diminishes before the official release, resulting in a pre-announcement return drift. Consistent with uncertainty reduction, we have already demonstrated that pre-TRA returns are particularly elevated when interest rates are near the zero lower bound (**Table 6**). During such periods, when monetary policy is constrained and provides limited new information, TRAs emerge as a primary source of market-relevant announcements, enabling markets to resolve uncertainty about Treasury issuance quantities and timing.

In this section, we provide direct evidence for the uncertainty reduction mechanism. First, we show that Treasury market uncertainty, measured by the implied volatility of Treasury bonds (TIV), systematically declines on pre-TRA days, and that pre-TRA returns are highest when this decline is largest. Second, we link pre-TRA returns to two measures of fiscal uncertainty: proximity to the debt ceiling and dispersion in professional forecasts of the federal budget balance. Third, we document a surge in investor attention to Treasury refunding on pre-TRA days, consistent with active information acquisition by market participants ahead of the announcement, as theorized by Ai et al. (2021). Finally, Appendix B provides additional supporting evidence from text-based uncertainty measures.

5.2.1 Treasury Market Uncertainty

Our first direct test of the uncertainty reduction hypothesis examines Treasury market-specific volatility. We follow Lucca and Moench (2015) and Hu et al. (2022), who link pre-announcement returns in equity markets to changes in the VIX, by testing whether pre-TRA returns are associated with a decline in Treasury implied volatility (TIV), derived from options on 10-year Treasury futures (Choi, Mueller, and Vedolin, 2017).

We define the resolution of uncertainty on day t as the decline in implied volatility, $\Delta TIV_t = TIV_{t-1} - TIV_t$. A larger positive value of ΔTIV_t signifies a greater reduction in uncertainty. We find that uncertainty is indeed resolved on pre-TRA days: the mean ΔTIV is 6.8 bps on pre-TRA days

($t = 3.53$) versus a negligible -0.1 bps on all other days ($t = -0.15$). The difference is statistically significant at the 1% level. This resolution follows a run-up in uncertainty in the week prior to the TRA, a pattern also documented for FOMC announcements.[15]

To test whether this uncertainty resolution is reflected in asset prices, we run the following regression:

$$ret_t = \beta_1 \times \mathbb{1}_t(\text{pre-TRA}) \times \Delta TIV[-1,0] + \beta_2 \times \mathbb{1}_t(\text{pre-TRA}) + \beta_3 \times \Delta TIV[-1,0] + \text{FE} + \epsilon_t \quad (3)$$

where $\Delta TIV[-1,0]$ is the one-day resolution of uncertainty on the pre-TRA day. The coefficient of interest, β_1, captures how pre-TRA returns vary with the magnitude of uncertainty reduction.

The results, shown in **Table 9 Panel A**, are striking. The interaction coefficient, β_1, is positive and highly significant across all bond maturities. This indicates that pre-TRA returns are highest precisely when uncertainty resolves the most. The effect is economically large: a one-standard-deviation increase in $\Delta TIV[-1,0]$ is associated with a 12.7 bps increase in the 10-year Treasury pre-TRA return and a 24.8 bps increase for the 30-year bond. This pattern is unique to the Treasury market; we find no similar effect for equity returns, as shown in the last column ('MKT').

In an alternative specification using only observations from pre-TRA dates (**Table 9 Panel B**), we control for changes in equity market uncertainty (VIX) and broader economic policy uncertainty (EPU) from Baker, Bloom, and Davis (2016).

$$ret_t = \beta_1 \times \Delta TIV[-1,0] + \beta_2 \times \Delta VIX[-1,0] + \beta_3 \times \Delta EPU[-1,0] + \epsilon_t \quad (4)$$

The coefficient on ΔTIV remains positive and significant, confirming that the priced uncertainty is specific to the Treasury market. Interestingly, the coefficient on ΔVIX is negative, suggesting that on pre-TRA days, a reduction in equity market uncertainty coincides with lower Treasury returns,

[15] Similar to the finding of Hu et al. (2022) in equity markets leading up to FOMC meetings, we also find a greater build-up of uncertainty in the week leading up to TRAs. Between day -7 and day -2 prior to the TRAs, TIV increases by 8.1 bps ($t = 1.67$). The average 5-day change in TIV on all other days is -0.03 bps ($t = -0.05$). A Welch's two-sample t-test confirms that the means are significantly different from each other at the 10% level ($t = 1.66$).

distinguishing the TRA-related bond premium from the equity risk premium. Overall, the evidence strongly suggests that TRAs are a key event for resolving uncertainty in the Treasury market, and that this resolution results in a significant realization of the risk premium.

5.2.2 Fiscal Uncertainty

TRAs provide detailed plans for financing the federal government in the near term, making them a key event for resolving fiscal uncertainty. We test this proposition using two distinct proxies: proximity to the statutory debt ceiling and dispersion in professional forecasts of the federal budget balance. This analysis allows us to identify the specific nature of the uncertainty that TRAs help resolve and to show how this resolution is priced into Treasury returns.

Debt Ceiling. The statutory debt ceiling of the federal government is a recurring source of significant fiscal uncertainty. We find that the magnitude of pre-TRA returns is amplified during periods of heightened debt-ceiling-related stress, which we measure using two factors: the proximity of outstanding debt to the ceiling and the timing of legislative changes to the limit.[16]

We obtain the history of statutory debt limits and daily total debt outstanding from the White House and the Treasury websites, respectively. During our 1991–2023 sample period, the debt ceiling was changed 34 times. We categorize TRAs into four groups: (1) "Close to ceiling": total debt is within 1% of the limit or the limit is suspended (55 occurrences); (2) "Close to change": a debt ceiling change occurs within 30 trading days after the TRA (19 occurrences); (3) "Both": satisfying both conditions (16 occurrences); and (4) "Neither": satisfying neither condition (64 occurrences). The "close to change" condition serves as a proxy for periods when fiscal risks are particularly salient and market participants are keenly awaiting guidance.

Figure 7 shows that while pre-TRA returns are positive across all groups, they are substantially larger when debt ceiling concerns are elevated. For 30-year Treasurys, the average pre-TRA return is 59.9 bps when the TRA is both close to the ceiling and a future change, nearly triple the 22.1

[16]For the history of debt ceiling changes, see Table 7.3–Statutory Limits on Federal Debt. For daily data on total US debt outstanding, see Debt to the Penny.

bps return in the "Neither" category. This heterogeneity demonstrates that TRAs likely command greater attention and play a more critical role in disseminating information and reducing uncertainty when fiscal risks are at the forefront. In these scenarios, the market places a higher premium on fiscal-related uncertainty, resulting in a larger pre-TRA drift.

Fiscal Condition Forecast Dispersion. To further quantify fiscal uncertainty, we use professional forecasts of the U.S. federal budget balance from the Bloomberg ECFC survey. This survey, available from 2007 to 2023, elicits daily forecasts from economists at banks and research institutions. On each day, we measure fiscal uncertainty as the interquartile range of forecasts among all economists for the current fiscal year's budget balance, a direct proxy for cross-economist disagreement and uncertainty regarding the government's fiscal position.[17]

We define the *reduction* in fiscal uncertainty around the pre-TRA day as the change in forecast dispersion from the day before to the day of the pre-TRA day:

$$\Delta\text{ForecastDisp}[-1,0] \equiv \text{ForecastDisp}[\tau-1] - \text{ForecastDisp}[\tau], \tag{5}$$

where τ is the pre-TRA day. We hypothesize that a larger reduction in forecast dispersion (i.e., higher $\Delta\text{ForecastDisp}[-1,0] > 0$) should be associated with higher pre-TRA returns.

The results, reported in **Table 10**, support this hypothesis. In **Panel A**, we interact the pre-TRA day indicator with the fiscal uncertainty reduction measure, $\Delta\text{ForecastDisp}[-1,0]$. For longer-term bonds (7-year and up), the interaction coefficient is positive and statistically significant. This shows that pre-TRA gains are more pronounced when there is a greater resolution of uncertainty about the government's fiscal position.

To account for potential delays in forecast revisions, we also examine uncertainty reduction over longer windows: from one day before to one day after the pre-TRA day ($\Delta\text{ForecastDisp}[-1,1]$) and five days after ($\Delta\text{ForecastDisp}[-1,5]$). The results, in **Panels B** and **C**, reinforce the findings

[17] The forecast dispersion changes as economists incorporate new information into their projections. Unlike many surveys tied to fixed schedules, Bloomberg survey participants can update their forecasts daily.

in Panel A, with positive and significant coefficients across all maturities. While these extended windows may also capture the market's reaction to the TRA itself, they confirm the central finding: the pre-TRA period is associated with a significant resolution of fiscal uncertainty, which is reflected in positive Treasury returns.

5.2.3 Investor Attention and Information Acquisition

The resolution of fiscal-specific uncertainty, combined with the lack of evidence for leakage, strongly suggests a mechanism of active information processing by market participants. This view, theorized by Ai et al. (2021), posits that investors with generalized risk sensitivity optimally acquire public information days ahead of major announcements to mitigate uncertainty. We next present evidence of this information acquisition.

Using Bloomberg News Trends, which tracks news article frequency to specific topics, we find a distinct quarterly cycle in attention to "Treasury Quarterly Refunding" that peaks around TRAs (**Figure 8**).[18] Crucially, this surge in attention begins on the pre-TRA days (days -1 and -2), before the official release. This pattern holds for both traditional news articles and social media posts (**Figure A.9**) and is corroborated by Google search volume for the same terms, which separately captures broader and individual investor attention (**Figure A.10**).

Overall, the evidence suggests that the pre-TRA window is a critical period of information discovery, where market participants intensify their monitoring and analysis of available public signals to anticipate the Treasury's financing plans. The convergence of attention from news media, social networks, and individual investors, combined with the formal dialogue between the Treasury and primary dealers, creates an environment where uncertainty is reduced through collective information processing, supporting the mechanism proposed by Ai et al. (2021). This active information acquisition process is likely a key driver of the pre-TRA drift we observe in

[18]Bloomberg News Trends tracks the daily frequency of news articles related to specific topics over the period between 2015 and 2023. Specifically, we use the "smart search" feature of Bloomberg News Trends which matches closely related terms. Bloomberg News Trends contains separate counts for news articles (Bloomberg news, web content, and other news wires) and social media stories (posts on X or Stocktwits).

Treasury returns.[19]

6 The Interaction Between TRA and FOMC Meetings

The information environment in Treasury markets is shaped by both fiscal and monetary policy announcements. Treasury Refunding Announcements (TRAs) provide critical signals about government borrowing needs and the fiscal outlook, while monetary policy decisions from FOMC meetings exert substantial influence on the term structure of interest rates (Gürkaynak, Sack, and Swanson, 2005; Hanson and Stein, 2015). These two pivotal events frequently occur within days of each other, delivering overlapping signals that jointly influence market expectations and risk premia. As documented in Section 2.1, 81 out of 129 TRAs since 1991 have occurred within one week of an FOMC meeting, with this temporal proximity becoming more routine in recent years. This section examines how the scheduling and sequence of these announcements influence pre-TRA returns, providing additional empirical support for our central hypothesis that the pre-TRA drift represents compensation for uncertainty resolution.

6.1 Pre-TRA Drift Around FOMC Announcements

We empirically examine how pre-TRA returns vary with the timing and content of nearby FOMC announcements. We categorize TRAs based on their proximity to FOMC meetings: those occurring within five business days of an FOMC meeting ("FOMC Near") and those occurring outside this window ("FOMC Far"). Within the "FOMC Near" group, we further distinguish whether the FOMC announcement occurred *before* the TRA ("FOMC Earlier") or *after* the TRA ("FOMC Later").

Table 11 Panel A reports the results. The evidence is striking: positive pre-TRA returns are present almost exclusively when an FOMC announcement occurs within the preceding five

[19] While our evidence points toward uncertainty resolution as the key driver, it is important to note that this risk-based explanation is not mutually exclusive with mechanisms rooted in market microstructure. For instance, the price drift can manifest from Treasury dealers' inventory positioning in anticipation of the upcoming Treasury announcements, possibly as a result of information acquisition.

days. In the "FOMC Earlier" scenario, pre-TRA returns are economically large and statistically significant, approximately doubling the unconditional average. For instance, 10-year and 30-year Treasury bonds earn excess returns of 23.7 and 34.6 bps, respectively. In contrast, when the TRA precedes the FOMC meeting or when no meeting is scheduled nearby, pre-TRA returns are small and statistically insignificant.

We next examine how the stance of monetary policy affects the pre-TRA drift. We classify each pre-TRA day based on the most recent FOMC rate decision: rate hike, rate cut, or no change. The results, reported in **Table 11 Panel B**, show that the pre-TRA drift is strongest and most statistically significant when the Federal Reserve maintains rates unchanged. During these periods, 10-year and 30-year Treasury bonds earn 14.0 and 22.1 bps, respectively. The premium is positive but smaller and statistically insignificant following rate hikes, and it becomes negative following rate cuts.

These findings are consistent with our uncertainty reduction mechanism. While both TRA and FOMC announcements are critical for assessing Treasury market risk, they provide distinct yet complementary information. When an FOMC announcement precedes a TRA, it resolves uncertainty about monetary policy, the Federal Reserve's own demand for Treasury securities, and—through its impact on term premia—investors' demand for Treasury securities. On the pre-TRA day, investors can then synthesize information from both events, effectively integrating signals about Treasury demand (from monetary policy) and supply (from fiscal policy). This sequential information processing generates greater uncertainty resolution compared to scenarios where these announcements occur in isolation or in reverse chronological order. Furthermore, when the Federal Reserve maintains rates unchanged, monetary policy uncertainty is minimal, and Treasury refunding emerges as the primary source of near-term uncertainty in Treasury markets, thereby amplifying the information value of TRAs and the associated risk premium.

To provide direct empirical support for this interpretation, we test a key prediction of our hypothesis: TRAs should be more informative—and thus resolve more uncertainty on pre-TRA days—when they can incorporate recently disclosed monetary policy information. We measure

informativeness using the variance of forecast revisions to marketable borrowing estimates scaled by GDP ($FR_t(MB)/GDP_{t-1}$, as defined in Section 5.1.1), where higher variance indicates greater information acquisition and uncertainty resolution. We find that the variance of these forecast revisions is 2.52% when a TRA follows an FOMC meeting. Using F-tests, we confirm this variance is significantly higher than when the TRA precedes the FOMC meeting (0.91%, rejecting the null that variances are equal with $p < 0.01$) or when there is no nearby FOMC meeting (0.60%, with $p < 0.01$). This demonstrates that TRAs are indeed more informative when they can incorporate recently disclosed monetary policy information. Further supporting this interpretation, **Figure A.11** in the Appendix shows that the corresponding reduction in term premia on pre-TRA days is also largest in this scenario.

6.2 The Reciprocal Effect

To further substantiate the complementary nature of these announcements, we examine the reciprocal relationship: the impact of TRAs on FOMC-window returns in Treasurys. While the pre-FOMC drift in Treasurys is debated (Lucca and Moench, 2015), recent evidence reveals a significant positive return for long-term Treasurys over the 3-day window surrounding FOMC meetings (Hillenbrand, 2025). We examine how these 3-day cumulative returns are affected by the presence and timing of a nearby TRA.

Table 12 presents our findings. Consistent with Hillenbrand (2025), we find a significant positive return in Treasurys over the 3-day window around all FOMC meetings. However, this effect is almost entirely driven by meetings that are not accompanied by a TRA. In the "TRA Far" subsample, 10-year Treasurys earn 24.9 bps, whereas in the "TRA Near" subsample, the return is a statistically insignificant 9.9 bps. This suggests that when an FOMC meeting is the primary information event, it becomes the focal point for resolving market-wide uncertainty, generating a significant 3-day return.

The low average return in the "TRA Near" group masks important heterogeneity based on the sequence of announcements. The positive returns reappear when the TRA precedes the FOMC

meeting ("TRA Earlier"), with 10-year Treasurys earning a significant 22.9 bps. In this scenario, the TRA first resolves uncertainty about fiscal policy and Treasury supply, allowing the market to better price the subsequent information from the FOMC. Conversely, when the FOMC meeting occurs before the TRA ("TRA Later"), the 3-day return is negative, and positive return is subsequently earned on the pre-TRA day.[20]

This symmetrical evidence strongly reinforces our central hypothesis. Just as a prior FOMC meeting enhances the informativeness of a subsequent TRA, a prior TRA enhances the price discovery process around a subsequent FOMC meeting. This demonstrates that the two announcements are complementary, with their sequential timing being critical for the market's ability to resolve uncertainty about the Treasury market.

7 Conclusion

This paper uncovers a striking and persistent pattern in U.S. Treasury markets: medium- and long-term bonds earn substantial positive returns on the day before quarterly Treasury Refunding Announcements (TRAs). This pre-TRA drift has persisted since the 1990s and intensified in recent decades amid growing fiscal pressures. The effect is economically large; for 30-year Treasury bonds, over 15% of the total annual return is concentrated on these four pre-scheduled days, with an average daily gain of 24.3 basis points. A simple trading strategy exploiting this pattern yields an annualized Sharpe ratio exceeding four.

We demonstrate that this phenomenon is not an artifact of known calendar effects, concurrent macroeconomic news, or information leakage about the Treasury's borrowing plans. Instead, our evidence points to the resolution of uncertainty as the primary driver. We show that Treasury market implied volatility systematically declines on pre-TRA days, and that returns are highest when this uncertainty reduction is greatest. The effect is amplified during periods of heightened fiscal

[20]The effect of a nearby TRA on FOMC-window equity returns is slightly different. We find strong pre-FOMC returns in equities when there is a nearby TRA, even in the more recent time period where a decline in pre-FOMC returns has been documented Kurov et al. (2021). However, when there is nearby TRA meeting, there is no significant difference between cases where the TRA occurs first or second.

stress—specifically, when the national debt approaches its statutory limit and when professional forecasts of the federal budget balance diverge. The interaction with monetary policy provides further support: pre-TRA returns are largest when the announcement follows a recent FOMC meeting, a sequence that allows markets to synthesize both fiscal and monetary signals for a more complete resolution of uncertainty.

Our findings contribute to a deeper understanding of the interplay between fiscal policy and asset prices, joining recent work that explores these critical linkages (e.g., Jiang, Lustig, Van Nieuwerburgh, and Xiaolan, 2024b; Gomez Cram, Kung, and Lustig, 2023). As federal deficits have expanded and debt sustainability has become a central concern (Jiang et al., 2023), TRAs have transformed from routine administrative disclosures into pivotal market events. The strengthening of the pre-TRA drift over time underscores the increasing importance of fiscal uncertainty in driving Treasury market dynamics. This research highlights the critical role of the Treasury's communication and debt management strategies in maintaining financial stability and provides a new lens through which to view the pricing of sovereign risk. For policymakers, investors, and researchers, these results underscore that in an era of fiscal strain, understanding the market's reaction to debt management announcements is more crucial than ever.

Tables and Figures



Most Recent Quarterly Refunding Documents

DOCUMENTS RELEASED AT 3:00 PM MONDAY, OCTOBER 30, 2023

Financing Estimates: 2023 - 4th Quarter

Economic Policy Statements to TBAC: 2023 - 4th Quarter

(The next release is scheduled for January 29, 2024)

DOCUMENTS RELEASED AT 8:30 AM WEDNESDAY, NOVEMBER 1, 2023

Policy Statement: 2023 - 4th Quarter
TBAC Report to Secretary: 2023 - 4th Quarter
TBAC Minutes: 2023 - 4th Quarter

TBAC Recommended Financing Table Q4 2023
TBAC Recommended Financing Table Q1 2024
TBAC Recommended Financing Table By Refunding Quarter

TBAC Discussion Charts:

Treasury Presentation to TBAC (Final): 2023 - 4th Quarter
TBAC Presentation to Treasury: (Charge 1, Charge 2, Archives)

Auction Schedule: XML Format | PDF Format

(The next release is scheduled for January 31, 2024)

DOCUMENTS RELEASED AT 12:00 PM FRIDAY, OCTOBER 13, 2023

Primary Dealer Meeting Agenda: 2023 - 4th Quarter

Quarterly Release Data: 2023 - 4th Quarter

(The next release is scheduled for January 12, 2024)

Figure 2 Treasury Refunding Documents from Q4 2023



PRESS RELEASES

Treasury Announces Marketable Borrowing Estimates

October 30, 2023

Sources and Uses Table

WASHINGTON -- The U.S. Department of the Treasury today announced its current estimates of private held net marketable borrowing[1] for the October – December 2023 and January – March 2024 quarters.

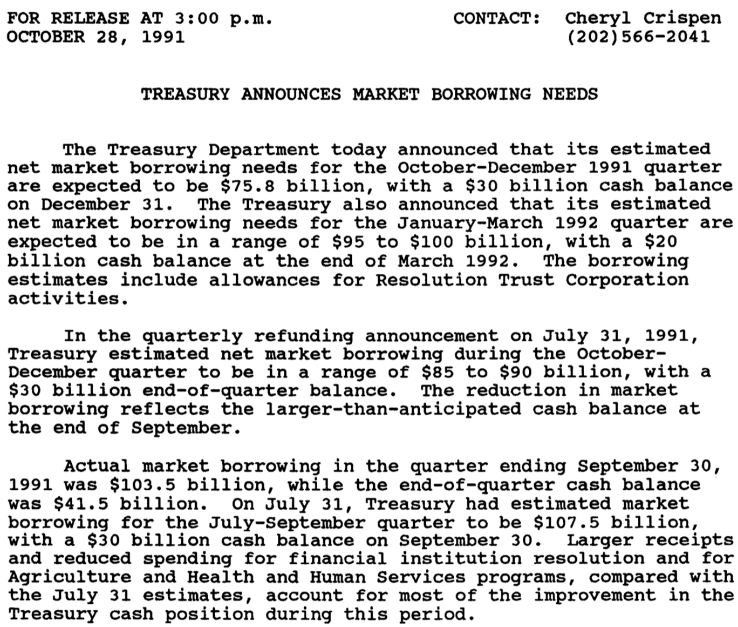
- During the October – December 2023 quarter, Treasury expects to borrow $776 billion in privately-held net marketable debt, assuming an end-of-December cash balance of $750 billion.[2] The borro estimate is $76 billion lower than announced in July 2023, largely due to projections of higher recei somewhat offset by higher outlays.[3]
- During the January – March 2024 quarter, Treasury expects to borrow $816 billion in privately-held marketable debt, assuming an end-of-March cash balance of $750 billion.[4]

During the July – September 2023 quarter, Treasury borrowed $1.010 trillion in privately-held net marketable debt and ended the quarter with a cash balance of $657 billion. In July 2023, Treasury estimated borrowing of $1.007 trillion and assumed an end-of-September cash balance of $650 billion. increase in privately-held net market borrowing was $3 billion: changes across all major components w small.

Additional financing details relating to Treasury's Quarterly Refunding will be released at 8:30 a.m. on Wednesday, November 1, 2023.

###

A. Q4 2023 Release



FOR RELEASE AT 3:00 p.m.
OCTOBER 28, 1991

CONTACT: Cheryl Crispen
(202)566-2041

TREASURY ANNOUNCES MARKET BORROWING NEEDS

The Treasury Department today announced that its estimated net market borrowing needs for the October-December 1991 quarter are expected to be $75.8 billion, with a $30 billion cash balance on December 31. The Treasury also announced that its estimated net market borrowing needs for the January-March 1992 quarter are expected to be in a range of $95 to $100 billion, with a $20 billion cash balance at the end of March 1992. The borrowing estimates include allowances for Resolution Trust Corporation activities.

In the quarterly refunding announcement on July 31, 1991, Treasury estimated net market borrowing during the October-December quarter to be in a range of $85 to $90 billion, with a $30 billion end-of-quarter balance. The reduction in market borrowing reflects the larger-than-anticipated cash balance at the end of September.

Actual market borrowing in the quarter ending September 30, 1991 was $103.5 billion, while the end-of-quarter cash balance was $41.5 billion. On July 31, Treasury had estimated market borrowing for the July-September quarter to be $107.5 billion, with a $30 billion cash balance on September 30. Larger receipts and reduced spending for financial institution resolution and for Agriculture and Health and Human Services programs, compared with the July 31 estimates, account for most of the improvement in the Treasury cash position during this period.

B. Q4 1991 Release

Figure 3 Primary Release of Marketable Borrowing Estimates from Treasury Refunding Announcements

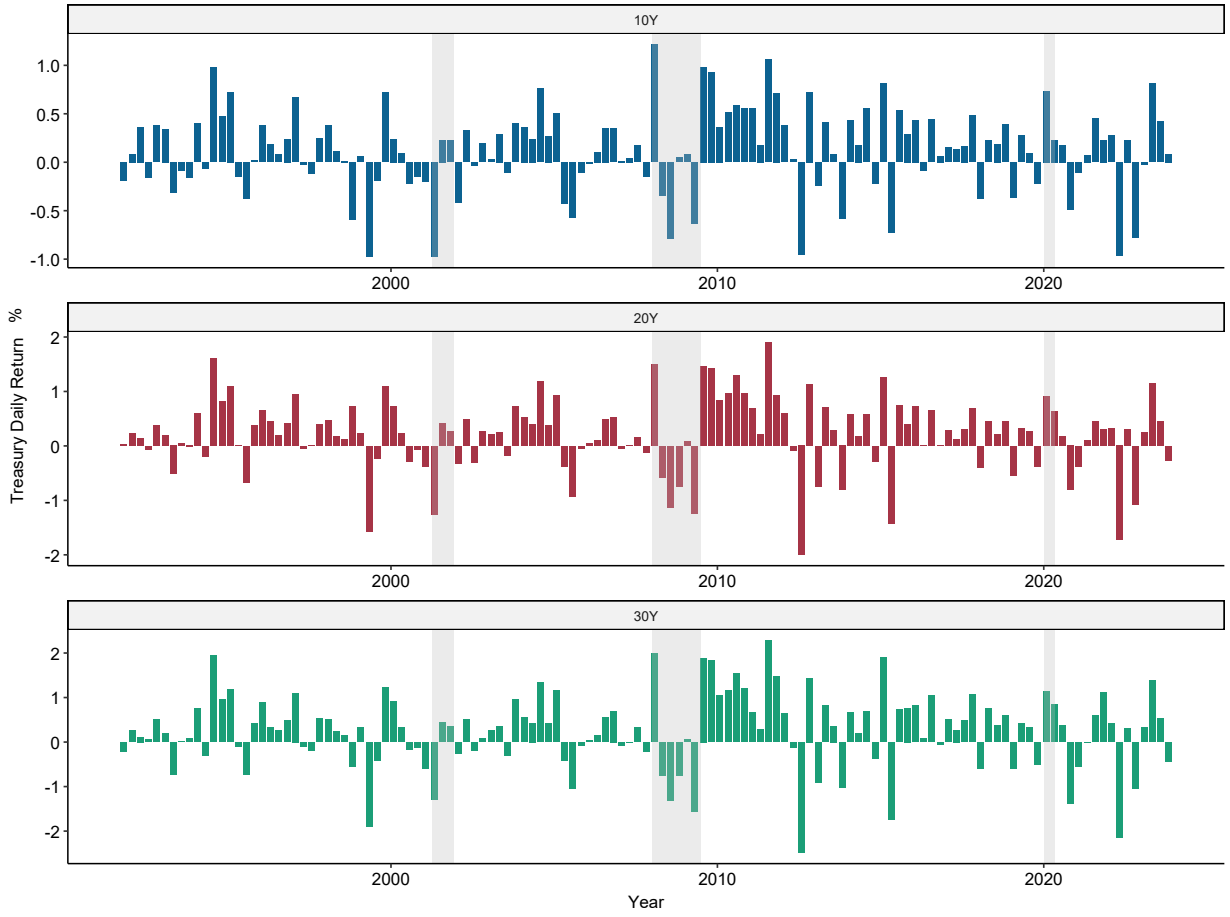


Figure 4 10-, 20-, and 30-Year Treasury Returns on Pre-TRA Days Over Time

This figure plots the time series of daily returns for 10-, 20-, and 30-year Treasurys on the day before each quarterly Treasury Refunding Announcement (pre-TRA day). Only returns on pre-TRA days are shown. Shaded areas represent NBER recession periods.

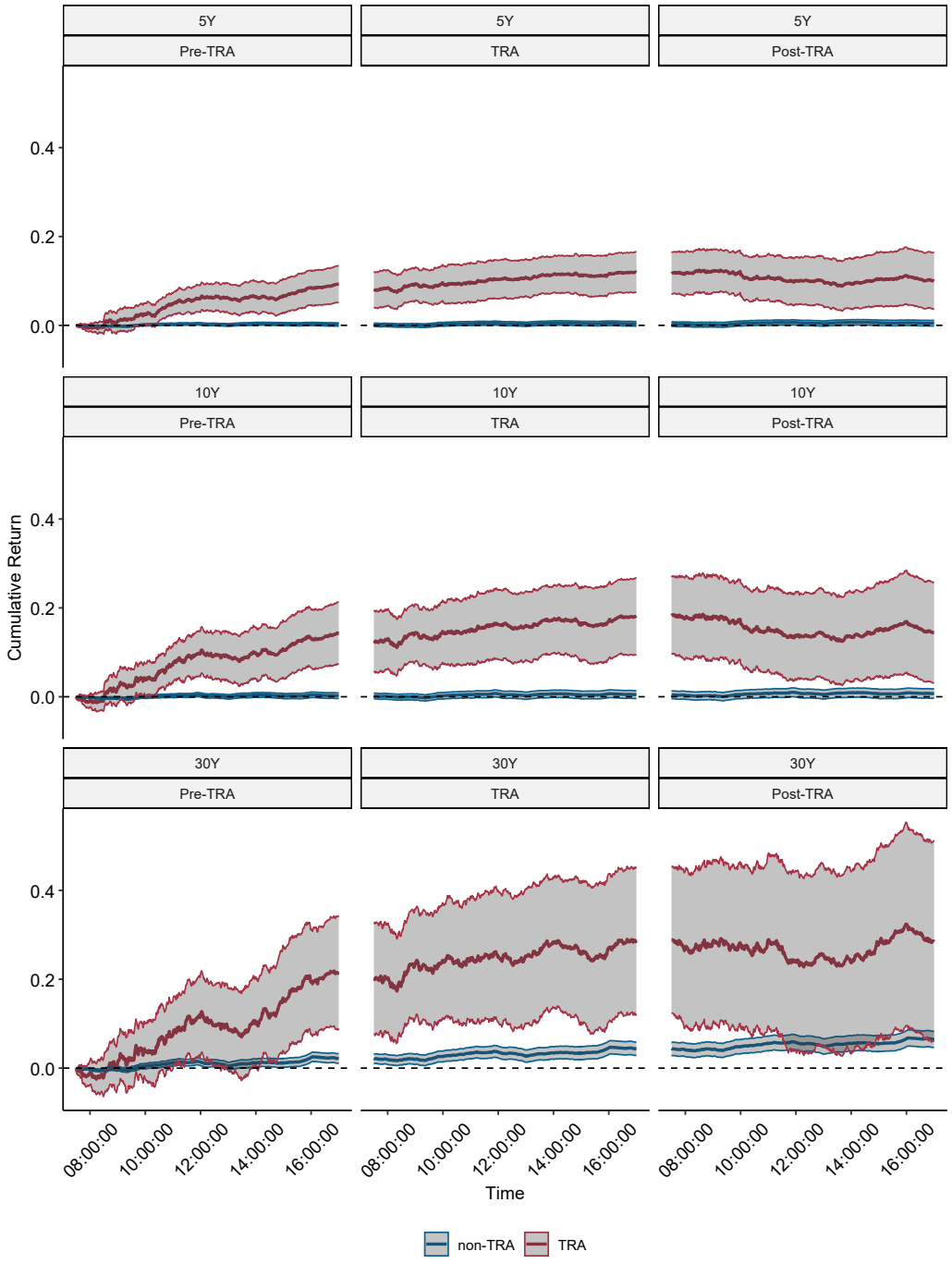


Figure 5 Cumulative Intraday Returns of 5, 10, and 30-Year Treasurys around TRAs

This figure shows the average cumulative intraday returns for 5-, 10-, and 30-year Treasurys during New York trading hours (07:30-17:00 ET). The blue lines plot returns over a three-day window around Treasury Refunding Announcements (TRAs), starting from the pre-TRA day. The red lines show the average returns on all other, non-TRA-related days for comparison. The shaded areas represent 95% confidence intervals. The sample period is from 2006 to 2023.



	n	mean	sd	p5	p25	median	p75	p95
$\Delta MB_{t-1}/GDP_{t-2}$ (%)	102	0.15	1.18	-1.40	-0.49	-0.05	0.68	2.38
$FR_t(MB)/GDP_{t-1}$ (%)	106	0.22	1.61	-1.12	-0.25	0.04	0.45	1.56
$\Delta MB_t/GDP_{t-1}$ (%)	102	0.17	2.04	-1.32	-0.47	0.02	0.68	2.41

Figure 6 Time Series of Refunding Estimates Announced by the Treasury Department

This figure plots the time series of three measures of marketable borrowing estimates announced by the Treasury Department: the seasonally-adjusted change in Marketable Borrowing estimate in quarter t ($FR_t(MB)/GDP_{t-1}$), the seasonally-adjusted change in Marketable Borrowing estimate in quarter $t-1$ ($\Delta MB_{t-1}/GDP_{t-2}$), and the forecast revision of Marketable Borrowing in quarter t ($\Delta MB_{t-2}/GDP_{t-1}$). Shaded areas represent NBER recession periods.

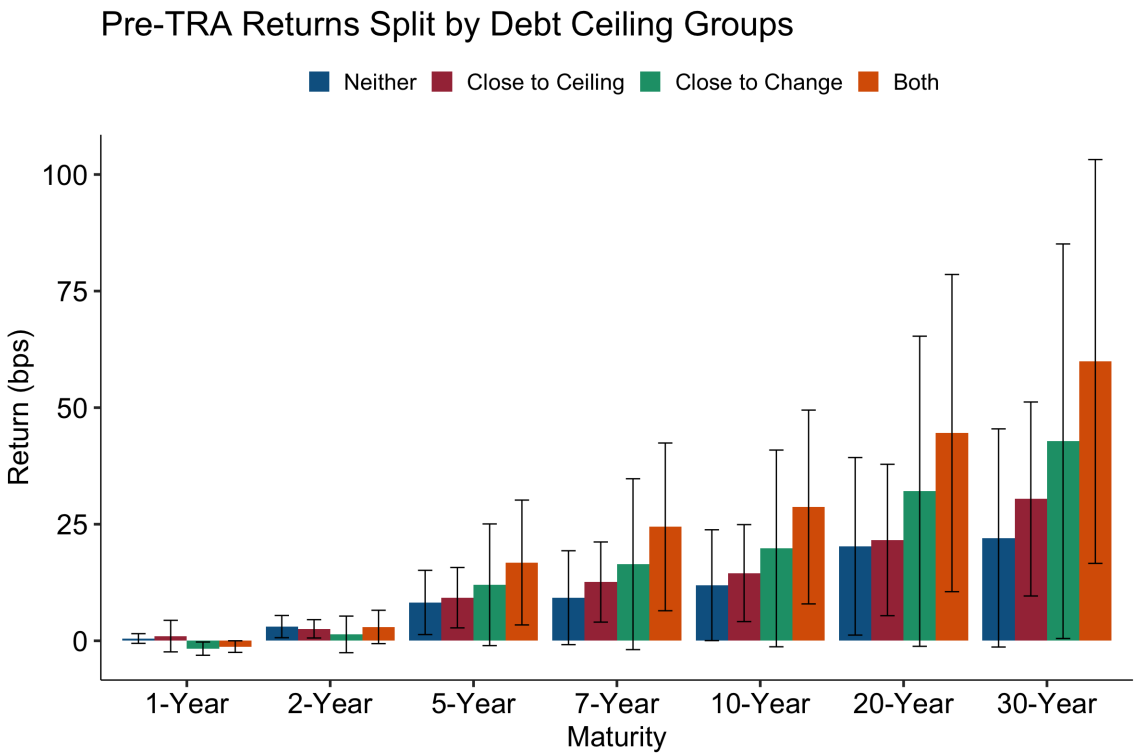


Figure 7 Average Returns on Pre-TRA Days Split by Debt Ceiling Groups

This figure plots the average return on pre-TRA days for Treasurys with maturities of 1, 2, 5, 7, 10, 20, and 30 years, split by debt ceiling groups. Red bars show the average return on days when the total national debt is within 1% of the debt ceiling or the debt ceiling is suspended. Green bars show the average return on days when a change in the debt ceiling occurs within the 30 trading days following the associated TRA day. Orange bars show the average return on days when both are true, while blue bars show the average return on days when both are false. Standard error bars depict 95% confidence intervals.

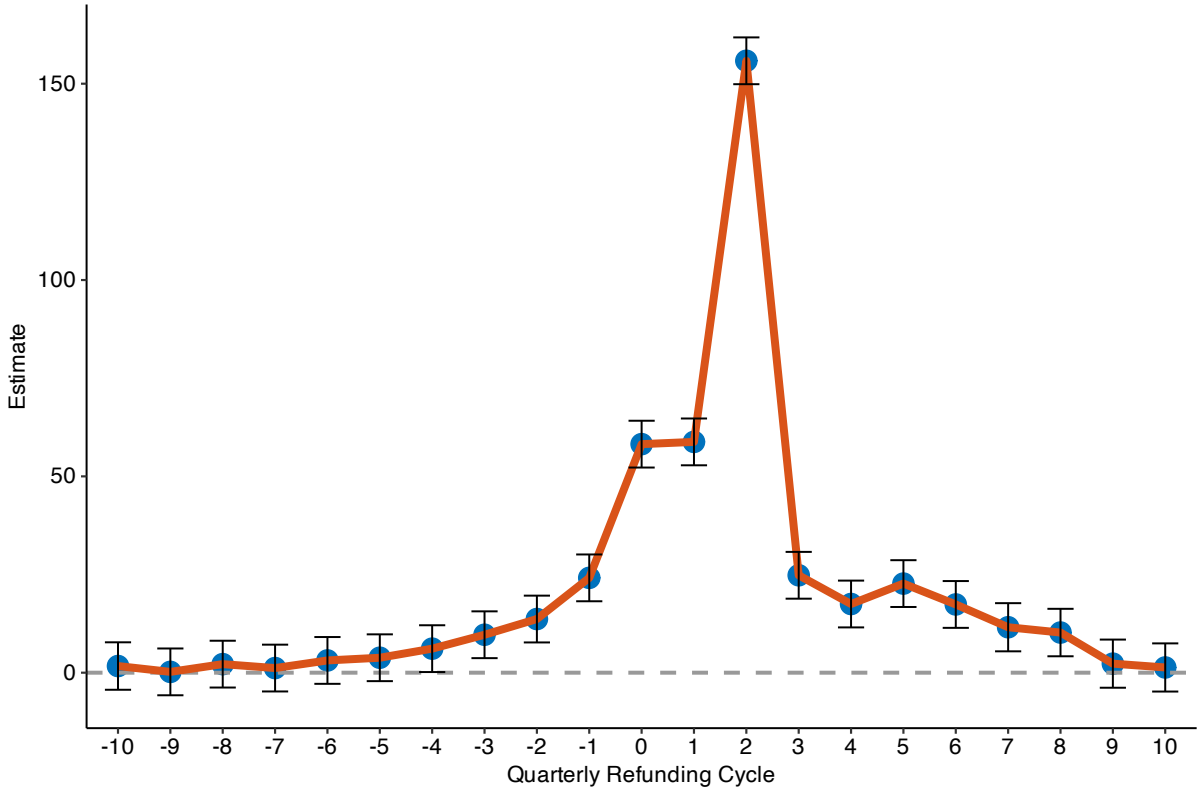


Figure 8 Investor Attention to "Treasury Refunding Announcements" Across Refunding Cycles: Bloomberg News Trends

This figure illustrates investor attention to Treasury refunding announcements, measured by the Bloomberg News Trends based on smart searches across all sources tracked by Bloomberg for "Treasury Quarterly Refunding," over a 21-day window centered around the TRA dates. The plot displays regression coefficients for each day in the window, with 95% confidence intervals shown as error bands. The sample period is from 2015 to 2023.

Table 1 Treasury Refunding Announcement Dates

This table lists all primary Treasury Refunding Announcement dates between 1991Q4 and 2023. * indicates a TRA that directly preceded an FOMC Announcement (within 1 week); † indicates a TRA that directly followed an FOMC Announcement (within 1 week)

Panel A: Complete List of TRA Dates by Year

Year	Q1	Q2	Q3	Q4
1991				10/28/1991
1992	02/03/1992*	04/27/1992	08/03/1992	10/30/1992
1993	02/01/1993*	05/03/1993	08/02/1993	11/01/1993
1994	01/31/1994*	05/02/1994	08/01/1994	10/31/1994
1995	01/30/1995*	05/01/1995	07/31/1995	10/30/1995
1996	01/29/1996*	04/29/1996	07/29/1996	10/28/1996
1997	02/03/1997*	04/28/1997	07/28/1997	10/27/1997
1998	02/02/1998*	05/04/1998	08/03/1998	10/26/1998
1999	02/01/1999*	05/03/1999	08/02/1999	11/01/1999
2000	01/31/2000*	05/01/2000	07/31/2000	10/30/2000
2001	01/29/2001*	04/30/2001	07/30/2001	10/29/2001
2002	01/28/2002*	04/29/2002	07/29/2002	10/28/2002
2003	02/03/2003†	04/28/2003	07/28/2003	11/03/2003†
2004	02/02/2004†	05/03/2004*	08/02/2004	11/01/2004
2005	01/31/2005*	05/02/2005*	08/01/2005	10/31/2005*
2006	01/30/2006*	05/01/2006	07/31/2006	10/30/2006†
2007	01/29/2007*	04/30/2007	07/30/2007	10/29/2007*
2008	01/28/2008†	04/28/2008*	07/28/2008	11/03/2008†
2009	02/02/2009†	04/27/2009*	08/03/2009	11/02/2009*
2010	02/01/2010†	05/03/2010†	08/02/2010	11/01/2010*
2011	01/31/2011†	05/02/2011†	08/01/2011	10/31/2011*
2012	01/30/2012†	04/30/2012†	07/30/2012*	10/29/2012†
2013	02/04/2013†	04/29/2013*	07/29/2013*	11/04/2013†
2014	02/03/2014†	04/28/2014*	08/04/2014†	11/03/2014†
2015	02/02/2015†	05/04/2015†	08/03/2015†	11/02/2015†
2016	02/01/2016†	05/02/2016†	08/01/2016†	10/31/2016*
2017	01/30/2017*	05/01/2017*	07/31/2017†	10/30/2017*
2018	01/29/2018*	04/30/2018*	07/30/2018*	10/29/2018
2019	01/28/2019*	04/29/2019*	07/29/2019*	10/28/2019*
2020	02/03/2020†	05/04/2020†	08/03/2020†	11/02/2020*
2021	02/01/2021†	05/03/2021†	08/02/2021†	11/01/2021*
2022	01/31/2022†	05/02/2022*	08/01/2022†	10/31/2022*
2023	01/30/2023*	05/01/2023*	07/31/2023†	10/30/2023*

Panel B: Count by TRA and FOMC Proximity

Announcement Type	Count
Total TRA (Since Q4 1991)	**129**
TRA directly preceding FOMC Announcement (within 1 week)	45
TRA directly following FOMC Announcement (within 1 week)	36
TRA without proximate FOMC announcement	48
Total FOMC Announcements (Since Q4 1991)	**267**
FOMC announcement without proximate TRA	186

Table 2 Summary Statistics of Returns and Yields on Pre-TRA Days and All Other Days

This table reports summary statistics on daily returns and yields on pre-Treasury Refunding Announcement (pre-TRA) Days and all other days. The sample period is from 1991Q4 to 2023. Panel A presents CRSP Treasury bond returns and Panel B presents GSW Treasury bond yields.

Panel A: CRSP Treasury Returns

	Pre-TRA Days					Other Days				
Maturity	N	Mean	SD	Min	Max	N	Mean	SD	Min	Max
Daily Return (bps)										
1Y	129	0.66	8.77	-10.12	90.59	7,933	1.18	4.92	-90.75	98.17
2Y	129	2.66	8.78	-21.33	34.15	7,933	1.31	10.48	-91.66	118.14
5Y	129	8.25	25.88	-57.33	91.08	7,933	1.73	27.52	-182.72	189.87
7Y	129	10.27	36.36	-90.97	115.28	7,933	1.93	37.36	-234.92	314.23
10Y	129	12.62	43.15	-97.92	121.41	7,933	1.82	45.59	-291.93	355.48
20Y	129	19.88	67.68	-200.41	189.87	7,933	2.33	69.60	-615.60	519.17
30Y	129	24.33	84.44	-249.16	228.21	7,933	2.07	90.28	-855.62	839.07
Return Accumulated Per Year (%)										
1Y	33	0.03	0.18	-0.17	0.92	33	2.90	2.49	-0.68	8.14
2Y	33	0.10	0.19	-0.38	0.53	33	3.25	3.30	-3.60	11.24
5Y	33	0.32	0.54	-0.81	1.53	33	4.30	5.88	-8.90	17.92
7Y	33	0.40	0.74	-1.17	2.21	33	4.82	7.44	-11.68	20.65
10Y	33	0.49	0.83	-1.24	2.53	33	4.52	8.22	-15.43	23.34
20Y	33	0.78	1.34	-2.18	4.12	33	5.85	12.26	-24.77	29.45
30Y	33	0.95	1.62	-2.47	5.03	33	5.33	16.17	-31.65	43.35

Panel B: GSW Yields

	Pre-TRA Days					Other Days				
Maturity	N	Mean	SD	Min	Max	N	Mean	SD	Min	Max
Daily Yield Changes (bps)										
1Y	129	-0.07	3.32	-13.12	9.85	7,919	-0.01	4.42	-59.54	40.47
2Y	129	-0.93	4.64	-19.97	13.73	7,919	-0.01	5.42	-51.58	37.47
5Y	129	-1.58	5.71	-23.89	15.38	7,919	-0.01	6.04	-47.08	39.29
10Y	129	-1.54	5.75	-20.48	17.15	7,919	-0.02	5.90	-51.89	38.24
20Y	129	-1.73	5.50	-20.90	15.14	7,919	-0.02	5.44	-33.22	36.10
30Y	129	-1.71	5.88	-26.21	16.72	7,919	-0.02	5.61	-33.14	34.21
Yield Changes Accumulated Per Year (%)										
1Y	33	0.00	0.07	-0.18	0.18	33	-0.02	1.53	-3.38	4.10
2Y	33	-0.04	0.10	-0.27	0.21	33	-0.02	1.40	-2.53	3.63
5Y	33	-0.06	0.12	-0.35	0.10	33	-0.03	1.19	-2.39	2.88
10Y	33	-0.06	0.12	-0.37	0.14	33	-0.06	1.03	-2.07	2.20
20Y	33	-0.07	0.11	-0.33	0.15	33	-0.05	0.92	-1.67	2.17
30Y	33	-0.07	0.12	-0.49	0.14	33	-0.04	0.92	-2.02	2.36

Table 3 Treasury Returns Around Treasury Refunding Announcements

This table reports estimation results of Regression (1) using the CRSP Treasury bond returns with maturities ranging from 1 to 30 years. Day-of-week (DOW) and end-of-month (EOM) fixed effects are included in certain specifications. Standard errors based on Newey-West t-statistics with optimal length are reported in parenthesis. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The sample period is from 1991Q4 to 2023.

	Daily Return (bps)						
Maturity	**1Y**	**2Y**	**5Y**	**7Y**	**10Y**	**20Y**	**30Y**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A							
pre-TRA	-0.50	1.36*	6.52***	8.35***	10.80***	17.60***	22.25***
	(0.77)	(0.78)	(2.29)	(3.21)	(3.81)	(5.97)	(7.45)
TRA	0.80	0.41	-1.70	-1.91	-3.00	-3.03	-5.80
	(0.79)	(0.76)	(2.16)	(2.83)	(3.58)	(5.74)	(7.57)
post-TRA	-0.09	0.42	1.76	2.07	2.46	5.67	4.88
	(0.40)	(0.92)	(2.63)	(3.56)	(4.36)	(6.65)	(8.74)
Constant	1.17***	1.30***	1.72***	1.92***	1.82***	2.28***	2.08**
	(0.06)	(0.12)	(0.30)	(0.40)	(0.49)	(0.74)	(0.94)
DOW FE							
EOM FE							
R^2	0.001	0.000	0.001	0.001	0.001	0.001	0.001
N	8,061	8,061	8,061	8,061	8,061	8,061	8,061
Panel B							
pre-TRA	0.44	2.67***	8.04***	10.03***	12.63***	17.74***	21.21***
	(0.78)	(0.83)	(2.40)	(3.33)	(3.95)	(6.18)	(7.73)
TRA	-0.72	-1.10	-3.12	-3.66	-4.56	-4.38	-6.59
	(0.80)	(0.80)	(2.24)	(2.94)	(3.70)	(5.89)	(7.77)
post-TRA	-0.14	0.23	0.92	0.97	0.86	4.61	3.97
	(0.42)	(0.95)	(2.71)	(3.70)	(4.51)	(6.90)	(9.06)
DOW FE	✓	✓	✓	✓	✓	✓	✓
EOM FE							
R^2	0.024	0.007	0.002	0.002	0.002	0.001	0.001
N	8,061	8,061	8,061	8,061	8,061	8,061	8,061
Panel C							
pre-TRA	0.54	1.86**	6.01**	7.46**	9.40**	13.20**	14.78*
	(0.79)	(0.83)	(2.43)	(3.38)	(4.03)	(6.30)	(7.86)
TRA	-0.68	-1.44*	-3.97*	-4.73	-5.92	-6.29	-9.28
	(0.80)	(0.80)	(2.24)	(2.94)	(3.71)	(5.94)	(7.84)
post-TRA	-0.12	0.08	0.53	0.47	0.24	3.73	2.72
	(0.42)	(0.94)	(2.70)	(3.68)	(4.49)	(6.87)	(9.02)
DOW FE	✓	✓	✓	✓	✓	✓	✓
EOM FE	✓	✓	✓	✓	✓	✓	✓
R^2	0.024	0.009	0.004	0.003	0.003	0.003	0.003
N	8,061	8,061	8,061	8,061	8,061	8,061	8,061

Table 4 Yield and Term Premium Changes Around Treasury Refunding Announcements

This table reports regression results of daily changes in various yield and term premium measures around TRAs. The dependent variables include daily changes in constant maturity Treasury yields estimated by Gürkaynak et al. (2007) (Panel A), term premia estimated by Kim and Wright (2005) (Panel B), and TIPS yields estimated by Gürkaynak et al. (2007) (Panel C). The maturities range from 1 to 30 years. Day-of-week (DOW) and end-of-month (EOM) fixed effects are included in all specifications. Standard errors based on Newey-West t-statistics with optimal length are reported in parenthesis. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The sample period is from 1991Q4 to 2023.

Maturity	**1Y**	**2Y**	**5Y**	**7Y**	**10Y**	**20Y**	**30Y**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: GSW Daily Yield Changes							
pre-TRA	-0.12	-0.80*	-1.39***	-1.38**	-1.32**	-1.32***	-1.26**
	(0.32)	(0.44)	(0.54)	(0.54)	(0.54)	(0.51)	(0.55)
TRA	0.21	0.61	0.77	0.78*	0.76*	0.64	0.76
	(0.32)	(0.41)	(0.47)	(0.47)	(0.46)	(0.45)	(0.48)
post-TRA	-0.30	-0.34	-0.36	-0.46	-0.58	-0.59	-0.69
	(0.36)	(0.46)	(0.55)	(0.55)	(0.55)	(0.53)	(0.56)
R^2	0.003	0.004	0.004	0.003	0.003	0.004	0.003
N	8,048	8,048	8,048	8,048	8,048	8,048	8,048
Panel B: KW Daily Term Premium Changes							
pre-TRA	-0.21***	-0.33***	-0.46***	-0.48**	-0.50**		
	(0.08)	(0.13)	(0.18)	(0.19)	(0.21)		
TRA	0.02	0.03	0.06	0.09	0.12		
	(0.07)	(0.11)	(0.16)	(0.17)	(0.18)		
post-TRA	-0.10	-0.16	-0.21	-0.21	-0.21		
	(0.08)	(0.13)	(0.18)	(0.20)	(0.21)		
R^2	0.006	0.006	0.006	0.005	0.005		
N	8,048	8,048	8,048	8,048	8,048		
Panel C: GSW TIPS Daily Yield Changes (1999-2023)							
pre-TRA		-1.00	-1.60***	-1.34***	-1.09**	-0.40	
		(1.34)	(0.54)	(0.49)	(0.47)	(0.51)	
TRA		-1.59	0.64	0.43	0.35	0.33	
		(1.37)	(0.50)	(0.45)	(0.43)	(0.45)	
post-TRA		1.84	-0.56	-0.24	0.00	-0.39	
		(1.38)	(0.57)	(0.53)	(0.50)	(0.50)	
R^2		0.002	0.005	0.004	0.003	0.002	
N		6,238	6,238	6,238	6,238	6,238	
DOW FE	✓	✓	✓	✓	✓	✓	✓
EOM FE	✓	✓	✓	✓	✓	✓	✓

Table 5 Treasury Returns Around Quarterly Refunding Announcements: Trading Strategies

This table compares the performance of trading strategies that long respective securities on the pre-TRA days ("Pre-TRA Days") against strategies that invest on all other days ("Other Days"). For each strategy, we report annualized returns (%), standard deviations (%), and Sharpe ratios. The 1-month Treasury bill rate is used as the risk-free rate. Additionally, we provide the starting year of each strategy, which lines up with the inception of the ETFs for Panels B, C, and D. Panel A presents strategies investing in Treasury bonds with maturities ranging from 1 to 30 years, as well as an equally weighted strategy investing equally across all these maturities. Panel B presents strategies investing in nominal Treasury bond ETFs (SHY, IEI, IEF, TLH, TLT) and TIPS ETFs (TIP). Panel C presents strategies investing in corporate bond ETFs (LQD, VCSH, VCIT, VCLT). Panel D presents the strategy investing in the equity ETF (SPY). The sample period is from 1991Q4 to 2023.

	Pre-TRA Days			Other Days			
Maturity	Return	Std	Sharpe Ratio	Return	Std	Sharpe Ratio	Start Year
Panel A: Treasury bonds							
1Y	0.74	1.39	0.54	2.06	0.77	2.67	1991
2Y	5.78	1.39	4.15	2.42	1.66	1.46	1991
5Y	19.86	4.12	4.82	3.47	4.36	0.80	1991
7Y	24.95	5.78	4.32	3.98	5.92	0.67	1991
10Y	30.87	6.86	4.50	3.70	7.23	0.51	1991
20Y	49.18	10.75	4.58	4.97	11.04	0.45	1991
30Y	60.39	13.41	4.50	4.33	14.33	0.30	1991
EW	27.40	5.90	4.65	3.56	6.16	0.58	1991
Panel B: Treasury ETFs							
SHY	7.85	1.21	6.46	1.10	1.52	0.73	2002
IEI	24.70	3.72	6.64	2.06	4.16	0.50	2007
IEF	37.54	6.18	6.08	2.59	6.90	0.38	2002
TLH	36.36	9.34	3.89	2.80	10.57	0.26	2007
TLT	59.62	12.67	4.71	3.85	14.51	0.27	2002
TIP	33.82	5.42	6.24	2.57	6.35	0.41	2003
Panel C: Corporate Bond ETFs							
LQD	38.89	6.28	6.19	3.76	8.54	0.44	2002
VCSH	12.63	1.91	6.61	2.06	2.97	0.69	2009
VCIT	34.45	4.58	7.52	3.41	5.86	0.58	2009
VCLT	35.20	9.61	3.66	4.74	11.96	0.40	2009
Panel D: Stock ETFs							
SPY	-2.07	19.03	-0.11	10.53	18.75	0.56	1993

Table 6 Pre-Refunding Announcements Return Across Subsamples

This table reports the average returns of Treasurys of various maturities on pre-TRA days across several subsamples. Panel A presents the baseline results for the full sample. Panel B splits the sample into pre-2002 and post-2002 periods. Panel C splits the sample based on the federal budget balance (Surplus or Deficit). Panel D splits the sample by the proximity to the debt ceiling and subsequent changes of the debt ceiling (Close to debt ceiling, Close to change, Both, or Neither). Panel E splits the sample by whether the federal funds rate is at the zero lower bound (ZLB). Panel F splits the sample based on whether the Federal Reserve is conducting Quantitative Easing. Panel G splits the sample based on whether the economy is in a recession, as determined by the NBER recession dating committee. Panel H splits the sample by the slope of the Treasury yield curve, defined as the difference between the 10-year and 2-year constant maturity Treasury yields from Gürkaynak et al. (2007) (Upward or Downward sloping). Panel I splits the sample by calendar quarter. t-statistics are reported in brackets. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

		1Y		5Y		10Y		30Y	
	N	Mean	t-stat	Mean	t-stat	Mean	t-stat	Mean	t-stat
A. Full sample									
Full	129	0.66	[0.86]	8.25***	[3.62]	12.62***	[3.32]	24.33***	[3.27]
B. Pre and post 2002									
Pre-2002	41	0.86	[1.27]	4.55	[1.10]	6.48	[1.03]	17.44	[1.61]
Post-2002	88	0.57	[0.53]	9.97***	[3.66]	15.48***	[3.27]	27.55***	[2.85]
C. Federal budget balance									
Surplus	16	-0.42	[-0.37]	-4.47	[-0.68]	-7.81	[-0.68]	-3.40	[-0.17]
Deficit	113	0.82	[0.94]	10.05***	[4.20]	15.51***	[3.91]	28.26***	[3.54]
D. Debt ceiling									
Close to debt ceiling	55	1.01	[0.60]	9.25***	[2.86]	14.51***	[2.79]	30.41***	[2.92]
Close to change	19	-1.68**	[-2.37]	12.01*	[1.84]	19.81*	[1.88]	42.80**	[2.02]
Both	16	-1.24**	[-1.99]	16.79**	[2.51]	28.69***	[2.76]	59.90***	[2.77]
Neither	64	0.49	[0.94]	8.22**	[2.39]	11.92**	[2.01]	22.06*	[1.89]
E. Zero lower bound									
ZLB	28	-1.94***	[-5.07]	17.47***	[3.34]	27.06***	[2.72]	47.77**	[2.15]
Non-ZLB	101	1.39	[1.43]	5.69**	[2.30]	8.62**	[2.19]	17.84**	[2.49]
F. Quantitative easing									
QE	36	-1.79***	[-5.32]	14.91***	[3.55]	23.36***	[2.89]	41.06**	[2.24]
Non-QE	93	1.61	[1.54]	5.67**	[2.12]	8.46**	[2.02]	17.86**	[2.40]
G. Recession									
Recession	10	-0.94	[-0.51]	2.12	[0.18]	-2.18	[-0.10]	-16.67	[-0.45]
Non-recession	119	0.80	[0.97]	8.76***	[3.86]	13.86***	[3.73]	27.78***	[3.75]
H. Slope of the yield curve									
Upward-sloping	118	0.78	[0.92]	8.94***	[3.78]	13.66***	[3.42]	26.36***	[3.33]
Downward-sloping	10	-0.43	[-0.38]	2.04	[0.22]	4.71	[0.36]	10.12	[0.50]
I. By quarter									
Q1	32	0.51	[0.93]	14.51***	[3.61]	24.55***	[3.70]	45.93***	[3.74]
Q2	32	1.30	[0.44]	-1.60	[-0.36]	-2.81	[-0.36]	-7.83	[-0.51]
Q3	32	0.18	[0.24]	11.52**	[2.16]	15.49*	[1.86]	30.42*	[1.81]
Q4	33	0.67	[1.10]	8.55**	[2.11]	13.23*	[1.86]	28.68**	[2.07]

Table 7 Pre-Announcement Returns and Other Macroeconomic Announcements

This table presents OLS regression results of daily Treasury returns on pre-TRA day dummies, controlling for other macroeconomic announcements and their surprises. The dependent variables are daily CRSP Treasury bond returns with maturities ranging from 1 to 30 years. Panel A presents the baseline results, controlling for day-of-week and end-of-month fixed effects, Panel B additionally includes macroeconomic announcement day fixed effects, and Panel C additionally includes a full set of macroeconomic announcement surprises (the coefficients are available in Table A.3 in the Appendix). The macroeconomic announcements include Industrial Production, Nonfarm Payrolls, Consumer Price Index (CPI), Producer Price Index (PPI), Purchasing Manager Index (PMI), Unemployment Rate, Gross Domestic Product (GDP), University of Michigan Consumer Sentiment Final, Initial Jobless Claims, Retail Sales, Durable Goods Orders, Housing Starts, Construction Spending, Capacity Utilization, The Leading Index, Trade Balance, Factory Orders, New Home Sales, US Federal Budget Balance. The surprises are calculated as the difference between the actual and the consensus forecast from Refinitiv (formerly Reuters). Surprises of non-announcement days are set to zero. Standard errors based on Newey-West t-statistics with optimal length are reported in parenthesis. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The sample period is from 2004 to 2023.

	Daily Return (bps)						
Maturity	**1Y**	**2Y**	**5Y**	**7Y**	**10Y**	**20Y**	**30Y**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Baseline Results							
pre-TRA	-0.14	2.33**	8.41***	10.97**	13.58**	13.67	16.73
	(0.38)	(1.00)	(3.13)	(4.40)	(5.41)	(8.79)	(11.12)
DOW FE	✓	✓	✓	✓	✓	✓	✓
EOM FE	✓	✓	✓	✓	✓	✓	✓
R^2	0.028	0.009	0.005	0.004	0.004	0.002	0.003
N	5,005	5,005	5,005	5,005	5,005	5,005	5,005
Panel B: Including Macro Announcement Day FEs							
pre-TRA	-0.50	2.16**	8.25**	10.89**	12.93**	11.35	12.72
	(0.45)	(1.10)	(3.33)	(4.60)	(5.67)	(9.21)	(11.72)
Macro Announcement Day FE	✓	✓	✓	✓	✓	✓	✓
DOW FE	✓	✓	✓	✓	✓	✓	✓
EOM FE	✓	✓	✓	✓	✓	✓	✓
R^2	0.270	0.249	0.244	0.234	0.230	0.218	0.221
N	5,005	5,005	5,005	5,005	5,005	5,005	5,005
Panel C: Including Macro Announcement Surprises							
pre-TRA	-0.10	2.51**	9.02***	11.79***	14.53***	15.22*	18.53
	(0.39)	(1.01)	(3.16)	(4.46)	(5.49)	(8.95)	(11.34)
Macro Announcement Surprises	✓	✓	✓	✓	✓	✓	✓
DOW FE	✓	✓	✓	✓	✓	✓	✓
EOM FE	✓	✓	✓	✓	✓	✓	✓
R^2	0.040	0.023	0.019	0.017	0.016	0.014	0.013
N	5,005	5,005	5,005	5,005	5,005	5,005	5,005

Table 8 Pre-Announcement Returns and Actual Treasury Refunding Estimates

This table reports results from an OLS regression that regresses pre-TRA Treasury returns on realized Treasury refunding estimates. The dependent variables are CRSP Treasury bond returns with maturities ranging from 1 to 30 years on the day before the TRA. The independent variables are three measures of marketable borrowing estimates announced by the Treasury Department on the TRA day: the seasonally-adjusted change in Marketable Borrowing estimate in quarter $t-1$ ($\Delta MB_{t-1}/GDP_{t-2}$, available before pre-TRA), the forecast revision of Marketable Borrowing in quarter t ($\Delta MB_{t-2}/GDP_{t-1}$, available after pre-TRA), and the seasonally-adjusted change in Marketable Borrowing estimate in quarter t ($FR_t(MB)/GDP_{t-1}$, available after pre-TRA). All measures are scaled by GDP from the previous quarter. Standard errors based on Newey-West t-statistics with optimal length are reported in parenthesis. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The sample period is from 1997Q1 to 2023.

	Daily Return (bps)						
Maturity	**1Y**	**2Y**	**5Y**	**7Y**	**10Y**	**20Y**	**30Y**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Marketable Borrowing Estimates in Quarter $t-1$							
Constant	0.00	0.02*	0.07**	0.09**	0.11**	0.17**	0.22**
	(0.01)	(0.01)	(0.03)	(0.04)	(0.05)	(0.08)	(0.10)
$\Delta MB_{t-1}/GDP_{t-2}$	2.04	1.51*	2.85	3.16	1.88	1.32	0.76
	(1.47)	(0.77)	(2.07)	(2.94)	(3.40)	(5.74)	(7.41)
R^2	0.063	0.045	0.016	0.010	0.002	0.000	0.000
N	101	101	101	101	101	101	101
Panel B: Forecast Revision of the Marketable Borrowing Estimates in Quarter t							
Constant	0.00	0.02**	0.08***	0.09**	0.12**	0.18**	0.22**
	(0.01)	(0.01)	(0.03)	(0.04)	(0.05)	(0.08)	(0.09)
$FR_t(MB)/GDP_{t-1}$	0.28	-0.16	-0.59	-0.56	-0.67	-0.71	0.46
	(0.35)	(0.26)	(0.92)	(1.63)	(2.19)	(4.67)	(5.66)
R^2	0.002	0.001	0.001	0.001	0.001	0.000	0.000
N	105	105	105	105	105	105	105
Panel C: Marketable Borrowing Estimates in Quarter t							
Constant	0.00	0.02*	0.07**	0.09**	0.11**	0.17**	0.22**
	(0.01)	(0.01)	(0.03)	(0.04)	(0.05)	(0.08)	(0.10)
$\Delta MB_t/GDP_{t-1}$	-0.12	0.17	0.02	0.22	0.20	0.16	1.03
	(0.16)	(0.32)	(0.88)	(1.20)	(1.40)	(2.78)	(3.36)
R^2	0.001	0.002	0.000	0.000	0.000	0.000	0.001
N	101	101	101	101	101	101	101

Table 9 Pre-Announcement Returns and Changes in Treasury Implied Volatility

This table reports estimation results of Regressions (3) in Panel A and (4) in Panel B. The dependent variables are CRSP Treasury bond returns with maturities ranging from 1 to 30 years in columns (1)-(7) and the equity market return in column (8). $\Delta TIV[-1,0]$ is the 1-day change in the Treasury Implied Volatility on the 10-year Treasury from Choi, Mueller, and Vedolin (2017), in basis points. ΔTIV is measured as $TIV_{t-1} - TIV_t$ so a higher value corresponds to greater resolution of uncertainty. Day-of-week (DOW) and end-of-month (EOM) fixed effects are included in all specifications in Panel A. In Panel B, $\Delta VIX[-1,0]$ is the 1-day change in the VIX index and $\Delta EPU[-1,0]$ is the 1-day change in Economic Policy Uncertainty from Baker et al. (2016), both calculated similarly to $\Delta TIV[-1,0]$. Standard errors based on Newey-West t-statistics with optimal length are reported in parenthesis. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The sample period is from 1991Q4 to 2023.

	Daily Return (bps)							
	1Y	**2Y**	**5Y**	**7Y**	**10Y**	**20Y**	**30Y**	**MKT**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: All Days								
pre-TRA	0.08	1.20	4.32*	5.13	6.73	8.64	8.87	-1.65
	(0.74)	(0.86)	(2.59)	(3.62)	(4.41)	(6.94)	(8.65)	(11.08)
$\Delta TIV[-1,0]$	0.00	0.02	0.09***	0.14***	0.18***	0.24***	0.25***	0.71***
	(0.00)	(0.01)	(0.02)	(0.03)	(0.04)	(0.07)	(0.10)	(0.12)
pre-TRA $\times \Delta TIV[-1,0]$	0.07***	0.10**	0.25**	0.34**	0.39**	0.67**	0.88**	-0.03
	(0.02)	(0.04)	(0.11)	(0.16)	(0.19)	(0.32)	(0.39)	(0.51)
DOW FE	✓	✓	✓	✓	✓	✓	✓	✓
EOM FE	✓	✓	✓	✓	✓	✓	✓	✓
R^2	0.025	0.012	0.017	0.021	0.022	0.018	0.013	0.043
N	8,063	8,063	8,063	8,063	8,063	8,063	8,063	8,123
Panel B: pre-TRA Only								
Constant	0.16	1.85**	5.72**	6.59*	8.21**	12.94**	15.68**	-0.56
	(0.67)	(0.83)	(2.41)	(3.45)	(3.88)	(6.02)	(7.62)	(5.39)
$\Delta TIV[-1,0]$	0.08***	0.13***	0.39***	0.58***	0.70***	1.10***	1.36***	-0.12
	(0.02)	(0.04)	(0.12)	(0.17)	(0.20)	(0.33)	(0.40)	(0.29)
$\Delta VIX[-1,-0]$	-0.52	-1.17**	-3.84**	-6.03**	-8.09***	-13.55**	-15.76**	65.73***
	(0.50)	(0.57)	(1.77)	(2.66)	(3.04)	(5.18)	(6.55)	(5.51)
$\Delta EPU[-1,-0]$	0.00	0.01	-0.01	-0.04	-0.05	-0.06	-0.11	0.00
	(0.01)	(0.01)	(0.04)	(0.05)	(0.07)	(0.11)	(0.13)	(0.08)
R^2	0.038	0.119	0.131	0.150	0.166	0.175	0.166	0.713
N	129	129	129	129	129	129	129	129

Table 10 Pre-Announcement Returns and Dispersion in Forecasts of Fiscal Deficit

This table reports the relationship between Treasury returns and dispersion in fiscal balance forecasts around pre-TRA days. The forecast dispersion is a daily measure of the interquartile range of individual fiscal balance forecasts for the current fiscal year from the Bloomberg ECFC survey. We compute the changes in forecast dispersion between (a) the day before the pre-TRA day and the pre-TRA day, $\Delta\text{ForecastDisp}[-1,0]$; (b) the day before and the day after the pre-TRA day, $\text{ForecastDisp}[-1,1]$; (c) the day before and 5 days after the pre-TRA day and $\Delta\text{ForecastDisp}[-1,5]$. The dependent variables are CRSP Treasury bond returns with maturities ranging from 1 to 30 years. All regressions include day-of-week and end-of-month fixed effects. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The sample period is from 2007 to 2023.

	Daily Return (bps)						
Maturity	**1Y**	**2Y**	**5Y**	**7Y**	**10Y**	**20Y**	**30Y**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Changes in forecast dispersion between [-1,0]							
pre-TRA	-0.39	2.16**	8.80**	11.51**	14.14**	13.73	17.45
	(0.39)	(1.10)	(3.56)	(5.01)	(6.22)	(10.18)	(12.96)
$\Delta\text{ForecastDisp}[-1,0]$	0.59	0.17	-2.83	-2.76	-5.40	-12.45	-18.75
	(0.38)	(1.01)	(3.00)	(3.98)	(5.39)	(10.58)	(14.84)
pre-TRA $\times$ $\Delta\text{ForecastDisp}[-1,0]$	3.32	10.12	42.27	78.14*	98.77**	177.95**	251.76***
	(3.82)	(8.44)	(26.30)	(43.89)	(48.03)	(76.44)	(94.88)
R^2	0.035	0.010	0.005	0.005	0.004	0.003	0.004
N	4,067	4,067	4,067	4,067	4,067	4,067	4,067
Panel B: Changes in forecast dispersion between [-1,1]							
pre-TRA	-0.40	2.14*	8.79**	11.56**	14.22**	14.01	17.89
	(0.39)	(1.10)	(3.56)	(5.02)	(6.23)	(10.19)	(12.98)
$\Delta\text{ForecastDisp}[-1,1]$	0.60**	0.27	1.80	5.47	5.22	11.73	14.73
	(0.30)	(0.60)	(2.02)	(3.76)	(3.82)	(8.04)	(9.68)
pre-TRA $\times$ $\Delta\text{ForecastDisp}[-1,1]$	0.25	4.39	23.70	53.96	70.69*	135.31**	199.53**
	(3.48)	(7.53)	(22.93)	(36.52)	(40.44)	(66.93)	(83.70)
R^2	0.035	0.010	0.005	0.005	0.005	0.003	0.004
N	4,067	4,067	4,067	4,067	4,067	4,067	4,067
Panel C: Changes in forecast dispersion between [-1,5]							
pre-TRA	-0.41	2.14*	8.79**	11.55**	14.26**	14.17	18.13
	(0.39)	(1.10)	(3.58)	(5.05)	(6.27)	(10.25)	(13.06)
$\Delta\text{ForecastDisp}[-1,5]$	-0.01	-0.40	-0.72	-0.68	-1.20	-0.60	-1.87
	(0.12)	(0.35)	(1.07)	(1.62)	(2.15)	(3.92)	(5.05)
pre-TRA $\times$ $\Delta\text{ForecastDisp}[-1,5]$	0.36	2.51	15.00	34.34*	47.94**	101.41***	147.51***
	(1.83)	(4.52)	(13.45)	(20.48)	(22.99)	(38.56)	(48.94)
R^2	0.035	0.010	0.005	0.004	0.004	0.003	0.003
N	4,067	4,067	4,067	4,067	4,067	4,067	4,067

Table 11 Pre-TRA Returns and FOMC Announcements

This table reports regression results using the CRSP Treasury bond returns with maturities ranging from 1 to 30 years as dependent variables. Panel A examines differences in returns on pre-TRA days conditional on the relative timing between TRA and FOMC announcements. "FOMC Far" is an indicator that equals 1 if there is no FOMC announcement within 5 days of the TRA. "FOMC Later (Earlier)" is an indicator that equals 1 if the FOMC occurs within 5 days after (before) the TRA announcement, and 0 otherwise. Panel B examines differences in returns on pre-TRA days conditional on the current FOMC rate announcement. "Cut (Hike)" is an indicator that equals 1 if the most recent FOMC meeting announced a rate cut (hike), and 0 otherwise. Day-of-week (DOW) and end-of-month (EOM) fixed effects are included in all specifications. Standard errors based on Newey-West t-statistics with optimal length are reported in parenthesis. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The sample period is 1991Q4 to 2023.

	Daily Return (bps)						
Maturity	**1Y**	**2Y**	**5Y**	**7Y**	**10Y**	**20Y**	**30Y**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Relationship with Proximate FOMC Meeting							
pre-TRA × FOMC Far	2.42	2.31	4.01	3.24	4.40	11.78	8.89
	(1.99)	(1.48)	(4.18)	(5.81)	(6.50)	(9.96)	(11.87)
pre-TRA × FOMC Later	-0.49	-0.14	1.77	2.23	3.60	3.42	5.53
	(0.44)	(1.31)	(3.90)	(5.43)	(6.74)	(10.90)	(13.96)
pre-TRA × FOMC Earlier	-0.62	3.85***	14.19***	19.87***	23.65***	27.51***	34.63***
	(0.54)	(1.12)	(3.45)	(4.91)	(6.15)	(10.02)	(12.75)
DOW FE	✓	✓	✓	✓	✓	✓	✓
EOM FE	✓	✓	✓	✓	✓	✓	✓
R^2	0.025	0.009	0.004	0.004	0.004	0.003	0.003
N	8,062	8,062	8,062	8,062	8,062	8,062	8,062
Panel B: Conditional on Most Recent FOMC Rate Announcement							
pre-TRA	0.97	2.77***	9.33***	11.77***	13.95***	18.50**	22.13**
	(1.09)	(0.92)	(2.73)	(3.95)	(4.64)	(7.56)	(9.56)
pre-TRA × Hike	-1.16	-3.03	-8.33	-9.02	-9.68	-11.61	-14.30
	(1.34)	(2.28)	(6.28)	(8.30)	(9.69)	(14.67)	(17.45)
pre-TRA × Cut	-1.80	-3.14	-14.33**	-20.63**	-21.34*	-24.87	-36.18*
	(1.48)	(2.53)	(7.16)	(9.31)	(11.87)	(17.18)	(20.60)
Hike	0.14	-0.29	-0.81	-1.19	-1.28	-2.25	-2.51
	(0.14)	(0.30)	(0.75)	(0.99)	(1.19)	(1.77)	(2.19)
Cut	1.09***	1.19**	1.15	0.87	-0.07	-1.41	-1.00
	(0.24)	(0.48)	(1.14)	(1.56)	(1.84)	(2.67)	(3.43)
DOW FE	✓	✓	✓	✓	✓	✓	✓
EOM FE	✓	✓	✓	✓	✓	✓	✓
R^2	0.029	0.011	0.005	0.004	0.004	0.003	0.003
N	8,062	8,062	8,062	8,062	8,062	8,062	8,062

Table 12 Treasury Returns Around FOMC Announcements

This table reports the average cumulative return over the 3-day FOMC window for Treasury Bonds of maturities ranging from 1-30 years in columns (1)-(7), cumulative returns for the equity market index in column (8), and cumulative returns for the equity market index from 2002-2023 in column (9). "All FOMC" represents all FOMC announcements between 1991Q4 and 2023. "TRA Near (Far)" is the subset of FOMC announcements where there is (is not) a TRA announcement within 5 days of the FOMC announcement. "TRA Later (Earlier)" is the subset of FOMC announcements where the TRA occurs within 5 days after (before) the FOMC announcement. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. See **Table A.4** for a further breakdown between the 3 days around the FOMC window.

	1Y (1)	**2Y** (2)	**5Y** (3)	**7Y** (4)	**10Y** (5)	**20Y** (6)	**30Y** (7)	**MKT** (8)	**MKT†** (9)
	3-Day Cumulative Return (bps)								
All FOMC	5.40***	7.83***	14.83***	18.10***	20.46***	28.07***	33.56***	33.51**	14.67
	(0.62)	(1.28)	(3.26)	(4.60)	(5.63)	(8.21)	(10.59)	(13.86)	(18.43)
TRA Far	6.54***	8.87***	16.59***	21.18***	24.91***	36.57***	45.40***	25.50	-11.49
	(0.78)	(1.62)	(4.09)	(5.85)	(7.10)	(10.28)	(13.05)	(16.95)	(24.95)
TRA Near	2.71***	5.37***	10.65**	10.81	9.92	7.93	5.49	52.57**	55.19**
	(0.91)	(1.91)	(5.13)	(6.89)	(8.62)	(12.79)	(17.30)	(23.67)	(26.05)
TRA Later	2.17*	3.90	3.40	-0.28	-6.25	-20.79	-31.64	53.49	53.49
	(1.31)	(2.38)	(6.78)	(9.16)	(11.66)	(17.44)	(22.96)	(40.49)	(40.49)
TRA Earlier	3.14**	6.55**	16.46**	19.69**	22.85*	30.90*	35.20	51.83*	56.94*
	(1.26)	(2.84)	(7.36)	(9.80)	(12.06)	(17.59)	(24.25)	(27.68)	(32.52)

†2002-2023

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Internet Appendix for

Pre-Refunding Announcement Gains in U.S. Treasurys

A A Model of the Pre-TRA Premium

This appendix develops a deliberately minimal model of the pre-TRA premium. The model claims no theoretical novelty, and its lineage is worth stating precisely. The market structure follows Gabaix and Maggiori (2015, GM): constrained intermediaries absorb a residual imbalance that the rest of the market cannot. GM obtain a downward-sloping demand for risk from a limited-commitment constraint on divertible intermediated funds. We instead adopt the friction and scheduled-announcement formulation of Mueller, Tahbaz-Salehi, and Vedolin (2017b, MTV): a value-at-risk constraint on risk-neutral intermediaries that binds when the next-period value is nondegenerate and prices the asset at a conditional quantile of its own future value ahead of a scheduled announcement. The constraint itself carries the contracting foundation of Adrian and Shin (2014). Our contribution is the mapping, not the machinery, and its purpose is to discipline the mechanism proposed in the main text: we apply the framework to uncertainty about the Treasury's financing program—the borrowing amounts and maturity composition revealed at the refunding announcement—and replace the intermediaries in that framework with value-at-risk–constrained investors who absorb the residual supply of long-duration Treasurys.

Four results obtain, each corresponding to a feature of the evidence. First, scheduled financing uncertainty generates an incremental expected log excess return on long-term Treasurys over the announcement window, increasing in the amount of financing uncertainty (Proposition 1). Second, in a log-linear cross-sectional extension, the premium increases with duration, and its duration slope increases with uncertainty (Proposition 2). Third, the same extension ties the premium to the adverse upper tail of financing outcomes and maps adverse financing realizations to negative Treasury returns (Proposition 3). Fourth, across states, greater financing uncertainty produces both a lower pre-TRA price and a lower constrained-intermediary position (Corollary 1).

Three remarks then delimit what the structure does and does not deliver: Remark 1 distinguishes the negative-return frequency, which is exact throughout the limiting single-bond equilibrium, from the skewness and Sharpe-ratio restrictions that take their sharp form in the log-linear extension. Remark 2 shows how return variance unrelated to the announcement affects the empirical measurement of these restrictions. Remark 3 records that a compression of the adverse conditional financing tail maps into a higher price before the formal release, while leaving the expected return over that narrower subwindow undetermined without further structure.

A.1 Environment

Time is discrete with three dates, $t = 0, 1, 2$. The window from $t = 0$ to $t = 1$ is the pre-TRA window: the refunding announcement arrives at $t = 1$ and resolves uncertainty about the Treasury's financing program. The window from $t = 1$ to $t = 2$ is an ordinary window with no scheduled announcement.

Assets. Two assets trade. The first is a one-period riskless bill with constant gross rate $R \geq 1$, which also serves as the intermediaries' funding rate. We hold R fixed and known throughout: the model deliberately shuts down variation in current and expected short rates, so that any premium it generates is a pure term-premium effect. The second asset is a long-term Treasury bond that pays a coupon $c > 0$ at each date and trades at an ex-coupon price P_t.[21] The model ends at $t = 2$, when the bond is valued by the investor sector alone.

Supply. The outstanding amount (float) of the long bond held outside the official sector is s_t. The date-0 float s_0 is known. At $t = 1$, the financing realization determines the float going forward:

$$s_1 \;=\; \bar{s} + \sigma_{\text{TRA}}\,\varepsilon, \qquad \varepsilon \sim F, \qquad \mathbb{E}[\varepsilon] = 0, \qquad \text{Var}(\varepsilon) = 1, \tag{6}$$

where F is continuous and strictly increasing with bounded support $[\underline{\varepsilon}, \bar{\varepsilon}]$, and ε is independent of the habitat-demand shocks (f_0, f_1, f_2) introduced below. The normalization $\text{Var}(\varepsilon) = 1$ makes $\sigma_{\text{TRA}} \geq 0$ the standard deviation of the financing shock. The parameter captures ex-ante uncertainty about the program: both the total amount of marketable borrowing and its maturity composition, since a longer-maturity tilt raises the long-duration float for any given borrowing total. A window with no scheduled financing uncertainty corresponds to $\sigma_{\text{TRA}} = 0$, in which case $s_1 = \bar{s}$ is known at $t = 0$.

Investors. Two investor groups hold the bond alongside the intermediaries. Yield-insensitive investors—the preferred-habitat clientele of Vayanos and Vila (2021)—absorb f_t units of face value, where f_t is drawn independently across dates from a distribution G that is continuous and strictly increasing on its bounded support $[\underline{f}, \bar{f}]$, $\underline{f} < \bar{f}$. The f_t shocks are the fundamental demand risk of the framework. Yield-sensitive investors allocate a fixed market value $d > 0$ to the bond, generating face-value demand d/P_t that is decreasing in price.

Intermediaries. A unit mass of identical risk-neutral intermediaries enters each period with no capital. At $t \in \{0, 1\}$ the representative intermediary purchases $q_t \geq 0$ units of the bond at price P_t, financing the position at rate R. Its profit at $t + 1$ is

$$V_{t+1} \;=\; q_t \left(P_{t+1} + c - R\,P_t\right). \tag{7}$$

Absent any friction, a risk-neutral intermediary would take unbounded positions whenever the expected excess return is nonzero. Following Mueller, Tahbaz-Salehi, and Vedolin (2017b), we limit risk-bearing capacity with a value-at-risk constraint: the probability of a loss cannot exceed a small $\alpha_t \in (0, 1)$,

$$\max_{q_t \geq 0} \;\; \mathbb{E}_t[V_{t+1}] \quad \text{s.t.} \quad \mathbb{P}_t(V_{t+1} \leq -\delta) \leq \alpha_t, \tag{8}$$

where $\delta > 0$ is arbitrarily small and we present results in the limit $\delta \to 0$. Gabaix and Maggiori (2015) obtain a downward-sloping demand for risk from a different friction and are explicit that such constraints stand in for a richer contracting problem. Adrian and Shin (2014) supply that

[21] The coupon lower bound in Assumption A.1(ii) is a sufficient regularity condition ensuring interior intermediary holdings throughout the admissible state space. It is not the economic source of the pre-TRA premium, which arises from quantile pricing of financing risk.

foundation for the value-at-risk form used here, deriving constraints of this type from a contracting problem with risk-shifting moral hazard.

Market clearing. At $t \in \{0, 1\}$, the float is held by the three groups,

$$f_t + \frac{d}{P_t} + q_t \;=\; s_t, \tag{9}$$

and at $t = 2$ the intermediaries exit, so the investor sector absorbs the entire float realized at the announcement:

$$f_2 + \frac{d}{P_2} \;=\; s_1 \quad\Longrightarrow\quad P_2 \;=\; \frac{d}{s_1 - f_2}, \tag{10}$$

so that P_2 is the terminal continuation value at which the investor sector absorbs the realized float, not the payoff of a bond maturing at $t = 2$.

The comparative statics in σ_{TRA} below are taken over an admissible set $\Sigma \subset [0, \infty)$ of uncertainty levels on which the following restrictions hold.

Assumption A.1 *For every $\sigma \in \Sigma$, define $\underline{s}(\sigma) \equiv \min\{s_0,\ \bar{s} + \sigma\underline{\varepsilon}\}$. The following conditions hold. (i) $\underline{s}(\sigma) > \bar{f}$: the float exceeds the maximal habitat demand in every state, so a positive residual must be absorbed at every date. (ii) $c \geq R\, d/\big(\underline{s}(\sigma) - \bar{f}\big)$: the coupon income on the residual is large enough, relative to the funding cost, that levered intermediaries hold positive positions in equilibrium; this is the counterpart of the conditions guaranteeing nonzero intermediation in Gabaix and Maggiori (2015). (iii) $\alpha_0 < 1 - F(0)$, so that $z_{1-\alpha_0} \equiv F^{-1}(1 - \alpha_0) > 0$; and $\alpha_1 < G(\mathbb{E}[f_2])$, which guarantees that the priced quantile of the terminal value lies strictly below its conditional mean (see the proof of Lemma 1).*

Because $\underline{\varepsilon} < 0$ for a mean-zero shock, the lower support point $\bar{s} + \sigma\underline{\varepsilon}$ falls as uncertainty rises, so conditions (i)–(ii) need not hold for arbitrarily large σ; the admissible set Σ collects the uncertainty levels at which they do. Since $\underline{s}(\sigma)$ is nonincreasing in σ, conditions (i)–(ii) are preserved as σ falls, so Σ is an interval containing zero; sign conditions on derivatives therefore deliver monotonicity on Σ.

A.2 Equilibrium

An equilibrium is a collection of prices and positions $(P_0, P_1, P_2, q_0, q_1)$ such that intermediaries solve problem (8) taking prices as given and the market-clearing conditions (9)–(10) hold. When the next-period price is nondegenerate, the finite-δ value-at-risk problem provides a one-period regularization of intermediary demand. The regularized problem takes the conditional distribution of the next-period price as given. As $\delta \downarrow 0$, its demand converges to the conditional-quantile pricing rule of Mueller et al. (2017b, eq. (2) and Lemma A.1). We use the finite-δ problem only to characterize the limiting equilibrium; all subsequent equilibrium and asset-pricing results concern the $\delta \downarrow 0$ limit.

Lemma 1 (Quantile pricing) *Suppose Assumption A.1 holds. If the conditional distribution of P_{t+1} is continuous and its conditional CDF is strictly increasing in a neighborhood of its α_t-quantile,*

then for all sufficiently small $\delta > 0$ a unique finite-δ equilibrium price exists, the intermediary position is strictly positive, the value-at-risk constraint binds, and

$$R\,P_t \;=\; c + Q^t_{\alpha_t}[P_{t+1}] + \frac{\delta}{q_t}, \tag{11}$$

so that, as $\delta \downarrow 0$,

$$P_t \;=\; \frac{1}{R}\left(c + Q^t_{\alpha_t}[P_{t+1}]\right), \tag{12}$$

where $Q^t_\alpha[\,\cdot\,]$ denotes the α-quantile conditional on date-t information. If P_{t+1} is deterministic, the equilibrium price instead satisfies $P_t = (P_{t+1} + c)/R$ and the value-at-risk constraint is slack. In either case, the limiting positions are $q_t = s_t - f_t - d/P_t > 0$. Equivalently, defining the one-period log excess holding return

$$r_{t+1} \;\equiv\; \ln\left(\frac{P_{t+1} + c}{RP_t}\right), \tag{13}$$

the limiting equilibrium satisfies $Q^t_{\alpha_t}[r_{t+1}] = 0$.

Proof. Let $Y_{t+1} \equiv P_{t+1} + c - RP_t$ denote the per-unit excess payoff and write $\bar{Q}_t \equiv Q^t_{\alpha_t}[P_{t+1}]$. Suppose first that the conditional distribution of P_{t+1} is continuous, with conditional CDF strictly increasing in a neighborhood of its α_t-quantile.

Demand. For $q_t > 0$, the constraint in (8) reads $\mathbb{P}_t(Y_{t+1} \le -\delta/q_t) \le \alpha_t$. Given prices at which $\mathbb{E}_t[Y_{t+1}] > 0$ (verified below), expected profit $q_t\,\mathbb{E}_t[Y_{t+1}]$ is strictly increasing in q_t, while the loss probability is nondecreasing in q_t (the threshold $-\delta/q_t$ rises toward zero as the position grows), so the intermediary chooses the largest feasible position and the constraint binds. Continuity gives $Q^t_{\alpha_t}[Y_{t+1}] = -\delta/q_t$, and location equivariance of quantiles, $Q^t_{\alpha_t}[Y_{t+1}] = \bar{Q}_t + c - RP_t$, yields (11) and, conditional on prices, the demand schedule

$$q_t \;=\; \frac{\delta}{RP_t - c - \bar{Q}_t} \qquad \text{whenever} \quad RP_t > c + \bar{Q}_t,$$

derived under price taking.

Existence, uniqueness, and convergence. Combining the demand schedule with market clearing $q_t = s_t - f_t - d/P_t$, and taking the conditional distribution of P_{t+1} and hence $\bar{Q}_t$ as given, the finite-δ market-clearing price solves

$$\left(s_t - f_t - \frac{d}{P_t}\right)\left(RP_t - c - \bar{Q}_t\right) \;=\; \delta.$$

On the domain $P_t > \max\{\, d/(s_t - f_t),\ (c + \bar{Q}_t)/R \,\}$, both factors are positive and strictly increasing in P_t; the left-hand side vanishes at the lower boundary of the domain and increases without bound as $P_t \to \infty$. Hence a unique solution P^δ_t exists for every $\delta > 0$, and P^δ_t decreases to $\max\{d/(s_t - f_t),\ (c + \bar{Q}_t)/R\}$ as $\delta \downarrow 0$. Because $\bar{Q}_t > 0$, Assumption A.1(ii) gives $(c + \bar{Q}_t)/R > c/R \ge d/(\underline{s}(\sigma) - \bar{f}\,) \ge d/(s_t - f_t)$, so the limit is the quantile-pricing boundary (12), and the limiting position $q_t = s_t - f_t - d/P_t$ is strictly positive.

Verification of positive expected profit. Assumption A.1(iii) delivers $\mathbb{E}_t[P_{t+1}] > \bar{Q}_t$ at both

dates. At $t = 1$, $\alpha_1 < G(\mathbb{E}[f_2])$ implies $G^{-1}(\alpha_1) < \mathbb{E}[f_2]$, so

$$\bar{Q}_1 \;=\; \frac{d}{s_1 - G^{-1}(\alpha_1)} \;<\; \frac{d}{s_1 - \mathbb{E}[f_2]} \;\le\; \mathbb{E}_1\left[\frac{d}{s_1 - f_2}\right] \;=\; \mathbb{E}_1[P_2],$$

the last inequality by Jensen, since $d/(s_1 - f)$ is convex in f. At $t = 0$ with $\sigma_{\mathrm{TRA}} > 0$, $z_{1-\alpha_0} > 0$ and g strictly decreasing give $\bar{Q}_0 = g(\bar{s} + \sigma_{\mathrm{TRA}} z_{1-\alpha_0}) < g(\bar{s}) \le \mathbb{E}_0[g(s_1)] = \mathbb{E}_0[P_1]$, the last inequality by Jensen and convexity of g (established below). From (11), $\mathbb{E}_t[Y_{t+1}] = \mathbb{E}_t[P_{t+1}] - \bar{Q}_t - \delta/q_t^\delta$; since q_t^δ converges to a strictly positive limit, $\delta/q_t^\delta \to 0$, so for all sufficiently small δ the expected per-unit profit is strictly positive, confirming the presumption under which the constraint binds.

Deterministic case. If P_{t+1} is deterministic, a price below $(P_{t+1} + c)/R$ offers a riskless profit and unbounded demand, while a higher price yields zero demand; positive finite market-clearing holdings therefore require $P_t = (P_{t+1} + c)/R$, at which profit is identically zero and $\mathbb{P}_t(V_{t+1} \le -\delta) = 0 < \alpha_t$, so the constraint is slack.

Positivity of positions. In either case the equilibrium price satisfies $P_t > c/R$ (since $P_{t+1} > 0$), so Assumption A.1(ii) gives $P_t > d/(\underline{s}(\sigma) - \bar{f}) \ge d/(s_t - f_t)$, and market clearing yields $q_t = s_t - f_t - d/P_t > 0$.

Log-return implication. In the nondegenerate limiting equilibrium, monotonicity of the logarithm and (12) imply

$$Q^t_{\alpha_t}[r_{t+1}] = \ln\Big(c + Q^t_{\alpha_t}[P_{t+1}]\Big) - \ln(RP_t) = 0.$$

In the deterministic case $RP_t = P_{t+1} + c$, so $r_{t+1} = 0$ identically and the same quantile statement holds. ■

At $t = 1$ the conditional distribution of P_2 satisfies the hypothesis of Lemma 1, because f_2 is random with G continuous and strictly increasing; the constraint therefore binds in every ordinary window. At $t = 0$ the hypothesis holds if and only if $\sigma_{\mathrm{TRA}} > 0$, since $P_1 = g(s_1)$ is a strictly monotone transformation of ε and F is strictly increasing.

Solving backward from (10): conditional on s_1, the terminal value P_2 is strictly increasing in f_2, and because f_2 is independent of the financing shock, its conditional distribution remains G. The loss state at $t = 1$ is therefore a low realization of habitat demand, $Q^1_{\alpha_1}[P_2] = d/(s_1 - G^{-1}(\alpha_1))$, and

$$P_1 \;=\; \frac{1}{R}\left(c + \frac{d}{s_1 - G^{-1}(\alpha_1)}\right) \;\equiv\; g(s_1), \tag{14}$$

with

$$g'(s) \;=\; -\frac{d}{R\left[s - G^{-1}(\alpha_1)\right]^2} < 0, \qquad g''(s) \;=\; \frac{2d}{R\left[s - G^{-1}(\alpha_1)\right]^3} > 0$$

on the admissible state space: the date-1 price is strictly decreasing and strictly convex in the announced float. At $t = 0$ the only source of risk over the pre-TRA window is the financing realization, since P_1 in (14) depends on s_1 but not on f_1. Because g is decreasing, the lower α_0-quantile of P_1 corresponds to the upper $(1 - \alpha_0)$-quantile of the financing shock, $Q^0_{\alpha_0}[P_1] = g(\bar{s} + \sigma_{\mathrm{TRA}}\, z_{1-\alpha_0})$, and

$$P_0 \;=\; \frac{c}{R} + \frac{c}{R^2} + \frac{d}{R^2\left(\bar{s} + \sigma_{\mathrm{TRA}}\, z_{1-\alpha_0} - G^{-1}(\alpha_1)\right)}. \tag{15}$$

The pre-TRA price is set off the adverse upper quantile of the financing distribution: intermediaries price the bond as if the announcement will reveal a financing program near the top of its conceivable range, because that is the realization against which their constraint protects.

We use the log excess holding return in (13) for all asset-pricing results below. As in Mueller, Tahbaz-Salehi, and Vedolin (2017b), the structural equilibrium is solved in levels while its asset-pricing implications are stated in log excess returns. Define the expected log excess return over each window by $\phi_t \equiv \mathbb{E}_t[r_{t+1}]$.

$$\begin{aligned} \phi_0 &= \mathbb{E}_0[\ln(P_1 + c)] - \ln\Big(c + Q^0_{\alpha_0}[P_1]\Big) \\ &= \mathbb{E}[H(\bar{s} + \sigma_{\text{TRA}}\varepsilon)] - H\big(\bar{s} + \sigma_{\text{TRA}} z_{1-\alpha_0}\big)\,, \\ \phi_1 &= \mathbb{E}_1[\ln(P_2 + c)] - \ln\Big(c + Q^1_{\alpha_1}[P_2]\Big)\,, \end{aligned} \tag{16}$$

where

$$H(s) \equiv \ln\big(c + g(s)\big). \tag{17}$$

Two observations about (16). First, both premia are mean-minus-quantile wedges in log payoff space: Lemma 1 sets the α_t-quantile of the log excess return to zero. Under Assumption A.1(iii) and the monotonicity and convexity of the relevant payoff mappings—shown for the ordinary window in the display below, and for the pre-TRA window in the proof of Proposition 1—the conditional mean log payoff lies strictly above that priced quantile whenever the payoff is nondegenerate, so $\phi_t > 0$. Second, the model does not imply that Treasury premia exist only in announcement windows. In the ordinary window, the map $f \mapsto \ln(c + d/(s_1 - f))$ is strictly increasing and strictly convex; Assumption A.1(iii) therefore gives

$$\ln\Big(c + Q^1_{\alpha_1}[P_2]\Big) < \ln\left(c + \frac{d}{s_1 - \mathbb{E}[f_2]}\right) \le \mathbb{E}_1[\ln(P_2 + c)]\,,$$

so $\phi_1 > 0$ whenever habitat-demand risk is nondegenerate. What disappears when no financing uncertainty is scheduled to resolve is the incremental announcement-window component ϕ_0, which compensates intermediaries for financing-announcement risk.

A.3 Financing Uncertainty and the Pre-TRA Premium

Proposition 1 *For $\sigma_{\text{TRA}} \in \Sigma$: (i) if $\sigma_{\text{TRA}} = 0$, then $\phi_0 = 0$; (ii) if $\sigma_{\text{TRA}} > 0$, then $\phi_0 > 0$; and (iii) ϕ_0 is strictly increasing in σ_{TRA} on Σ.*

Proof. Write $\sigma \equiv \sigma_{\text{TRA}}$, $z \equiv z_{1-\alpha_0}$, and $a \equiv G^{-1}(\alpha_1)$. From (14) and (17), with $x \equiv s - a > 0$,

$$H(s) = \ln\left(c + \frac{c}{R} + \frac{d}{Rx}\right),$$

so

$$H'(s) = -\frac{d}{x\,[c(R+1)x + d]} < 0, \qquad H''(s) = \frac{d\,[2c(R+1)x + d]}{x^2[c(R+1)x + d]^2} > 0.$$

Thus H is strictly decreasing and strictly convex on the admissible state space.

(i) If $\sigma = 0$, then $P_1 = g(\bar{s})$ is deterministic and (16) gives $\phi_0 = H(\bar{s}) - H(\bar{s}) = 0$.
(ii) If $\sigma > 0$, Jensen's inequality and $\mathbb{E}[\varepsilon] = 0$ give

$$\mathbb{E}[H(\bar{s} + \sigma\varepsilon)] \geq H(\bar{s}).$$

Assumption A.1(iii) gives $z > 0$, and strict monotonicity of H therefore gives

$$H(\bar{s}) > H(\bar{s} + \sigma z).$$

Combining the two inequalities in (16) yields $\phi_0 > 0$.

(iii) Bounded support and Assumption A.1 keep the relevant denominators bounded away from zero on Σ, so differentiation under the expectation is valid. Differentiating (16),

$$\phi_0'(\sigma) = \mathbb{E}[\varepsilon H'(\bar{s} + \sigma\varepsilon)] - zH'(\bar{s} + \sigma z).$$

Since $\mathbb{E}[\varepsilon] = 0$, the first term equals

$$\mathrm{Cov}(\varepsilon, H'(\bar{s} + \sigma\varepsilon)) \geq 0,$$

because $H'' > 0$ makes H' increasing, so ε and $H'(\bar{s} + \sigma\varepsilon)$ are comonotone. The second term is strictly positive because $z > 0$ and $H' < 0$. Hence $\phi_0'(\sigma) > 0$ on Σ, which is an interval, so ϕ_0 is strictly increasing on Σ. ■

The economics mirror the source framework. Ahead of the announcement, intermediaries are uncertain about the financing program they will face, a risk above and beyond the fundamental demand risk they bear in ordinary windows. Because the value-at-risk constraint gives them a downward-sloping demand for risk, they absorb the residual float only at a price discount, set off the adverse quantile of the financing distribution. The bond therefore trades below its expected continuation value at $t = 0$ and earns a positive expected log excess return as the uncertainty resolves—an incremental pre-TRA premium increasing in σ_{TRA}, and equal to zero when no financing uncertainty is scheduled to resolve.

A.4 A Log-Linear Duration Extension

To obtain cross-sectional predictions, we add a reduced-form duration extension. The extension does not follow mechanically from the nonlinear single-bond price function g of Section A.2; it assumes that the financing shock reprices a common long-end yield factor, and that the value-at-risk constraint applies to each maturity separately, abstracting from cross-maturity portfolio netting. Let claims be indexed by duration $\tau > 0$, with date-1 log prices

$$\ln P_1^{(\tau)} = \kappa_\tau - \tau\, y_1, \qquad y_1 = \bar{y} + \sigma_y\, \varepsilon, \qquad \sigma_y = \lambda\, \sigma_{\mathrm{TRA}}, \tag{18}$$

where $\lambda > 0$ maps financing uncertainty into long-end yield uncertainty and κ_τ collects maturity-specific constants. We state the extension for pure-discount claims and impose separately that parameters are such that equilibrium intermediation is positive at every maturity; the coupon condition of Assumption A.1(ii) does not automatically deliver this. Applying Lemma 1 security by security, the date-0 log price is the discounted α_0-quantile, $\ln P_0^{(\tau)} = \kappa_\tau - \tau(\bar{y} + \sigma_y z_{1-\alpha_0}) - \ln R$.

Using the same log-excess-return convention as in (16), the expected pre-TRA premium is

$$\phi^{(\tau)} \;\equiv\; \mathbb{E}_0\left[\ln \frac{P_1^{(\tau)}}{R P_0^{(\tau)}}\right] \;=\; \lambda\, z_{1-\alpha_0}\, \tau\, \sigma_{\mathrm{TRA}}. \tag{19}$$

The theoretical asset-pricing layer is therefore expressed in log excess returns throughout. The arithmetic daily returns used empirically coincide with these to first order when daily yield changes are small, so that empirical mapping is approximate rather than exact.

Proposition 2 *For $\tau > 0$, the pre-TRA premium is weakly increasing in duration,*

$$\frac{\partial \phi^{(\tau)}}{\partial \tau} \;=\; \lambda\, z_{1-\alpha_0}\, \sigma_{\mathrm{TRA}} \;\geq\; 0,$$

with strict inequality when $\sigma_{\mathrm{TRA}} > 0$; and the duration slope strictly increases with financing uncertainty,

$$\frac{\partial^2 \phi^{(\tau)}}{\partial \tau\, \partial \sigma_{\mathrm{TRA}}} \;=\; \lambda\, z_{1-\alpha_0} \;>\; 0.$$

Proof. Immediate from (19). ■

Duration is the quantity of announcement risk per unit of market value, so the premium scales linearly with it; and because uncertainty raises the price of bearing each unit, the cross-sectional slope itself rotates up when σ_{TRA} is high. Equation (19) also delivers the realized excess log return over the window,

$$r^{(\tau)} \;=\; \tau\, \sigma_y \left(z_{1-\alpha_0} - \varepsilon\right), \tag{20}$$

which we use next.

A.5 Fiscal Tail Risk and the Return Distribution

A distinctive feature of quantile pricing is that the premium responds to the adverse tail of the financing distribution, not merely to its dispersion.

Proposition 3 *Consider the log-linear extension with $\tau > 0$ and $\sigma_{\mathrm{TRA}} > 0$. The premium $\phi^{(\tau)}$ in (19) depends on the financing-shock distribution only through the adverse upper quantile $z_{1-\alpha_0} = F^{-1}(1-\alpha_0)$. (i) Let $\widetilde{F}$ be continuous and strictly increasing with mean zero, unit variance, and bounded admissible support. If $\widetilde{F}^{-1}(1-\alpha_0) > F^{-1}(1-\alpha_0)$, holding the other parameters fixed, then the premium is strictly larger under $\widetilde{F}$ for every τ. (ii) The realized return (20) is positive with probability $1-\alpha_0$ and negative with probability α_0, and*

$$\mathrm{skew}\left(r^{(\tau)}\right) \;=\; -\,\mathrm{skew}(\varepsilon).$$

Proof. (i) is immediate from (19). For (ii), $r^{(\tau)} > 0$ if and only if $\varepsilon < z_{1-\alpha_0}$, an event of probability $1-\alpha_0$ by continuity of F, and $r^{(\tau)}$ is a strictly decreasing affine transformation of ε, so its skewness is the negative of the skewness of ε. ■

The operative comparison in part (i) is the adverse-quantile ordering: a standardized distribution with the same center and variance but a fatter right tail carries a strictly larger premium, because the constraint prices the scenario at the $(1-\alpha_0)$-quantile rather than a symmetric moment.

Remark 1 (Scope: exact and extension-specific distributional implications) *Lemma 1 prices the bond so that the α_t-quantile of its log excess return is zero. Because the relevant payoff distributions are continuous and strictly monotone in their primitive shocks, one implication is exact in the limiting single-bond equilibrium. For $\sigma_{\text{TRA}} > 0$, realized pre-TRA excess returns are negative with probability exactly α_0:*

$$r_1 < 0 \quad \Longleftrightarrow \quad \varepsilon > z_{1-\alpha_0}.$$

Likewise, ordinary-window excess returns are negative with probability α_1. The log transformation preserves the sign of an excess return, so the same negative-return frequencies apply to arithmetic excess returns.

Two additional restrictions are exact in the log-linear extension, where $r^{(\tau)}$ is affine in ε:

$$\operatorname{skew}(r^{(\tau)}) = -\operatorname{skew}(\varepsilon), \qquad \frac{\mathbb{E}[r^{(\tau)}]}{\operatorname{sd}(r^{(\tau)})} = z_{1-\alpha_0},$$

where the second equality uses $\operatorname{Var}(\varepsilon) = 1$. Both are invariant to maturity. Moreover,

$$r^{(\tau)} < 0 \quad \Longleftrightarrow \quad \varepsilon > z_{1-\alpha_0}$$

for every $\tau > 0$: duration scales the magnitude of announcement-related gains and losses but does not change the financing states in which they occur.

The skewness and Sharpe-ratio restrictions need not remain exact in the nonlinear single-bond model. There,

$$r_1 = H(s_1) - \ln(RP_0)$$

is a strictly convex decreasing transformation of ε, so return skewness depends jointly on the shape of the financing-shock distribution and the curvature of H. Likewise, the funding-normalized arithmetic excess return $e^{r_1} - 1$ is a convex transformation of the log excess return. Consequently, the sign and magnitude of skewness and other standardized higher-moment restrictions outside the log-linear extension generally require additional distributional restrictions or calibration.

Remark 2 (Measurement) *The restrictions of Remark 1 apply to the announcement-related component of returns. A measured daily return also contains variation unrelated to the financing program:*

$$r^{\text{obs}} = r^{(\tau)} + \eta,$$

where η is independent of ε, has mean zero, and has positive variance, collecting concurrent macroeconomic news, order flow, and idiosyncratic noise. Noise affects the headline statistics asymmetrically. The per-event Sharpe ratio is attenuated unambiguously: the mean of r^{obs} equals the announcement premium while its variance strictly exceeds that of $r^{(\tau)}$, so the measured ratio understates $z_{1-\alpha_0}$. The sign frequency, by contrast, is not identified: noise can flip announcement-component returns in either direction, so $\mathbb{P}(r^{\text{obs}} < 0)$ can lie above or below α_0 depending on the distribution of the unrelated component. The observed share of negative pre-TRA days therefore does not identify α_0 without a stand on the unrelated-variance share.

A small constraint probability is nevertheless quantitatively compatible with the observed return distribution. For example, with a right-skewed standardized financing shock, $\alpha_0 = 0.05$,

and unrelated return volatility four times the volatility of the announcement component, a simple simulation produces a negative-day frequency near one-third and a measured per-event Sharpe ratio below one-half.[22]

Proposition 3 gives a conditional interpretation of fiscal-stress episodes. If a debt-ceiling episode raises the adverse upper quantile of the long-duration financing program—for example, by increasing uncertainty about the amount or maturity composition of the securities the market will ultimately need to absorb—then the model predicts a larger pre-TRA premium in that episode. The model does not itself imply that every debt-ceiling episode shifts long-duration float in this direction: a binding ceiling can temporarily restrict gross issuance, alter bill supply, or move the maturity composition in several ways, so the right-tail shift is an empirical premise rather than a theorem. Conditional on such a shift, the premium rises even when the center of the financing distribution changes little. The same structure makes the premium compensation rather than a free lunch: sufficiently adverse financing realizations produce negative returns whose magnitude increases with the distance of the realization into the upper tail.

Within the log-linear extension, return asymmetry inherits—with a sign flip—the shape of the operative shock distribution. Quantile pricing operates in ordinary windows as well ($\phi_1 > 0$ compensates habitat-demand risk), so the model does not predict exactly zero asymmetry outside announcement windows; but if ordinary habitat-demand shocks are approximately symmetric, it need not generate comparable asymmetry there, while the distribution of conceivable financing outcomes has a pronounced right tail: debt-limit standoffs, recessions, wars, and pandemics make borrowing far above plan more conceivable than borrowing equally far below it. For part (ii) to imply negatively skewed pre-TRA returns, the auxiliary empirical condition is that the financing shock be right-skewed—a condition to check against the data rather than assume: the distribution of announced marketable-borrowing revisions, an observable component of and empirical proxy for the float shock, is itself right-skewed, with skewness **[VERIFY: +*x.xx*]** (computed from the Table **??** inputs). As a proxy statement, this supports right-skewness of ε.

A.6 Prices and Positions

Corollary 1 *In the single-bond model, holding (s_0, f_0, d) fixed, an increase in σ_{TRA} on Σ strictly lowers both the pre-TRA price and the intermediary position: $\partial P_0/\partial\sigma_{\text{TRA}} < 0$ and $\partial q_0/\partial\sigma_{\text{TRA}} < 0$.*

Proof. The first claim is immediate from (15). From market clearing, $q_0 = s_0 - f_0 - d/P_0$, so $\partial q_0/\partial\sigma_{\text{TRA}} = (d/P_0^2)\,\partial P_0/\partial\sigma_{\text{TRA}} < 0$. ■

The corollary is a cross-state comparative static: holding the float, habitat demand, and yield-sensitive capital fixed, an equilibrium with greater financing uncertainty has both a lower pre-TRA price and a lower constrained-intermediary position, with yield-sensitive investors absorbing more of the float at the lower price. It distinguishes the mechanism from inventory-accumulation or front-running accounts, which require intermediaries to hold more duration precisely in the high-premium states; here, high-uncertainty (high-premium) states carry lower intermediary holdings. Two qualifications govern the empirical mapping. First, the model has no dates before $t = 0$

[22] For illustration, draw ε from a lognormal distribution with log-standard deviation 0.6, demean and standardize it to unit variance, set $z_{1-\alpha_0}$ to its 95th percentile, and draw independent $\eta \sim N\big(0, [4\,\text{sd}(r^{(\tau)})]^2\big)$. With four million draws, the negative-day frequency is approximately 0.32 and the measured per-event Sharpe ratio approximately 0.46.

and no law of motion for inventory, so the corollary does not by itself characterize changes in an intermediary's holdings during the days leading into the window; the prediction concerns comparisons across states, not accumulation dynamics. Second, taking the prediction to positions data requires habitat demand and the float to be comparable across the states being compared—f_0 independent of σ_{TRA}, or controls that hold demand and supply conditions fixed—and the model object q_0 is the aggregate position of the marginal constrained-intermediary sector, for which primary-dealer net positions are an empirical proxy rather than an exact counterpart.

A.7 Pre-Release Resolution of Financing Uncertainty

The three-date baseline dates the resolution of financing uncertainty to the close of the announcement-risk window. Empirically, most of the pre-TRA return accrues before the formal borrowing release, with little price movement at the release itself. The following remark records what the pricing rule of Lemma 1 does—and does not—say about this pattern.

Remark 3 (Pre-release tail compression) *Let $\mathcal{I}^- \subseteq \mathcal{I}^+$ be public information sets, both preceding the formal release, and let*

$$u(\mathcal{I}) \equiv Q_{1-\alpha_0}[s_1 \mid \mathcal{I}]$$

denote the adverse conditional supply quantile. Applying the pricing rule of Lemma 1 under each information set, so that $\widetilde{R}P(\mathcal{I}) = c + g(u(\mathcal{I}))$ for the appropriate funding rate, gives

$$\frac{P(\mathcal{I}^+)}{R_{-,+}\,P(\mathcal{I}^-)} = \frac{c + g(u^+)}{c + g(u^-)}, \qquad u^{\mp} \equiv u(\mathcal{I}^{\mp}).$$

Since $g' < 0$, a refinement that compresses the adverse tail, $u^+ < u^-$, maps into a higher price. This can occur even with the conditional mean unchanged,

$$\mathbb{E}[s_1 \mid \mathcal{I}^+] = \mathbb{E}[s_1 \mid \mathcal{I}^-],$$

so a pre-release price rise does not require directional information about the eventual financing realization.

The result has three limits. First, it is a comparative static across information sets rather than an equilibrium of an intermediate trading date: incumbent holdings and within-window market clearing are not modeled. Second, it does not establish a positive expected pre-release return, because information refinement places no general ordering between $\mathbb{E}^-[g(u^+)]$ and $g(u^-)$; posterior quantiles are not martingales. Third, the negative surprise loading in (20) is a full-window prediction, while the corresponding loading over the narrower pre-release subwindow depends on a signal process that the model does not specify.

Within these limits, the result provides a qualitative interpretation of the timing evidence. Declining Treasury implied volatility and narrowing forecast dispersion are consistent with a reduction in uncertainty before the release; to the extent that this reduction includes compression of the adverse conditional financing tail $u(\mathcal{I})$, the pricing rule maps it into a higher bond price before the official announcement.

A.8 Mapping the Model to the Evidence

The model organizes the evidence around the constrained bearing of financing risk. Proposition 1 predicts an incremental expected log excess return in windows containing scheduled financing uncertainty and a larger premium when that uncertainty is greater. This is consistent with the elevation of Treasury returns on pre-TRA days relative to ordinary days and with the stronger pre-TRA returns in states of elevated Treasury-market and fiscal uncertainty: the interactions with Treasury implied volatility, fiscal policy uncertainty (Table **??**), and the dispersion of marketable-borrowing forecasts (Table **??**).

Proposition 2 predicts that both the premium and its sensitivity to financing uncertainty increase with duration, matching the maturity gradient in Table **??** and the strengthening of the uncertainty interactions with maturity. The log-linear extension additionally imposes two cross-maturity restrictions that are borne out in the data. Since $r^{(\tau)}$ differs across maturities only through the positive duration loading τ, the announcement-related component loses in the same financing states at every maturity; correspondingly, negative pre-TRA days display strong sign concordance across Treasury maturities **[VERIFY: compute 10Y/30Y sign concordance on pre-TRA days]**. The same proportionality implies a per-event Sharpe ratio that is invariant to duration, equal in the model to $z_{1-\alpha_0}$ under the unit-variance normalization. Empirically, per-event Sharpe ratios are comparable across intermediate and long maturities **[VERIFY: Table ?? inputs]**, consistent with this restriction.

Proposition 3 adds distributional predictions. Conditional on fiscal-stress episodes raising the adverse upper quantile of long-duration financing outcomes, those episodes carry larger premia, consistent with the debt-ceiling amplification in Section **??**. In the log-linear extension, right-skewed financing risk maps one-for-one into left-skewed pre-TRA log returns. Empirically, pre-TRA returns are distinctly left-skewed whereas non-pre-TRA returns do not exhibit the same asymmetry, consistent with the model's interpretation of the announcement window as exposure to an asymmetric financing-risk distribution. The comparable skewness observed at the 10- and 30-year points is likewise consistent with Remark 1. The exact model restriction that the announcement-related return is negative with probability α_0 should be interpreted through Remark 2: unrelated daily return variation means that the observed negative-day frequency does not identify the constraint probability, although the observed frequency is quantitatively compatible with a small α_0.

Corollary 1 predicts lower constrained-intermediary positions, alongside lower prices, in higher-uncertainty states. The FR-2004 evidence (Figure **??**) that primary-dealer net positions are, in conditional mean, flat to lower in pre-TRA weeks is consistent with this cross-state comparative static and inconsistent with accumulation-based accounts that require dealers to hold more duration precisely when expected returns are high. Dealer positions remain an empirical proxy for the model's aggregate marginal constrained-intermediary sector.

Several empirical objects lie outside the solved model and are therefore interpreted as consistency evidence rather than direct predictions. The model holds current and expected short rates fixed, so its expected log excess return is naturally compensation for bearing long-duration financing risk rather than short-rate risk. The loading of pre-TRA returns on the Kim–Wright term-premium component of long yields (Table **??**), together with the absence of pre-TRA movement in near-term policy-rate expectations, is qualitatively consistent with this interpretation, although the model contains no affine term-structure decomposition. The model likewise does not price options: declining

Treasury implied volatility on pre-TRA days (Figure **??**) is consistent with uncertainty resolution, but option prices are not endogenous model objects. Nor does the model contain equities: the near-zero pre-TRA performance of the equity index (Table **??**) is a useful placebo, consistent with a mechanism whose primitive priced exposure is the long-duration Treasury float.[23]

Remark 3 frames the timing. Within the pricing rule, compression of the adverse conditional financing tail maps into a higher bond price before the formal release without requiring directional information. Treasury implied volatility falls, fiscal-forecast dispersion narrows, and attention to the refunding process rises before the release. These facts are consistent with pre-release information acquisition and uncertainty reduction—the information-acquisition theory of Ai et al. (2021) supplies the reason processing concentrates ahead of a scheduled release, and Ai and Bansal (2018) the general logic of premia earned around scheduled uncertainty resolution—while the tail-compression interpretation additionally requires that part of this reduction operate through the adverse conditional financing quantile. On the directional margin, two predictions must be kept distinct. For the full announcement-risk window, the log-linear realized return (20) loads negatively on a correctly measured financing realization; for a pre-release subwindow, the loading depends on the signal process, which the model does not specify. The statistically weak coefficients on announced borrowing revisions (Table **??**)—noisy proxies for the long-duration float shock—are consistent with the baseline, but they do not by themselves establish that resolution was nondirectional. On the conditional-mean margin, the baseline predicts a positive conditional expected log excess return after controlling for the true financing realization, with a magnitude that varies with ex-ante financing uncertainty; empirically, the estimated intercepts remain large and significant after controlling for announced surprises.

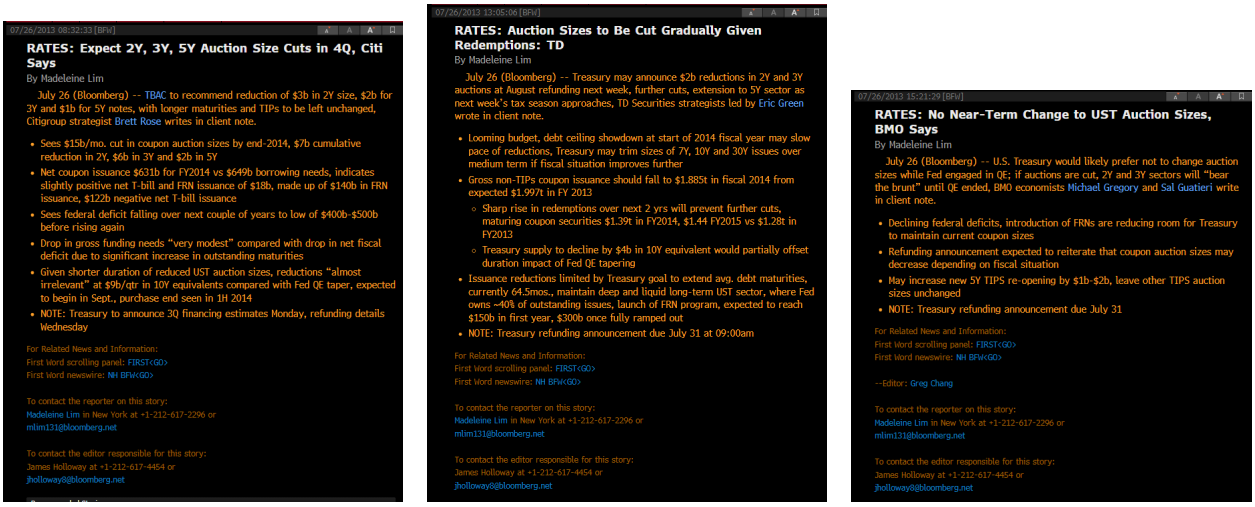
Finally, the constraint is the model's limit to arbitrage in a qualitative sense. In nondegenerate states, the finite-δ demand schedule in (11) becomes arbitrarily elastic only as the price approaches the quantile-pricing boundary, so market clearing requires a price discount from the marginal constrained intermediary. In the $\delta \to 0$ limit, however, the constraint is scale-free—at the boundary, the loss probability equals α_t at any position size—so the model contains no dollar-capital parameter that quantitatively bounds strategy size or the entry of outside capital. It illustrates how a probability-based risk constraint can prevent the marginal intermediary from bidding the premium away; it is not a quantitative model of aggregate arbitrage capacity or strategy scalability. Separately, and as a matter of arithmetic rather than of the model, a premium earned over four scheduled windows per year annualizes modestly at the event frequency even when it is large per event. Remark 2 adds the measurement discipline: unrelated daily variance attenuates the observed per-event Sharpe ratio, and the observed frequency of negative pre-TRA days does not by itself identify the constraint probability α_0.

B Additional Tables and Figures

[23] The model is likewise silent on currencies. With the short rate fixed and no exchange-rate margin, the setting deliberately strips the framework of Mueller, Tahbaz-Salehi, and Vedolin (2017b) of its foreign-exchange dimension: the priced shock enters only through the long-duration float that constrained intermediaries must absorb. Any pre-TRA exposure in currencies would therefore have to arise through channels outside the model—for example, global portfolio-demand responses to Treasury duration.

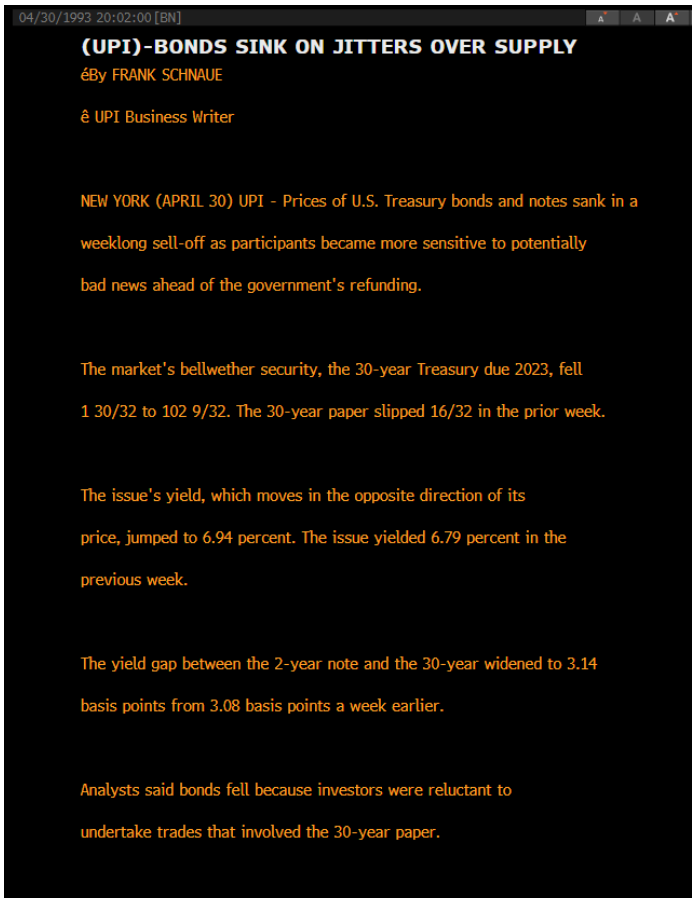
Media and dealer coverage on the pre-refunding day

A natural question is what information market participants actually receive on the pre-refunding day. To illustrate the information environment, we hand-collect contemporaneous Bloomberg coverage published ahead of the quarterly refunding announcement. Two features stand out. First, the coverage is overwhelmingly about *issuance and duration*: primary dealers publish explicit forecasts of the size and maturity composition of the upcoming auctions and tie those forecasts to the duration the Treasury will sell relative to the Federal Reserve's holdings. Second, this pattern is not new: the same supply-focused framing appears in wire coverage decades before our intraday sample, indicating that pre-refunding supply uncertainty has long been salient in real time. Figure A.1 reproduces three Bloomberg First Word items published on July 26, 2013, ahead of the August 2013 refunding announcement; within hours of one another, Citigroup, TD Securities, and BMO each circulate a forecast of the Treasury's auction-size decision and link it to the duration impact of the Fed's QE tapering. Figure A.2 shows a much earlier example from April 1993 attributing a week-long Treasury sell-off to "jitters over supply" ahead of the refunding.



(a) Citigroup — 08:32 ET (b) TD Securities — 13:05 ET (c) BMO — 15:21 ET

Figure A.1 Dealer commentary ahead of the refunding announcement. Three Bloomberg First Word items published on July 26, 2013, ahead of the August 2013 quarterly refunding announcement (due July 31, 2013), each reporting a primary dealer's forecast for the upcoming auction-size decision, tying expected issuance to the duration impact of the Federal Reserve's QE tapering.


04/30/1993 20:02:00 [BN]

(UPI)-BONDS SINK ON JITTERS OVER SUPPLY

éBy FRANK SCHNAUE

ê UPI Business Writer

NEW YORK (APRIL 30) UPI - Prices of U.S. Treasury bonds and notes sank in a weeklong sell-off as participants became more sensitive to potentially bad news ahead of the government's refunding.

The market's bellwether security, the 30-year Treasury due 2023, fell 1 30/32 to 102 9/32. The 30-year paper slipped 16/32 in the prior week.

The issue's yield, which moves in the opposite direction of its price, jumped to 6.94 percent. The issue yielded 6.79 percent in the previous week.

The yield gap between the 2-year note and the 30-year widened to 3.14 basis points from 3.08 basis points a week earlier.

Analysts said bonds fell because investors were reluctant to undertake trades that involved the 30-year paper.

Figure A.2 An early example of pre-refunding press coverage. Bloomberg/UPI wire item published April 30, 1993, ahead of the May 1993 quarterly refunding, headlined "Bonds Sink on Jitters over Supply," attributing a week-long Treasury sell-off to participants becoming "more sensitive to potentially bad news ahead of the government's refunding."

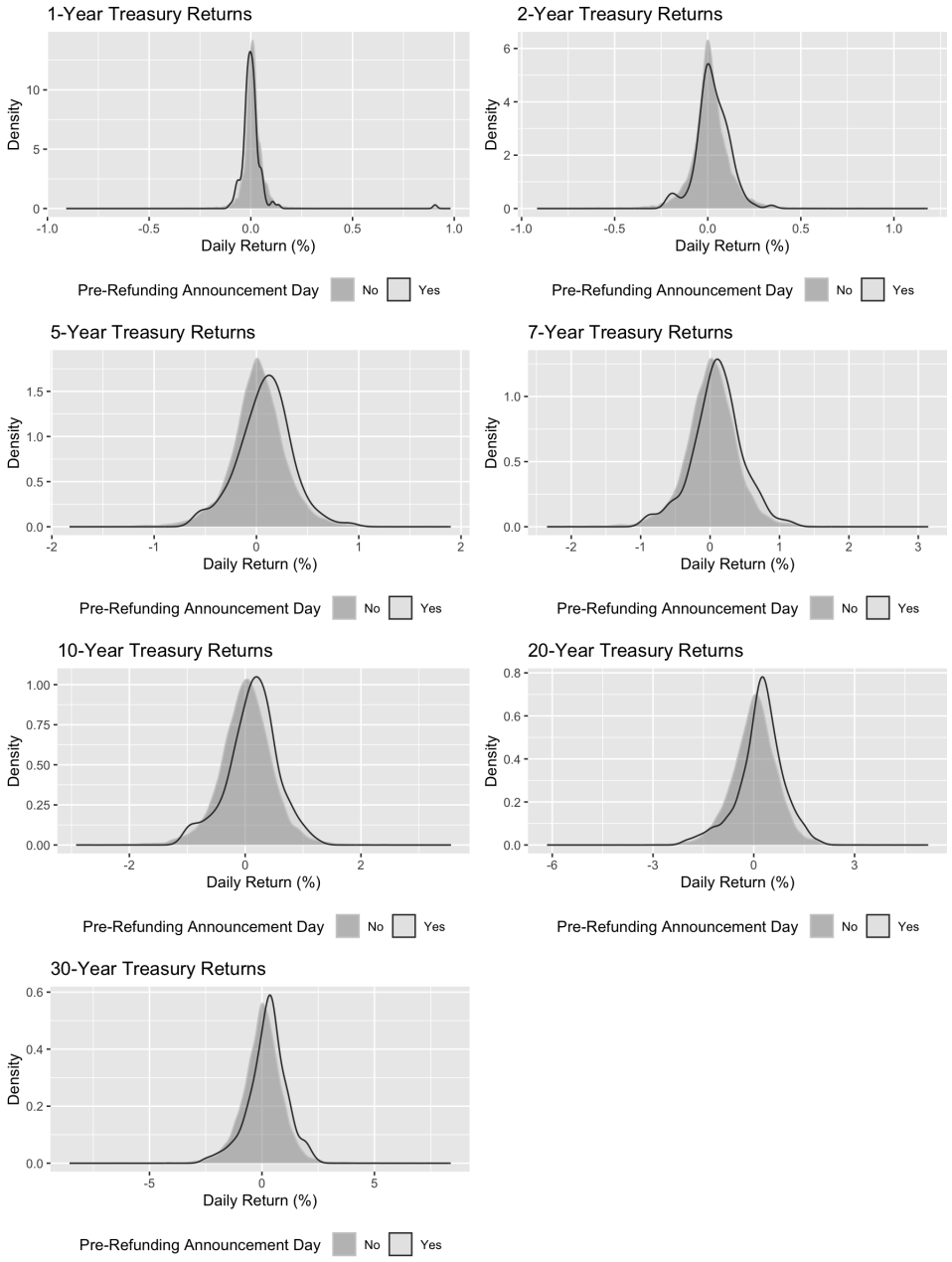


Figure A.3 Distribution of Daily Returns for Treasurys of Various Maturities, Split by Pre-TRA and Non-Pre-TRA Days

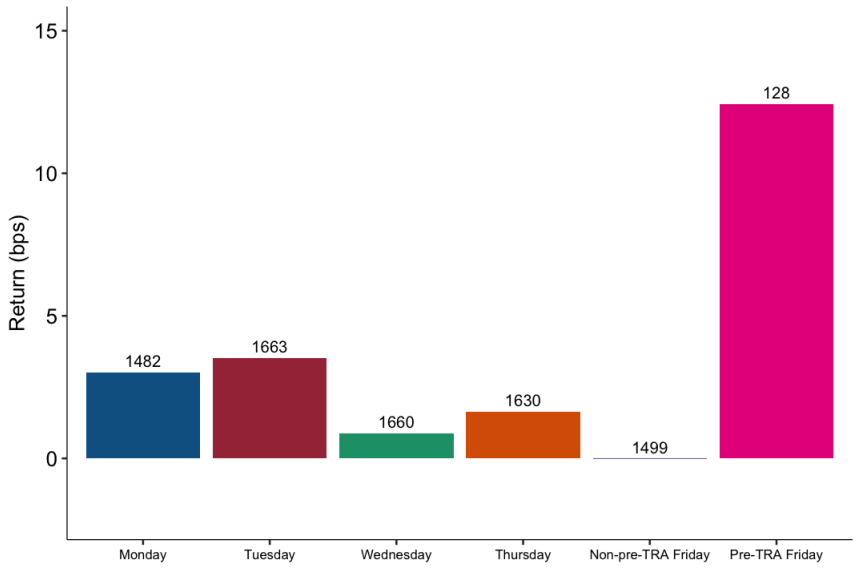


Figure A.4 Average Daily Return of 10-Year Treasury, Split by Day of Week and Pre-TRA Days

The number on the bar represents the number of observations.

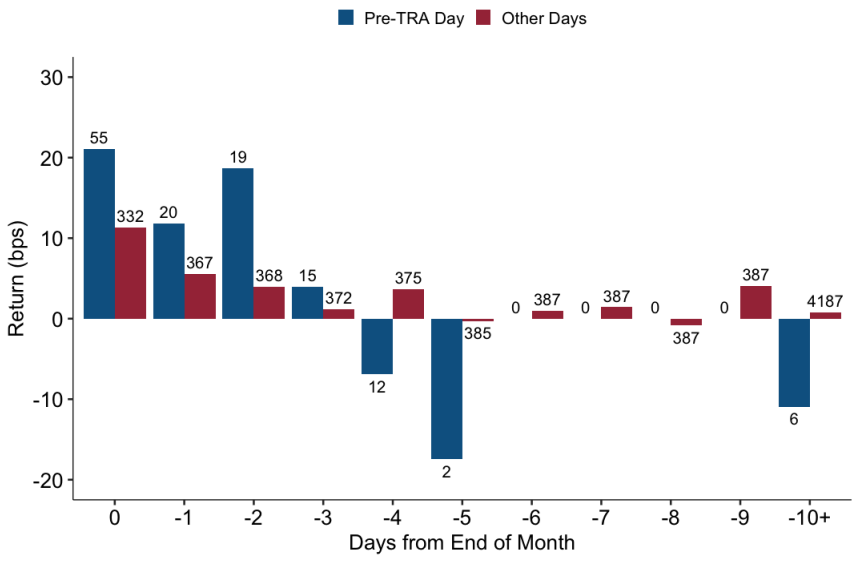


Figure A.5 Average Daily Return of 10-Year Treasury, Split by Days from End of Month and Pre-TRA Days

The number on the bar represents the number of observations. The x-axis represents the number of trading days from the end of the month, so that 0 is the last trading day of the month, -1 is one day prior to the last trading day of the month, and so on. -10+ averages between all days that are at least 10 trading days from the end of the month.

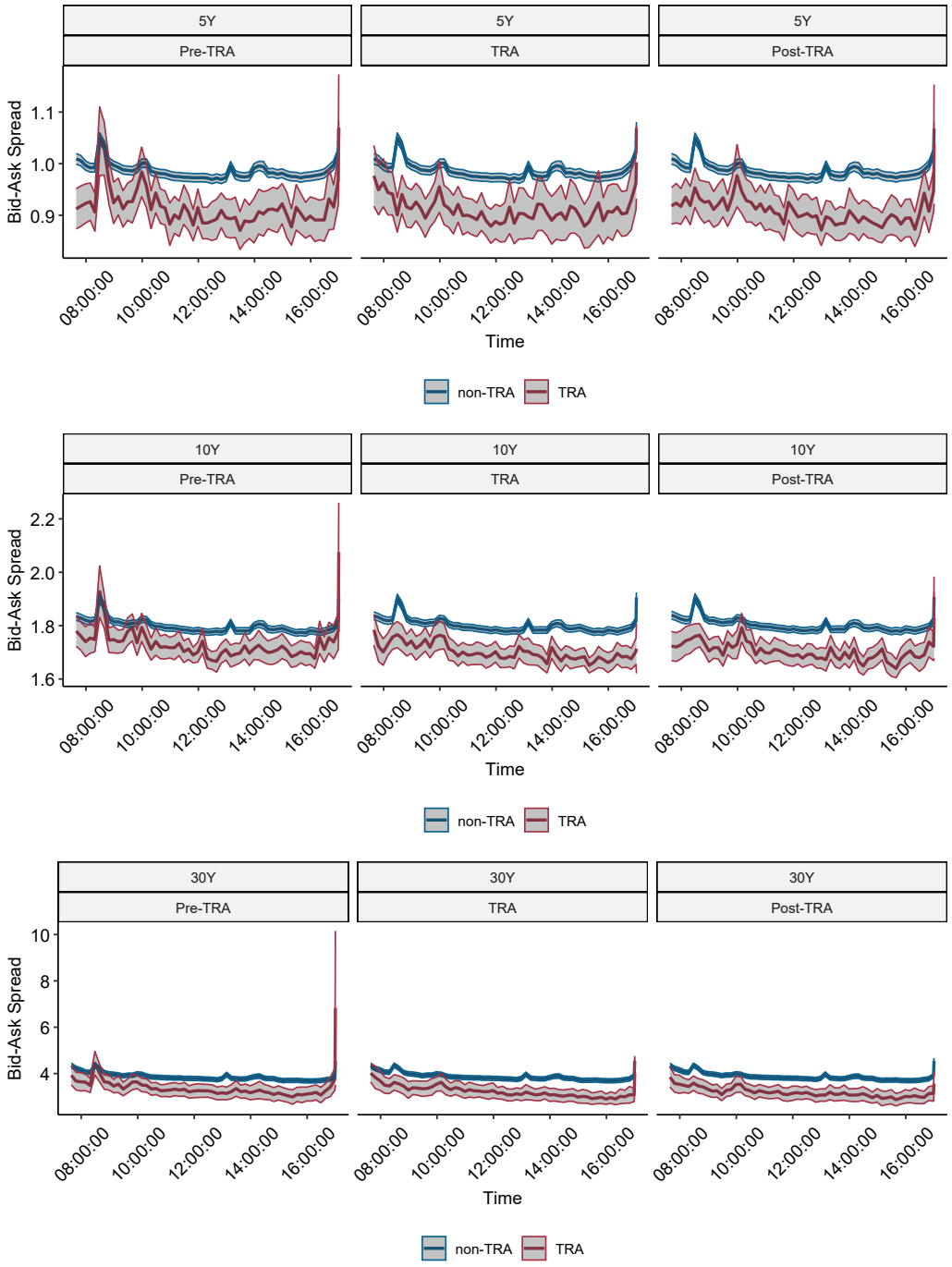


Figure A.6 Bid-Ask Spread around Treasury Refunding Announcements

This figure plots the average bid-ask spread in 10-minute intervals for Treasurys with maturities of 5, 10, and 30 years. The red lines depict this liquidity measure on TRA days, while the blue lines represent it during any three-day period that does not overlap with TRAs. The shaded areas represent 90% confidence intervals.

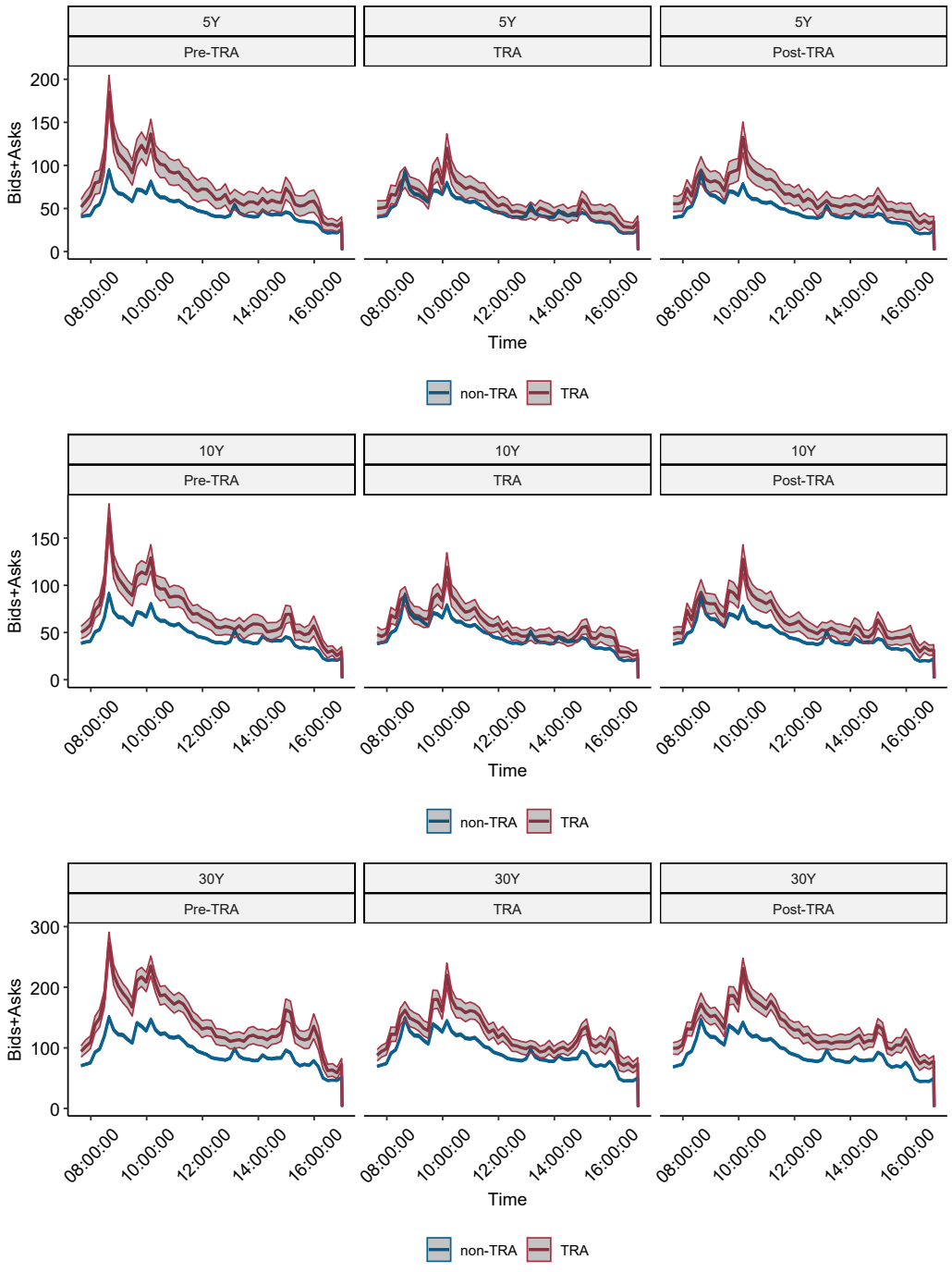


Figure A.7 Total Bids and Asks around Treasury Refunding Announcements

This figure plots the total number of bids and asks, aggregated in 10-minute intervals, for Treasurys with maturities of 5, 10, and 30 years. The red lines depict this liquidity measure on TRA days, while the blue lines represent it during any three-day period that does not overlap with TRAs. The shaded areas represent 90% confidence intervals.

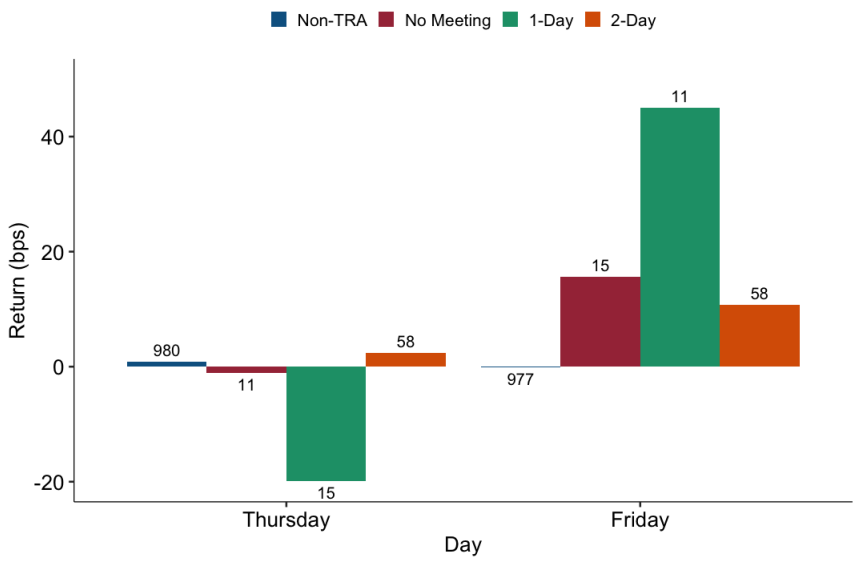
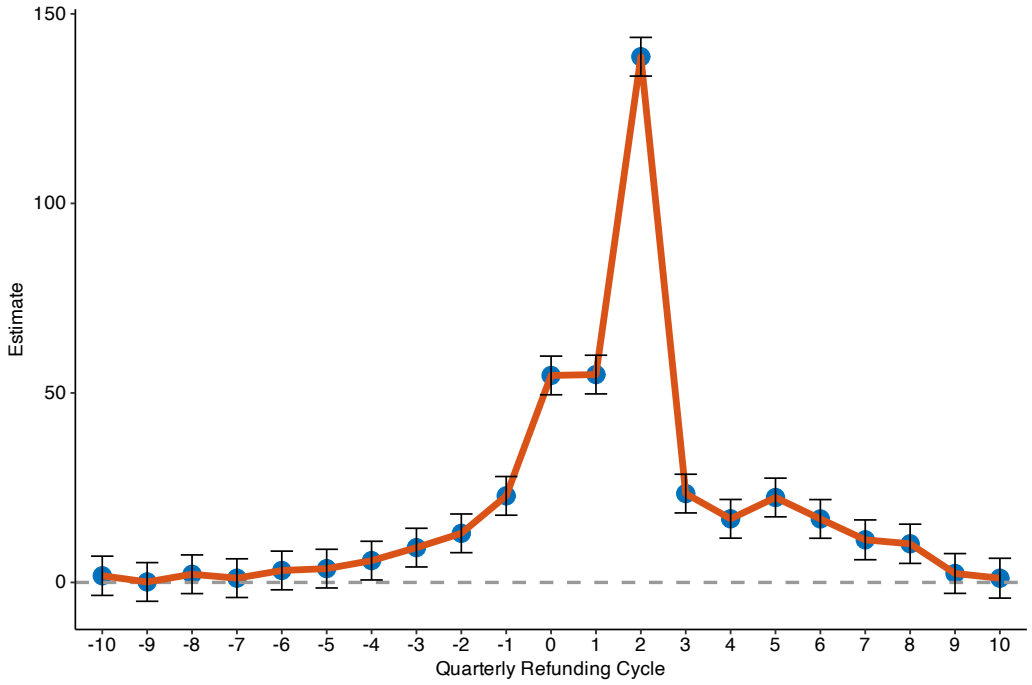
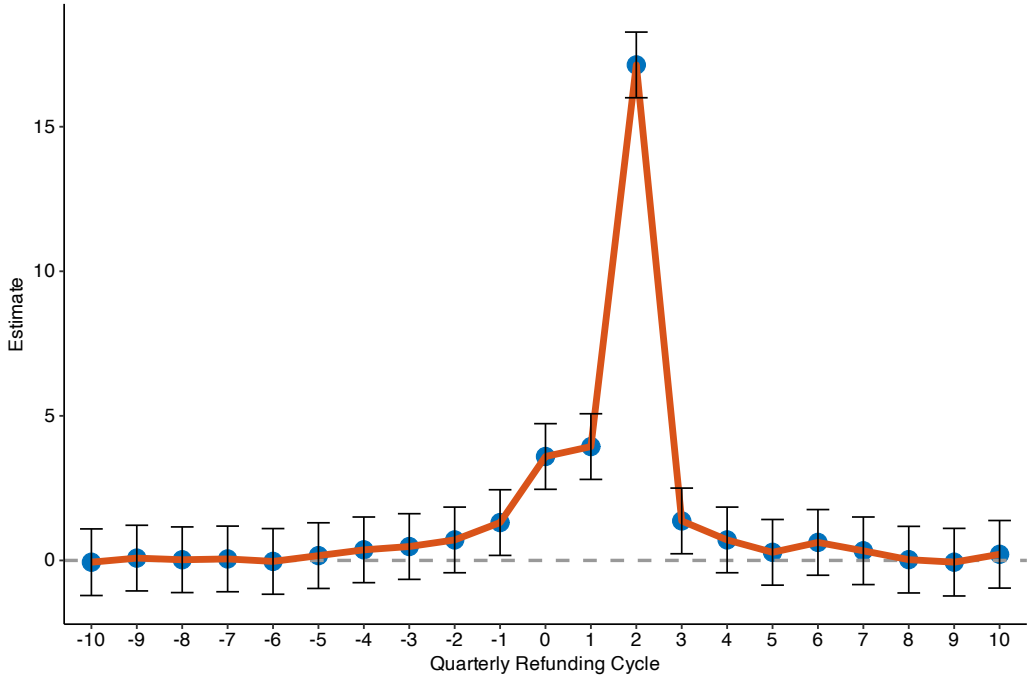


Figure A.8 Average Daily Return of 10-Year Treasury, Split by Occurrence of Primary Dealer Meetings

The number on the bar represents the number of observations. The sample is from 2003-2023, as 2003 is the first year during which public data on PD meeting dates is available. The blue bars show average returns that are outside of the TRA window. The red bars show average returns in the week leading up to the TRA, but with no PD meeting occurring on that day. The green bars show average returns in the week leading up to the TRA, where a 1-day PD meeting occurred on that day. The orange bars show average returns in the week leading up to the TRA, where a 2-day PD meeting included that day.



A. Bloomberg News Trends: News Articles



B. Bloomberg News Trends: Social Network

Figure A.9 Investor Attention for "Treasury Refunding Announcements" Across Refunding Cycles

This figure displays investor attention to Treasury refunding announcements over TRA cycles, measured by Bloomberg News Trends from two separate sources (a) news articles and (b) social network. Each panel plots the coefficients of regressing respective attention measure on a set of indicator variables for the 21-day window around the TRA dates, with 95% confidence intervals indicated by the error bands. The sample period is from 2015 to 2023.

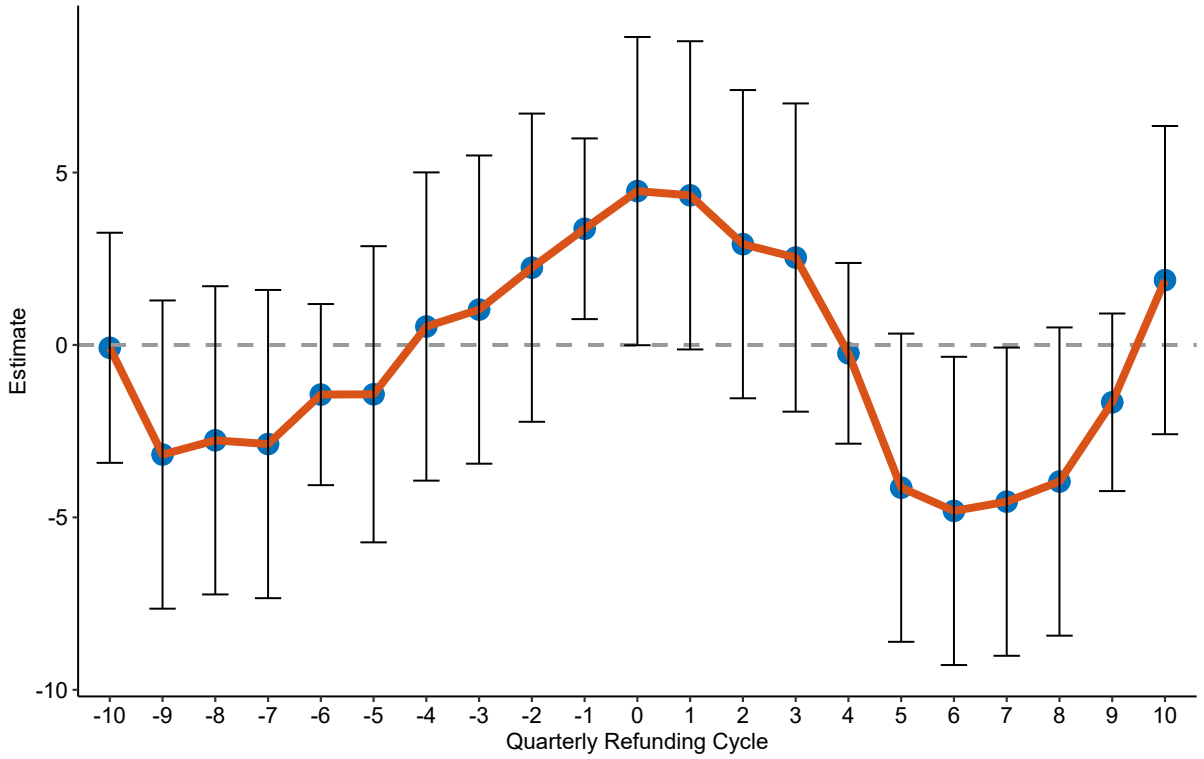


Figure A.10 Investor Attention for "Treasury Refunding Announcements" across Refunding Cycles: Google Trends

This figure illustrates investor attention to Treasury refunding announcements, measured by the Google Search Volume Index (SVI) for the term "Treasury Quarterly Refunding," over a 21-day window centered around the TRA dates. The plot displays regression coefficients for each day in the window, with 95% confidence intervals shown as error bands. The sample period is from 2006 to 2023.

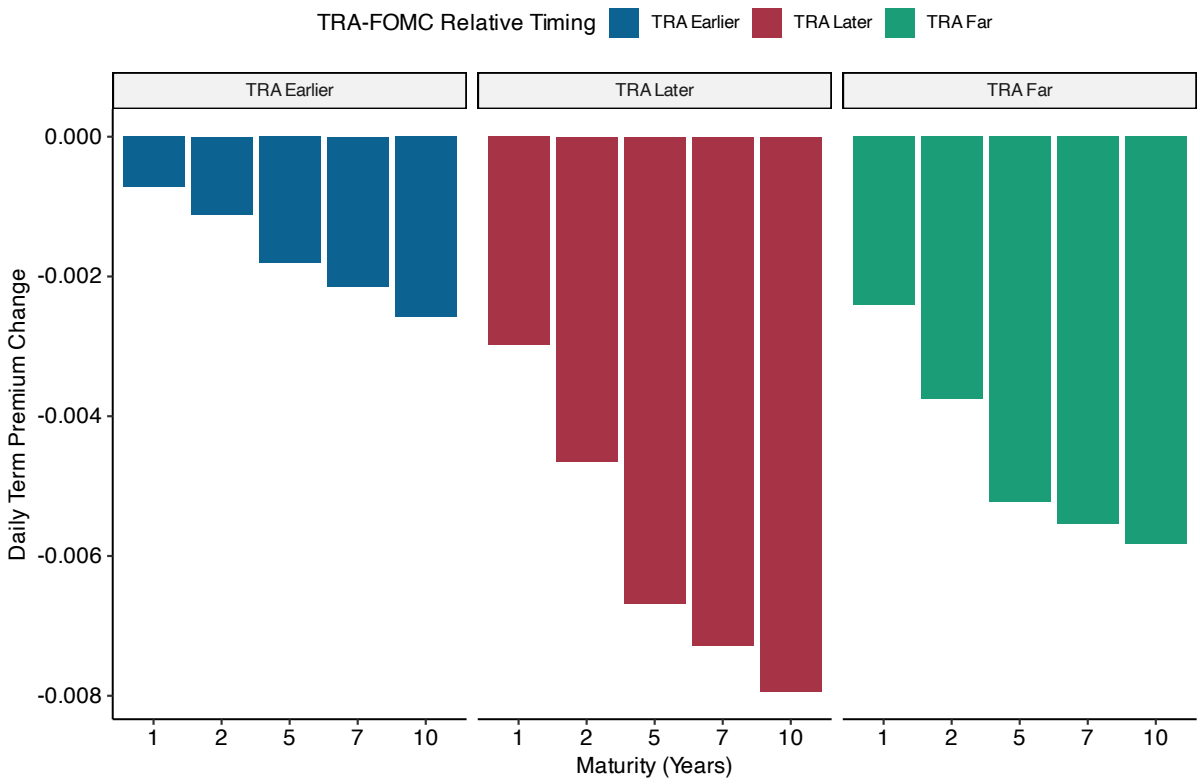


Figure A.11 Changes in Treasury Term Premium on Pre-TRA Days Conditional TRA and FOMC Timing

This figure plots the average daily change in the Treasury term premium (TP) on the pre-TRA days, conditional on the timing of these announcements: (1) TRA occurring before the FOMC announcement, 'TRA Earlier'; (2) TRA occurring after the FOMC announcement, 'TRA Later'; and (3) TRA and FOMC are scheduled far apart, 'TRA Far'. The term premium is estimated by Kim and Wright (2005).

Table A.1 Treasury Returns Around Quarterly Refunding Announcements: ETFs

This table reports estimation results of Regression (1) using bond and equity ETF returns. The ETFs include SHY (1-3 year Treasury Bonds), IEI (3-7 year), IEF (7-10 year), TLH (10-20 year), TLT (20+ year), TIP (Inflation Protected Treasurys), LQD (Investment-Grade Corporate Bonds), VCSH (Short-Term Corporate Bonds), VCIT (Intermediate-Term Corporate Bonds), VCLT (Long-Term Corporate Bonds), and SPY (S&P 500 Equity Index). Day-of-week (DOW) and end-of-month (EOM) fixed effects are included in certain specifications. Standard errors based on Newey-West t-statistics with optimal length are reported in parenthesis. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The sample period is from the indicated start year until 2023.

	Daily Return (bps)										
	Treasury ETFs						Corporate Bond ETFs				Stock ETF
Ticker	**SHY**	**IEI**	**IEF**	**TLH**	**TLT**	**TIP**	**LQD**	**VCSH**	**VCIT**	**VCLT**	**SPY**
Start Year	2002	2007	2002	2007	2002	2003	2002	2009	2009	2009	1993
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Panel A											
pre-TRA	2.65***	8.98***	13.81***	13.34*	22.06**	12.39***	13.78***	4.20**	12.29***	12.03	-4.77
	(0.84)	(2.86)	(4.25)	(7.19)	(8.72)	(3.84)	(4.35)	(1.66)	(3.91)	(8.19)	(10.87)
TRA	-1.59*	-0.28	-6.22	-1.34	-9.79	-2.09	-8.45**	-1.22	-5.42	-9.74	10.33
	(0.83)	(2.78)	(4.25)	(7.70)	(9.90)	(4.04)	(4.01)	(1.42)	(3.63)	(8.44)	(10.72)
post-TRA	-0.26	-0.33	2.67	3.44	6.35	1.83	-1.01	1.12	3.79	7.19	3.89
	(0.94)	(3.44)	(4.87)	(8.43)	(10.99)	(4.53)	(4.38)	(1.74)	(4.56)	(9.93)	(10.74)
Constant	0.68***	1.00***	1.30**	1.26	1.81	1.24**	1.86***	0.95**	1.52**	2.07	4.31***
	(0.12)	(0.38)	(0.57)	(0.95)	(1.16)	(0.55)	(0.71)	(0.38)	(0.68)	(1.29)	(1.19)
R^2	0.002	0.002	0.002	0.001	0.001	0.002	0.001	0.001	0.002	0.001	0.000
N	5,393	4,270	5,393	4,270	5,393	5,049	5,393	3,547	3,547	3,547	7,784
Panel B											
pre-TRA	1.93**	7.05**	10.37**	9.03	12.83	7.15*	8.98*	1.75	7.69*	0.82	-4.98
	(0.91)	(3.08)	(4.52)	(7.58)	(9.25)	(4.11)	(4.61)	(1.79)	(4.08)	(8.72)	(11.32)
TRA	-1.28	-1.24	-6.47	-2.62	-10.16	-0.74	-7.60*	-0.58	-3.79	-6.99	10.53
	(0.87)	(2.89)	(4.41)	(7.99)	(10.17)	(4.14)	(4.51)	(1.62)	(4.00)	(8.89)	(11.36)
post-TRA	-0.16	-0.84	1.80	2.57	5.33	2.50	-2.16	0.76	3.40	8.63	0.75
	(0.96)	(3.55)	(5.05)	(8.73)	(11.35)	(4.66)	(4.70)	(1.73)	(4.63)	(10.14)	(10.99)
DOW FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EOM FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
R^2	0.006	0.005	0.004	0.002	0.003	0.005	0.004	0.006	0.007	0.005	0.000
N	5,393	4,270	5,393	4,270	5,393	5,049	5,393	3,547	3,547	3,547	7,784

Table A.2 Intraday Liquidity around TRAs

This table reports various intraday liquidity measures across the Treasury Refunding Announcement dates. The dependent variables are the intraday liquidity measures: average bid-ask spreads (Panel A) and total number of bids and asks (Panel B) in 10-minute intervals. We use the Tradeweb data for the 2, 5, 10, and 30-year Treasury bonds from 2006 to 2023. Day-of-week (DOW), end-of-month (EOM), and time of day (TOD) fixed effects are included in certain specifications. The comparison group is all days that are not in the 3-day window around TRAs. Standard errors based on Newey-West t-statistics with optimal length are reported in parenthesis. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	2Y	**5Y**	**10Y**	**30Y**	**2Y**	**5Y**	**10Y**	**30Y**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Bid-ask spread								
Constant	0.77***	0.99***	1.80***	3.88***				
	(0.00)	(0.00)	(0.00)	(0.03)				
Pre-TRA	-0.04***	-0.07***	-0.07***	-0.47***	-0.01	-0.05***	-0.06***	-0.31**
	(0.01)	(0.01)	(0.01)	(0.12)	(0.02)	(0.02)	(0.02)	(0.14)
TRA	-0.04**	-0.08***	-0.10***	-0.64***	-0.02	-0.04***	-0.08***	-0.43***
	(0.02)	(0.01)	(0.01)	(0.11)	(0.02)	(0.02)	(0.02)	(0.12)
Post-TRA	-0.04**	-0.08***	-0.10***	-0.68***	0.01	-0.02	-0.04***	-0.27**
	(0.02)	(0.01)	(0.01)	(0.11)	(0.02)	(0.01)	(0.01)	(0.11)
DOW FE					✓	✓	✓	✓
EOM FE					✓	✓	✓	✓
TOD FE					✓	✓	✓	✓
R^2	0.001	0.001	0.001	0.001	0.031	0.025	0.015	0.014
N	368,242	368,242	368,242	368,242	368,242	368,242	368,242	368,242
Panel B: Number of bids and asks								
Constant	21.31***	46.46***	45.28***	89.33***				
	(0.32)	(0.44)	(0.39)	(0.66)				
Pre-TRA	11.81***	27.36***	24.19***	50.86***	0.02	5.17	3.90	13.93***
	(3.34)	(4.47)	(3.32)	(4.90)	(3.44)	(4.46)	(3.22)	(4.68)
TRA	1.91	10.39***	10.97***	30.33***	0.09	5.93*	5.88**	18.38***
	(2.23)	(3.32)	(2.60)	(4.01)	(2.32)	(3.31)	(2.54)	(3.88)
Post-TRA	5.11*	17.44***	15.32***	38.57***	-3.16	-0.53	-2.62	0.38
	(2.87)	(3.69)	(2.91)	(4.21)	(2.96)	(3.66)	(2.83)	(3.98)
DOW FE					✓	✓	✓	✓
EOM FE					✓	✓	✓	✓
TOD FE					✓	✓	✓	✓
R^2	0.001	0.003	0.003	0.006	0.124	0.305	0.363	0.500
N	368,242	368,242	368,242	368,242	368,242	368,242	368,242	368,242

Table A.3 Pre-Announcement Returns and Other Macroeconomic Announcement Surprises

This table presents OLS regression results of daily Treasury returns on pre-TRA day dummies, controlling for macroeconomic announcements surprises. The dependent variables are daily CRSP Treasury bond returns with maturities ranging from 1 to 30 years. The independent variables include includes the full set of macroeconomic announcement surprises. All regressions include day-of-week and end-of-month fixed effects. The macroeconomic announcements include Industrial Production, Nonfarm Payrolls, Consumer Price Index (CPI), Producer Price Index (PPI), Purchasing Manager Index (PMI), Unemployment Rate, Gross Domestic Product (GDP), University of Michigan Consumer Sentiment Final, Initial Jobless Claims, Retail Sales, Durable Goods Orders, Housing Starts, Construction Spending, Capacity Utilization, The Leading Index, Trade Balance, Factory Orders, New Home Sales, US Federal Budget Balance. The surprises are calculated as the difference between the actual and the consensus forecast from Refinitiv (formerly Reuters). Surprises of non-announcement days are set to zero. Standard errors based on Newey-West t-statistics with optimal length are reported in parenthesis. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The sample period is from 2004 to 2023.

Maturity	Daily Return (bps)						
	1Y	**2Y**	**5Y**	**7Y**	**10Y**	**20Y**	**30Y**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
pre-TRA	-0.10	2.51**	9.02***	11.79***	14.53***	15.22*	18.53
	(0.39)	(1.01)	(3.16)	(4.46)	(5.49)	(8.95)	(11.34)
Macro Announcement Surprises:							
PMI	-3.67**	-8.16**	-19.40**	-20.50	-23.11	-29.23	-28.87
	(1.44)	(3.45)	(8.96)	(12.54)	(15.83)	(25.82)	(34.75)
Consumer Sentiment Final	-7.36***	-18.65***	-51.16***	-63.53**	-69.52**	-96.60*	-125.13*
	(2.72)	(6.45)	(17.81)	(26.09)	(31.88)	(52.15)	(66.12)
Initial Jobless Claims	-0.19**	-0.33	-0.78	-1.19	-1.21	-1.72	-2.43
	(0.09)	(0.22)	(0.62)	(0.86)	(1.04)	(1.77)	(2.40)
The Leading Index	-0.50	-2.11*	-5.10	-5.95	-5.15	-6.97	-6.52
	(0.49)	(1.15)	(3.43)	(4.70)	(5.37)	(9.12)	(12.03)
Unemployment Rate	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Factory Orders	-1.40	-4.93	-17.25	-20.83	-27.16	-45.71	-58.51
	(1.00)	(3.67)	(11.69)	(16.67)	(19.48)	(34.65)	(42.76)
Trade Balance	0.00	0.00	0.00**	0.00**	0.00***	0.00***	0.00***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
New Home Sales	0.00	0.00**	0.00**	0.00**	0.00**	0.00*	0.00*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Capacity Utilization	2.65**	3.00	4.99	4.58	5.30	6.90	-0.90
	(1.28)	(2.22)	(6.74)	(9.96)	(13.22)	(21.90)	(29.44)
Housing Starts	0.00**	0.00	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
PPI	-2.30***	-1.82	-5.08	-5.42	-0.83	-3.20	-8.65
	(0.83)	(2.16)	(7.10)	(11.35)	(13.11)	(23.29)	(31.58)
Construction Spending	0.00	0.00	0.00	0.00**	0.00**	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
CPI	-0.55***	-1.44***	-4.55***	-6.23***	-7.30***	-11.35***	-13.17***
	(0.13)	(0.32)	(0.93)	(1.35)	(1.68)	(2.86)	(3.73)
Consumer Sentiment Preliminary	-0.26	-1.18	-3.71	-4.03	1.29	11.02	23.52
	(1.26)	(3.15)	(9.62)	(13.70)	(16.61)	(27.01)	(38.55)
Industrial Production	-0.42**	-1.69***	-4.54**	-5.38**	-6.64**	-10.93*	-14.45
	(0.19)	(0.59)	(1.77)	(2.57)	(3.19)	(5.99)	(9.26)
Retail Sales	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Nonfarm Payrolls	0.04	-0.86	-3.51	-4.89	-5.94	-9.56	-12.84
	(0.21)	(0.64)	(2.19)	(3.37)	(3.90)	(6.36)	(8.48)
Federal Budget	-0.18	-0.92	-3.82**	-5.60**	-6.39*	-8.94	-11.96
	(0.22)	(0.57)	(1.82)	(2.60)	(3.33)	(6.06)	(8.45)
Durable Goods Orders	0.83**	0.92	3.06*	4.79**	8.29***	12.89***	19.50***
	(0.35)	(0.67)	(1.56)	(1.95)	(2.49)	(4.29)	(6.74)
DOW FE	✓	✓	✓	✓	✓	✓	✓
EOM FE	✓	✓	✓	✓	✓	✓	✓
R^2	0.040	0.023	0.019	0.017	0.016	0.014	0.013
N	5,005	5,005	5,005	5,005	5,005	5,005	5,005

Table A.4 Treasury Returns Around FOMC Announcements: Day by Day

This table reports regression results where the dependent variable is returns of Treasury Bonds with maturities ranging from 1 to 30 years in columns (1)-(7), the equity market return in column (8), and the equity market return between 2002-2023 in column (9). "FOMC" is the day of an FOMC announcement. "Pre- (Post-) FOMC" is the day before (after) an FOMC announcement. "TRA Far" is an indicator that equals 1 if there is not a TRA announcement within 5 days of the FOMC announcement. "TRA Later (Earlier)" is an indicator that equals 1 if the TRA occurs after (before) the FOMC announcement within 5 days, and 0 otherwise. Standard errors based on Newey-West t-statistics with optimal length are reported in parenthesis. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The sample period is from 1991Q4 until 2023.

	1Y (1)	**2Y** (2)	**5Y** (3)	**7Y** (4)	**10Y** (5)	**20Y** (6)	**30Y** (7)	**MKT** (8)	**MKT†** (9)
	Daily Return (bps)								
pre-FOMC × ...									
... TRA Far	0.66	1.77**	4.33**	5.51**	5.49*	10.09**	13.16**	-0.48	-13.58
	(0.44)	(0.82)	(2.05)	(2.69)	(3.17)	(4.65)	(5.85)	(8.79)	(13.03)
... TRA Later	-0.80***	-0.76	-1.59	-1.46	-4.36	-5.64	-8.50	21.39	19.47
	(0.31)	(1.00)	(3.61)	(5.46)	(6.91)	(12.14)	(16.30)	(30.63)	(30.70)
... TRA Earlier	0.09	0.68	4.93	8.18*	12.22**	22.23**	28.99**	7.89	-2.03
	(0.63)	(1.29)	(3.35)	(4.59)	(6.01)	(9.90)	(13.55)	(13.54)	(16.40)
FOMC × ...									
... TRA Far	1.38***	2.77**	6.88**	8.53**	11.24**	16.31***	21.90***	33.11***	32.70**
	(0.50)	(1.20)	(3.05)	(4.12)	(4.70)	(6.06)	(7.32)	(9.81)	(13.57)
... TRA Later	1.21	-0.05	-0.54	-2.29	-4.53	-15.22	-22.35	20.90	20.40
	(1.24)	(2.51)	(6.23)	(7.70)	(9.53)	(13.05)	(17.69)	(20.03)	(20.14)
... TRA Earlier	-0.41	1.70	5.36	5.72	5.33	9.09	11.67	13.89	22.05
	(0.77)	(1.72)	(4.38)	(5.93)	(7.08)	(10.46)	(13.95)	(16.11)	(18.50)
post-FOMC × ...									
... TRA Far	0.94**	0.79	1.65	3.36	5.34	8.47	11.70	-19.25*	-42.53***
	(0.42)	(0.84)	(2.35)	(3.31)	(4.05)	(6.26)	(8.03)	(10.43)	(15.90)
... TRA Later	-0.95*	-1.32	-5.53	-9.64	-12.43	-19.33	-23.89	-1.49	-2.40
	(0.54)	(1.42)	(4.67)	(6.44)	(8.56)	(12.70)	(15.96)	(19.49)	(19.66)
... TRA Earlier	0.55	0.47	1.21	0.45	0.17	-5.58	-9.12	17.30	21.10
	(0.80)	(1.61)	(4.07)	(5.42)	(6.92)	(11.02)	(15.24)	(17.56)	(21.21)
DOW FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
EOM FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
R^2	0.027	0.011	0.005	0.005	0.005	0.005	0.006	0.003	0.005
N	8,061	8,061	8,061	8,061	8,061	8,061	8,061	8,121	5,535

†2002-2023

C Text-Based Uncertainty

Every quarter, on the day following the primary announcement, the Treasury Department meets with the Treasury Borrowing Advisory Committee (TBAC). The TBAC is comprised of members from large financial institutions such as banks, broker dealers, hedge funds, and asset managers.[24] During this meeting, the TBAC presents their assessment of the current state of the Treasury market and makes recommendations on timely debt management issues. In addition, the Treasury assigns "charges" to the TBAC, which involve questions and issues they seek guidance on for the quarter ahead. The minutes for the TBAC meeting are released as part of the secondary release, which occurs one day after the meeting itself and two days after the primary release.

We employ a large language model, GPT-4o, to extract uncertainty levels from the text of the TBAC minutes, following a methodology similar to Bybee (2023). For each quarter, we feed in the full text of the TBAC minutes and prompt GPT to return its assessment of the level of uncertainty embedded in the meeting minutes.[25] The time series of this measure, which we call "TBAC Uncertainty" is shown in **Figure A.13**. The series exhibits somewhat expected patterns, with noticeable spikes around the Great Recession and the beginning of the COVID-19 pandemic sandwiched around a relatively low uncertainty period in the 2010s. TBAC uncertainty is elevated during times when the MOVE index is higher, with a correlation of 0.25.

Because the TBAC meeting occurs after the primary release and discussion topics span beyond the refunding numbers themselves, the uncertainty extracted from the meeting minutes can be understood as the *leftover uncertainty* following the TRAs. Therefore, we may expect higher TBAC uncertainty to be related to lower pre-TRA returns, as higher leftover uncertainty is related to lower uncertainty reduction in the days prior. **Table A.5** documents this relationship. We find that pre-TRA returns are higher when TBAC uncertainty is low. This pattern is strongest for the longest maturity bonds, and holds after controlling for MOVE index levels. A one standard deviation increase in leftover uncertainty is associated with a 7 basis point lower pre-TRA return on the 10-year Treasury and a 16 basis point lower pre-TRA return on the 30-year Treasury, accounting for a large portion of the pre-TRA returns.

[24] List of current TBAC members can be found on the Treasury website.

[25] See **Figure A.12** for the full prompt.

```
Here is the Minutes of the Meeting of the Treasury Borrowing
    Advisory Committee of the Securities Industry and Financial
    Markets Association:

‘‘{minutes}’’

How much uncertainty do you think these minutes indicate in the
    Treasury’s financing strategy and market conditions?

Write your answer as:

{{magnitude of uncertainty (0-100, 0 is the lowest uncertainty, 100
    is highest uncertainty)}}:
{{confidence (0-1)}}:
{{explanation (less than 25 words)}}:
```

Figure A.12 Full Prompt for Extracting Uncertainty from TBAC Meeting Minutes using GPT-4o

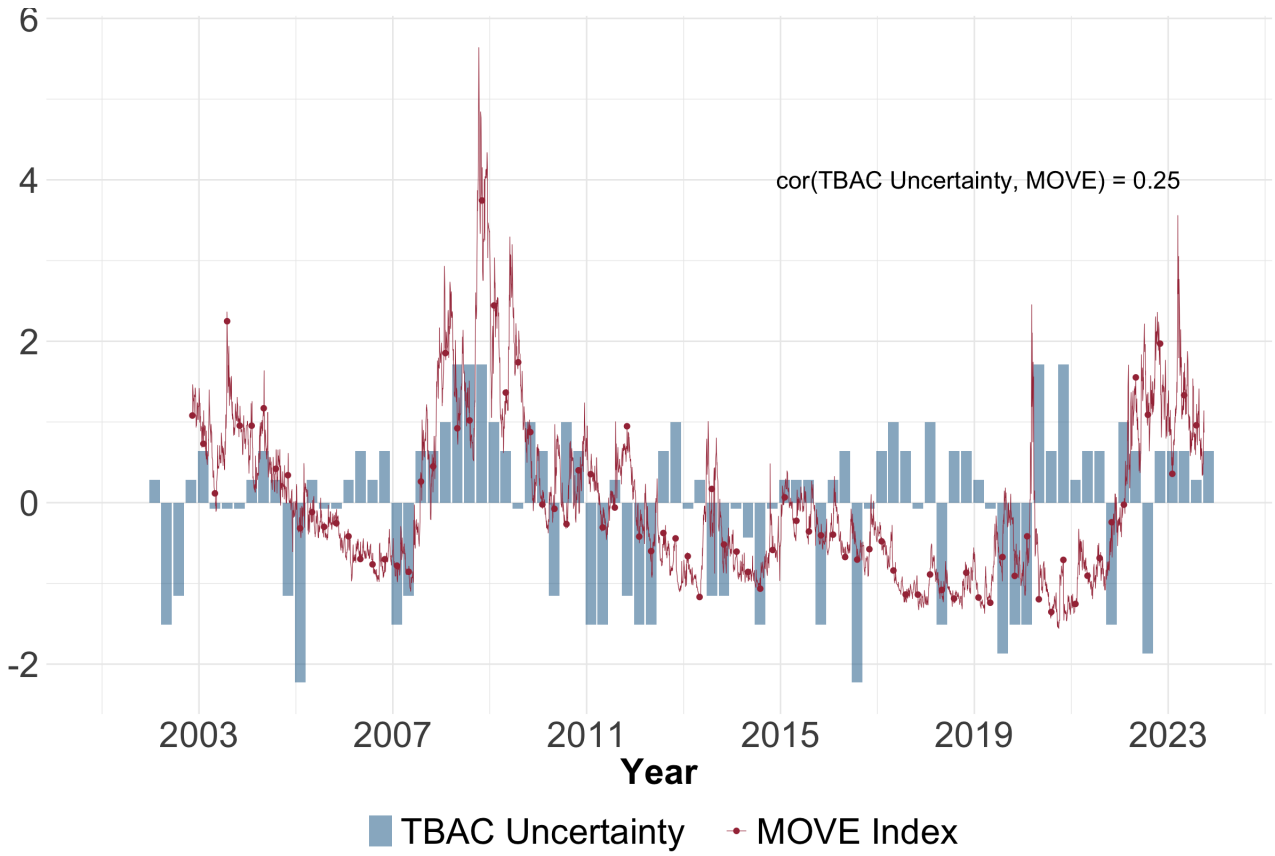


Figure A.13 Time Series of Uncertainty in TBAC Minutes Extracted from GPT-4o

TBAC Uncertainty and MOVE time series are normalized to have mean 0 and variance 1.

Table A.5 TBAC Meeting Minutes Uncertainty

This table reports the relationship between pre-TRA returns and uncertainty levels in TBAC Meeting Minutes as extracted from GPT-4o. The dependent variables are CRSP Treasury bond returns with maturities ranging from 1 to 30 years on pre-TRA days. Panel B includes a control for the level of the MOVE index. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively. The sample period is from 2003 to 2023.

	Pre-TRA Return (bps)						
Maturity	**1Y**	**2Y**	**5Y**	**7Y**	**10Y**	**20Y**	**30Y**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A							
Constant	6.44	7.30**	23.69***	35.41***	47.76***	71.87***	98.57***
	(8.06)	(2.95)	(7.45)	(11.48)	(13.79)	(23.96)	(31.57)
TBAC Uncertainty	-0.10	-0.07	-0.22*	-0.37*	-0.53**	-0.84*	-1.16**
	(0.11)	(0.05)	(0.13)	(0.20)	(0.24)	(0.44)	(0.57)
R^2	0.017	0.015	0.015	0.020	0.028	0.027	0.032
N	88	88	88	88	88	88	88
Panel B							
Constant	-1.55	6.11*	19.18**	32.46**	42.30**	71.84**	96.67**
	(1.64)	(3.45)	(9.52)	(14.53)	(18.27)	(32.87)	(41.86)
TBAC Uncertainty	0.02	-0.07	-0.27*	-0.43**	-0.64**	-0.93**	-1.31**
	(0.03)	(0.05)	(0.14)	(0.21)	(0.26)	(0.42)	(0.57)
$MOVE_t$	0.00	0.01	0.08	0.07	0.15	0.07	0.14
	(0.02)	(0.04)	(0.10)	(0.14)	(0.18)	(0.29)	(0.36)
R^2	0.005	0.013	0.028	0.026	0.040	0.031	0.038
N	81	81	81	81	81	81	81