The 2025 U.S. Debt Limit Through the Lens of Financial Markets

Luca Benzoni and Marisa Wernick

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Luca Benzoni and Marisa Wernick[1]

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Abstract

We examine the 2025 U.S. debt limit episode through the lens of financial markets. First, we document an increase in trading activity in the U.S. sovereign CDS market, and we infer a probability of default from CDS premiums. We find that default risk reached 1% by the November 6 Presidential election, fell quickly after that, and progressively climbed back up in subsequent months to the current 1.1% level. Overall, these estimates are well below the default risk estimates for the debt-limit episodes of 2011, 2013, and 2023, which range from 4% to 6%. Second, so far we only find small distortions in the market for Treasury bills that mature around the "X-date," when Treasury is expected to extinguish its existing resources, and thus would be most affected by a hypothetical default. This is in contrast with the 2023 episode, when bills maturing around the X-date traded with a yield that was about 1% higher than those maturing in other months. Third, we discuss the broader consequences that debt-limit events can have for the level of bank reserves at the Federal Reserve, and their implications for money markets liquidity.

JEL Codes: G10; G12; G18; G28; E32; E43; E44

Keywords: U.S. default; sovereign CDS; default probabilities; U.S. CDS; debt limit

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1. Introduction

The U.S. debt limit is the total amount of money that the United States is allowed to borrow to meet existing obligations, including interest and principal payments on national debt, Social Security, Medicare, and Medicaid benefits, military salaries, and other payments. The Fiscal Responsibility Act of 2023 suspended the debt limit through January 1, 2025, and on January 2 a new debt limit was established at the amount of debt outstanding at the end of the previous day. Since then, the U.S. Treasury has been unable to borrow additional money. On January 17, 2025, Treasury Secretary Janet Yellen notified Congress of the measures that the Treasury was going to begin using on January 21 to meet its obligations, including suspending investment in retirement, disability, and health funds for federal workers. While such measures allow the Treasury to continue making payments, they will eventually be exhausted, and Congress will need to increase, or suspend, the debt limit in order to avoid risking a default.[2]

In this article, we study the 2025 debt limit episode through the lens of financial markets. First, we turn to the U.S. sovereign credit default swap (CDS) market to gauge market participants' assessment of the risk of a U.S. default. To this end, we imply default probabilities from the time-series of U.S. sovereign CDS premiums from the summer of 2024 through current date, and we compare our estimates to those obtained for the debt ceiling episodes of 2011, 2013, and 2023. We refer to such measures as "risk-adjusted" probabilities, because they account for the adjustment that market participants make due to the uncertainty of a default and the actual loss given default, and their aversion to the risk surrounding these events.[3] Moreover, to gauge how informative these probability estimates are, we explore various liquidity metrics for U.S. sovereign CDSs over the past months, and we contrast them to those observed during, and outside of, other previous debt limit events. Second, we examine the effect of demand and supply shocks in the Treasury market triggered by debt-limit dynamics and their effect on interest rates. More specifically, we explore whether risk-management practices by institutional investors, e.g.,

[2] See the Debt Limit Letter to Congress Members 2024127 Mike Johnson (treasury.gov) and 20250117 Mike Johnson (treasury.gov)

[3] Such an adjustment could be sizable. First, the returns on a fixed-income investment are typically negatively skewed, with upside limited by the face value of the bond. Second, in case of a credit event, other assets would also likely fare poorly. Hence, there is risk in a short CDS position that is difficult to diversify away, and protection sellers will adjust the default probability upward, thereby increasing the CDS premium. That is, the actual default probability is likely smaller than the risk-adjusted measure that we imply from CDS data.

money market funds, generate demand segmentation along the yield curve that distorts Treasury bills' pricing. For instance, out of concerns for disruptions in payments, money managers might avoid bills that mature around the X-date, and bid up the prices of Treasuries with other nearby maturities. Moreover, the debt-limit forces the Treasury to adjust the supply and maturity structure of new debt, which affects the availability of Treasuries in the market. We discuss the effect of this supply shock and the actions available to policy makers to mitigate its impact on interest rates.

We find that trading activity in the U.S. sovereign CDS contract has been extremely subdued since the passing on the Fiscal Responsibility Act of 2023, only to pick up again in the fall of 2024 when the end of the debt limit suspension was becoming closer. During this period of renewed activity, CDS premiums increased through Election Day, implying a one-year risk-adjusted default probability that peaked at 1%. The default probability fell abruptly to 0.35% on November 6, 2024, on the wake of news that a single party had seized control of both the Presidency and the Senate. Political uncertainty that a fractured government might fail to lift the debt limit fell even lower in mid-November, when the Republican Party won the majority in the lower chamber, bringing the default probability below 0.3%. Optimism however was tempered in the following weeks, as negotiation to avoid a government shutdown unfolded in December. At the time of writing, the risk-adjusted default probability reached 1.1%.

Next, we examine the pricing of Treasury bills that expire around the summer of 2025, when the Treasury is likely to exhaust its extraordinary measures and, if Congress fails to take action, a default could occur (the so-called X-date). As a point of comparison we use the term structure of Overnight Indexed Swap (OIS) rates with the Secured Overnight Funding Rate (SOFR) as the floating-rate reference entity. Because the counterparties of the OIS contracts do not involve the federal government, and the contracts are overnight derivative instruments subject to daily margin requirements, the OIS rate represents a near-risk-free investment that is less affected by changes in the probability of a U.S. default. At the time of writing, we find the spread between OIS rates and matched-maturity Treasury bills rates are mostly stable in maturities ranging from spring 2025 through winter 2026. Bill rates expiring in late summer 2025 have been increasing, potentially indicating some concern for a possible impasse in the

debt limit negotiations, but for now the distortions in the Treasury bills market, as seen through the lens of the OIS-bills spread, are still limited.

The debt-limit events can also have broader consequences for the balance of reserves that financial intermediaries hold with the Federal Reserve, and thus for the functioning of money markets. In the on-going episode, the Federal Reserve has been running down its System Open Market Account (SOMA) holdings of securities. So far the runoff has been absorbed by a decline in the Overnight Reverse Repo (ON RRP) facility with little impact on reserves (Perli 2025). However, further runoffs in the SOMA portfolio will eventually lead to lower reserves.

During this debt-limit episode, the expected decline in reserves is also affected by the contemporaneous actions of the Treasury department, which is running down the balance of the Treasury General Account (TGA) to fulfill its payments obligations. As checks are sent to households and cleared at financial intermediaries, reserves and ON-RRP balances increase, and liquidity in the financial system improves. However, once the debt limit is lifted or suspended, the Treasury department will resume its debt issuance. Should this issuance resemble past debt limit episodes, the U.S. Treasury would likely focus on issuance of Treasury bills in order to efficiently bring the TGA account back to the desired level. Such issuance would be quick and potentially large, depending on the level of the TGA balance at the time Congress takes action. Since the ON RRP facility balance is already very low, a steep decline in reserves is likely as the TGA is rebuilt. These concerns have triggered discussion among market participants as to whether the Federal Reserve will pause, slow, or stop quantitative tightening, to avoid an excessive rundown in bank reserves. The FOMC announced on March 19 its intention to slow the balance sheet runoff, consistent with its intentions stated on May 4, 2022, to "slow and then stop the decline in the size of the balance sheet when reserve balances are somewhat above the level it judges to be consistent with ample reserves."[4] We will continue to follow these events as they unfold.

Relative to prior debt limit episodes, the perceived risk of a so-called "technical default" by the United States, in which the Treasury misses a payment deadline due to a failure to suspend the debt limit, has remained comparably low. For instance, the risk-adjusted default probability

[4] See the May 4, 2022 FOMC statement here.

implied by U.S. sovereign CDS contracts exceeded 6% in the summer of 2011, and was well above 4% in 2013 and 2023, i.e., higher than the 1% peak registered on November 5, 2024. Moreover, OIS-Treasury Bills spreads are more robust currently than in previous debt ceiling episodes. For instance, in spring 2023 yields on bills maturing around the X-date were more than 1% higher than yields on bills maturing before and after the date at which debt limit disruptions were anticipated. So far we have not seen such a big spread. Yet, a possible U.S. default would be extremely disruptive for financial markets, damaging for U.S. households, and detrimental for future borrowing costs.

Our paper contributes to the literature that studies the effects of the U.S. debt limit in financial markets, see, e.g., Benzoni, Cabanilla, Cocco, and Kavoussi (2023), Cassidy and Mirani (2025), Gallagher and Collins (2016), and Stein and Wallen (2023). Compared to this previous work, we focus on the 2025 events and draw a comparison with previous debt limit episodes. Moreover, our work extends the literature that studies sovereign credit risk through the lens of CDS markets; see, e.g., Augustin, Chernov, and Song (2020), Brigo, Pede, and Petrelli (2019), Chernov, Schmid, and Schneider (2020), and Klingler and Lando (2018). Our paper is connected with the literature that studies the convenience premium in Treasuries, e.g., Acharya and Laarits (2023), van Binsbergen, Diamond, and Grotteria (2022), Augustin, Chernov, Schmid, and Song (2021) and Fleckenstein and Longstaff (2024). Finally, our work complements a vast literature that studies supply and demand effects in the Treasury market, e.g., Greenwood, Hanson, and Vayanos (2024), Greenwood and Vayanos (2010, 2024), Krishnamurthy and Vissing-Jorgensen (2011, 2012), Modigliani and Sutch (1966), D'Amico, English, López-Salido, Nelson (2012), D'Amico and King (2013), and Swanson (2011).

2. What does the sovereign CDS market tell us about the likelihood of a U.S. default?

The CDS market has evolved over the years to give participants an infrastructure where to trade credit risk, i.e., the risk that a borrower, or reference entity, will default on its bonds or loans. In a CDS contract, a "protection buyer" pays a premium to a "protection seller." In exchange for the premium payments, if the borrower's reference entity defaults on its bonds or loans, the protection seller is required to make a payment to the protection buyer based on the decrease in the market value of the borrower's bonds and loans. The total notional amount of

CDS outstanding was $9.3 trillion as of June 2024.[5] Trading however is concentrated on contracts written on single name entities and on indices that track a basket of corporate bond issuers. In comparison, the notional amount written on sovereign entities stood at merely $1 trillion, or 11% of the total. Within this class, most of the trading concentrates on emerging markets names, e.g., Argentina, Brazil, Mexico, Russia and Turkey, with occasional pockets of activity in developed market economies, e.g., Italy and Greece during the Euro zone crisis. In comparison, trading in the U.S. sovereign CDS is minimal relative to both the total size of the CDS market and the sheer amount of outstanding U.S. debt. For instance, Boyarchenko and Shachar (2020) and Benzoni, Cabanilla, Cocco, and Kavoussi (2023) show that *gross* notional amounts outstanding peaked at $32.3 billion in 2011, while *net* notional amounts outstanding reached $5.7 billion in 2023.[6] Figure 1 tracks these developments and extends them to current date.

Gross and net notional amounts, however, do not fully convey the nature of liquidity in the U.S. sovereign CDS. To this end, Figure 2 shows gross weekly trading (left panel) and number of weekly traded contracts (right panel). Trading is spotty, with long dormant periods alternated with outbursts of activity that typically coincide with debt limit episodes. Figure 3 highlights this point by zooming in the series of weekly contracts from 2022 to current date. Trading picked up in January 2023, when the U.S. reached the debt limit, and continued through early summer 2023, when Congress passed the Fiscal Responsibility Act that suspended the limit. Activity waned down considerably after that, only to pick up again in fall 2024 as the suspension period was coming to a close.

Trading is central to making prices informative, hence here we focus on the period from fall 2024 through the current date to infer the likelihood of a U.S. default. In sync with the recent trading increases around October and early November 2024, the CDS premiums in Figure 4 show a marked increase in the cost of insuring against a default, with a peak on November 5, the day prior to the U.S. presidential election. Around that time, the U.S. CDS curve became "inverted," i.e., the cost of insurance was higher at the one-year than the five-year tenor.

[5] See Tables D10.1 and D10.4 in the OTC derivatives statistics published by the Bank of International Settlements (BIS), available here.
[6] Net notional measures the aggregate payments to be made by the protection sellers in the event of a default by the reference entity, hence it provides a better estimate of the ultimate exposure compared to gross notional.

Normally, the quoted spread on the five-year CDS is higher than the one-year CDS because of greater uncertainty that a credit event might occur further into the future. The relative increase in one-year CDS reflects investor interest to seek protection for a possible credit event in the short term, such as one related to the debt-limit episode.

To map CDS premiums into a default probability, we need to determine the expected loss in case of a default. In a CDS contract, the protection seller compensates the protection buyer by an amount that depends on the valuation and availability of bonds on the defaulted reference entity. If the U.S. Treasury were to miss a payment, the Credit Derivatives Determination Committee (DC) [7] would be tasked to rule whether a credit event occurred, i.e., if payments should be made on CDS contracts. Moreover, the DC would determine whether to hold an auction and what securities are deliverable into that auction. Market participants would then offer the cheapest eligible and available bonds into the auction. In the current episode, the cheapest to deliver security would be the thirty-year Treasury bond that matures on May 15, 2050, issued near par on May 15, 2020, at the peak of the Covid pandemic, with a 1.25% coupon rate. Since the subsequent increase in U.S. interest rates, its price fell by roughly half, as seen in Figure 5.

Usually the settlement price of a CDS auction is a blend of the prices of the securities deliverable into the auction, especially if the outstanding amount of CDS notional exceeds that of the bonds outstanding by the reference entity. This is however not the case in a hypothetical U.S. default, as there are $73 billion Treasury bonds maturing on May 15, 2050. Even if a fraction of them are tied up in the portfolios of buy-and-hold investors, most likely the sheer size of the issue dwarfs the notional amount of U.S. sovereign CDS outstanding (Figure 1).[8] Therefore, in case of a credit event, the cash flow perceived by the protection buyer would approximately be the difference between $1 and the price of the thirty-year bond maturing on May 15, 2050, per unit of face value, times the notional amount of the CDS contract. While the exact amount of the cash flow is unknown due to interest rate and default risk, the current price of that bond is, in present value, the best estimate of the cash flow upon default.

[7] In 2018, ISDA appointed DC Administration Services, Inc. (DCAS) as the Determination Committees Secretary. The most recent website for the Determination Committees is here.

[8] In addition to the $73 billion Treasury bonds maturing on May 15, 2020, there are $89 billion outstanding in the 30-year Treasury bond maturing on August 15, 2050. That bond has a coupon rate of 1.375% and trades at a price only slightly higher than that of the cheapest deliverable.

At the inception of the CDS contract, the buyer and the seller of credit derivative protection agree to a CDS premium such that the contract has zero market value. That is, the present value of CDS premium payments made by the protection buyer equals the present value of the payments made by the protection seller. In a single period model, and abstracting from transaction costs, this implies:

PV CDS premiums = p*PV Cashflow(credit event) + (1-p)*PV Cashflow(no credit event),

where p denotes the risk-adjusted probability of a credit event and PV denotes the present value of a cash flow. In case of no credit event, the seller of CDS insurance makes no payment, hence the Cashflow(no credit event) term is zero. Thus, the CDS pricing equation simplifies into an expression for the risk-adjusted default probability,

p = (PV CDS premium) / (PV Cashflow(credit event)).

The risk-adjusted default probability is thus the ratio of the CDS premiums the protection buyer is expected to pay, divided by the expected loss that the protection seller commits to refund in case of default. In the current episode, the expected loss given default is high, in the order of 50%, due to the deep discount at which the cheapest to deliver bond is trading (Figure 5). Thus, protection sellers demand, and buyers are willing to pay, a higher premium against a given amount of credit risk.

The magnitude of the expected loss in a U.S. credit event is unique to the current, as well as the previous 2023 debt limit episode. Both now and in 2023 the cheapest to deliver security has been the 30-year bond issued on May 15, 2020, with a 1.25% coupon rate. Since 2020, the FOMC has repeatedly increased the federal funds rate, resulting in a marked increase in long-term Treasury yields and a corresponding decline in the prices of notes and bonds, especially those with long maturity that pay a low coupon rate. Because of a higher expected loss given default, CDS premiums have been higher in 2023 and 2025 for the same amount of credit risk. For instance, in the 2011 and 2013 debt limit episodes the cheapest to deliver security was changing over time and typically traded at a small discount, from near-zero to 20%. Hence, in those events a lower CDS premium would imply a relatively higher risk-adjusted default probability, because loss-given-default was expected to be much lower.

While the simple single-period example is useful to convey intuition, in practice CDS contracts involve pro-rated quarterly payments of the premium, and the default could occur at any time during the tenor of the contract. We explain our computations in more detail in the Appendix.

Figure 6 shows the one-year risk-adjusted *p* estimate during the on-going debt limit episode. Since the summer of 2024, CDS premiums have increased in sync with renewed trading activity. The risk-adjusted default probability peaked at 1% the day before the U.S. presidential election. It then fell abruptly on November 6, 2024, on the wake of news that a single party had seized control of both the Presidency and the Senate. Perceived risks of a potential credit event fell even lower in mid-November, when the Republican Party won the majority in the lower chamber and the default probability fell below 0.3%. Optimism however was tempered in the following weeks, as negotiation to avoid a government shutdown unfolded in December. At the time of writing, the risk-adjusted default probability reached 1.1%.

Compared to previous episodes, the *p* estimate has been significantly lower. Figure 7 shows risk-adjusted default risk estimates for 2011, 2013, and 2023.[9] In the summer of 2011, *p* hovered around 4% before reaching a 6% peak shortly ahead of the passing of the Budget Control Act of 2011, which brought the first of the three episodes to conclusion on August 2. In the second episode, *p* peaked at 4% in fall of 2013, shortly before the October 17, 2013 passing of the Continuing Appropriations Act, 2014. Finally, *p* spiked up to 1.8% when the U.S. reached the debt limit in January 2023, and continued to increase to 4% through the end of April 2023. The *p* estimate remained elevated though May. On May 31, 2023, the U.S. House of Representatives passed the Fiscal Responsibility Act of 2023, which cleared the Senate on June 1, bringing the 2023 debt ceiling episode to a close. By June 2, 2023, one-year CDS premiums were down to about 10 bps, implying a *p* estimate of around 20 bps.

[9] Unlike the current episode where the cheapest to deliver security has remained the same, such a security in 2011 and 2013 changed over time, rendering the default probability estimate noisier. To attenuate this problem, we collect data on all Treasury securities that were outstanding at the time, and for each day we identify the one that would have been cheapest to deliver in case of a default. We then use the average price of the cheapest deliverable bonds over the previous five calendar days to imply a *p* estimate.

3. The debt limit and the market for U.S. Treasury bills

The consequences of the debt limit can be farther reaching than the U.S. sovereign CDS market. For instance, Treasury bills that are maturing around the time when the Treasury is expected to exhaust its extraordinary measures can be affected, because the risk of delayed payments could induce some market participants, e.g., money market funds, to avoid holding such securities in their portfolios. This shift in demand could push down the prices of Treasury bills maturing around the X-date relative to those expiring at nearby maturities. Unlike the U.S. sovereign CDS market, the market for Treasury bills is large and extremely liquid. Hence, the term structure of bills' rates is an important gauge of the disruption caused by the debt limit in financial markets.

Figure 8 shows Treasury bills' yields maturing in 2025, computed using prices as of April 16 and May 27, 2025. As a benchmark, the figure also includes the term structure of OIS rates with the SOFR as the floating-rate reference entity. Because the counterparties of the OIS contracts do not involve the federal government, and the contracts are overnight derivative instruments subject to daily margin requirements, the OIS rate represents a near-risk free investment that is less affected by changes in the probability of a U.S. default. Both the OIS and bills term structures are downward sloping, consistent with market participants' expectations that the FOMC will lower the federal funds target during the year. The OIS rate is higher than bills rates throughout 2025, with bills' rates expiring in late summer of 2025 that are slightly more elevated. This pattern is more visible in the April than in the May data.[10] It indicates some concern for a possible impasse in the debt limit negotiations, even though for now distortions in the Treasury bills market driven by debt-limit negotiations, as measured by the OIS-bills spread, appear to be limited.

These results contrast with the experience of the previous debt limit episode, when markets were paying much closer attention to the expected X-date (see, e.g., Benzoni, Cabanilla, Cocco, and Kavoussi, 2023). On January 19, 2023, U.S. Treasury Secretary Yellen notified Congress of

[10] An August X-date is consistent with estimates later released by Treasury Secretary Bessent on May 9, 2025. See the Debt Limit Letter to Congress Members 20250509 Kevin McCarthy (treasury.gov).

the extraordinary measures that the Treasury had begun using on that day and provided an update on the government ability to continue making payments:[11]

> "While Treasury is not currently able to provide an estimate for how long extraordinary measures will enable us to continue to pay the government's obligations, it is unlikely that cash and extraordinary measures will be exhausted before early June."

Market participants took notice and over time the general sentiment was that the Treasury would have enough cash to make payments through late summer. Consistent with this estimate, the top panel of Figure 9 shows the term structure of Treasury bills' yields maturing through 2023, computed with prices as of April 28, 2023. Bills maturing in spring and fall 2023 traded at a significant premium relative to the OIS curve. In contrast, the bills maturing in August, which would have been affected in case of missed payments, traded at much lower prices. The difference in terms of yield to maturity was in the order of 100 bps.

Subsequent communications by Secretary Yellen confirmed that the expected X-date was the driving force behind this price differential. Indeed, on May 1, 2023, wrote again to Congress, stating that:[12]

> "In my January 13 letter, I noted that it was unlikely that cash and extraordinary measures would be exhausted before early June. After reviewing recent federal tax receipts, our best estimate is that we will be unable to continue to satisfy all of the government's obligations by early June, and potentially as early as June 1."

The market reaction was swift. The bottom panel of Figure 9 shows that on May 2 the term structure of bills repriced with an expectation that the securities most likely to be disrupted by the debt limit would be the ones maturing in early June.

4. The debt limit and bank reserves

The debt limit events can have broader consequences for the balance of reserves that financial intermediaries hold with the Federal Reserve, and thus for the functioning of money markets.

[11] See the Debt Limit Letter to Congress Members 20230119 Kevin McCarthy (treasury.gov).
[12] See the Debt Limit Letter to Congress Members 20230501 Kevin McCarthy (treasury.gov).

In May 2022 the FOMC communicated its plans for the reduction of its SOMA portfolio holdings.[13] Within these plans, the FOMC stated its goal to transition from the abundant level of reserves built in the aftermath of the Covid pandemic by beginning to slow and then stop the decline in the size of the balance sheet when reserve balances are somewhat above the level it judges to be consistent with ample reserves. The FOMC did not specify a precise target for bank reserves, but rather have emphasized the use of various indicators of money markets liquidity to infer when an adequate reserve level has been reached (e.g., Perli 2025). Between June 1, 2022, when the FOMC instructed the SOMA Desk to start the portfolio runoff, and the week of May 14, 2025 total Federal Reserve assets declined by $2.09 trillion (Figure 10).

So far, the decline in the SOMA portfolio has been absorbed almost entirely by a reduction in the ON RRP facility, while the level of reserves has been largely stable (Figures 11-12). The ON RRP facility, however, has reached $55 billion the week of April 16, 2025, the lowest recorded level since 2021. While some further decline in the ON RRP facility is possible, its already low level suggests that a further reduction in portfolio holdings will result in a decline of other Federal Reserve liabilities, i.e., most likely reserves.

Any future decline in reserves, however, will likely be partially impacted by the contemporaneous actions of the Treasury department. Since the Treasury enacted extraordinary measures the week of January 19, 2025, the balance of the Treasury General Account has declined by approximately $364 billion through the week of April 2, 2025, and later climbed back up to $678 billion by the end of April due to tax payments (Figure 13). Absent a Congressional resolution to raise or suspend the debt limit, the Treasury will have to make use of the remaining TGA balances to fulfill its payments obligations.

However, once the debt limit is lifted or suspended, the Treasury department will resume its debt issuance, likely via Treasury bills issuance, to bring the TGA account back to an adequate level. Such issuance would be quick and potentially large, depending on the level of the TGA account at the time Congress takes action. Since the ON RRP facility balance is already

[13] See the May 4, 2022, FOMC Statement available here and the Plans for Reducing the Size of the Federal Reserve's Balance Sheet available here.

low, it would most likely result in a steep decline in reserves.[14] These concerns have triggered discussions among market participants whether the Federal Reserve will pause, slow, or stop quantitative tightening, to avoid an excessive rundown in bank reserves. Such a view was reinforced by the FOMC minutes released on February 19, 2025, in which various FOMC participants noted that it may be appropriate to consider pausing or slowing balance sheet runoff until the resolution of the debt-limit event. On March 19, the FOMC announced a slow-down in the balance sheet runoff:

> "Beginning in April, the Committee will slow the pace of decline of its securities holdings by reducing the monthly redemption cap on Treasury securities from $25 billion to $5 billion. The Committee will maintain the monthly redemption cap on agency debt and agency mortgage-backed securities at $35 billion."

Such a decision was largely expected by market participants. Indeed, the red marks in Figure 10 show forecasts for the Treasury and MBS holdings, collected in January and March 2025 by the staff of the Federal Reserve Bank of New York from a panel of Primary Dealers and Market Participants (the Survey of Market Expectations, or SME). In both cases, forecasters expected the SOMA Treasury and MBS holdings to level off around $6.3 trillion by June 2025. The Survey of Markets Expectations also provides insights into the expected path of reserves, TGA, and ON-RRP balances. As of March 2025, the respondents expected reserves to remain ample, and level off above $3 trillion (the green marks in Figure 11), while the ON-RRP balance steadily declines to very low levels (Figure 12). Overall, these forecasts project optimism in regard to a debt-limit resolution, as seen also in the expected path for the TGA balance, which does not decline excessively and quickly climbs back up to around $0.8 trillion in the summer 2025 (Figure 13). We will continue to follow these events as they unfold.

We conclude this section with a final remark. There is an asymmetry between debt limit episodes in which the FOMC is in the process of running off the SOMA portfolio, and episodes

[14] The events of mid-September 2019 are a cautionary tale for the consequences of a decline in reserves well below ample levels. The week of September 13, 2019, reserves dropped to $1.34 trillion, the lowest level since 2012. This situation created a combination of decreased supply and increased demand for liquidity, that resulted in elevated rates in fed funds trading (Anbil, Anderson, and Senyuz (2020)). The Federal Reserve intervened swiftly, with the SOMA Desk announcing an overnight repo operation that offered up to $75 billion against Treasury, agency, and agency MBS collateral, and offered additional repo for the rest of the week. This operations were followed by a decline in rates and a normalization of money markets (see also Afonso et al. (2021) for more details on the September 19, 2019 episode).

in which the FOMC is engaging in quantitative easing (QE). In the latter case, reserves are increasing due to QE purchases, and thus their ample level is less subject to disruptions due to debt limit dynamics. Interestingly, the FOMC was engaging in quantitative tightening during the 2023 debt limit episode as well, yet there have been no disruptions in money markets at that time. When Congress passed the Fiscal Responsibility Act of 2023, the Treasury resumed debt issuance to quickly bring the TGA balance from near zero to approximately $0.8 trillion (Figure 13). However, at the time not only reserves were ample but also the ON RRP balance exceeded $2 trillion (Figures 11 and 12). Thus, the Treasury debt issuance was easily absorbed by a decline in the ON-RRP account, without impairing liquidity in money markets. While reserves are also ample in the current episode and comparable in magnitude to those recorded in 2023, the ON RRP balance is low.

5. Lessons learned and open questions

As the 2025 debt-limit events unfold, we have yet another opportunity to learn how the U.S. debt limit affects financial markets, and how in turn financial markets developments bear weight on the decisions of Congress and policy makers. Lesson learned include:

1. The risk-adjusted probability of a U.S. default has been low in 2024-2025 relative to previous episodes. It first peaked at 1% on November 5, 2024, and later reached 1.2% on April 11, 2025, compared to 6% in 2011 and around 4% in 2013 and 2023.

2. Similar to the 2023 episode, the valuation of the cheapest to deliver Treasury security has been central to pinning down the probability of a default. Because of the high expected loss given default, the cost of U.S. credit protection for a given amount of default risk was higher in the current and the 2023 episodes than in previous years. For instance, in 2011 and 2013 the expected loss in a hypothetical default was much lower, hence back then lower CDS premiums were associated with similar default probabilities.

3. The U.S. sovereign CDS markets continues to be tiny relative to the sheer size of U.S. debt, and remains largely dormant. Trading concentrates during debt limit episodes, alternated by substantial periods of inactivity. As such, U.S. sovereign CDS premiums are likely more

useful as a gauge for the risk of a "technical default," than as a more comprehensive measure for the risk of U.S. insolvency.

4. The consequence of the debt limit are more far reaching for financial markets than the U.S. sovereign CDS market. In the article, we discuss two important implications that highlight the role of Treasury demand and supply shocks, triggered by debt-limit dynamics, on interest rates.

   First, out of concern for disruptions due to a default, some market participants, e.g., money market funds, shun away from Treasuries that are likely affected by a technical default, and instead favor securities that mature well before, and after, the expected X-date. This was particularly evident in the 2023 episode, when Treasury bills expiring around the summer of 2023 were trading at a discount of around 100 bps compared to bills maturing before and after the expected X-date. This is less visible in the current episode, in which the yield discount outside of summer 2025 is much lower.

   Second, debt-ceiling dynamics compound with balance sheet decisions by the FOMC to affect the overall availability and maturity structure of Treasuries in the market. At the same time, the FOMC can buffer, at least in part, such supply shocks, e.g., via interventions in the repo market, to reduce their effect on interest rates.

There are also open questions:

1. Due to the tight nature of the U.S. sovereign CDS market, any signal for the probability of a default likely reflects the activity of a fairly small group of specialized investors, rather than a wider consensus across the broader public. Who is buying protection against a U.S. default, and what are their motivations? And who is on the other side of these trades? In this respect, monitoring disruption in the market for Treasury bills, and following the developments in the quantitative tightening decisions by the FOMC, significantly expands the coverage of the on-going debt limit episode and its implications for financial markets.

2. While a 1% default probability might seem small, the consequence of a possible U.S. default, even if only "technical" in nature, would be far reaching for households, who rely on the U.S. government for Social Security, Medicare, and Medicaid checks, military salaries, and other

payments; moreover a default would be disruptive for financial markets and detrimental for future borrowing costs. From this perspective, any estimate larger than zero would be too big.

Thus, why keep a debt limit at all?

The debt limit was first created by Congress in 1917 through the Second Liberty Bond Act so that the government would be able to more easily borrow during World War I, up to a cap, without the need for Congress to approve each issuance of debt in a separate piece of legislation.[15] In principle, the debt limit should help to bring the U.S. default risk down to zero, by forcing Congress to take the necessary steps when debt grows excessively. However, in the last decades political polarization and conflicting priorities between the opposition and the governing parties ended up repeatedly bringing the U.S. on the verge of a technical default, without solving the underlying fiscal imbalances. It remains an open question how to address the sustainability of U.S. debt beyond partisan debt ceiling negotiations.

[15] See, e.g, the Debt Ceiling Q&A by the Committee for a Responsible Federal Budget, available here.

Appendix

In this Appendix we discuss the computation of the CDS-implied probability of a U.S. default in more detail. We follow the Appendix of Benzoni, Cabanilla, Cocco, and Kavoussi (2023) closely; we reproduce it here for ease of reading of the paper.

Without loss of generality, we focus on a one-year CDS contract, which is the case we consider in the paper. In a CDS contract, the protection buyer makes quarterly payments in the amount of the protection premium.[16] The yearly premium is pro-rated over three-month periods and paid out on the twentieth of the last month of each quarter (March 20, June 20, September 20, and December 20).

Following Sundaresan (2009), denote $s(i)$ the risk-adjusted probability that the reference entity survives through quarter i. Moreover, assume that the protection buyer and seller do not default on their obligation[17] on a CDS contract with \$1 notional amount, and denote by c the yearly CDS premium. Then the expected present value of the premiums on a one-year CDS contract is:

$$1) \quad \sum_{i=1}^{4} s(i) B_0(i) \frac{c}{4},$$

where $B_0(i)$ denotes the time-0 price of a riskfree zero-coupon bond that matures in quarter i with face value equal to one. In equation (1), multiplying the pro-rated CDS premiums $c/4$ by $B_0(i)$ yields the present value of the payments discounted at the riskfree rate to time zero, when the two parties enter the contract. Weighing such payments by the risk-adjusted survival probability $s(i)$ yields the expected value of such payments. Due to the risk of a breakdown in the debt-ceiling negotiations, Treasuries are not risk free in our analysis. Moreover, outside of debt-ceiling episodes, Treasuries often trade below a hypothetical risk-free rate due to their liquidity and safety-asset status. Thus, it is common to use another rate in these present value computations, e.g., the term structure of swap rates.

In case of a credit event during quarter i, the protection buyer is responsible to pay the premium pro-rated through the default date. For illustration, assume that a credit event always occurs in the middle of the quarter, i.e., February 15, May, 15, August 15, or November 15, and denote by $p(i) = s(i-1) - s(i)$ the risk-adjusted probability that the reference entity defaults in quarter i. Then, in addition to the expected value of the payments in equation (1), the protection buyer is responsible to pay the expected present value of the premiums associated with a credit event:

$$2) \qquad \sum_{i=1}^{4} p(i) B_0\left(i-\frac{1}{2}\right) \frac{1}{2} \frac{c}{4},$$

where the discount factor $B_0\left(i-\frac{1}{2}\right)$ applies to the pro-rated premium cash flow that matures upon default in the middle of quarter i.

The sum of the expressions in equations (1)–(2) yields the present expected value of all payments made by the protection buyer to the seller:

$$3) \qquad \sum_{i=1}^{4} s(i) B_0(i) \frac{c}{4} + \sum_{i=1}^{4} p(i) B_0\left(i-\frac{1}{2}\right) \frac{1}{2} \frac{c}{4}.$$

[16] Many CDS contracts are standardized so that the running CDS premium, paid quarterly in arrears, is fixed across entities with the same credit rating (e.g., 100 bps for investment-grade companies) while any adjustment to the fixed running premium is settled in advance shortly after the inception of the contract. The adjustment to the running premium is computed using market conventions for a recovery rate. This practice helps to simplify netting.

[17] In practice, collateral provides protection against counterparty risk.

On the other hand, in case of a credit event the protection seller is responsible to make the protection buyer whole by paying the "loss given default" (LGD), i.e., the amount of money that the buyer lost on the reference entity. The expected present value of such payment is:

$$4) \qquad \sum_{i=1}^{4} p(i)B_0\left(i-\frac{1}{2}\right)LGD.$$

For ease of exposition, equation (4) assumes that *LGD* is constant. In practice this assumption is violated because, in case of default, *LGD* is determined by the CDS auction based on the price of the cheapest deliverable bonds. Thus, we approximate the present value of the loss given default with the difference between the face and the market values of the cheapest deliverable Treasury security on each given day.[18]

The CDS premium is the fixed payment c that equals the expected payments made by the protection buyer and seller,

$$5) \qquad \sum_{i=1}^{4} s(i)B_0(i)\frac{c}{4}+\sum_{i=1}^{4} p(i)B_0\left(i-\frac{1}{2}\right)\frac{c}{8}=LGD\sum_{i=1}^{4} p(i)B_0\left(i-\frac{1}{2}\right),$$

which yields:

$$6) \qquad c=\frac{LGD\sum_{i=1}^{4} p(i)B_0\left(i-\frac{1}{2}\right)}{\sum_{i=1}^{4} s(i)B_0(i)\frac{1}{4}+\sum_{i=1}^{4} p(i)B_0\left(i-\frac{1}{2}\right)\frac{1}{8}}.$$

In our exercise, we observe daily realizations of the U.S. CDS premium c as well as the discount factors $B_0(i)$, $i = 1, 1.5, 2, \ldots, 4$. From these inputs, we seek to estimate the survival probabilities $s(i)$, and the associated default probabilities $p(i) = s(i-1) - s(i)$. Given the number of unknown variables, some assumptions are necessary to solve the problem.

If a U.S. default were to occur, most likely it would be due to Congress' inability to lift the debt ceiling before the Treasury runs out of money. There is no certain deadline for this to happen, but many estimates fall in the middle of the summer. Hence, we focus on the possibility that the U.S. might default on August 15, and denote such probability by p. In contrast, we assume that the likelihood of a default on any other date is zero. With these assumptions, in equation (5), $s(i) = 1$ and $p(i) = 0$ in quarters that precede the summer of 2023, $s(i) = 1 - p$ and $p(i) = p$ in the summer of 2023, and $s(i) = 1 - p$ and $p(i) = 0$ in quarters that follow the summer of 2023.

To illustrate, consider the case of a CDS contract created at the beginning of January 2023. In this example, we assume that there will be no default in 2023Q1 and Q2. In Q3, there is a probability p of default, and thus a survival probability of $(1 - p)$. We assume that if the U.S. avoid default in Q3, then there will be no default in Q4. Hence the probability that the U.S. will survive through the end of Q4 is $(1 - p)$. Substituting into equation (5), we obtain:

$$7) \qquad B_0(1)\frac{c}{4}+B_0(2)\frac{c}{4}+(1-p)B_0(3)\frac{c}{4}+(1-p)B_0(4)\frac{c}{4}+pB_0(2.5)\frac{c}{8}=pB_0(2.5)LGD.$$

The timing associated with the discount factor $B_0(2.5)$ refers to the fact that, in this example, we assume that the default occurs in the middle of a quarter and settlement of the cashflows upon default is

[18] Implicit in our calculation is the assumption of independence between the risk-free rate and the default event. In practice, the risk-free discount rate could have increased if market participants feared an imminent default. However, the price of the cheapest deliverable Treasury bond is, in present value, a reasonable estimate of the expected cash flow based on current information.

immediate. That is, $i = 2.5$ refers to the mid-point between the end of quarters 2 and 3. In practice the CDS auction has to take place prior to the settlement of the payments. While our approach abstracts from this friction, we do not expect the results to be materially affected. We then solve equation (7) for the only unknown term p.

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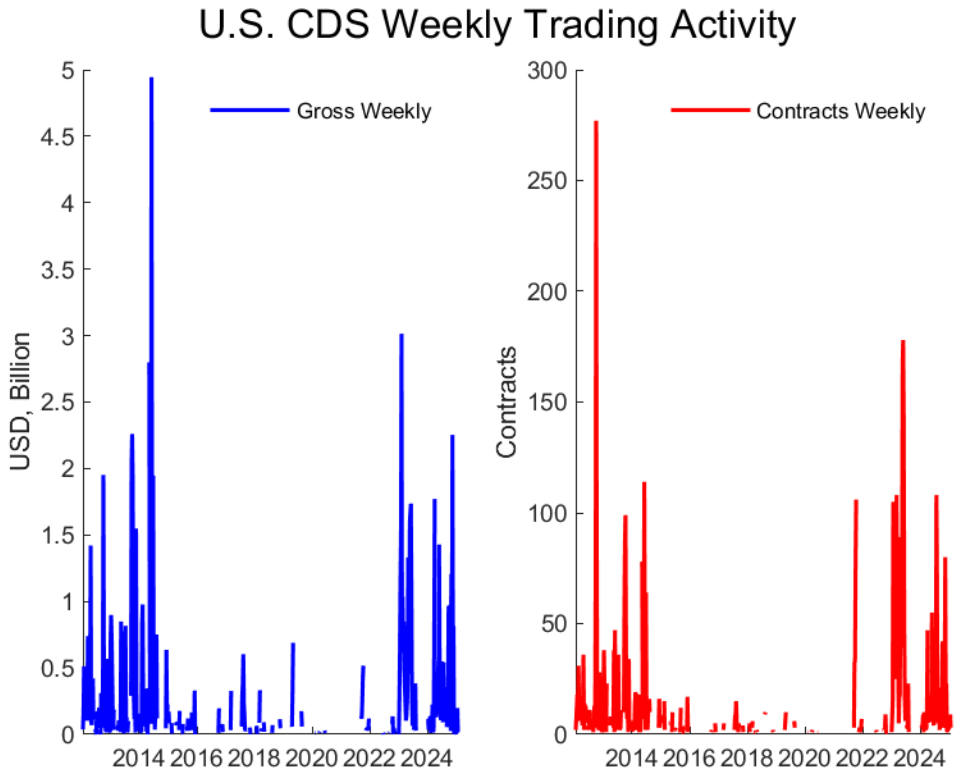
1. Gross and net notional outstanding in U.S. CDS

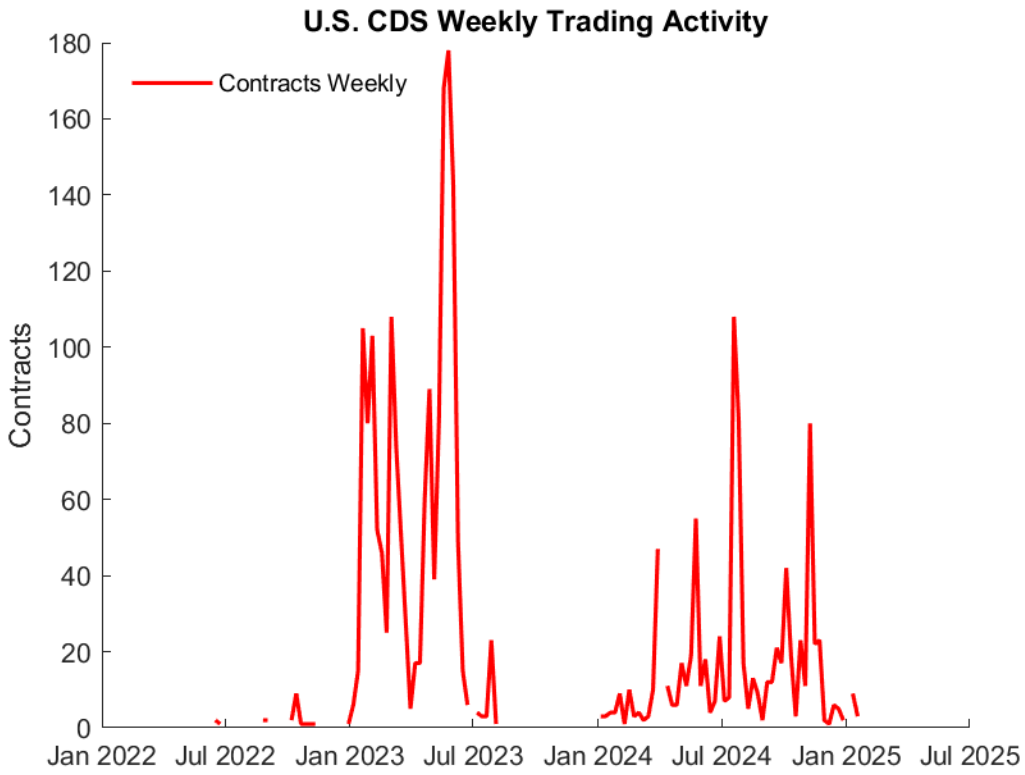
Source: DTCC Kinetics.

2. Weekly trading activity in U.S. CDS



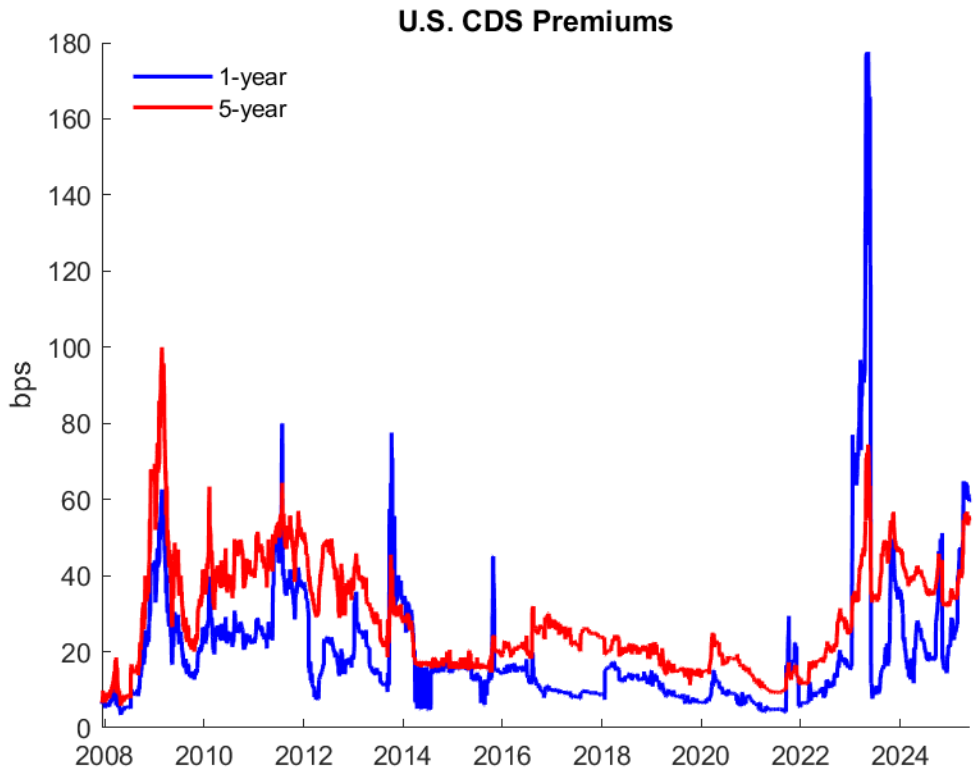
Source: DTCC Kinetics.

3. Weekly trading activity in U.S. CDS during 2022-2025



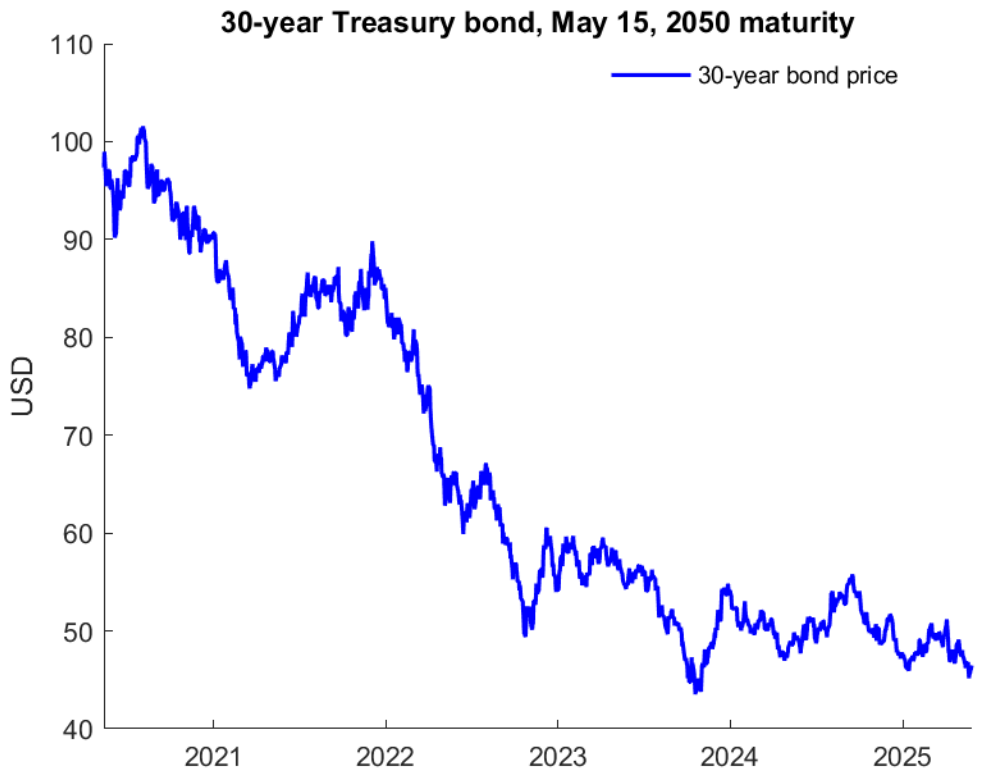
Source: DTCC Kinetics.

4. U.S. CDS premiums



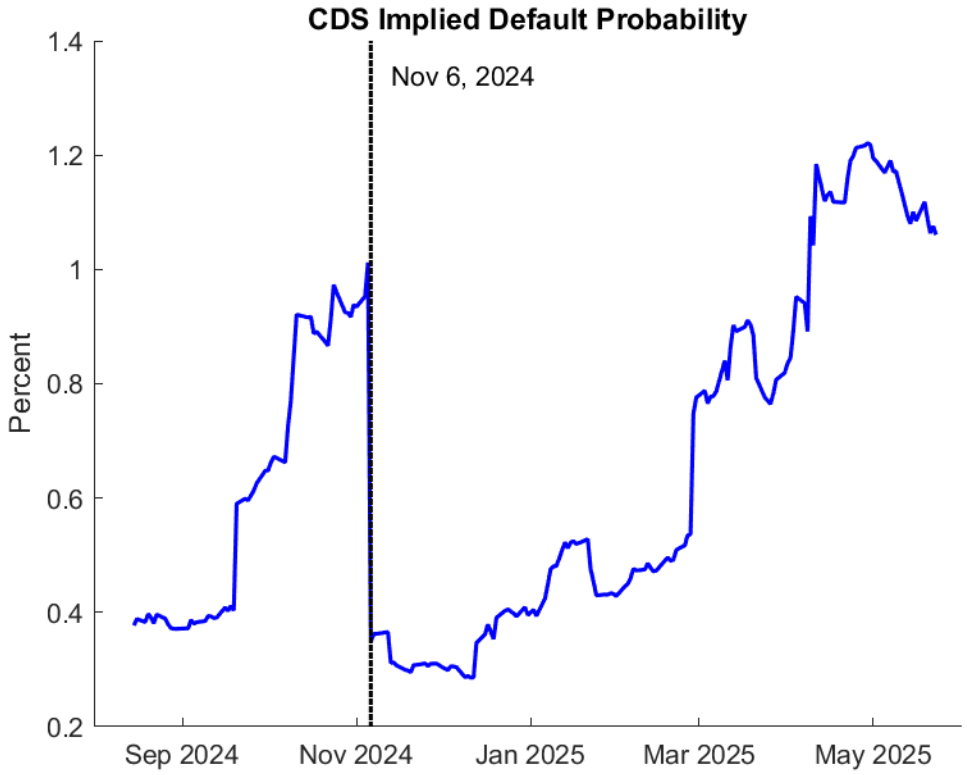
Source: Bloomberg Finance L.P.

5. 30-year Treasury bond price



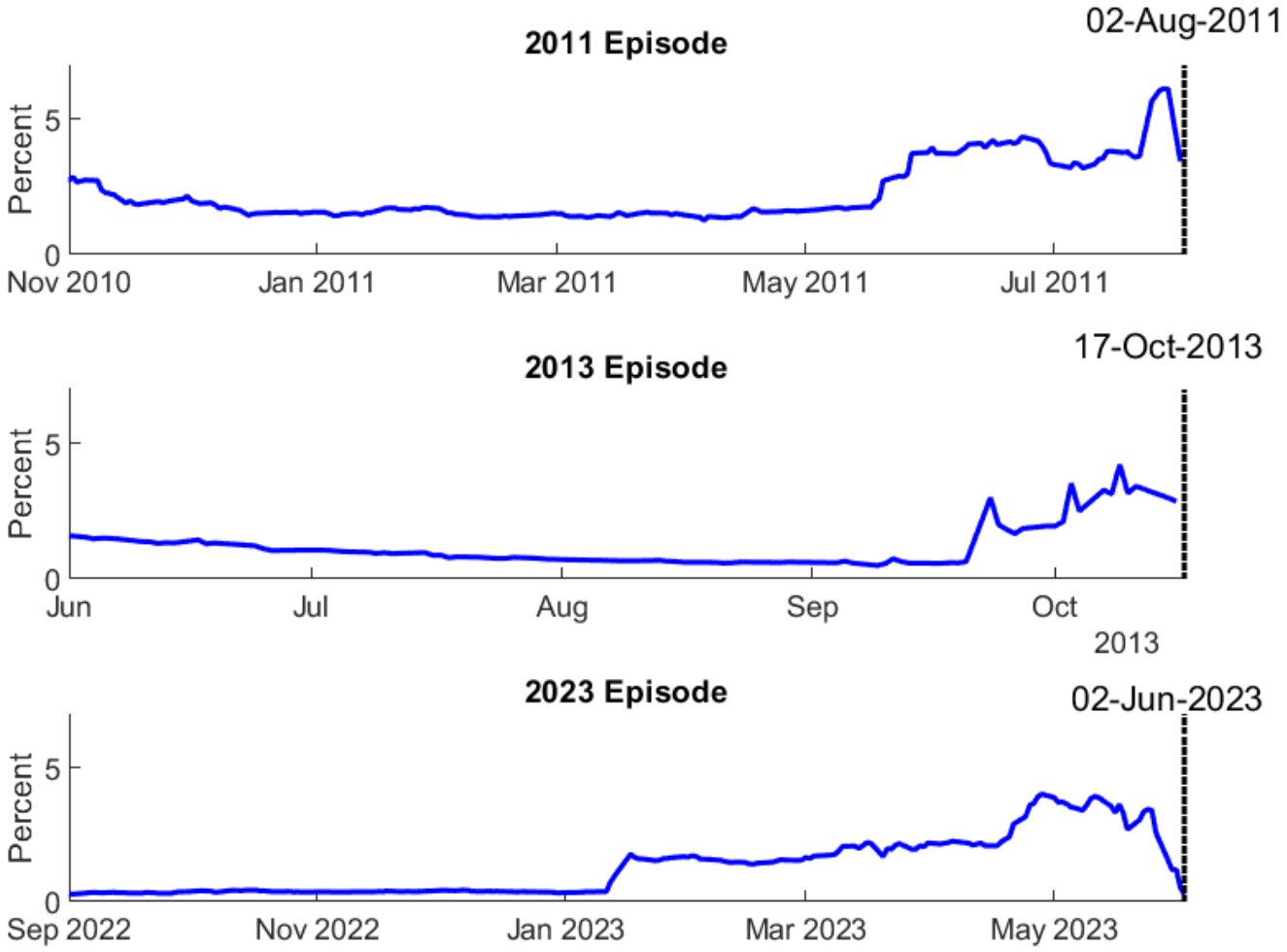
Source: Bloomberg Finance L.P.

6. U.S. default probability



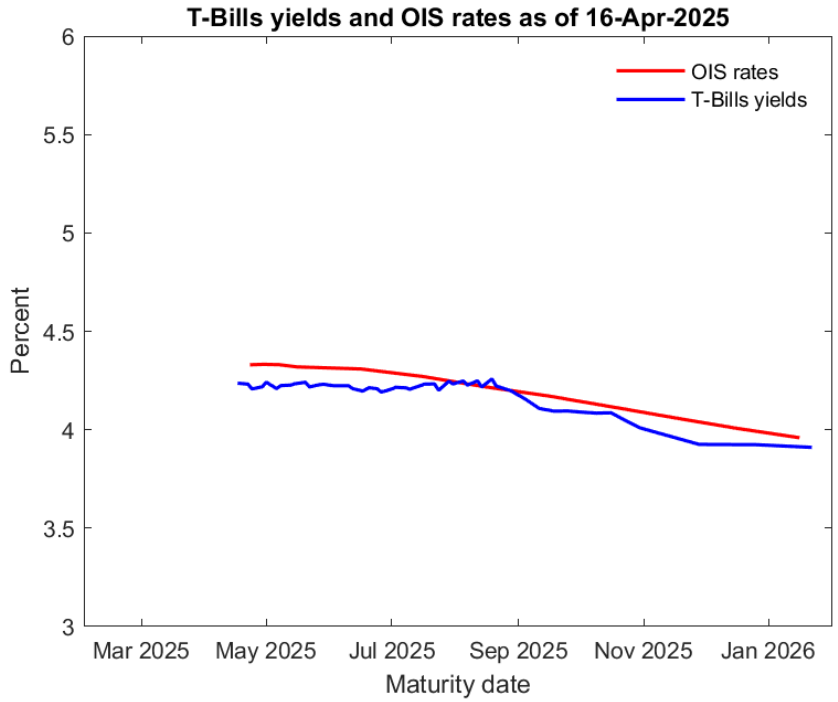
Source: Bloomberg Finance L.P. and authors' calculations.

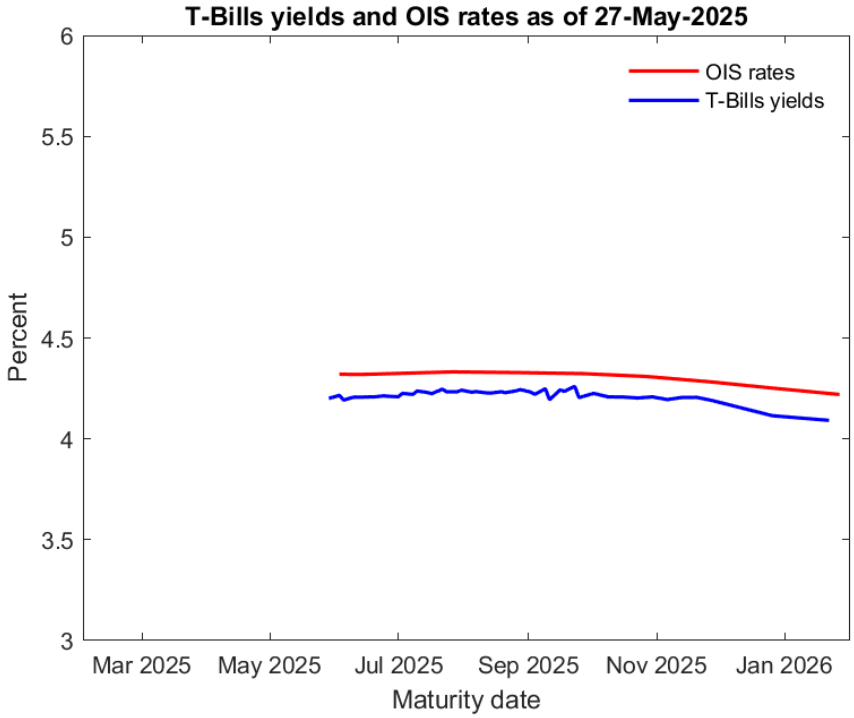
7. U.S. default probability: 2011, 2013, and 2023 debt ceiling episodes



Source: Bloomberg Finance L.P. and authors' calculations.

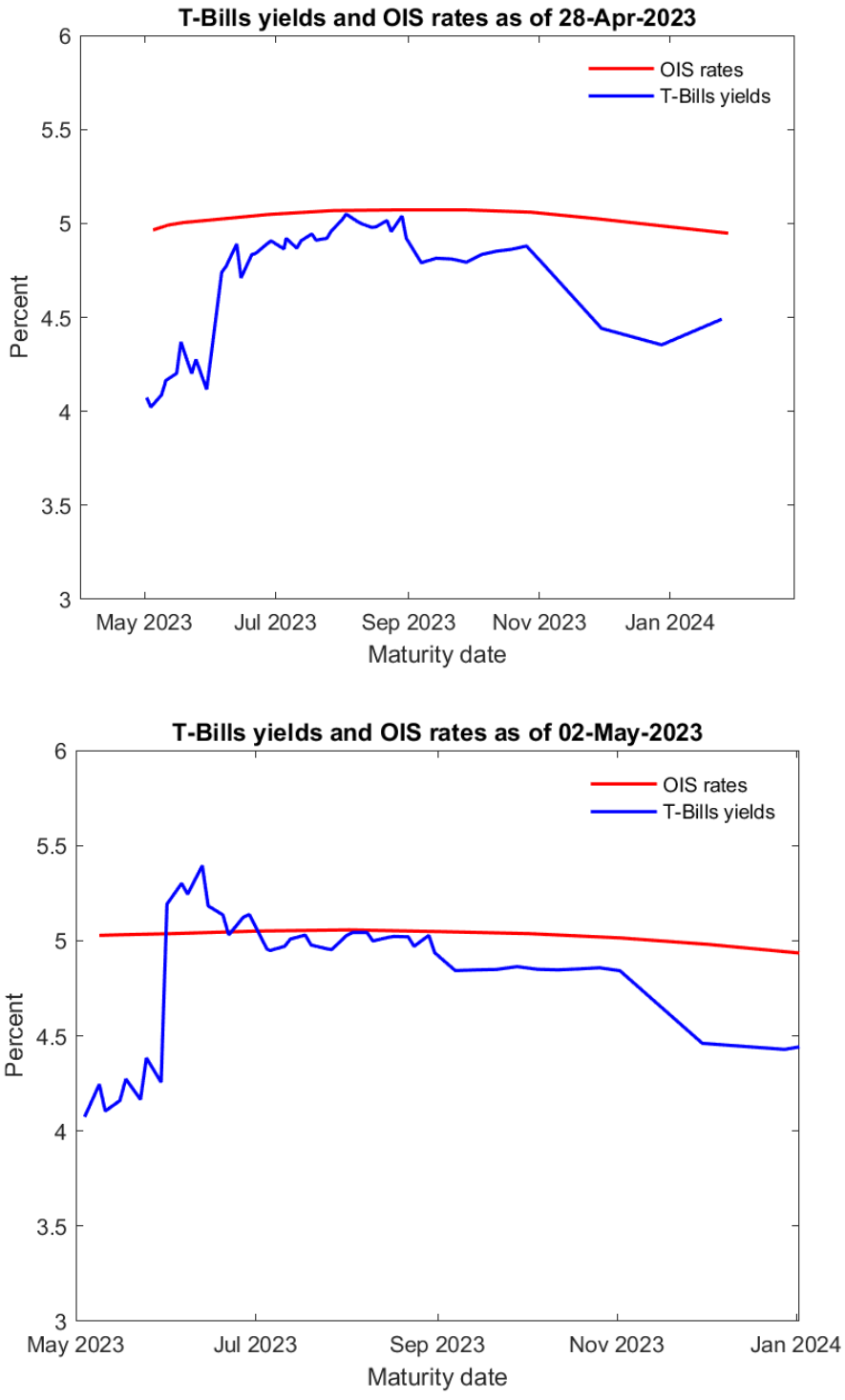
8. Term structures of Treasury bill yields and OIS rates





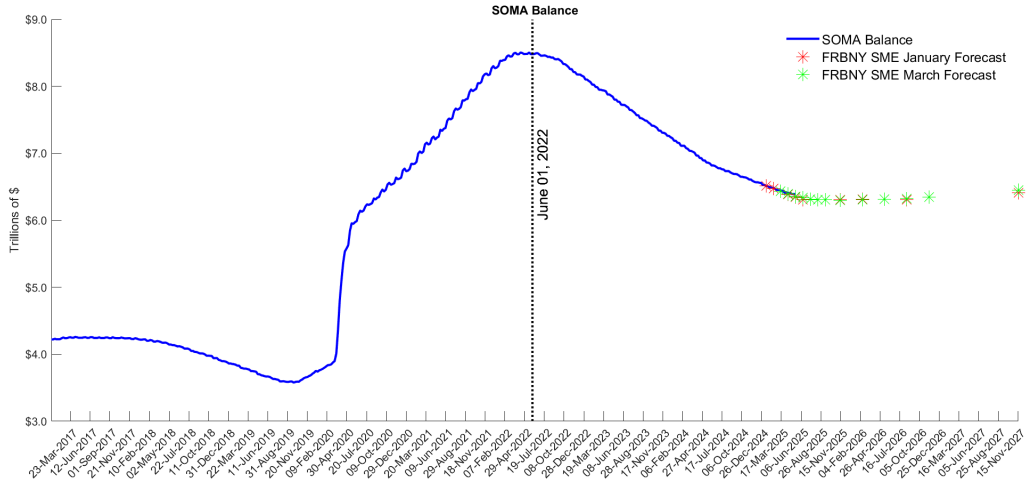
Sources: Bloomberg Finance L.P. and authors' calculations.

9. Term structures of Treasury bill yields and OIS rates: The 2023 episode



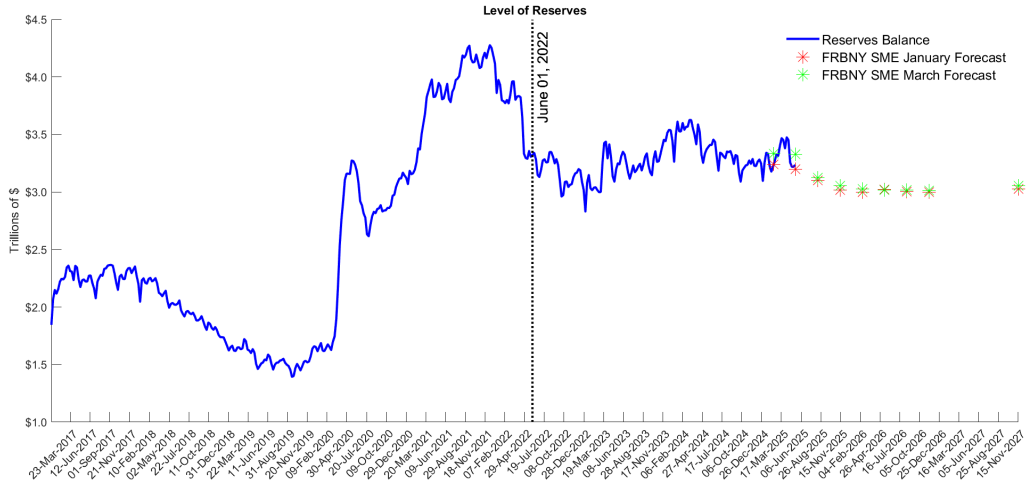
Sources: Bloomberg Finance L.P. and authors' calculations.

10. Total SOMA holdings



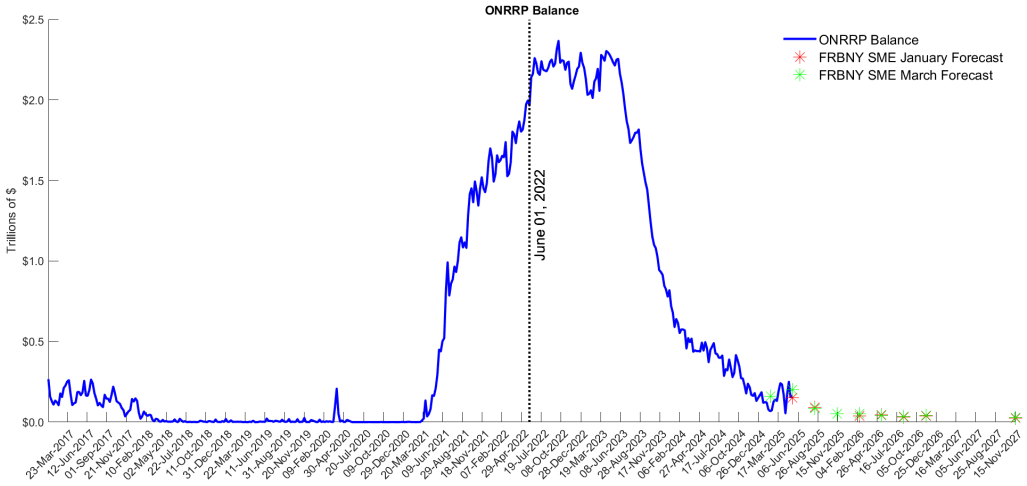
Source: Federal Reserve Board of Governors and Federal Reserve Bank of New York.

11. Reserves



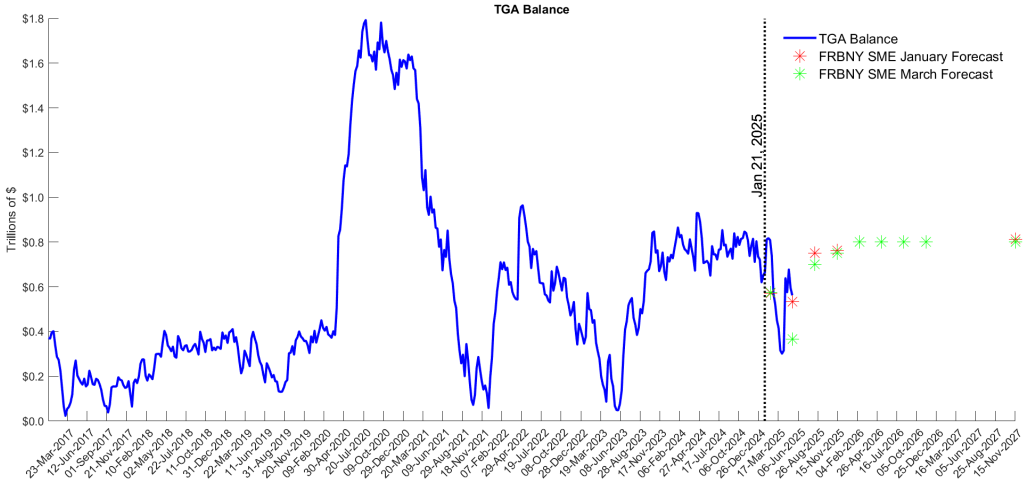
Source: Federal Reserve Board of Governors and Federal Reserve Bank of New York.

12. Overnight Reverse Repo Facility



Source: Federal Reserve Board of Governors and Federal Reserve Bank of New York.

13. Treasury General Account



Source: Federal Reserve Board of Governors and Federal Reserve Bank of New York.