Take it to the Limit: The Debt Ceiling, Political Brinkmanship, and Treasury Yields

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Abstract

This study estimates the impact of recent debt limit episodes on Treasury bill yields. To do so, we separate the average wedge over expected market rates on all bills outstanding from excess yields on bills that could be affected by a delayed principal payment in the event of a debt limit breach. The former provides an estimate of the increased borrowing costs to the Treasury during and soon after a debt limit episode, while the latter indicates the discount that an investor is willing to accept to replace a bill maturing soon after a projected debt limit breach date with a bill maturing outside that time frame. We find that average rates more than doubled during the peak of both the 2011 and 2013 debt limit episodes, but were larger in magnitude and more prolonged for the 2011 episode. Conversely, excess yields for individual bills that matured soon after the projected breach dates appeared earlier and were significantly higher for the 2013 episode, peaking at 43basis points in 2013, but only 18 basis points in 2011. We attribute these differences across episodes to learning by market participants. Our results imply that for $100 billion of bill issuance at the height of a debt limit episode, the Treasury can expect increased borrowing costs of $70 to $90 million.

Key Words: Political Uncertainty; Debt Limit; Treasuries; Interest Rates

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Introduction

This study estimates the impact of the 2011 and 2013 debt limit episodes on Treasury bill yields. To do so, we separate the average wedge over expected market rates on all bills outstanding from excess yields on bills that could be affected by a delayed principal payment in the event of a debt limit breach. The former provides an estimate of the increased borrowing costs to the Treasury during and soon after a debt limit episode, while the latter indicates the discount that an investor is willing to accept to replace a bill maturing soon after a projected debt limit breach date with a bill maturing outside that time frame. We find that average rates more than doubled during the peak of both the 2011 and 2013 debt limit episodes, but were larger in magnitude and more prolonged for the 2011 episode. Conversely, excess yields for individual bills that matured soon after the projected breach dates appeared earlier and were significantly higher for the 2013 episode, peaking at 43basis points in 2013, but only 18 basis points in 2011. We attribute these differences across episodes to learning by market participants. Our results imply that for $100 billion of bill issuance at the height of a debt limit episode, the Treasury can expect increased borrowing costs of $70 to $90 million.

Background

In both May 2011 and 2013, Congress could not reach an agreement to increase the statutory debt limit. As a result, the Treasury Secretary declared a Debt Issuance Suspension Period (DISP), which allowed him to invoke extraordinary measures that temporarily extended the Treasury's borrowing capacity.[2,3] Throughout both episodes, the Treasury made several announcements in the form of letters to Congress, official statements, statements to the press, and Congressional testimony. By and large, these announcements informed Congress and the public of extensions to the DISP, and revisions to or affirmations of the projected debt limit "breach" date, which the Treasury ultimately declared to be August 2, 2011 and October 17, 2013. During the 2013 episode, the announcements also included projections of the Treasury's cash balance once extraordinary measures were exhausted. Table 1 lists the date, type, and

[2] The Treasury Secretaries during the 2011 and 2013 debt limit episodes were Timothy Geithner and Jack Lew, respectively.

[3] The use of extraordinary measures consists primarily of the temporary divestment of nonmarketable Government Account Series securities held in government accounts, which reduces nonmarketable debt, thereby allowing the government to issue marketable Treasury securities that finance the deficit while remaining below the debt limit. Once the debt limit is raised, the government accounts are restored, with most repaying any interest that would have accrued had the government account not been divested during the DISP.

summary of each announcement, as well as other important dates associated with the debt limit episodes.

As the projected breach dates neared and Congress failed to increase the debt limit, yields on Treasury bills increased (Figure 1), especially for bills maturing soon after the projected breach dates (Figure 2), which may have reflected concerns about possible delayed payments of those bills in the event of a debt limit breach. [4]

Methodology

In the analysis that follows, we separate out the change in yields for all bills outstanding during and after the debt limit episodes from the excess yields observed for individual bills that matured on or soon after a projected debt limit breach. The former allows us to estimate the impact of the recent debt limit episodes on the Treasury's borrowing costs, while the latter provides an estimate of the premium investors were willing to pay to replace bills that may have been perceived to be at risk of a delayed principal payment.

Our primary data source is the Center for Research in Security Prices U.S. Treasury Database. We construct a data set containing information on Treasury bills outstanding from 2011-2013, with one observation per business day per outstanding CUSIP.[5] Each observation contains identifiers such as CUSIP and maturity date as well as the annualized yield and bid-ask spread at the close of each business day. We augment our data set with the 3-month OIS rate from the Monetary and Financial Market Analysis group, net bill and coupon issuance from the FRB's tres_hist database, and FRB purchases of Treasury securities from the FRBNY's System Open Market Account Holdings series.

To conduct our analysis of Treasury bill yields, we employ the following empirical specification:

$$y_{c,t} = \alpha_c + \boldsymbol{X}'_{\boldsymbol{c,t}}\boldsymbol{\beta} + \boldsymbol{Z}'_{\boldsymbol{t}}\boldsymbol{\gamma} + \mathbf{1}(t \in E)\boldsymbol{\delta_t} + \mathbf{1}(t \in E, c \in B)\boldsymbol{\theta_{c,t}} + \epsilon_{c,t} \qquad (1)$$

where $y_{c,t}$ is the annualized yield (in basis points) for CUSIP c on date t; α_c is a CUSIP fixed effect; $X_{c,t}$ is a vector of variables that vary across time and CUSIP; Z_t is a vector of variables

[4] "…the fact that yields on Treasury bills that mature at the end of October are higher than bills that mature immediately before or after, might suggest nascent concerns about possible delays in payments on those bills." U.S. Department of the Treasury (October 2013), *The Potential Macroeconomic Effect of Debt Ceiling Brinkmanship.*

[5] We exclude Cash Management Bills from the analysis.

that vary across time, but is constant across CUSIP; $\mathbf{1}(t \in E)$ is an indicator that takes on a value of one if date t occurred during a debt limit episode, E, and zero otherwise; δ_t is a vector of date fixed effects; $\mathbf{1}(t \in E, c \in B)$ is an indicator that takes on a value of one if date t occurred during a debt limit episode and CUSIP c matured on or soon after a projected breach date, B, and zero otherwise; $\theta_{c,t}$ is a vector of CUSIP- and date-specific effects; and $\epsilon_{c,t}$ is an error term that accounts for unobservables that affect the yield of CUSIP c on date t.[6]

CUSIP fixed effects account for time-invariant characteristics of a Treasury bill, such as whether the bill matures at quarter end (when firms need cash), and thus sells at a premium relative to other bills. The vector $X_{c,t}$ includes controls for time to maturity and bill reopenings. The vector Z_t includes polynomial time trends for the sample period and for the months preceding and following a debt limit episode. This vector also includes the 3-month OIS rate.[7] Inclusion of the 3-month OIS rate in the regression is particularly important because it reflects market expectations for short-term rates, while remaining relatively immune to a debt limit episode.[8] In this sense, the OIS rate acts as a control for aggregate factors affecting bill yields not related to a debt limit episode. In auxiliary regressions, net bill and coupon issuance, FRB purchases of Treasury securities, and net bill and coupon issuance interacted with FRB Treasury purchases are also included in Z_t as controls for supply-side factors that potentially affect yields.

The δ_t's and $\theta_{c,t}$'s are our primary coefficients of interest. The date fixed effects, δ_t, are included for (approximately) the two weeks prior to and following the projected breach dates in 2011 and 2013. We interpret these coefficients as the average wedge over expected market rates on date t resulting from the debt limit episode net of any excess yields for bills at risk of a

[6] Standard errors are heteroscedasticity-consistent.
[7] We chose the 3-month rather than the 1-month OIS rate because the weighted average maturity of bills outstanding in our sample is approximately three months.
[8] The 3-month OIS rate is a geometric average of the expected Fed Funds rate over the next three months. To the extent that the Fed Funds market is a substitute for short-dated Treasury securities, the OIS rate could potentially be affected by a debt limit episode.

delayed principal payment.[9] The δ_t's thus reflect the premium that the Treasury must offer in order to issue a bill on date t.[10]

The CUSIP- and date-specific coefficients, $\theta_{c,t}$, are included for individual CUSIPs maturing in the weeks just prior to and following the projected breach dates in 2011 and 2013. Specifically, we include the $\theta_{c,t}$ coefficients for the CUSIPs maturing between July 28 and September 8 for the 2011 debt limit episode, and between October 10 and November 21 for the 2013 episode. We interpret each of the $\theta_{c,t}$ coefficients as the excess yield associated with one of these CUSIPs as the projected breach date nears. It follows that the $\theta_{c,t}$'s provide a measure of the discount that investors were willing to accept to replace bills that may have been perceived to be at risk of a delayed principal payment in the event of a debt limit breach with a bill maturing outside that time frame.

Results

Figure 3 provides point estimates and 95 percent confidence intervals for the δ_t's in the two weeks prior to and following the projected breach dates in 2011 and 2013. What is striking from the figure is that the average wedge over expected market rates appeared earlier, was larger in magnitude, and was more prolonged for the 2011 debt limit episode. For the 2011 and 2013 episodes, the average wedge peaked at nine and seven basis points in the days immediately preceding the projected breach. These results suggest that for $100 billion of bill issuance at the height of a debt limit episode, the Treasury can expect increased borrowing costs between $70 and $90 million dollars. [11]

Figure 4 provides point estimates of excess yields for the Treasury bills that may have been at risk of a delayed principal payment in 2011 and 2013. The most conspicuous feature of this figure is that excess yields appear to have been significantly higher leading up to the projected breach date in 2013 than they were in 2011. Figure 5, which provides point estimates and confidence intervals for the bills maturing on August 11, 2011 and October 31, 2013, confirms

[9] We find that the OIS rate rose modestly during the height of the debt limit episodes. Consequently, we believe that the δ_t's provide a lower bound on the average increase in bill yields on date t resulting from the debt limit episode.
[10] This assertion assumes that the bill being issued matures on a date not perceived to be at risk of a delayed principal payment.
[11] The Treasury auctioned $107 billion in 4-, 13-, 26-, and 52-week bills on October 15-16 of 2013, the two days prior to the projected breach date of October 17, when average bill yields reached their highest levels.

this. Each of these bills was the second bill to mature after the projected breach date and demonstrated the largest excess yields observed for the 2011 and 2013 episodes, respectively. However, the excess yield on the bill maturing on October 31, 2013 was significantly higher throughout the two week period leading up to the projected breach date, and its peak (43 bp) was more than twice the value of its 2011 counterpart (18 bp). We observe a similar pattern for other corresponding bills (e.g. the bills payable on August 18, 2011 and November 7, 2013).

Another notable feature of Figure 4 is the monotonic decline in excess yields that we observe for each successive bill maturing after the August 11, 2011 and October 31, 2013 bills. For each episode, excess yields were close to zero for bills maturing three weeks after the bill with the highest excess yield. Finally, it is worth noting that the spike in excess yields observed on October 9, 2013 (eight days prior to the projected breach date) coincided with the issuance of a 5-day Cash Management Bill whose high rate (30 bp) exceeded market expectations.

Interpreting the Results

While the average wedge over expected market rates appeared earlier, was larger in magnitude, and was more prolonged for the 2011 debt limit episode, excess yields on the bills that may have been perceived to be at risk of a delayed principal payment appeared earlier and were significantly larger in magnitude for the 2013 episode. We believe there are two plausible explanations for this behavior, both of which involve learning by Treasury bill market participants between the two episodes.

One explanation is that the 2011 debt limit episode provided a learning experience for Treasury bill market participants, and by the time the 2013 episode began, responses by market participants were more adept. Specifically, participants' may have focused on selling off bills that matured on or soon after the projected breach date rather than a general sell-off of outstanding Treasury bills. The red lines in Figure 6 display the standardized Debt Ceiling and Government Shutdown Index created by Scott Baker, Nicholas Bloom, and Steven J. Davis.[12] The index is primarily a measure of the fraction of articles appearing in major newspapers in the United States that use the phrases "debt ceiling" or "government shutdown". Notice that the index was as many as ten standard deviations above its mean during the 2011 episode, and

[12] The monthly data are available at http://www.policyuncertainty.com/debt_ceiling.html. We are grateful to Scott Davis for providing us with a daily version of the index.

remained more than four standard deviations above its mean for the two weeks following the projected breach date. Conversely, the index during the 2013 episode was generally less than four standard deviations above its mean, and it fell to more normal levels after the projected breach date. This is perhaps even more surprising given that a government shutdown was ongoing throughout the peak of the 2013 debt limit episode, which was not the case in 2011. One interpretation of this result is that the heavy debt ceiling news coverage in 2011 and its eventual resolution just prior to the projected breach date taught market participants about the consequences and probability of a debt limit breach. Namely, that bills maturing on or soon after the projected breach date were the bills at the greatest risk of a delayed principal payment, but that a debt limit breach was likely to be avoided. In fact, in Figure 4 we see that excess yields jumped on September 25, 2013 and October 1, 2013 after the October 17 projected breach date was first announced and then reaffirmed, while we see no corresponding change in the average wedge over expected market rates following those Treasury statements.

Another possible reason that the average wedge over expected market rates in 2013 exceeded the wedge in 2013 is that greater political uncertainty during the 2011 debt limit episode drove up bill yields, and also led to the review and eventual downgrade of the U.S. sovereign credit rating by Standard & Poor's, which may have further increased yields.

Pastor and Veronesi (2011) posit that political uncertainty can have a negative effect on asset prices because it is non-diversifiable, and non-diversifiable risk generally depresses asset prices by raising discount rates. To measure the impact of political uncertainty on asset prices, a few recent studies have used the news-based measure of economic policy uncertainty (EPU) developed by Baker, Bloom, and Davis (2013).[13] If one takes as given that a higher fraction of articles on the debt ceiling is indicative of greater uncertainty over the outcome of a debt limit standoff, we can treat the Baker, Bloom, and Davis Debt Ceiling and Government Shutdown Index as a debt ceiling uncertainty index. Based on the discussion of the index above, this would imply that uncertainty over the outcome of the debt limit standoff was significantly higher and lasted longer in 2011 than 2013, and as such, the average wedge over expected market rates should be larger and longer in duration, which is what was observed. This explanation is consistent with the results of Brogaard and Detzel (2013), who find that rising policy uncertainty

[13] Examples include Brogaard and Detzel (2013) and Da, Engelberg, and Gao. (2013).

is associated with a decrease in contemporaneous asset prices (or in our case, an increase in Treasury bill yields).

The political uncertainty associated with the 2011 debt limit episode also led to the review and eventual downgrade of the U.S. sovereign credit rating in July and August 2011, respectively. On July 13 and July 14, 2011 Moody's and Standard & Poor's placed the U.S. sovereign credit rating on review for possible downgrade, citing "greater policymaking uncertainty".[14] To the extent that these events were unanticipated, they could have played a significant role in generating the larger and more prolonged positive wedge over expected market rates observed during the 2011 debt limit episode. As seen in Figure 6, this announcement does not appear to have had an immediate impact on the average wedge, suggesting it was anticipated. However, following a decline in the wedge upon passage of the Budget Control Act of 2011, which ended the debt limit standoff, the wedge jumped on August 8, 2011, the first business day after Standard & Poor's downgraded the U.S. sovereign credit rating to 'AA+' from 'AAA'. Conversely, none of the major ratings agencies issued reviews or downgrades of the U.S. sovereign credit rating during the 2013 debt limit episode. It would appear then that the ratings downgrade by Standard & Poor's in 2011 was at least partly responsible for the prolonged positive wedge over expected rates that was observed following resolution of the 2011 debt limit episode.

[14] "Research Update: United States of America Long-Term Rating Lowered to 'AA+' on Political Risks and Rising Debt Burden; Outlook Negative (August 5, 2011). Standard & Poor's, http://img.en25.com/Web/StandardandPoors/UnitedStatesofAmericaLongTermRatingLoweredToAA.pdf

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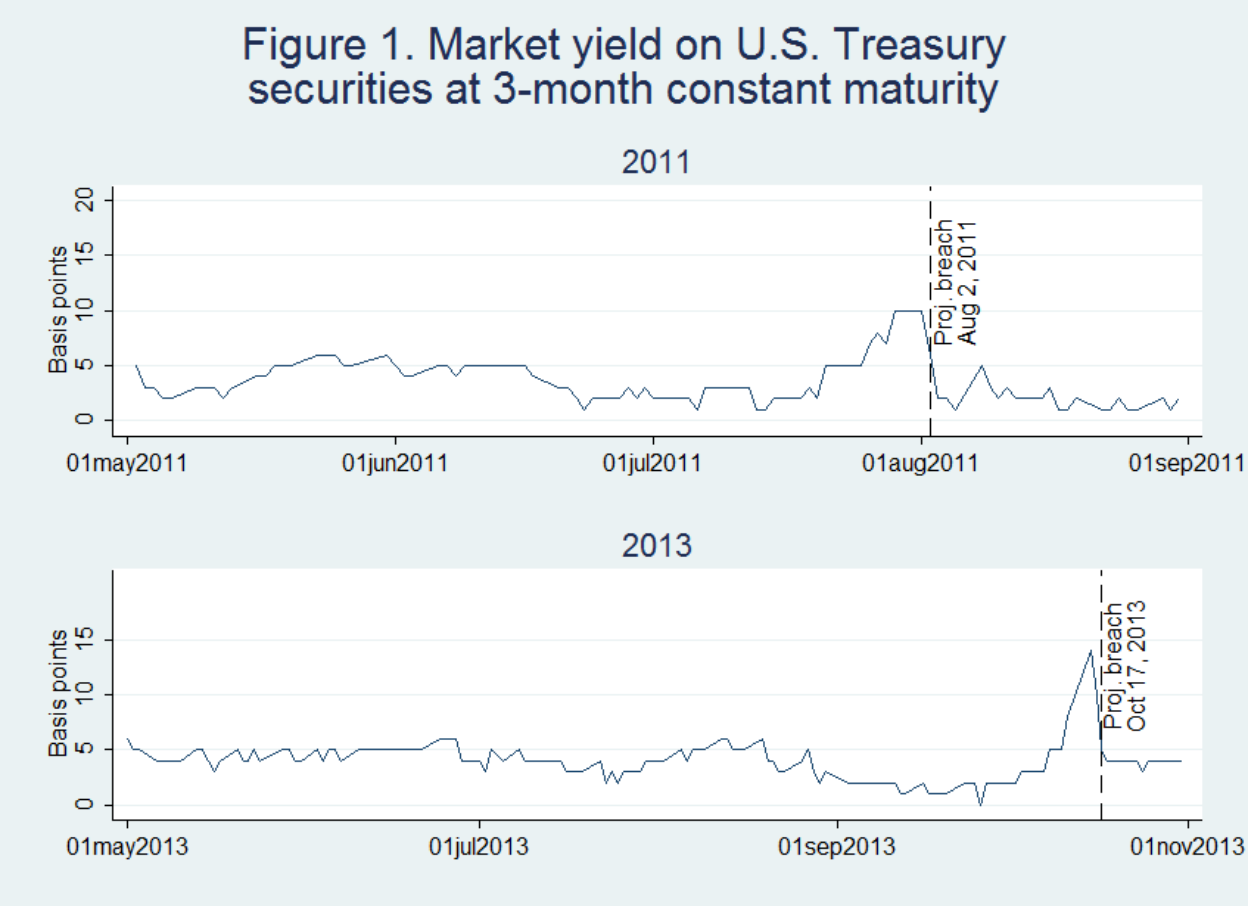
Table 1. Debt Limit Announcements from the Treasury and Other Important Events

Episode	Date	Type*	Summary
2011	May 2, 2011	Letter to Congress (T)	Announcement of Debt Issuance Suspension Period (DISP) lasting through August 2, 2011
	Jun 1, 2011	Statement (T)	August 2nd breach date projection reaffirmed
	Jul 1, 2011	Statement (T)	August 2nd breach date projection reaffirmed
	Jul 13, 2011	Statement	Moody's places U.S. sovereign credit rating of 'Aaa' on review for possible downgrade
	Jul 14, 2011	Statement	Standard & Poor's places its 'AAA' long-term and 'A-1+' short-term credit rating on the U.S. on Credit Watch negative
	Jul 15, 2011	Statement (T)	August 2nd breach date projection reaffirmed
	Aug 2, 2011	Legislation	Budget Control Act of 2011 is passed, which immediately increases debt limit by $400 bn; two additional increases of $500 bn and $1.2-1.5 trn subject to a Congressional motion of disapproval
	Aug 5, 2011	Statement	Standard & Poor's lowers long-term sovereign credit rating on U.S. to 'AA+' from 'AAA'
2013	May 17, 2013	Letter to Congress (T)	Announcement of DISP lasting through August 2, 2013
	Aug 2, 2013	Letter to Congress (T)	Extension of DISP to October 11, 2013
	Aug 26, 2013	Letter to Congress (T)	Extraordinary measures projected to be exhausted by mid-October 2013
	Sep 25, 2013	Letter to Congress (T)	Extraordinary measures projected to be exhausted no later than October 17, 2013
	Oct 1, 2013	Letter to Congress (T)	Final extraordinary measures being used; reaffirmed exhaustion of extraordarinary measures no later than October 17, 2013; cash balance of $30 bn on hand; government shutdown begins
	Oct 16, 2013	Legislation	Continuing Appropriations Act, 2014 is passed, which suspends the debt limit until February 7, 2014

*(T) indicates that the announcement came from the Treasury Department.
Source: "Debt Limit," U.S. Department of the Treasury, http://www.treasury.gov/initiatives/pages/debtlimit.aspx; Brandimarte, Walter and Daniel Bases (June 13, 2011). "Moody's puts U.S. ratings on review for downgrade," Reuters, www.reuters.com/article/2011/07/13/us-usa-ratings-moodys-idUSTRE76C6PT20110713; "Research

Update: United States of America Long-Term Rating Lowered to 'AA+' on Political Risks and Rising Debt Burden; Outlook Negative (August 5, 2011). Standard & Poor's, http://img.en25.com/Web/StandardandPoors/UnitedStatesofAmericaLongTermRatingLoweredToAA.pdf; Budget Control Act of 2011 (August 2, 2011). Government Printing Office, http://www.gpo.gov/fdsys/pkg/PLAW-112publ25/html/PLAW-112publ25.htm; H.R. 2775 – Continuing Appropriations Act, 2014 (October 17, 2013), Congress.gov, http://beta.congress.gov/bill/113th-congress/house-bill/2775



Source: Federal Reserve Board (2014), Statistical Release H.15, "Selected Interest Rates (Daily)" (March 13).

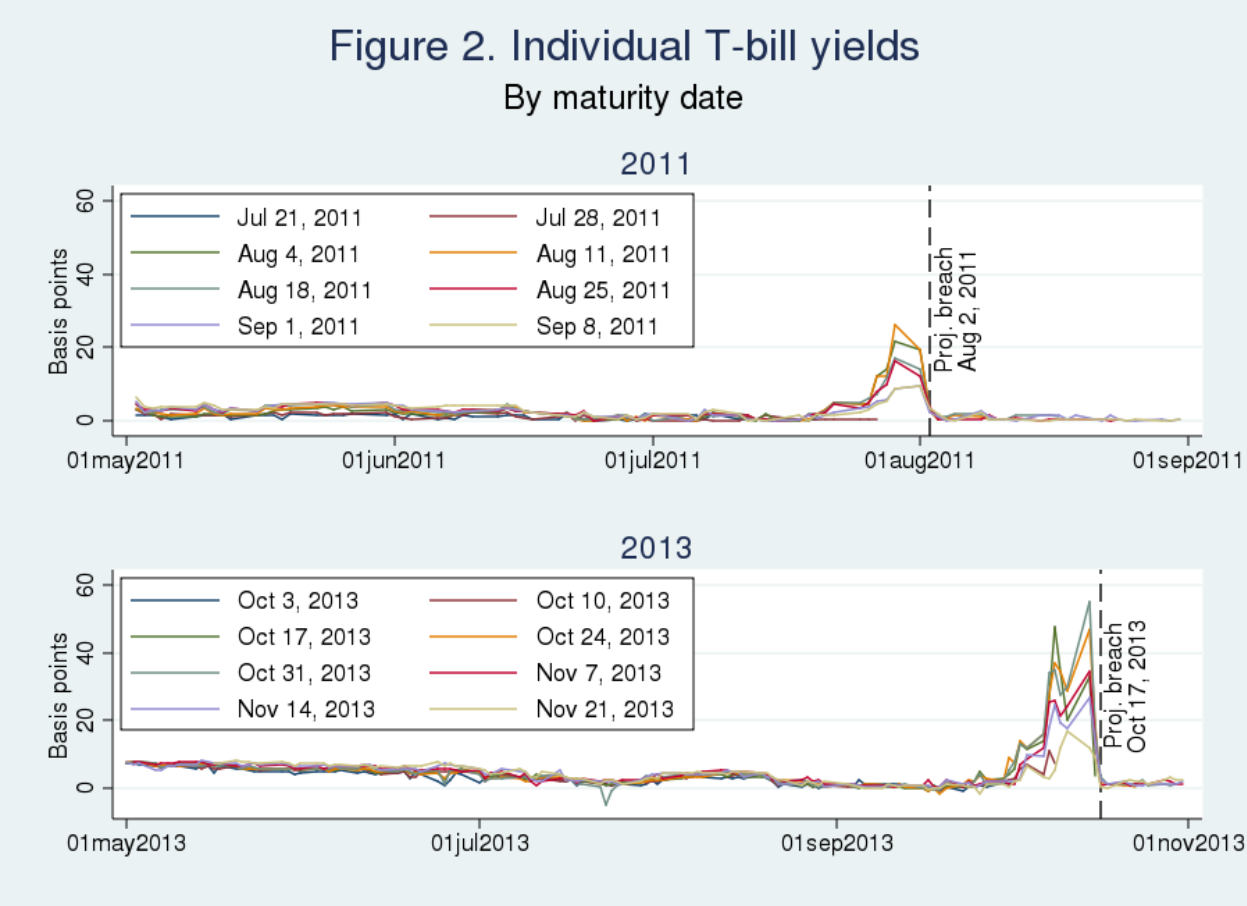


Figure 2. Individual T-bill yields
By maturity date
2011
Basis points
0
20
40
60
Jul 21, 2011
Jul 28, 2011
Aug 4, 2011
Aug 11, 2011
Aug 18, 2011
Aug 25, 2011
Sep 1, 2011
Sep 8, 2011
Proj. breach
Aug 2, 2011
01may2011
01jun2011
01jul2011
01aug2011
01sep2011
2013
Basis points
0
20
40
60
Oct 3, 2013
Oct 10, 2013
Oct 17, 2013
Oct 24, 2013
Oct 31, 2013
Nov 7, 2013
Nov 14, 2013
Nov 21, 2013
Proj. breach
Oct 17, 2013
01may2013
01jul2013
01sep2013
01nov2013

Source:

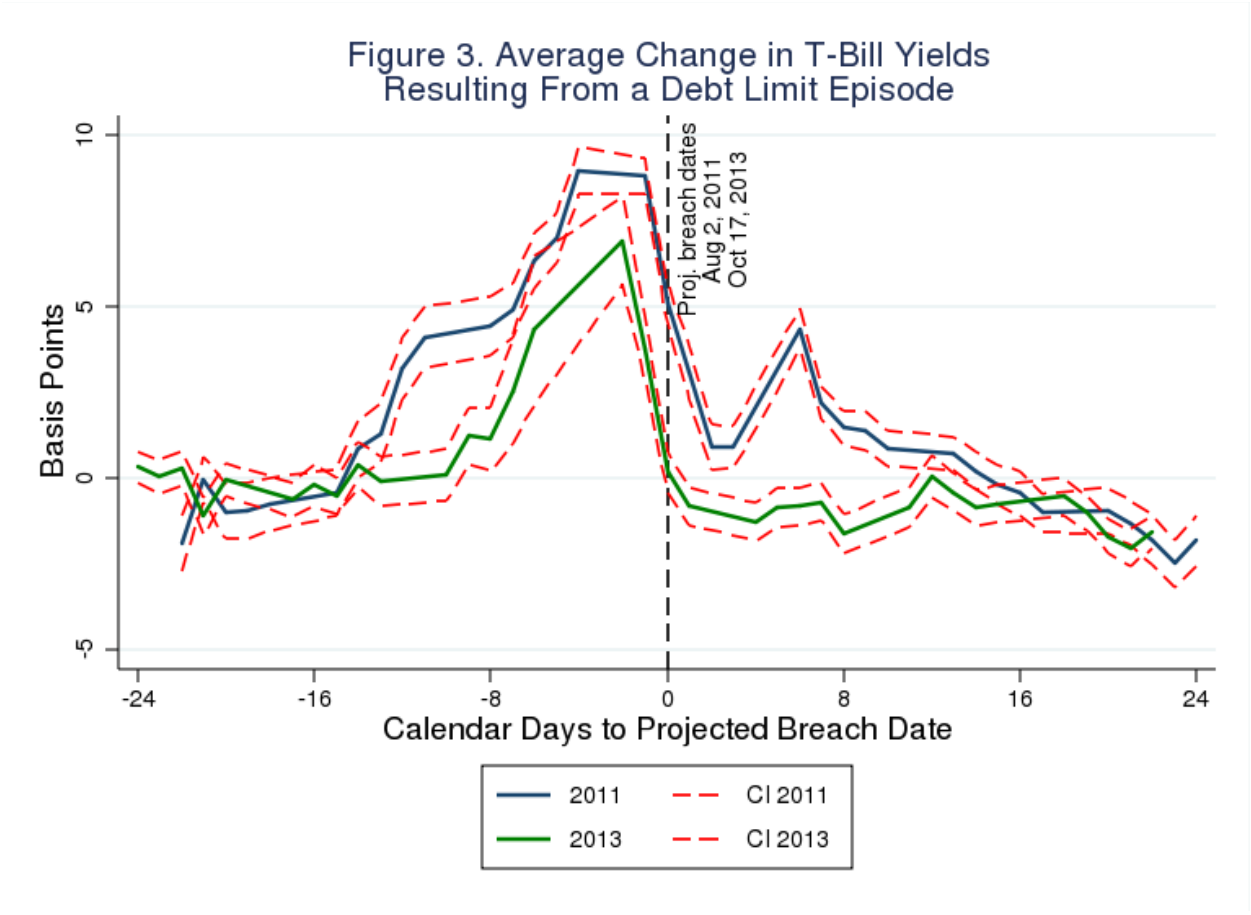
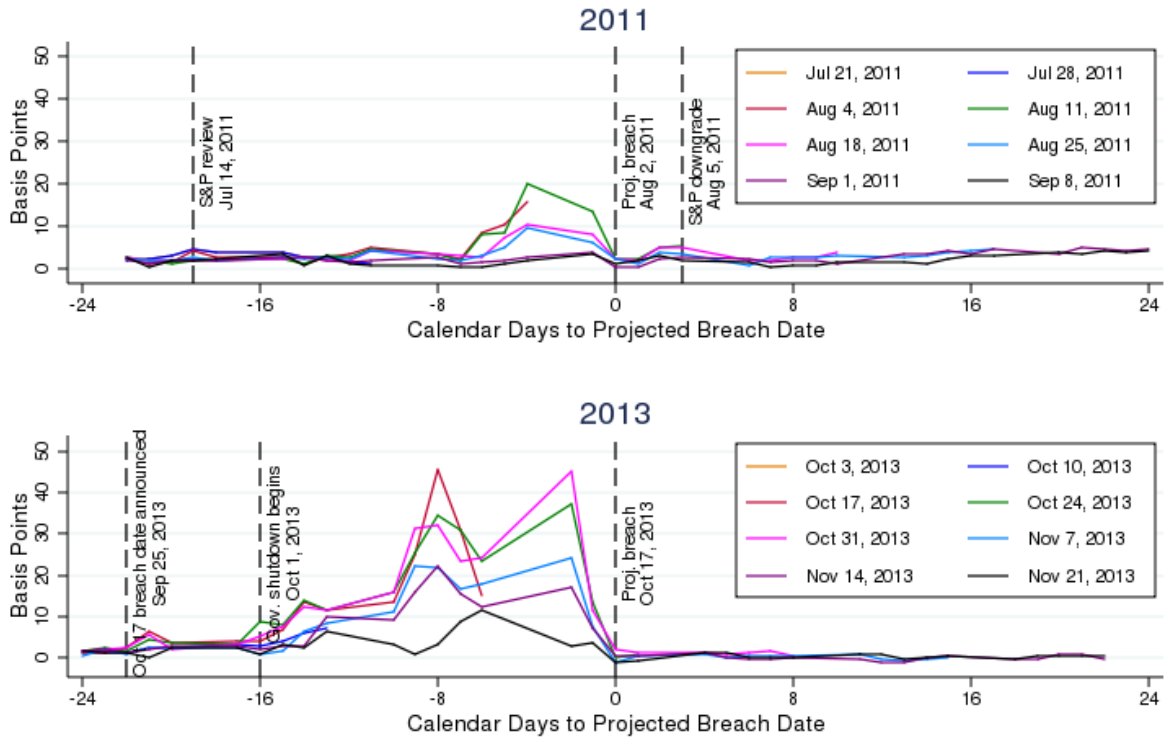


Figure 3. Average Change in T-Bill Yields
Resulting From a Debt Limit Episode
Basis Points
10
5
0
-5
Proj. breach dates
Aug 2, 2011
Oct 17, 2013
-24
-16
-8
0
8
16
24
Calendar Days to Projected Breach Date
2011
CI 2011
2013
CI 2013

Figure 4. Excess Yields on T-Bills Maturing Near the Projected Breach Dates



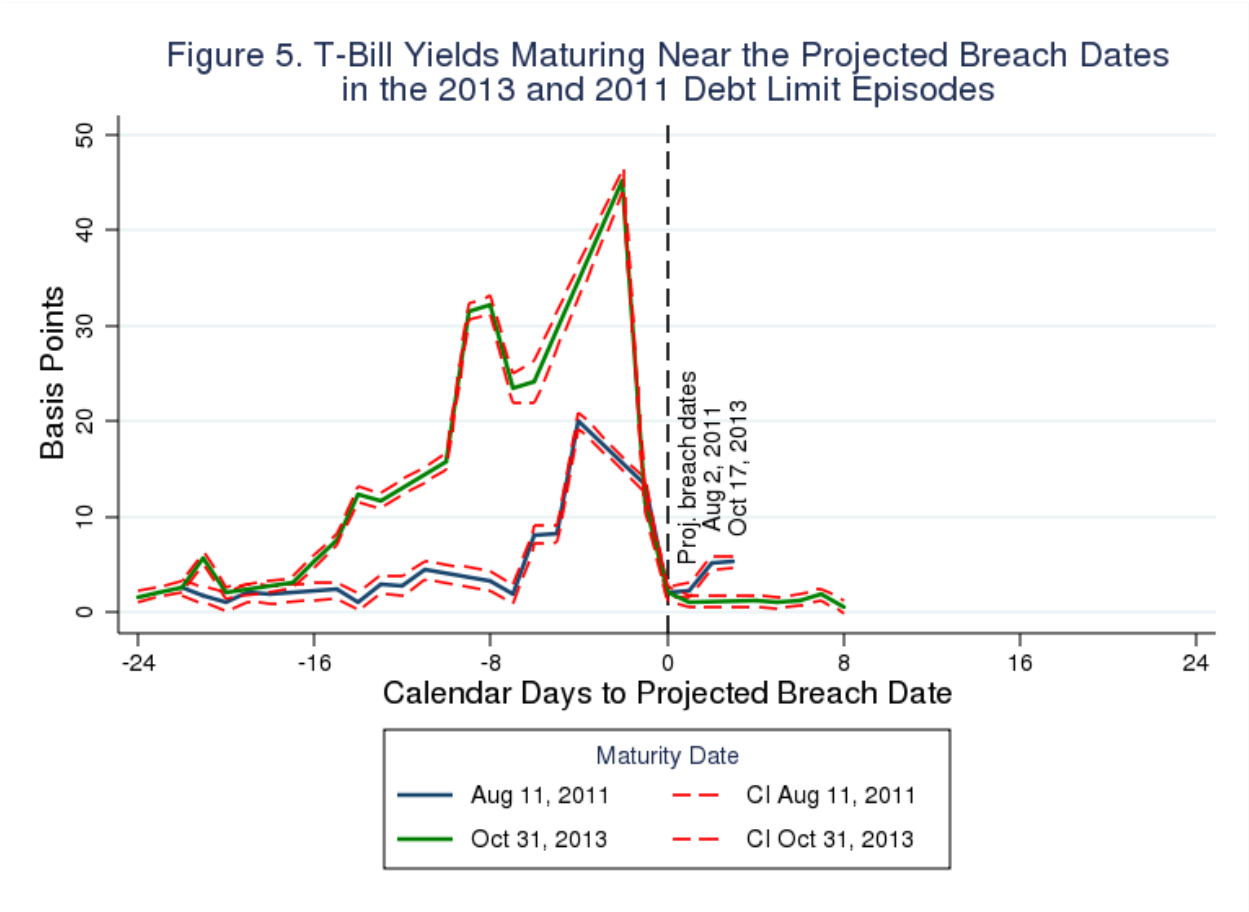


Figure 5. T-Bill Yields Maturing Near the Projected Breach Dates in the 2013 and 2011 Debt Limit Episodes
Basis Points
0
10
20
30
40
50
-24
-16
-8
0
8
16
24
Calendar Days to Projected Breach Date
Proj. breach dates
Aug 2, 2011
Oct 17, 2013
Maturity Date
Aug 11, 2011
CI Aug 11, 2011
Oct 31, 2013
CI Oct 31, 2013

Figure 6. Comparing the Average Wedge Over Expected Market Rates To the Debt Limit Uncertainty Index