Treasury Market Liquidity and the Effects of Treasury Buybacks

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Abstract

The rapid growth of U.S. Treasury debt has raised concerns about Treasury market functioning and dealer intermediation capacity. Using confidential dealer-level data, we study how the Treasury buyback program introduced in May 2024 affects primary dealer inventories and trading. We document persistent specialization among dealers across Treasury maturity segments. Buybacks are associated with declines in dealers' inventories in the targeted segment, followed by a return toward pre-buyback levels, a pattern observed across the maturity spectrum. These declines account for only part of the securities the Treasury purchases, suggesting that dealers also source securities from their clients. These declines are larger among dealers specializing in the targeted segment and among dealers with less slack relative to their Supplementary Leverage Ratio (SLR) requirements. Trading volumes also tend to rise around buyback operations, consistent with dealers being more willing to intermediate in anticipation of opportunities to shed inventories. Our findings suggest that buybacks temporarily relieve inventory pressures, particularly among specialized and balance-sheet-constrained dealers, potentially supporting continued intermediation in targeted maturity segments.

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1 Introduction

The stock of marketable U.S. Treasury debt outstanding has grown rapidly over the past two decades, and particularly quickly since 2020, as persistent federal deficits have been financed through record issuance across the maturity spectrum. Primary dealers are the principal intermediaries between the Treasury and the investing public, and post-financial-crisis capital and leverage regulation has constrained the balance sheet capacity they can devote to market making. As a result, there are growing concerns that dealers' intermediation capacity has not kept pace with the supply of Treasury securities they are asked to warehouse, distribute, and trade (Duffie, 2023; Duffie et al., 2023; Bräuning and Stein, 2024). Episodes of acute Treasury market stress, most visibly in March 2020, have sharpened concerns that a mismatch between the size of the Treasury market and dealers' capacity to intermediate it could leave the market vulnerable to future dislocations. Importantly, these concerns may not be uniform across the Treasury market. Liquidity conditions appear to differ across maturity segments, potentially reflecting differences in the intermediation capacity of the dealers active in each segment.

Treasury debt managers have several tools available to address these concerns, ranging from adjustments to auction sizes and maturity composition to more targeted interventions. In May 2024, the U.S. Department of the Treasury relaunched a program of regular buybacks of outstanding Treasury securities for the first time since 2000–2002. The stated goals of the program are twofold. Liquidity support buybacks provide a predictable opportunity for market participants to sell off-the-run securities to the Treasury, while cash management buybacks are intended to smooth the Treasury's cash balance and bill issuance. By offering a recurring opportunity to sell securities that dealers might otherwise need to warehouse, buybacks may alleviate inventory and balance sheet constraints. Moreover, the anticipation of future buyback operations may encourage dealers to intermediate more transactions, knowing that they will have opportunities to reduce their inventories through subsequent buybacks.

In this paper, we study how Treasury buyback operations affect primary dealer inventories and trading activity, and how these effects vary across dealers and Treasury maturity segments. We use confidential dealer-level data from the Federal Reserve's FR 2004 reports, which record each primary dealer's inventories and transaction volumes by maturity segment at a weekly frequency. We date each buyback by its settlement date, when the purchased securities leave dealers' balance sheets. We also construct measures of dealer specialization across maturity segments and combine them with data on dealers' Supplementary Leverage Ratio (SLR) requirements, which allows us to examine how the response to buybacks varies

with specialization and regulatory constraints.

We first document aggregate trends in dealer inventories and transactions. While dealer long inventories have increased in dollar terms, inventories and transaction volumes relative to the amount of Treasury debt outstanding declined over much of the period preceding the buyback program, with particularly pronounced declines in scaled inventories at longer maturities. Since the introduction of buybacks, scaled inventories have stabilized or increased across coupon maturity segments, and the earlier decline in scaled transaction volumes has leveled off. We treat these aggregate patterns as motivating rather than as evidence of the program's effects.

We also document substantial differences in liquidity across maturity segments and over time. Using a segment-level version of the yield-curve noise measure of Hu et al. (2013), we find that liquidity tends to be lower at the short end and, more recently, at the long end of the Treasury curve than at intermediate maturities.[1] The Treasury's largest buybacks, relative to the amount outstanding, have been at the long end and at the short end of the curve. These differences motivate studying dealer intermediation and the effects of Treasury buybacks separately across maturity segments, rather than only for the Treasury market as a whole.

We next document that primary dealers exhibit persistent specialization in Treasury maturity segments. Dealers conduct a disproportionate share of their transactions in particular maturity segments: in its most specialized segment, a dealer's share of transactions exceeds the average dealer's share by 13 percentage points. This specialization is highly persistent, with an autocorrelation of about 0.8 even at a one-year horizon. We find similar patterns in dealers' inventory holdings, with dealers holding disproportionately large inventories in the segments in which they specialize in transactions. These findings suggest that intermediation capacity in a given maturity segment may depend disproportionately on the dealers specializing in that segment.

We then examine how dealer inventories respond to Treasury buybacks. In the week a buyback settles, dealers reduce their long inventories in the targeted maturity segment by about $63 million each, and their inventories then rise again toward pre-buyback levels over the following two to three weeks. Summed across the 25 primary dealers, the initial decline equals about 35 percent of the amount the Treasury purchases. Because every purchase passed through a primary dealer before 2026, this partial decline suggests that dealers sourced much of what they sold to the Treasury from their clients rather than from their own inventories. This pattern of a partial and temporary decline is present across buybacks

[1] The short-end result holds even when we exclude securities with less than a year to maturity, for which the fitted curve is least reliable.

targeting short-, medium-, and long-maturity securities. We further find that inventory reductions are particularly pronounced among dealers specializing in the targeted maturity segment and among dealers with less slack relative to their regulatory SLR requirements. These two groups correspond to the two determinants of a dealer's gain from a buyback: specialized dealers transact in and hold more of the targeted securities, and constrained dealers face a higher cost of holding them.

Turning to transaction volumes, we find suggestive evidence of increased trading activity in the weeks surrounding buyback operations. The point estimates are positive in the weeks before and after an operation, but not in the week of the operation itself, when the next opportunity to sell to the Treasury is furthest away. This timing is consistent with dealers being more willing to intermediate in anticipation of opportunities to reduce their inventories through future buybacks.

Our findings suggest that Treasury buybacks partially and temporarily relieve inventory pressures, particularly among dealers specializing in the targeted maturity segment and those facing tighter balance sheet constraints. The effects of buybacks may therefore depend not only on the aggregate quantity of securities purchased, but also on which dealers' inventories are relieved. In particular, by reducing inventories among dealers that account for a disproportionate share of trading activity in the targeted maturity segment, buybacks may better support continued intermediation in that segment.

The remainder of the paper proceeds as follows. The rest of this section reviews the related literature. Section 2 describes the institutional details of the Treasury buyback program, including its 2000–2002 precedent. Section 3 describes our data sources and the construction of our main variables. Section 4 documents aggregate trends in dealer inventories, transactions, and specialization over our sample. Section 5 presents our baseline event-study and heterogeneity results. Section 6 concludes.

1.1 Related Literature

A large literature studies Treasury market functioning and the role of policy interventions in supporting market liquidity. Prior work documents the evolution of Treasury market liquidity and the factors contributing to episodes of market dysfunction (Hu et al., 2013; Adrian et al., 2025; Duffie et al., 2023). Related research examines the role of official-sector interventions in supporting Treasury market functioning (Kashyap et al., 2025). A growing literature shows that Treasury debt management itself moves financial conditions. Using high-frequency movements in Treasury futures around issuance announcements, Phillot (2025) identifies surprises in Treasury supply, Bi et al. (2025) separate these surprises into shocks to the

amount of debt and to its maturity, and Endo et al. (2026) show that unexpected increases in debt supply raise long-term yields and corporate borrowing costs and reduce investment and output, much like a conventional monetary policy tightening. Buybacks run in the opposite direction, removing securities from the market, and whereas this literature studies the aggregate effects of news about issuance, we study how such an operation affects the inventories of the individual dealers who intermediate it.

A more directly related literature studies Treasury buyback programs. Garbade and Rutherford (2007); Han et al. (2007); Connolly and Struby (2024) examine the 2000–2002 buyback program, while Duffie and Keane (2023); Duffie (2025) discuss the potential role of buybacks in improving Treasury market resilience. More recently, Zhou (2025) studies the 2024 buyback program, documenting improvements in security-level liquidity and reductions in aggregate primary dealer Treasury holdings. We complement this evidence by using confidential dealer-level data to study the distribution and dynamics of inventory adjustments around buyback operations. In particular, we investigate how these adjustments vary with dealers' maturity specialization and regulatory constraints, and whether buybacks are associated with changes in dealers' transaction volumes.

Our paper also contributes to the literature on the constraints shaping dealer intermediation capacity in the Treasury market (Brunnermeier and Pedersen, 2009; Trebbi and Xiao, 2019; He et al., 2022; Duffie, 2023; Correa et al., 2025; d'Avernas et al., 2025; Liang and Zhu, 2025). Duffie et al. (2023) argue that the growth of Treasury debt outstanding has outpaced the growth of dealer balance sheet capacity, and that this mismatch is a first-order determinant of Treasury market resilience during periods of stress. Using confidential dealer-level data, Bräuning and Stein (2024) show that tighter regulatory and internal risk constraints reduce dealer Treasury positions and market turnover and increase intermediation costs. Relatedly, Favara et al. (2026) find that shocks to bank balance sheets reduce participation in Treasury markets, particularly among banks with tighter supplementary leverage ratio (SLR) constraints. In the context of Bank of England QE reverse auctions, Boneva et al. (2025) show that dealers' willingness to sell securities depends on their interest rate risk exposures and regulatory capital. Whereas this literature primarily studies how constraints affect dealers' intermediation decisions, we examine how Treasury buybacks affect dealer inventories and whether these effects depend on dealers' proximity to regulatory leverage constraints.

Finally, we relate to the literature on dealer inventory management and the role of trading relationships in over-the-counter markets. Fleming et al. (2024) show that Treasury issuance is a principal driver of dealers' inventory changes and that dealers unwind these positions more rapidly when balance sheet costs are higher. Buybacks run this channel in

reverse, removing securities from dealers' inventories rather than adding to them. Related work studies investor demand and price pressure around Treasury auctions, and the role of dealers' limited risk-bearing capacity (Lou et al., 2013; Somogyi et al., 2024; Fleming et al., 2026). More broadly, the literature on over-the-counter markets emphasizes the role of inventory costs, customer relationships, and dealer networks in shaping liquidity provision (Hendershott et al., 2020; Cohen et al., 2024; Sambalaibat, 2025). We contribute to this literature by documenting persistent specialization among primary dealers across Treasury maturity segments, both in their transactions and inventory holdings. Our findings suggest that the capacity to intermediate in a given maturity segment may depend disproportionately on the constraints faced by dealers specializing in that segment. Consistent with this perspective, we find that the inventory effects of Treasury buybacks are concentrated among dealers specializing in the targeted maturity segment.

2 The Treasury Buyback Program

The Treasury has used buybacks as a debt management tool on two occasions. The first ran from March 2000 through April 2002, during which the Treasury conducted 45 reverse auctions and repurchased $67.5 billion of outstanding securities.[2] That program was undertaken against a backdrop of projected budget surpluses and a shrinking stock of marketable debt; buybacks allowed the Treasury to retire older, less liquid issues while preserving larger, more liquid sizes for its remaining benchmark securities, and to smooth its cash management around the government's fiscal calendar.

The second, and the subject of this paper, began in May 2024 against the opposite fiscal backdrop: a rapidly growing stock of marketable debt and persistent concerns about dealer intermediation capacity. The program has two distinct components. Liquidity support operations are intended, in the Treasury's own language, to "establish a predictable opportunity for market participants to sell off-the-run securities" back to the Treasury (U.S. Department of the Treasury, 2024), thereby supporting secondary market liquidity in seasoned issues that dealers might otherwise find costly to warehouse or distribute. Cash management operations are intended to reduce volatility in the Treasury's cash balance and in bill issuance, to minimize disruptions to bill supply, and to reduce borrowing costs over time, echoing the cash-management rationale of the earlier program.

Operationally, the Treasury announces buyback operations in advance as part of its regular quarterly refunding process and conducts them as reverse auctions in specific, pre-

[2]Garbade and Rutherford (2007), Han et al. (2007), and Connolly and Struby (2024) study this earlier program.

announced maturity sectors. Its exclusion rules remove, among others, on-the-run and recently issued securities and coupon securities that mature around quarterly tax payment dates or the April tax season (U.S. Department of the Treasury, 2024). In each operation, the Treasury accepts the offers it judges most attractive relative to prevailing market prices, and the purchased securities settle on the next business day. Until 2026, only primary dealers could submit offers, either for their own account or on behalf of their customers, and the submitting dealer remained responsible for delivering the securities.[3]

Operation sizes have grown over time and differ across maturity sectors. At the program's launch in May 2024, liquidity support operations were sized at up to $2 billion of nominal coupon securities and up to $500 million of Treasury Inflation-Protected Securities (TIPS) per operation. Between August and October 2024, the maximum size of nominal liquidity support operations was raised to $4 billion in sectors with up to ten years to maturity, while operations in the 10-to-20-year and 20-to-30-year sectors remained at $2 billion. Cash management operations, all of which have been conducted in the 1-month-to-2-year sector, began at up to $5 billion per operation in September 2024 and have since grown to between $7.5 billion and $15 billion.

Demand from market participants has consistently exceeded the amounts the Treasury purchases. Between the program's launch and October 2024, the Treasury conducted 16 nominal liquidity support operations, which attracted $144 billion in offers against a combined maximum of $43 billion and resulted in $31.9 billion in purchases; the Treasury bought less than the announced maximum in 6 of these 16 operations. The four cash management operations in September 2024 attracted $75 billion in offers, against $20 billion purchased. Through August 2026, the end of our sample, the Treasury conducted 99 nominal liquidity support operations, which together made $281 billion in par value available across 367 eligible issues and attracted $1.6 trillion in offers; the Treasury purchased $201.7 billion, or 72 percent of the maximum available. These purchases have been concentrated in a small number of securities. In the median operation, the Treasury bought about 6 of 35 eligible issues, and the largest single issue accounted for half of the amount purchased; across the sample, the top decile of purchased issues accounts for $92.1 billion, or 46 percent of all

[3]At the beginning of 2026, the Treasury began accepting buyback offers directly from a limited number of additional counterparties, as announced in its July 30, 2025 Quarterly Refunding Statement (U.S. Department of the Treasury, 2025); the Treasury amended its buyback regulations (31 CFR Part 375) to reflect this expanded eligibility in a final rule published on March 30, 2026 (U.S. Department of the Treasury, Bureau of the Fiscal Service, 2026). Eligibility is reviewed semiannually and is limited to auction bidders with more than $35 billion in total nominal coupon and TIPS auction awards, measured in 10-year duration equivalents, over a six-month observation period; customers can continue to participate through a primary dealer or an approved direct participant (U.S. Department of the Treasury, 2026a, U.S. Department of the Treasury).

liquidity support purchases. Over the same period, the Treasury also conducted 30 TIPS liquidity support operations, purchasing $12.9 billion, and 25 cash management operations, purchasing $236.9 billion.[4]

The maturity sectors named in each operation describe the securities the Treasury actually buys only loosely. Figure 1 plots, for each operation in the two long sectors, how far the shortest eligible and purchased securities lie above the sector's lower boundary, and how far the longest eligible and purchased securities lie below its upper boundary. In the five sectors with up to ten years to maturity, eligible securities extend to within about a year of both boundaries in every operation, and usually to within a few months, so the nominal sector describes the eligible securities well.[5] In the 10-to-20-year sector, however, the shortest eligible security has had between 14 and 16 years to maturity throughout the program, 4 to 6 years above the sector's lower boundary. The 30-year bonds issued between 2006 and 2010, which mature between 2036 and 2040, have not been eligible in any operation. The Federal Reserve holds a large share of these bonds, and the Treasury's purchase-limit rules exclude any security whose free float (the amount outstanding less Federal Reserve holdings and stripped amounts) would fall below $10 billion, or whose Federal Reserve holdings would exceed 70 percent of the amount outstanding, after the buyback (U.S. Department of the Treasury, 2024). As a result, the shortest eligible security has been the 20-year bond maturing in May 2040, the first issued after the Treasury reintroduced that maturity in 2020. The downward slope in the figure reflects this bond aging toward the sector's lower boundary. Purchases in the two long sectors have also moved away from their upper boundaries over time. Since 2025, purchases in the 10-to-20-year sector have been concentrated in securities with 14 to 17 years to maturity, and in most operations in the 20-to-30-year sector the longest bond purchased has matured several years before the 30-year boundary. In practice, long-end buybacks have therefore mostly targeted securities with roughly 14 to 25 years to maturity.

The program has also become a more active policy tool. In August 2026, the Treasury announced that the maximum size of liquidity support operations in the 10-to-20-year and 20-to-30-year sectors would at least double, effective September 9, 2026, citing "consistent strong sponsorship from market participants" in prior long-end operations (U.S. Department of the Treasury, 2026b); subsequent long-end operations were sized at $6 billion. The announcement came during a period of rising long-term yields, and press coverage described it as an effort to steady the bond market (Cox, 2026). Operation sizes and eligible maturity sectors continue to be adjusted periodically by the Treasury's Office of Debt Management in consultation with the Treasury Borrowing Advisory Committee at each quarterly refunding.

[4]Our analysis excludes buyback operations for TIPS.

[5]Appendix Figure A.3 reports all seven sectors.

For our purposes, the key institutional feature of the program is that each operation is targeted at a specific, pre-announced maturity sector and settles on a known date, which lets us construct a maturity-bucket-by-week panel of buyback exposure that we can merge with dealer-level inventory and transaction data, described next.

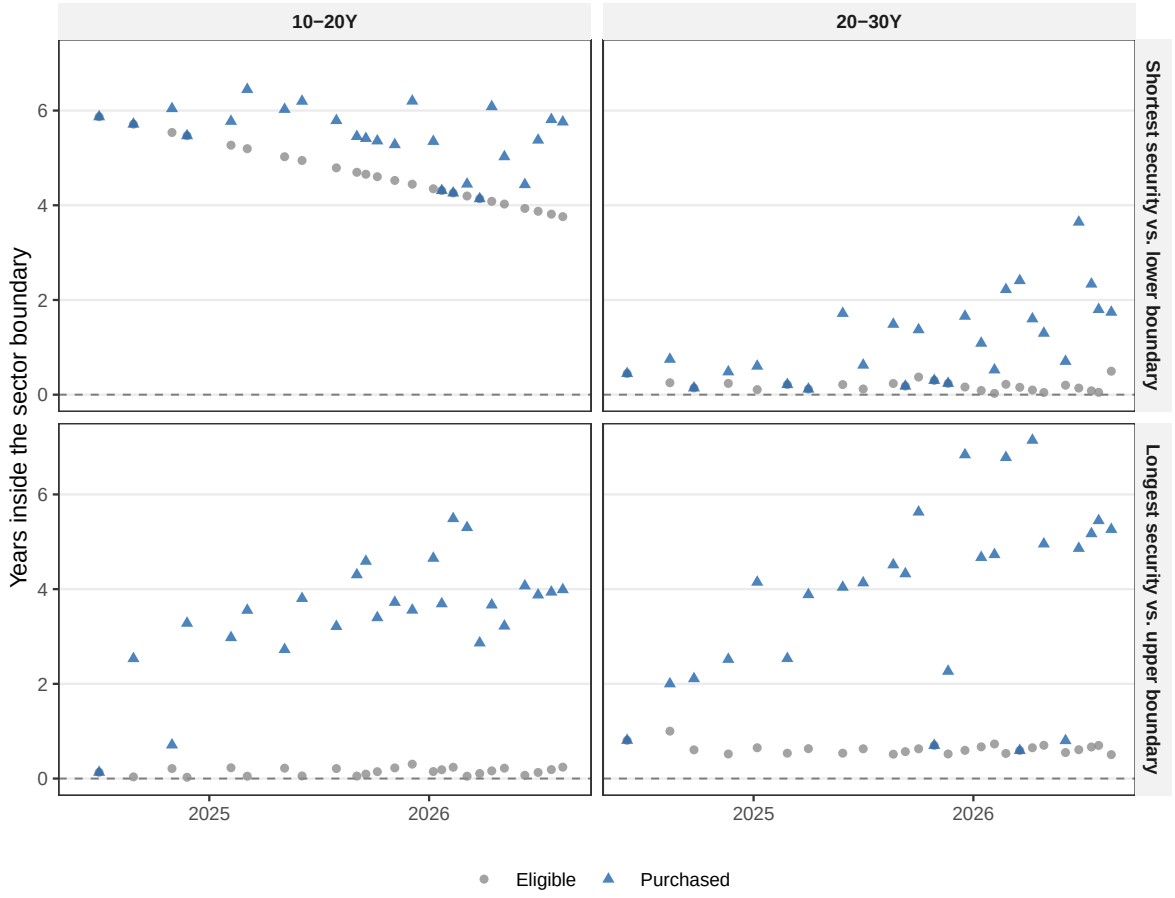


Figure 1: Distance of Eligible and Purchased Securities from Sector Boundaries: Long-End Operations

Notes: Each point corresponds to one nominal coupon liquidity support operation in the 10-to-20-year or 20-to-30-year sector between May 2024 and August 2026. Appendix Figure A.3 reports all seven sectors. The top row plots the remaining maturity of the shortest eligible (circles) and shortest purchased (triangles) security minus the lower boundary of the operation's maturity sector. The bottom row plots the upper boundary minus the remaining maturity of the longest eligible and longest purchased security. Positive values indicate that the security lies inside the sector, and zero that it lies exactly at the boundary. Remaining maturity is measured in years from the operation date. Source: U.S. Treasury buyback operation results (Fiscal Data, Treasury Securities Buybacks dataset).

3 Data

We begin with the FR 2004 data on primary dealer transactions and inventories in the Treasury market from January 2010 through August 2026. Primary dealers report their positions (FR 2004A) and transactions (FR 2004B) weekly, for weeks ending on Wednesday, and the data are at the dealer-week-maturity bucket level. We first create four lags and leads of the data for each week. For example, to create lag one, we merge in the previous week's values for inventories and transactions for that dealer-maturity bucket.

Next, we merge in measures of Treasury buyback activity, constructed at the week-maturity bucket level since the program's May 2024 relaunch. We date each buyback operation by its settlement date, when the purchased securities are delivered to the Treasury, and assign it to the FR 2004 reporting week that contains that date. We assign each security purchase to an FR 2004 maturity bucket based on the maturity of the security. We then construct a dummy that is equal to one if a buyback settled in that maturity bucket during the week, and a continuous measure of buyback intensity, namely the total amount purchased in buyback operations in that maturity bucket during the week, scaled by the total publicly held amount outstanding of Treasury securities in that maturity bucket at the end of the previous week.

We next merge in measures of dealer constraints, constructed at the quarter-dealer level from FFIEC 101 SLR Table 2 filings, using values for the most recent quarter-end before each week. In particular, we construct a dummy that indicates whether a dealer's holding company is subject to the Supplementary Leverage Ratio (SLR) requirement in the United States, and, for dealers whose holding company is subject, a continuous measure of SLR slack: the holding company's reported SLR minus its required SLR, in percentage points.

We then merge in measures of dealer transaction specialization in maturity buckets, which are constructed using the FR-2004 dataset. Transaction specialization for dealer d at time t in maturity bucket m is computed as follows:

$$Spe_{dmt} = \frac{Transac^{\text{all}}_{dmt}}{\sum_m Transac^{\text{all}}_{dmt}} - \frac{\sum_d Transac^{\text{all}}_{dmt}}{\sum_{d,m} Transac^{\text{all}}_{dmt}}, \tag{1}$$

where $Transac^{\text{all}}_{dmt}$ is dealer d's total transactions in maturity bucket m in week t, defined as the sum of its transactions with inter-dealer brokers and with other counterparties. Specialization compares the share of total transactions that dealer d has in maturity bucket m to the average share of total transactions that all dealers have in maturity bucket m. It is measured in percentage points of a dealer's total transactions. We compute specialization over four maturity buckets: bills, less than 3 years, 3 to 11 years, and more than 11 years.

This classification is disaggregated enough to separate specialization decisions into the broad maturity segments which are bills, short, medium, and long maturities while minimizing the noise from ax excessively fine classification. These particular maturity segments are also available over a longer horizon back to 2002 in the FR 2004 data.

4 Aggregate Trends

Before turning to dealer-level regressions, we document aggregate trends in dealer inventories and transactions, differences in liquidity across maturity segments, and dealer specialization over our sample.

4.1 Aggregate Dealer Inventories and Transactions by Maturity

Consistent with the growth of the Treasury market as a whole, raw aggregate dealer long inventory has trended upward across all maturity buckets since 2010, and has increased markedly since the Treasury announced its buyback program in May 2023, as shown in Figure 2. Raw aggregate dealer short inventories have not shown the same marked increase in most maturity segments, as shown in Figure 3. Figure 4 shows that total transactions in dollar terms remained relatively stable across Treasury coupons of different maturities from 2010 to 2023 and have increased since the first buyback operations in 2024. Rising dollar volumes alone do not show that market liquidity has improved, however, because the stock of debt to be traded has grown over the same period; we therefore turn to measures scaled by the amount outstanding.

A different picture emerges once inventory and transactions are scaled by the amount of debt outstanding in each bucket. Scaled long and short inventory declines across maturity buckets over much of the pre-2024 sample, as shown in Figures 5 and 6. This decline is particularly marked for Treasuries at the long end. Even as raw dealer inventory has grown in dollar terms, it has grown more slowly than the stock of debt that dealers intermediate. This divergence, a numerator growing quickly but a denominator growing faster still, is consistent with dealer balance sheet capacity failing to keep pace with the much faster growth in Treasury issuance and is a natural candidate motivation for the buyback program itself. Following the program's announcement, scaled long inventory in Treasury coupons (though not in bills) has since risen rather than continuing its prior secular decline. Turning to scaled transactions, we see a continuous decline across Treasury coupons of all maturity segments between 2010 and the announcement of the buyback program, as shown in Figure 7. This decline stops following the announcement of the Treasury buyback program, consistent

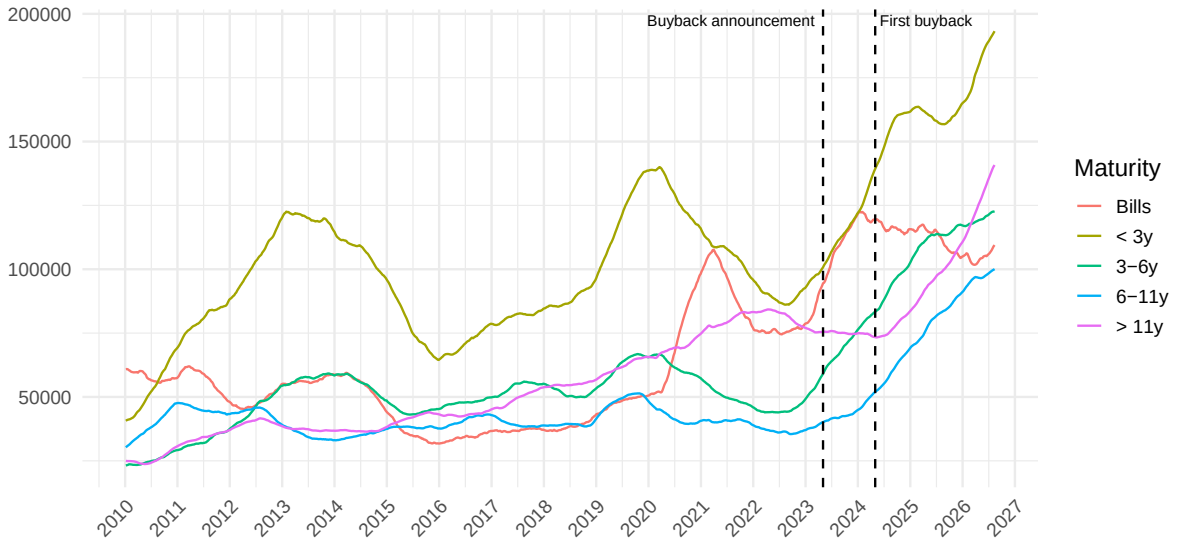


Figure 2: Dealer Long Inventories by Maturity Bucket

Notes: Figure showing 52-week rolling average aggregated long inventories across all primary dealers in each maturity bucket (bills, <3y, 3-6y, 6-11y, >11y) in millions of USD from 2010-01-01 - onward.

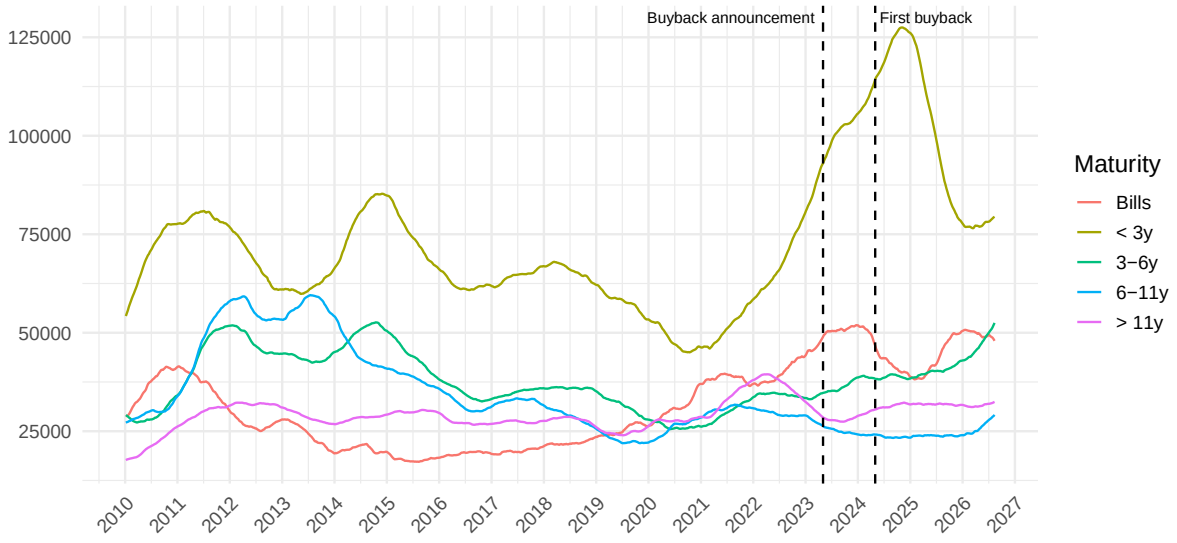


Figure 3: Dealer Short Inventories by Maturity Bucket

Notes: Figure showing 52-week rolling average aggregated short inventories across all primary dealers in each maturity bucket (bills, <3y, 3-6y, 6-11y, >11y) in millions of USD from 2010-01-01 - onward.

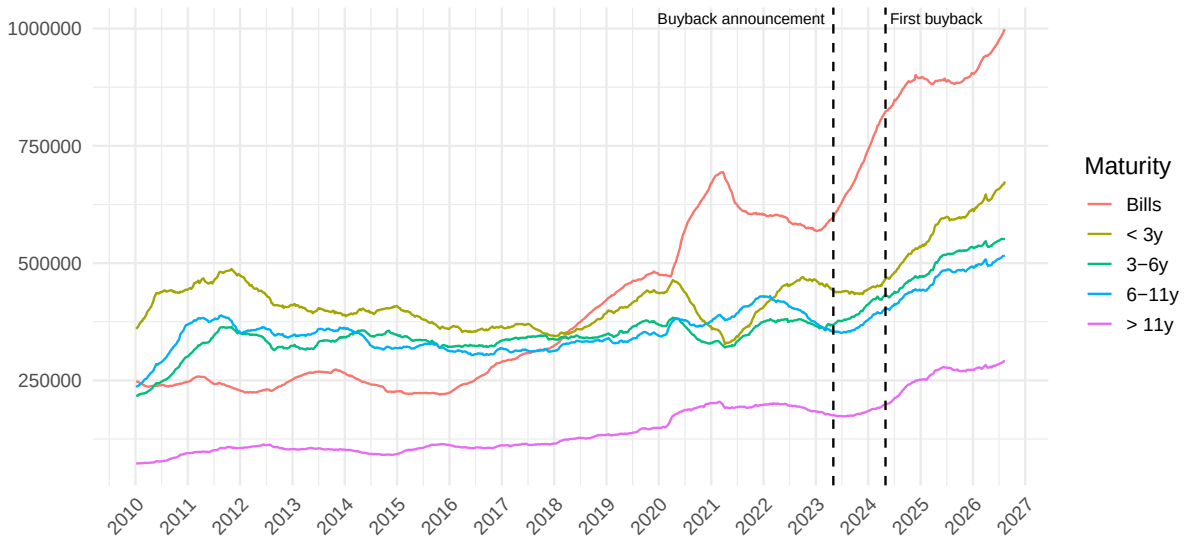


Figure 4: Dealer Total Transactions by Maturity Bucket

Notes: Figure showing 52-week rolling average aggregated total transactions across all primary dealers in each maturity bucket (bills, <3y, 3-6y, 6-11y, >11y) in millions of USD from 2010-01-01 - onward. Total transactions are constructed by summing other counterparties and inter-dealer brokers transactions.

with the program supporting dealer capacity and market liquidity at the margin, but does not reverse. We treat these aggregate patterns as suggestive and motivating rather than as causal evidence of the program's effects. Section 5 presents dealer-level event-study evidence around individual buyback operations that speaks more directly to the causal question.

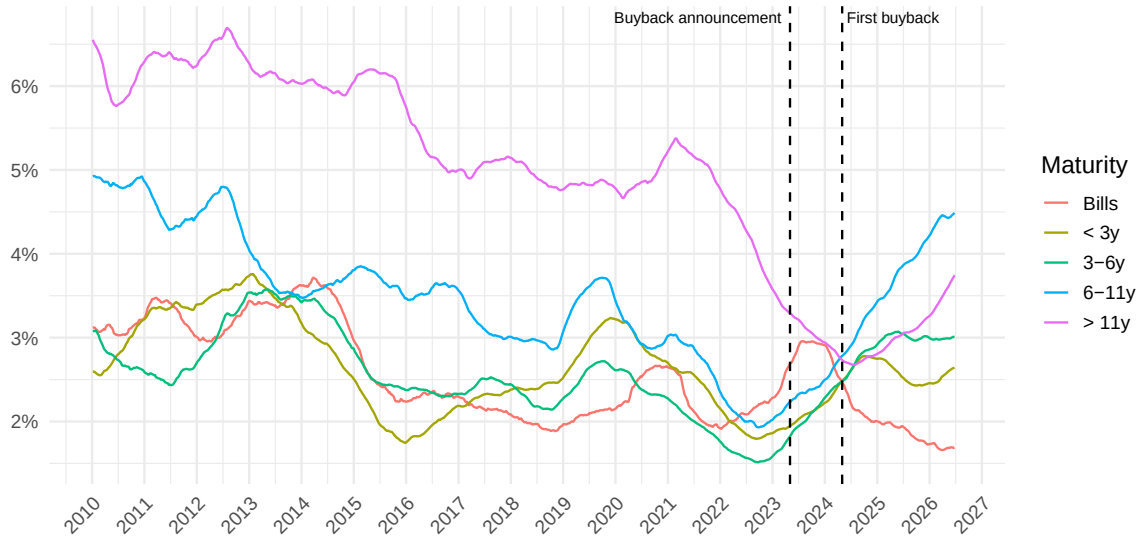


Figure 5: Dealer Long Inventories by Maturity Bucket as a Share of Amount Outstanding

Notes: Figure showing 52-week rolling average aggregated long inventories across all primary dealers in each maturity bucket (bills, <3y, 3-6y, 6-11y, >11y) as a percentage of the publicly available amount outstanding of Treasury securities in that bucket from 2010-01-01 - onward.

4.2 Differences in Liquidity Across Maturity Buckets

While there are common trends in dealers' inventories and transactions across maturity segments, there are also differences across segments that suggest that liquidity may differ from one segment to another. To investigate this further, we plot the time series of the root-mean-square deviation of off-the-run coupon yields from CRSP from the fitted yield curve of Gürkaynak et al. (2007). Hu et al. (2013) use a similar noise measure, aggregated across maturities, to capture variation in the liquidity of the Treasury market as a whole, where the larger the measure, the less liquid the market. Here, we construct the same noise measure separately for each buyback maturity sector, in order to investigate whether liquidity differs across segments.

Figure 8 shows the results. We find that noise differs across maturity segments, suggestive of differences in liquidity across segments. For example, the short-end 1M-2Y segment tends

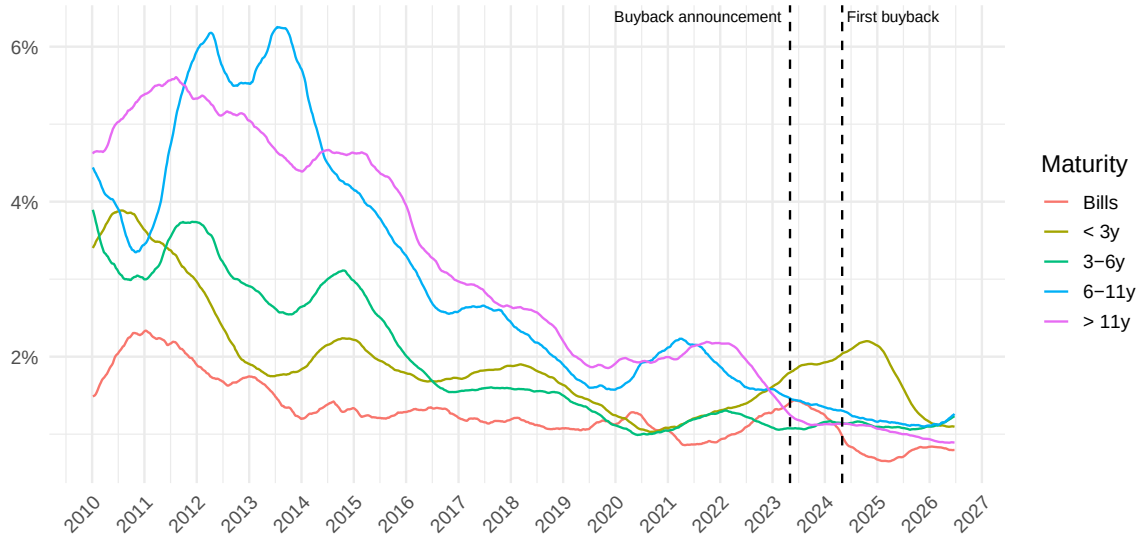


Figure 6: Dealer Short Inventories by Maturity Bucket as a Share of Amount Outstanding

Notes: Figure showing 52-week rolling average aggregated short inventories across all primary dealers in each maturity bucket (bills, <3y, 3-6y, 6-11y, >11y) as a percentage of the publicly available amount outstanding of Treasury securities in that bucket from 2010-01-01 - onward.

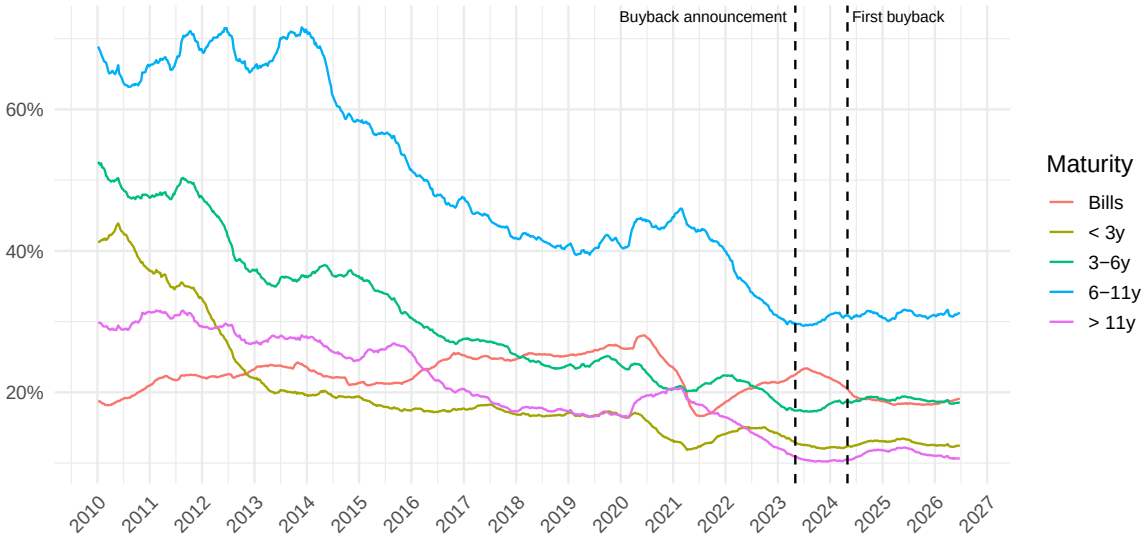


Figure 7: Dealer Total Transactions by Maturity Bucket as a Share of Amount Outstanding

Notes: Figure showing 52-week rolling average aggregated total transactions across all primary dealers in each maturity bucket (bills, <3y, 3-6y, 6-11y, >11y) as a percentage of the publicly available amount outstanding of Treasury securities in that bucket from 2010-01-01 - onward.

to be less liquid than longer maturity segments overall. This is in line with the idea that old off-the-run Treasuries tend to be particularly illiquid, and this short-end segment includes many such securities.[6] We also see that in the recent period of 2020–2024, liquidity appears worse in the long end (10–20Y and 20–30Y segments) than in the belly of the curve (2–3Y, 3–5Y, 5–7Y, and 7–10Y segments). Since the introduction of the buyback program, the Treasury's cumulative purchases as a fraction of the amount outstanding have been largest at the short end and the long end, precisely the segments where liquidity appears lower.

We also see that the liquidity of different segments relative to one another changes over time. For example, in 2000–2004 the 7–10Y segment appeared less liquid than the 10–20Y segment, with an average noise measure of 12.8 basis points compared with 1.6 basis points. More recently, this relationship has reversed, with an average noise measure of 4.0 basis points in the 7–10Y segment and 7.1 basis points in the 10–20Y segment during the 2020–2024 period. Similar changes in relative liquidity can be observed in other segments of the Treasury market.

More broadly, there are sharp increases in noise during the Great Financial Crisis across most segments except for the very long end. We also see increases in noise across segments during 2022. Around the introduction of the Treasury buyback program, noise declines across segments, suggesting that liquidity improved during this period. During the recent period of Treasury market stress in mid-2026, maturity segments differ in how affected they are. For example, the 10–20Y and 20–30Y segments, where the Treasury conducted larger purchases, show only modest increases in noise during this period, while the 5–7Y and 7–10Y segments, where the Treasury conducted smaller purchases, show larger ones.

4.3 Dealer Transaction Specialization in Maturity Buckets

We observe that there are differences in the indicators of intermediation and liquidity across different maturity segments within the Treasury market. One reason could be that dealers differ in how intensively they intermediate each segment. If dealers specialize in different segments, a decline in the intermediation capacity of the dealers specializing in a given segment will reduce liquidity in that segment unless other dealers step in. This would also suggest that Treasury buybacks may be more effective if they target the segments where liquidity is worst and relieve the inventories of dealers that are particularly constrained and that specialize in those segments.

[6] Securities with less than one year to maturity can show large yield deviations from small price differences, and the GSW curve is not fitted at such short maturities. Excluding them, noise in the 1M–2Y segment remains higher than at intermediate maturities (3.6 vs. 3.1 basis points on average from 2020 to April 2024, and 4.5 vs. 2.5 basis points afterward, using CRSP daily prices), although the gap is smaller.

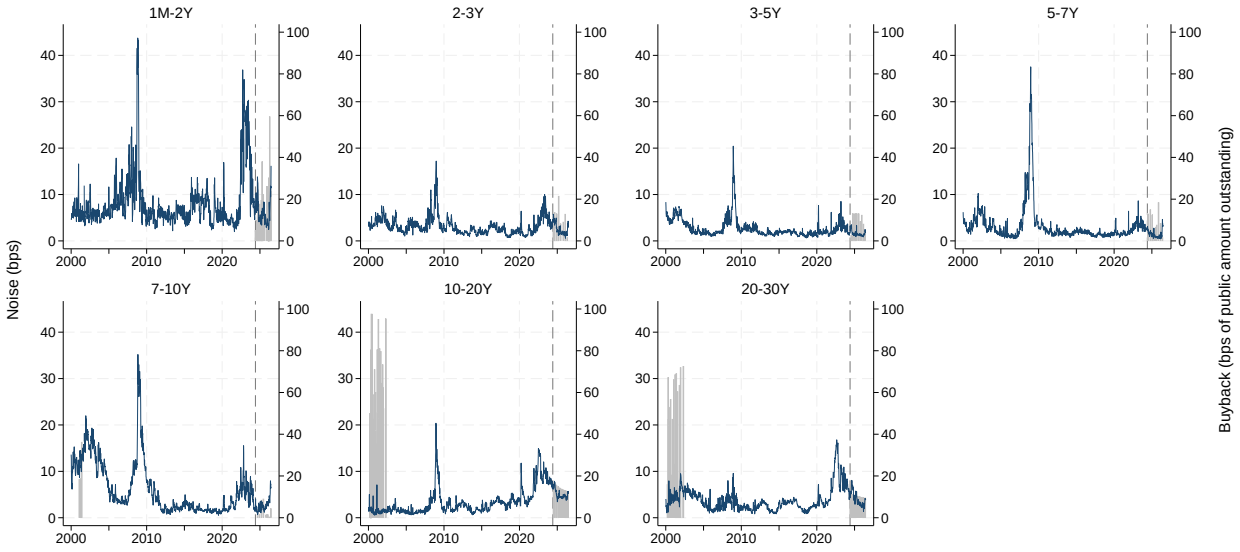


Figure 8: Noise by Maturity Bucket across Time

Notes: Figure showing the root-mean-squared deviation of observed coupon yields in each buyback sector from the GSW fitted curve, in basis points (left-hand-side axis). The grey bars show the size of Treasury buybacks in each buyback sector each week, scaled by the percentage of the publicly available amount outstanding in that sector, in basis points (right-hand-side axis). The grey dashed line indicates the beginning of the 2024 Treasury buyback program.

We investigate whether dealers are specialized in particular maturity segments. Dealers exhibit persistent transaction specialization in particular maturity buckets. We define a dealer's specialization in a maturity segment as the share of the dealer's transactions that falls in that segment minus the share of all dealers' combined transactions that falls in that segment (Equation 1). To summarize this measure, we rank each dealer's four maturity segments every week by the dealer's specialization in them, from rank 1, the segment in which the dealer's transactions are most disproportionately concentrated relative to the market as a whole, to rank 4, the segment in which they are least concentrated. Figure 9 shows the average specialization at each of these four ranks, averaged across all dealers and weeks.

Average specialization is positive and large for rank 1 segments, with a value of 0.13. This means that the share of a primary dealer's transactions in its most specialized bucket is on average 13 percentage points higher than the share of all dealers' transactions in that bucket. For the second most specialized bucket, this value is about 0.01, indicating that dealers transact about as much in their second-ranked bucket as the market as a whole. For the third- and fourth-ranked buckets, the values are about -0.04 and -0.11. Because each dealer's specialization sums to zero across buckets, the overweight in a dealer's top bucket is offset by these underweights. Overall, dealers do not transact uniformly across maturity

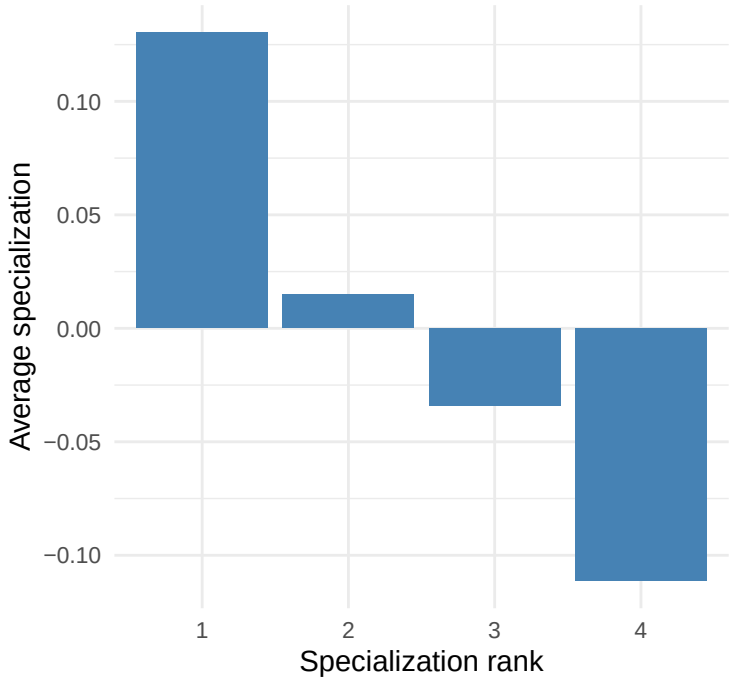


Figure 9: Average Dealer Transactions Maturity Specialization by Rank Position

Notes: Figure showing average of all primary dealers' specialization in total transactions by rank position. To construct this, transaction specialization for dealer d at time t in maturity bucket m is computed as follows:

$$Spe_{dmt} = \frac{Transac^{\text{all}}_{dmt}}{\sum_m Transac^{\text{all}}_{dmt}} - \frac{\sum_d Transac^{\text{all}}_{dmt}}{\sum_{d,m} Transac^{\text{all}}_{dmt}}, \tag{2}$$

where $Transac^{\text{all}}_{dmt}$ is dealer d's total transactions in maturity bucket m in week t, defined as the sum of inter-dealer brokers and other counterparties transactions. Specialization compares the share of total transactions that dealer d has in maturity bucket m to the average share of total transactions that all dealers have in maturity bucket m. We use the following four maturity buckets to compute specialization: bills, less than 3 years, 3 to 11 years, and more than 11 years. Next, for each dealer and week, we rank specializations from 1 through 4. Then we take the average of specialization across all dealers and weeks from 2001-07-04 onward for each rank, and plot this in 4 bars.

buckets but rather concentrate their activity disproportionately in a particular part of the curve, with a corresponding under-weighting of the buckets in which they are least active.

This specialization pattern is also highly persistent. Figure 10 shows that the autocorrelation of dealer-maturity specialization is about 0.86 at a one-week horizon and remains about 0.77 at a one-year horizon, indicating that a dealer's specialization in a maturity bucket in a given week is a good predictor of its specialization in that maturity bucket many months later. This suggests that these large average values for specialization are not the result of temporary influxes of transactions in different segments across time, but rather that the identity of the specialized segment is stable over time. This also supports our use of a dealer's specialization ranking in the week just prior to a buyback operation as a meaningful, largely predetermined characteristic in the heterogeneity analysis that follows.

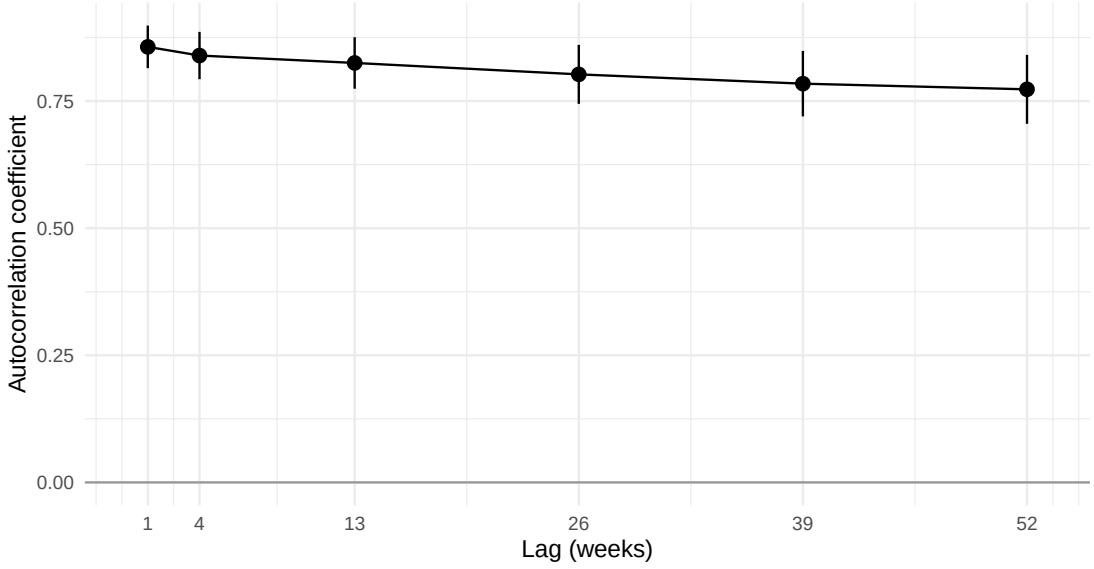


Figure 10: Autocorrelation of Dealer Transaction Maturity Specialization

Notes: Figure showing the autocorrelation of dealers' maturity-bucket specialization in transactions. Spe_{dmt} is constructed as above. Then, we run the following regression separately for $h = 1, 4, 13, 26, 39, 52$ weeks:

$$Spe_{dmt} = \rho_h Spe_{dm,t-h} + \alpha_{dt} + \delta_{mt} + \varepsilon_{dmt} \tag{3}$$

We plot ρ_h with 95% confidence intervals. Standard errors are clustered at the dealer level.

Dealers also tend to specialize in the same maturity segments in their inventories as in their trading. Table 1 regresses a dealer's specialization in long inventories, defined as in Equation (1) with long inventories in place of transactions, on its transaction specialization in the same maturity segment. The relationship is positive and significant. The coefficient of 0.55 in column (2) indicates that a 1-percentage-point greater overweight in transactions

in a given maturity segment, relative to the market as a whole, is associated with a 0.55-percentage-point greater overweight in long inventories in that segment. The relationship also holds within dealers over time (column 3), with a coefficient of 0.34. A dealer that trades disproportionately in securities with more than 11 years to maturity, for example, therefore also tends to hold a disproportionate share of its long inventory in that segment.

Table 1: Relationship between Dealer Inventory Specialization and Dealer Transaction Specialization

Dependent Variable:		Spe^{Inv}	
Model:	(1)	(2)	(3)
Variables			
Constant	0.0023***		
	(0.0008)		
Spe^{Tra}	0.5636***	0.5513***	0.3425***
	(0.0926)	(0.0963)	(0.0724)
Fixed-effects			
Dealer × Date		Yes	Yes
Maturity × Date		Yes	
Dealer × Maturity			Yes
Fit statistics			
Observations	116,067	116,018	116,018
R^2	0.15890	0.19906	0.43053
Within R^2		0.14813	0.03923

Notes: Table displays coefficients from the following regression:

$$Spe^{\text{Inv}}_{dmt} = \beta \cdot Spe^{\text{Tra}}_{dmt} + \varepsilon_{dmt}$$

with the fixed effects listed at the bottom of the table. Spe^{Inv}_{dmt} is dealer d's long inventory specialization in Treasury maturity bucket m in week t, and Spe^{Tra}_{dmt} is its total transaction specialization, where total transactions are defined as the sum of inter-dealer brokers and other counterparties transactions. Specialization is defined over four Treasury maturity buckets: bills, less than 3 years, 3 to 11 years, more than 11 years. The regression is estimated on dealer-week-maturity bucket observations reported on both FR 2004A and FR 2004B, from 2001-07-04 onward. Column (1) includes a constant and no fixed effects. Column (2) includes dealer-by-week and maturity bucket-by-week fixed effects, so the coefficient is identified from differences across maturity buckets within a dealer-week, relative to the average across dealers in that bucket-week. Column (3) includes dealer-by-week and dealer-by-maturity bucket fixed effects, so the coefficient is identified from within-dealer changes over time in the dealer's specialization, relative to that dealer's average specialization in each maturity bucket. Standard errors are clustered by dealer. *, ** and *** indicate significance at the 10%, 5%, and 1% level, respectively.

Dealer specialization in particular maturity segments within the Treasury market may initially be the product of dealers specializing in the provision of services to different types of clientele, who have different maturity habitats. For example, a dealer's institution may specialize in advising pension funds, which invest primarily in long-term Treasuries. When that dealer provides intermediation services for their clientele, that dealer will end up trans-

acting primarily in the long end of the curve. Given that dealers are aware that they then have less superior information about incoming flows in other maturity segments than the dealers specializing in those other segments, dealers may then also be less willing to trade in those other segments. In turn, dealers know that they likely have superior information about future flows in their specialty maturity segment, and so are more willing to trade in that segment. In this way, the identity of the maturity segment that a given dealer specializes in persists over time.

5 Empirical Results

This section studies how primary dealers adjust their inventories and their transactions in the weeks around Treasury buyback operations. We then examine whether these responses differ across dealers and across buybacks. The comparison across dealers asks whether the response depends on how binding a dealer's balance sheet constraints are and on how specialized the dealer is in the maturity segment of the buyback. The comparison across buybacks asks whether the response depends on the point of the curve at which the Treasury conducts the operation.

5.1 Response of Dealer Inventory to Buyback Operations

We begin by investigating how dealers adjust their inventories around Treasury buyback operations. To do so, we estimate the following regression specification:

$$Inv^{\text{long}}_{dmt,h} = \sum_{\substack{j=-4 \\ j\neq -1}}^{3} \beta_j \cdot (\mathbb{1}\{j = h\} \times BB_{mt}) + \alpha_d + \delta_h + \gamma_{mt} + \varepsilon_{dmt,h} \tag{4}$$

The variable BB_{mt} takes one of two forms. The first is a dummy variable that equals one if a buyback settled in maturity bucket m during week t. The second is the total amount purchased in buybacks settling in that bucket during week t scaled by the total publicly held amount outstanding in that bucket at the end of the prior week. The dependent variable $Inv^{\text{long}}_{dmt,h}$ is dealer d's long inventory in maturity bucket m at date $t + h$, which we express either in millions of U.S. dollars or scaled by the total publicly available amount outstanding in that maturity bucket as of the end of the prior week. α_d, δ_h, and γ_{mt} are dealer, buyback horizon, and buyback date-by-maturity bin fixed effects. We estimate this specification on a stacked sample that contains every week t since May 2024 in which a buyback settled in at least one maturity bucket. Each such week constitutes a window for every bucket, so the buckets the Treasury bought that week are treated and the buckets it did not buy

serve as controls with BB_{mt} equal to zero. Each coefficient β_j therefore measures how much inventories in the purchased bucket change between week -1 and week j relative to the same change in the buckets the Treasury did not purchase that week.

Figures 11, 12, and 13 plot the coefficients β_j from four weeks before to three weeks after the week in which a buyback settles. Dealer long inventories show no clear trend in the weeks leading up to a buyback and then fall in the week it settles, and we find this decline in both raw and scaled inventories and with both the dummy and the continuous buyback measure. Figure 11 shows that the average dealer reduces its long inventory in the targeted maturity segment by about \$63 million that week.

This decline accounts for only part of what the Treasury buys. Because the continuous specification scales inventories and purchases by the same amount outstanding, its week-0 coefficient of about -0.014 in Figure 13 implies that the average dealer's inventory falls by about 1.4 cents for each dollar the Treasury purchases. Summed across the 25 primary dealers, this estimate implies that aggregate dealer long inventory falls by about 35 cents per dollar purchased. If dealers were simply unloading their own positions onto the Treasury, we would expect this number to be much closer to a dollar. That it falls below one suggests that dealers may be acting in part as intermediaries in these operations by buying securities from their clients and passing them on to the Treasury. The Treasury allows this by design, since market participants other than primary dealers can sell through a primary dealer (U.S. Department of the Treasury, 2024). If dealers do pass through client securities on this scale, buybacks may relieve dealers' own balance sheets by less than the amount purchased would imply.

Across specifications, dealers begin accumulating long inventories again in the week after a buyback and thereby reverse the initial decline over the following weeks. Raw inventories remain about \$58 million below their pre-buyback level in week 1, but the gap narrows to about \$23 million and is no longer statistically significant by week 2, and the scaled estimates in Figure 13 return to about zero over the same horizon. This pattern is consistent with buybacks temporarily relieving dealers of inventory constraints and allowing them to continue intermediating in the targeted maturity segment, with inventories building up again as a result of this intermediation activity. Taken together, the partial decline and the subsequent rebuilding suggest that buybacks may work less by durably shrinking dealers' balance sheets than by giving dealers a recurring outlet that creates room to keep taking on securities from their clients.

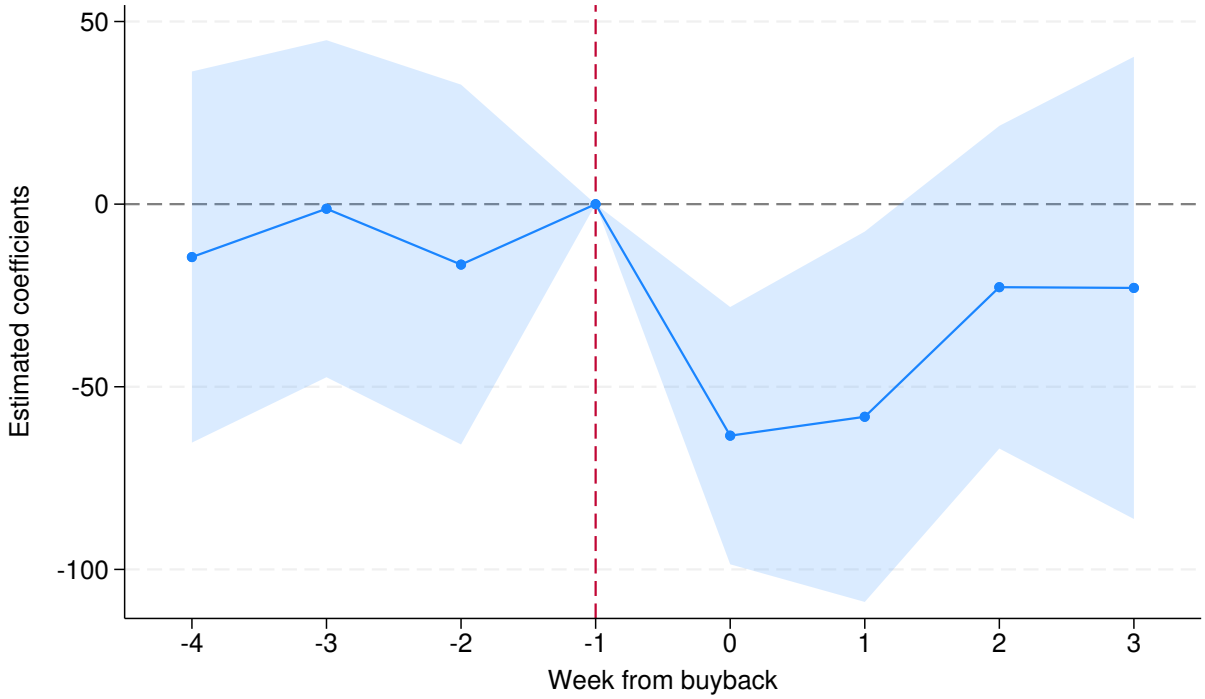


Figure 11: Dealer Long Inventory in Level on Buyback Dummy

Notes: Figure plots the coefficients β_j estimated in the following regression:

$$Inv^{\text{long}}_{dmt,h} = \sum_{\substack{j=-4 \\ j\neq -1}}^{3} \beta_j \cdot (\mathbb{1}\{j = h\} \times BB_{mt}) + \alpha_d + \delta_h + \gamma_{mt} + \varepsilon_{dmt,h} \tag{5}$$

BB_{mt} is a dummy that equals one if a buyback operation occurred in maturity bucket m during week t. $Inv^{\text{long}}_{dmt,h}$ is dealer d's long inventory in maturity bucket m at date $t+k$, in millions of USD, and α_d, δ_h, γ_{mt} are dealer, buyback horizon, and buyback date-by-maturity bin fixed effects respectively. Standard errors are two-way clustered by dealer and buyback time. The confidence intervals are at the 95% level.

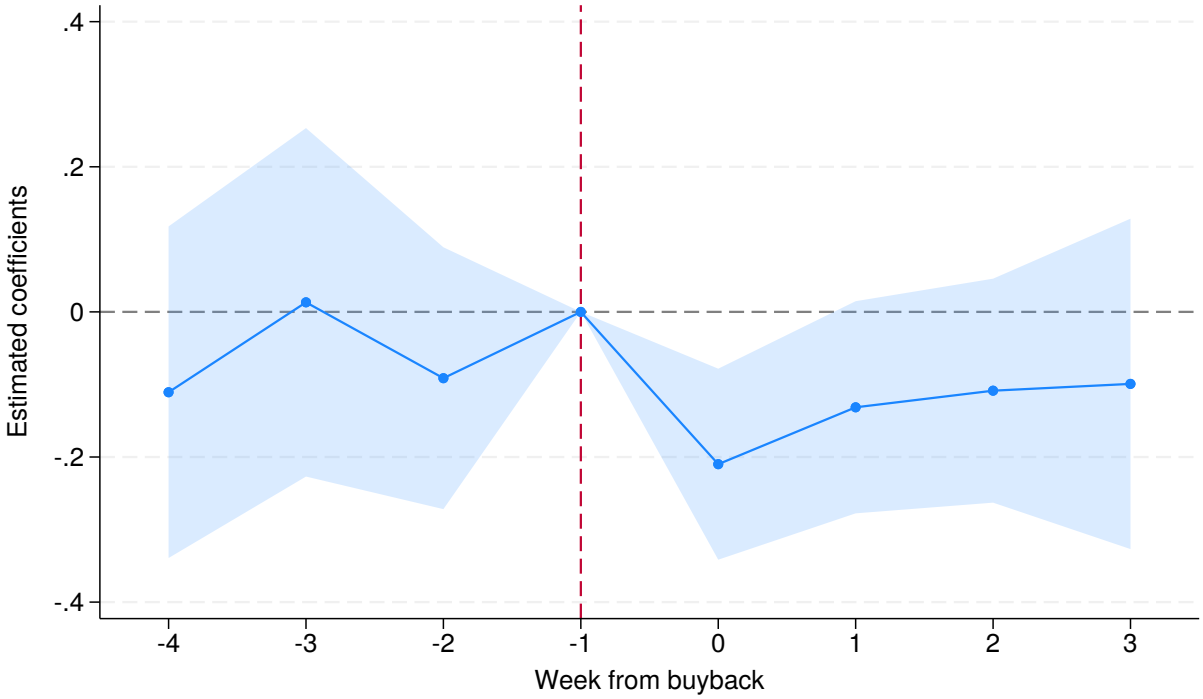


Figure 12: Dealer Long Scaled Inventory on Buyback Dummy

Notes: Figure plots the coefficients β_j estimated in the following regression:

$$Inv^{\text{long}}_{dmt,h} = \sum_{\substack{j=-4 \\ j\neq -1}}^{3} \beta_j \cdot (\mathbb{1}\{j = h\} \times BB_{mt}) + \alpha_d + \delta_h + \gamma_{mt} + \varepsilon_{dmt,h} \tag{6}$$

BB_{mt} is a dummy that equals one if a buyback operation occurred in maturity bucket m during week t. $Inv^{\text{long}}_{dmt,h}$ is dealer d's long inventory in maturity bucket m at date $t+k$ scaled by the total publicly available amount outstanding in maturity bucket m as of $t-1$ expressed in basis points, and α_d, δ_h, γ_{mt} are dealer, buyback horizon, and buyback date-by-maturity bin fixed effects respectively. Standard errors are two-way clustered by dealer and buyback time. The confidence intervals are at the 95% level.

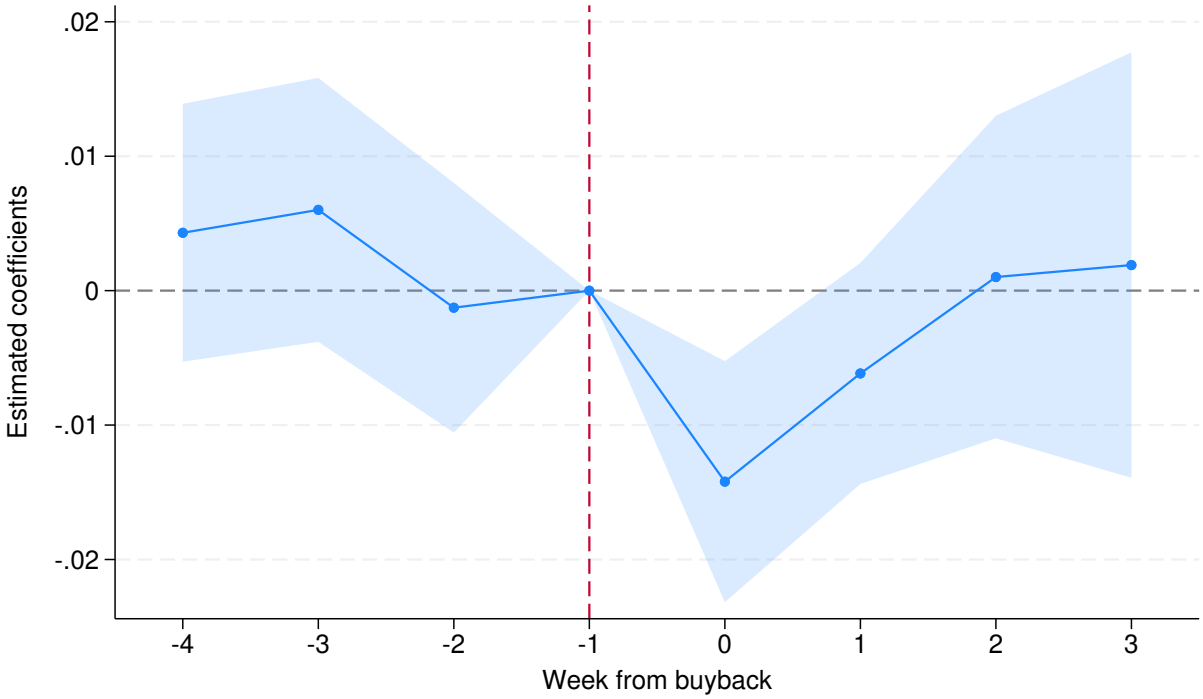


Figure 13: Dealer Long Scaled Inventory on Continuous Buyback Measure

Notes: Figure plots the coefficients β_j estimated in the following regression:

$$Inv^{\text{long}}_{dmt,h} = \sum_{\substack{j=-4 \\ j\neq -1}}^{3} \beta_j \cdot \left(\mathbb{1}\{j = h\} \times BB^{\$}_{mt} \right) + \alpha_d + \delta_h + \gamma_{mt} + \varepsilon_{dmt,h} \tag{7}$$

$BB^{\$}_{mt}$ is the total amount purchased in buyback operations in maturity bucket m during week t, scaled by the total publicly available amount outstanding of all Treasury securities in maturity bucket m as of week $t-1$ expressed in basis points. $Inv^{\text{long}}_{dmt,h}$ is dealer d's long inventory in maturity bucket m at date $t+k$ scaled by the total publicly available amount outstanding in maturity bucket m as of $t-1$ expressed in basis points, and α_d, δ_h, γ_{mt} are dealer, buyback horizon, and buyback date-by-maturity bin fixed effects respectively. Standard errors are two-way clustered by dealer and buyback time. The confidence intervals are at the 95% level.

5.2 Response of Dealer Transactions around Buyback Operations

We next investigate how dealers adjust the volume of transactions around Treasury buyback operations. To do so, we estimate the following regression specification:

$$Transac^{\text{all}}_{dmt,h} = \sum_{\substack{j=-4 \\ j\neq -1}}^{3} \beta_j \cdot (\mathbb{1}\{j = h\} \times BB_{mt}) + \alpha_d + \delta_h + \gamma_{mt} + \varepsilon_{dmt,h} \tag{8}$$

The variable BB_{mt} and the fixed effects are defined as before. The dependent variable $Transac^{\text{all}}_{dmt,h}$ is dealer d's total transactions in maturity bucket m at date $t+h$, which we scale by the total publicly held amount outstanding in that bucket at $t-1$ and express in basis points. Total transactions are the sum of the dealer's transactions with inter-dealer brokers and with other counterparties. They do not include the dealer's sale to the Treasury for a buyback, so these estimates capture how a dealer's trading with the rest of the market responds to a buyback.

Figures 14 and 15 plot the coefficients β_j from four weeks before to three weeks after the week in which a buyback settles. Dealer transactions show no significant response in the week of a buyback with either the dummy or the continuous measure. The point estimates nonetheless suggest that transactions rise gradually in the weeks after an operation and in the weeks leading up to one. One possible explanation for this pattern lies in the regular cadence of Treasury buybacks. Immediately after an operation, the next opportunity to sell securities to the Treasury is relatively distant. As the next buyback approaches, dealers may become increasingly willing to intermediate transactions because they anticipate that they will soon be able to reduce the inventories accumulated through this activity. This explanation would connect the transaction results to the inventory results above, since the inventories that dealers rebuild after one buyback are the inventories they can expect to sell into the next.

5.3 Heterogeneity of Buyback Operations on Dealer Inventory

Having established that dealer inventories decline on average around buyback operations, we next investigate whether this decline varies systematically across dealers and across operations. We begin with dealer specialization. Dealers that specialize in the targeted maturity segment are likely to play a greater role in intermediating transactions in that segment going forward, so reductions in their inventories may be particularly consequential for market liquidity. We then turn to regulatory constraints. If constraints on dealer balance sheets contribute to impaired liquidity, buybacks may be particularly effective when they relieve

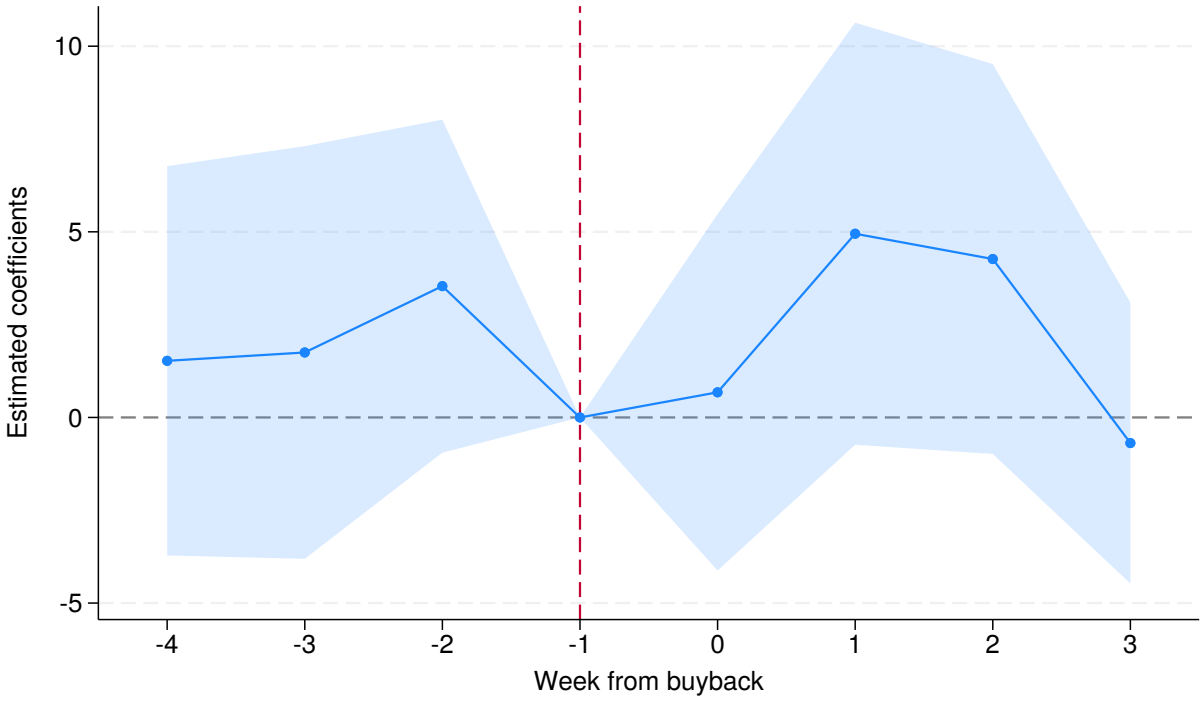


Figure 14: Dealer Scaled Total Transactions on Buyback Dummy

Notes: Figure plots the coefficients β_j estimated in the following regression:

$$Transac^{\text{all}}_{dmt,h} = \sum_{\substack{j=-4 \\ j\neq -1}}^{3} \beta_j \cdot (\mathbb{1}\{j = h\} \times BB_{mt}) + \alpha_d + \delta_h + \gamma_{mt} + \varepsilon_{dmt,h} \tag{9}$$

BB_{mt} is a dummy that equals one if a buyback operation occurred in maturity bucket m during week t. $Transac^{\text{all}}_{dmt,h}$ is dealer d's total transactions in maturity bucket m at date $t+k$, scaled by the total publicly available amount outstanding in maturity bucket m as of $t-1$ expressed in basis points. Total transactions are computed as the sum of inter-dealer brokers and other counterparties transactions, and α_d, δ_h, γ_{mt} are dealer, buyback horizon, and buyback date-by-maturity bin fixed effects respectively. Standard errors are two-way clustered by dealer and buyback time. The confidence intervals are at the 95% level.

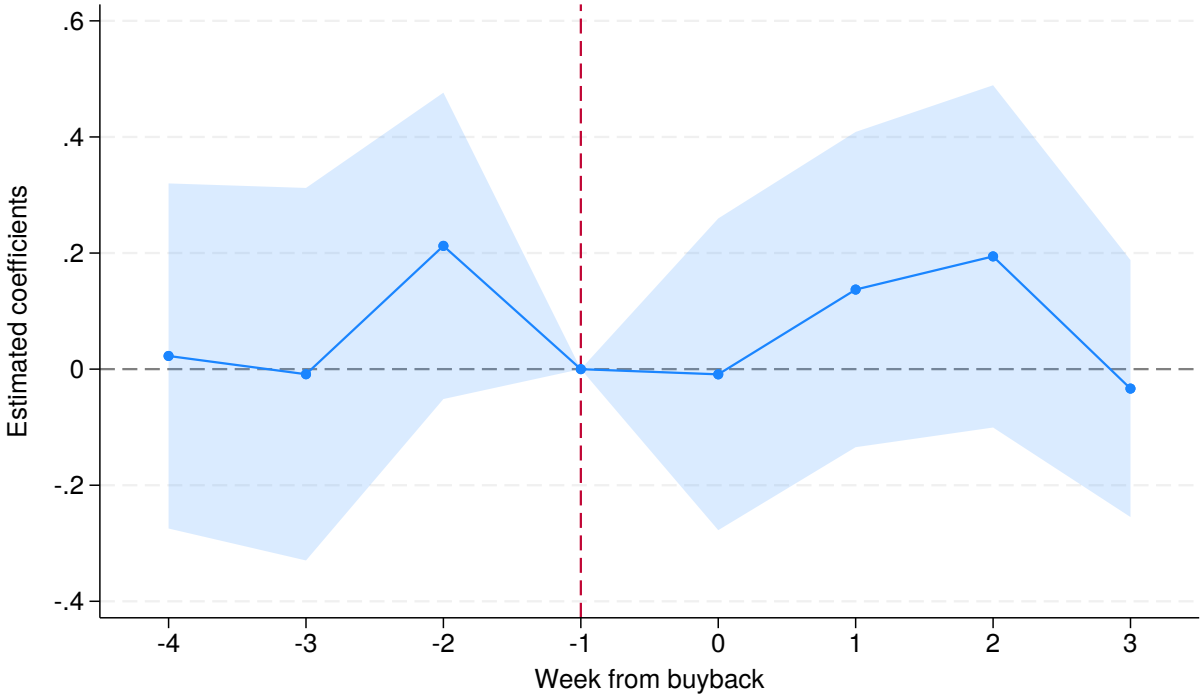


Figure 15: Dealer Scaled Total Transactions on Buyback Continuous Measure

Notes: Figure plots the coefficients β_j estimated in the following regression:

$$Transac^{\text{all}}_{dmt,h} = \sum_{\substack{j=-4 \\ j\neq -1}}^{3} \beta_j \cdot \left(\mathbb{1}\{j = h\} \times BB^{\$}_{mt} \right) + \alpha_d + \delta_h + \gamma_{mt} + \varepsilon_{dmt,h} \tag{10}$$

$BB^{\$}_{mt}$ is the total amount purchased in buyback operations in maturity bucket m during week t, scaled by the total publicly available amount outstanding of all Treasury securities in maturity bucket m as of week $t-1$ expressed in basis points. $Transac^{\text{all}}_{dmt,h}$ is dealer d's total transactions in maturity bucket m at date $t+k$, scaled by the total publicly available amount outstanding in maturity bucket m as of $t-1$ expressed in basis points. Total transactions are computed as the sum of inter-dealer brokers and other counterparties transactions, and α_d, δ_h, γ_{mt} are dealer, buyback horizon, and buyback date-by-maturity bin fixed effects respectively. Standard errors are two-way clustered by dealer and buyback time. The confidence intervals are at the 95% level.

the inventories of the most constrained dealers. Finally, we examine whether the inventory response varies across the maturity segments that buyback operations target.

5.3.1 Heterogeneity by Dealer Transaction Specialization

We first investigate whether buybacks reduce inventories by more among dealers that specialize in the targeted maturity segment. To do so, we estimate the following specification:

$$Inv^{\text{long}}_{dmt,h} = \beta_1 Z_{dmt,-1} + \beta_2 \mathbb{1}\{\text{BB week}_{th}\} \times Z_{dmt,-1} + \beta_3 Z_{dmt,-1} \times BB_{mt} \tag{11}$$

$$+ \beta_4 \mathbb{1}\{\text{BB week}_{th}\} \times BB_{mt} + \beta_5 \mathbb{1}\{\text{BB week}_{th}\} \times BB_{mt} \times Z_{dmt,-1} \tag{12}$$

$$+ \alpha_d + \delta_h + \gamma_{mt} + \varepsilon_{dmt,h}. \tag{13}$$

The variable $Z_{dmt,-1}$ measures dealer d's transaction specialization in maturity segment m in the week preceding buyback t. It is either a dummy equal to one if m is the segment of the dealer's top transaction specialization or the continuous measure of specialization in Equation (1). The variable $\mathbb{1}\{\text{BB week}_{th}\}$ equals one in the week the buyback settles ($h = 0$) and zero in the preceding week ($h = -1$). The variable BB_{mt} and the fixed effects are defined as in Equation (4), and the dependent variable is dealer d's long inventory at horizon h as a share of the total publicly held amount outstanding in bucket m at $t - 1$, expressed in basis points. The coefficient of interest is β_5, which measures how much more a dealer's inventory changes between the two weeks when the dealer is more specialized in the segment the Treasury buys.

Across both the rank-based and continuous specialization measures, Table 2 shows that dealers that are more specialized in the targeted maturity segment reduce their long inventories in that segment by more than other dealers do. This finding matters for the potential effects of buybacks on market liquidity. Specialized dealers concentrate their intermediation in these segments, so reducing their inventories may free up balance-sheet capacity among the dealers most oriented toward intermediating there. Buybacks may therefore be particularly effective in improving liquidity in the targeted segments when inventory reductions are concentrated among the dealers that specialize in them. The result also suggests that the relief documented above is not evenly shared, because the dealers most able to sell from their own inventories in a given segment appear to be the ones that specialize in it.

Table 2: Dealer Long Inventories by Transaction Maturity Specialization

	BB dummy		BB size	
	(1)	(2)	(3)	(4)
Constant	11.75***	12.95***	11.74***	12.94***
	(0.48)	(0.05)	(0.48)	(0.05)
Z_{-1}	4.38**	17.16**	4.54**	17.35**
	(1.96)	(6.75)	(2.06)	(6.85)
$\mathbb{1}\{\text{BB week}_{th}\}=1 \times Z_{-1}$	0.00	0.09	0.00	0.09
	(0.08)	(0.21)	(0.07)	(0.21)
$BB_{mt}=1 \times Z_{-1}$	0.31	-2.75		
	(1.61)	(4.64)		
$\mathbb{1}\{\text{BB week}_{th}\}=1 \times BB_{mt}=1$	-0.18**	-0.22***		
	(0.07)	(0.06)		
$\mathbb{1}\{\text{BB week}_{th}\}=1 \times BB_{mt}=1 \times Z_{-1}$	-0.15	-0.58***		
	(0.12)	(0.17)		
$BB^{\$}_{mt} \times Z_{-1}$			-0.05	-0.48
			(0.09)	(0.42)
$\mathbb{1}\{\text{BB week}_{th}\}=1 \times BB^{\$}_{mt}$			-0.01***	-0.01***
			(0.00)	(0.00)
$\mathbb{1}\{\text{BB week}_{th}\}=1 \times BB^{\$}_{mt} \times Z_{-1}$			-0.01**	-0.05*
			(0.01)	(0.03)
Dealer FE	Yes	Yes	Yes	Yes
BB horizon FE	Yes	Yes	Yes	Yes
BB date × Segment FE	Yes	Yes	Yes	Yes
Observations	51,664	51,556	51,664	51,556
Adj. R-sq	0.68	0.68	0.68	0.68
Specialization measure	Top dummy	Continuous	Top dummy	Continuous

Notes: Table displays coefficients from the following regression:

$$\begin{aligned} Inv^{\text{long}}_{dmt,h} = {} & \beta_1 Z_{dmt,-1} + \beta_2 \mathbb{1}\{\text{BB week}_{th}\} \times Z_{dmt,-1} + \beta_3 Z_{dmt,-1} \times BB_{mt} \\ & + \beta_4 \mathbb{1}\{\text{BB week}_{th}\} \times BB_{mt} + \beta_5 \mathbb{1}\{\text{BB week}_{th}\} \times BB_{mt} \times Z_{dmt,-1} \\ & + \alpha_d + \delta_h + \gamma_{mt} + \varepsilon_{dmt,h}. \end{aligned}$$

$Z_{dmt,-1}$ measures dealer d's transaction specialization in maturity segment m in the week preceding buyback t. In columns (1) and (3), it is a dummy equal to one if maturity segment m is the dealer's top transaction specialization. In columns (2) and (4), it is the continuous measure of transaction specialization. Transaction specialization is defined over four maturity segments: bills, less than 3 years, 3 to 11 years, and more than 11 years. BB_{mt} is either a dummy equal to one if a buyback operation occurred in maturity bucket m during week t (columns (1)–(2)), or the total amount purchased in buyback operations in maturity bucket m during week t, scaled by the total publicly available amount outstanding of Treasury securities in maturity bucket m as of week $t-1$, expressed in basis points (columns (3)–(4)). $\mathbb{1}\{\text{BB week}_{th}\}$ is a dummy equal to one in the week of the buyback ($h = 0$) and zero in the preceding week ($h = -1$). $Inv^{\text{long}}_{dmt,h}$ is dealer d's long inventory in maturity bucket m at horizon h, scaled by the total publicly available amount outstanding in maturity bucket m as of week $t-1$, expressed in basis points. α_d, δ_h, and γ_{mt} denote dealer, buyback horizon, and buyback date-by-maturity segment fixed effects, respectively. Standard errors are two-way clustered by dealer and buyback time. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

5.3.2 Heterogeneity by Dealer SLR Exposure

We next analyze whether inventory reductions are concentrated among dealers with less regulatory balance-sheet slack. If dealer balance sheet constraints contribute to reduced liquidity in the targeted segment, buybacks may be particularly effective when they relieve the inventories of the most constrained dealers. To investigate this, we re-estimate Equation (11) and replace specialization with a measure $Z_{dt,-1}$ of the exposure of dealer d's holding company to the Supplementary Leverage Ratio (SLR) requirement in the week preceding buyback t. This measure is either a dummy equal to one if the holding company is subject to the requirement or, among dealers subject to it, the holding company's SLR slack, which is its reported SLR minus its required SLR.

To investigate this, we estimate the following specification:

$$\begin{aligned} Inv^{\text{long}}_{dmt,h} = {} & \beta_1 Z_{dt,-1} + \beta_2 \mathbb{1}\{\text{BB week}_{th}\} \times Z_{dt,-1} + \beta_3 Z_{dt,-1} \times BB_{mt} \\ & + \beta_4 \mathbb{1}\{\text{BB week}_{th}\} \times BB_{mt} + \beta_5 \mathbb{1}\{\text{BB week}_{th}\} \times BB_{mt} \times Z_{dt,-1} \\ & + \alpha_d + \delta_h + \gamma_{mt} + \varepsilon_{dmt,h}. \end{aligned}$$

Table 3 shows that regulatory exposure matters at both margins. Columns (1) and (3) show that dealers subject to the SLR reduce their inventories by more than other dealers in the week a buyback settles. Columns (2) and (4) show that among these dealers the reductions are largest for those closest to their SLR requirement. These findings are consistent with buybacks disproportionately relieving the inventories of the dealers that face the tightest regulatory balance-sheet constraints and potentially freeing up capacity for their subsequent intermediation.

Table 3: Dealer Long Inventories by SLR Requirements and Slack

	BB dummy		BB size	
	(1)	(2)	(3)	(4)
Constant	13.09***	24.58***	13.09***	24.55***
	(0.50)	(3.43)	(0.51)	(3.43)
Z_{-1}	-1.56	0.64	-1.01	0.47
	(1.76)	(1.40)	(1.61)	(1.41)
$\mathbb{1}\{\text{BB week}_{th}\}=1 \times Z_{-1}$	0.25**	-0.09**	0.24**	-0.09***
	(0.11)	(0.03)	(0.11)	(0.03)
$BB_{mt}=1 \times Z_{-1}$	3.04	-1.01		
	(2.41)	(0.81)		
$\mathbb{1}\{\text{BB week}_{th}\}=1 \times BB_{mt}=1$	-0.11**	-0.48***		
	(0.04)	(0.14)		
$\mathbb{1}\{\text{BB week}_{th}\}=1 \times BB_{mt}=1 \times Z_{-1}$	-0.24**	0.05**		
	(0.10)	(0.02)		
$BB^{\$}_{mt} \times Z_{-1}$			0.09	-0.03
			(0.21)	(0.07)
$\mathbb{1}\{\text{BB week}_{th}\}=1 \times BB^{\$}_{mt}$			-0.01**	-0.04***
			(0.00)	(0.01)
$\mathbb{1}\{\text{BB week}_{th}\}=1 \times BB^{\$}_{mt} \times Z_{-1}$			-0.02***	0.01***
			(0.01)	(0.00)
Dealer FE	Yes	Yes	Yes	Yes
BB horizon FE	Yes	Yes	Yes	Yes
BB date × Segment FE	Yes	Yes	Yes	Yes
Observations	51,664	21,376	51,664	21,376
Adj. R-sq	0.67	0.63	0.67	0.63
SLR measure	SLR dummy	SLR slack	SLR dummy	SLR slack

Notes: Table displays coefficients from the following regression:

$$\begin{aligned} Inv^{\text{long}}_{dmt,h} = {} & \beta_1 Z_{dt,-1} + \beta_2 \mathbb{1}\{\text{BB week}_{th}\} \times Z_{dt,-1} + \beta_3 Z_{dt,-1} \times BB_{mt} \\ & + \beta_4 \mathbb{1}\{\text{BB week}_{th}\} \times BB_{mt} + \beta_5 \mathbb{1}\{\text{BB week}_{th}\} \times BB_{mt} \times Z_{dt,-1} \\ & + \alpha_d + \delta_h + \gamma_{mt} + \varepsilon_{dmt,h}. \end{aligned}$$

$Z_{dt,-1}$ measures dealer d's holding company's exposure to the Supplementary Leverage Ratio (SLR) requirement in the week preceding buyback t. In columns (1) and (3), it is a dummy equal to one if the dealer's holding company is subject to the SLR requirement. In columns (2) and (4), it is the continuous measure of SLR slack where they are subject to the SLR requirement, defined as the holding company's reported SLR minus its required SLR, expressed in percentage points. The regressions in columns (2) and (4) are estimated only for dealers subject to the SLR requirement. BB_{mt} is either a dummy equal to one if a buyback operation occurred in maturity bucket m during week t (columns (1)–(2)), or the total amount purchased in buyback operations in maturity bucket m during week t, scaled by the total publicly available amount outstanding of Treasury securities in maturity bucket m as of week $t-1$, expressed in basis points (columns (3)–(4)). $\mathbb{1}\{\text{BB week}_{th}\}$ is a dummy equal to one in the week of the buyback ($h=0$) and zero in the preceding week ($h=-1$). $Inv^{\text{long}}_{dmt,h}$ is dealer d's long inventory in maturity bucket m at horizon h, scaled by the total publicly available amount outstanding in maturity bucket m as of week $t-1$, expressed in basis points. α_d, δ_h, and γ_{mt} denote dealer, buyback horizon, and buyback date-by-maturity segment fixed effects, respectively. Standard errors are two-way clustered by dealer and buyback time. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

5.3.3 Heterogeneity by Maturity Segment of Buyback Operation

Lastly, we examine whether the inventory response varies across the maturity segments targeted by buyback operations. To do so, we re-estimate our baseline specification in Equation 4 separately for buyback operations targeting short maturities (less than two years), medium maturities (two to eleven years), and long maturities (more than eleven years). The results are shown in Figure 16.

We find similar declines in inventories within the targeted maturity segment during buyback weeks, irrespective of where along the maturity spectrum the buyback occurs. Similarly, inventories in the targeted maturity segment increase again in the weeks following the buyback, returning toward their pre-buyback levels regardless of which segment is targeted. These findings suggest that buybacks temporarily relieve dealers of inventories in the targeted maturity segment, irrespective of which segment is targeted, potentially allowing them to continue intermediating in that segment, with inventories subsequently accumulating again as a result of this intermediation activity.

6 Conclusion

This paper studies how the U.S. Treasury's buyback program affects primary dealer inventories and trading activity, using confidential dealer-level data. We first document that Treasury market liquidity differs across maturity segments and over time, and that primary dealers exhibit persistent specialization in particular maturity segments, both in their transactions and inventory holdings. Turning to buyback operations, we find that dealers reduce their long inventories in the targeted maturity segment during buyback weeks, with inventories subsequently returning toward their pre-buyback levels. This pattern holds across the maturity spectrum. Inventory reductions are particularly pronounced among dealers specializing in the targeted maturity segment and among dealers with less slack relative to their regulatory Supplementary Leverage Ratio (SLR) requirements. We also find suggestive evidence of increased trading activity in the weeks surrounding buybacks, consistent with dealers anticipating opportunities to reduce their inventories through future operations.

Taken together, our findings are consistent with Treasury buybacks providing partial and temporary inventory relief, particularly among specialized and balance-sheet-constrained dealers. They suggest that the effects of buybacks may depend not only on the aggregate quantity of securities purchased but also on which dealers' inventories are relieved. Because this relief is smaller than the Treasury's purchases and fades within weeks, buybacks may support dealer intermediation less by durably shrinking dealers' balance sheets than by giving

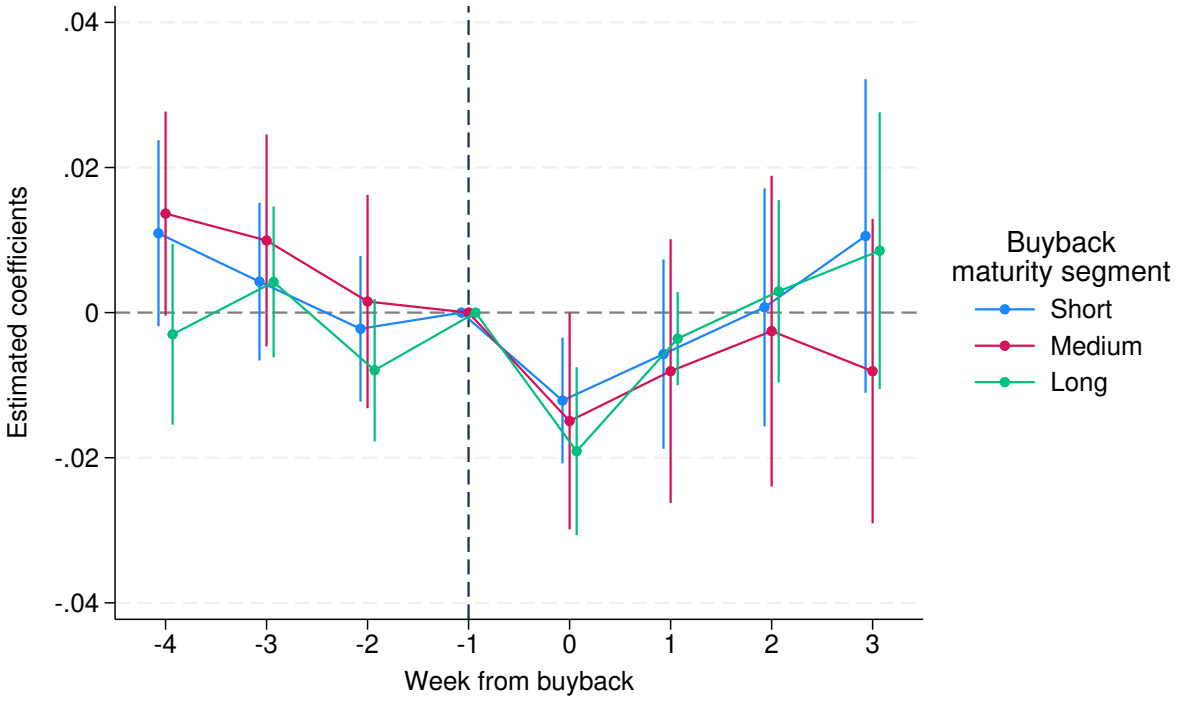


Figure 16: Heterogeneity by Buyback Maturity Segment: Dealer Long Inventories

Notes: Figure plots the coefficients β_j estimated in the following regression, estimated separately on three sub-samples as defined by the maturity segment of buyback operation in week t (short maturities - less than 2 years, medium maturities - 2 to 11 years, long maturities - more than 11 years):

$$Inv^{\text{long}}_{dmt,h} = \sum_{\substack{j=-4 \\ j\neq -1}}^{3} \beta_j \cdot \left(\mathbb{1}\{j = h\} \times BB^{\$}_{mt} \right) + \alpha_d + \delta_h + \gamma_{mt} + \varepsilon_{dmt,h} \tag{14}$$

$BB^{\$}_{mt}$ is the total amount purchased in buyback operations in maturity bucket m during week t, scaled by the total publicly available amount outstanding of all Treasury securities in maturity bucket m as of week $t-1$ expressed in basis points. $Inv^{\text{long}}_{dmt,h}$ is dealer d's long inventory in maturity bucket m at date $t+k$ scaled by the total publicly available amount outstanding in maturity bucket m as of $t-1$ expressed in basis points, and α_d, δ_h, γ_{mt} are dealer, buyback horizon, and buyback date-by-maturity bin fixed effects respectively. Standard errors are two-way clustered by dealer and buyback time. The confidence intervals are at the 95% level.

dealers a predictable and recurring opportunity to reduce their inventories. Our findings complement existing evidence on the liquidity effects of Treasury buybacks and highlight the role of dealer specialization and balance sheet constraints in shaping those effects.

References

Adrian, T., M. Fleming, and K. Nikolaou (2025). Us treasury market functioning from the global financial crisis to the pandemic. *Annual Review of Financial Economics 17*.

Bi, H., M. Phillot, and S. Zubairy (2025). Treasury supply shocks: Propagation through debt expansion and maturity adjustment. Working paper.

Boneva, L., J. Kastl, and F. Zikes (2025). Dealer balance sheets and bidding behavior in the bank of england's qe reverse auctions. *Journal of Financial Economics 174*, 104182.

Bräuning, F. and H. Stein (2024). The effect of primary dealer constraints on intermediation in the treasury market. Research Department Working Paper 24-7, Federal Reserve Bank of Boston.

Brunnermeier, M. K. and L. H. Pedersen (2009). Market liquidity and funding liquidity. *The review of financial studies 22*(6), 2201–2238.

Cohen, A., M. Kargar, B. Lester, and P.-O. Weill (2024). Inventory, market making, and liquidity in otc markets. *Journal of Economic Theory 222*, 105917.

Connolly, M. F. and E. Struby (2024). Treasury buybacks, the federal reserve's portfolio, and changes in local supply. *Journal of Banking & Finance 168*, 107286.

Correa, R., W. Du, and G. Y. Liao (2025). Us banks and global liquidity. *Journal of Political Economy Macroeconomics 3*(4), 574–620.

Cox, J. (2026, August). Treasury doubles debt buybacks as Bessent moves to steady bond market. CNBC. August 19, 2026.

d'Avernas, A., D. Petersen, and Q. Vandeweyer (2025). The central bank's balance sheet and treasury market disruptions.

Duffie, D. (2023). Resilience redux in the us treasury market. In *Jackson Hole Symposium, Federal Reserve Bank of Kansas City, August*.

Duffie, D. (2025). How us treasuries can remain the world's safe haven. *Journal of Economic Perspectives 39*(2), 195–214.

Duffie, D., M. J. Fleming, F. M. Keane, C. Nelson, O. Shachar, and P. Van Tassel (2023). Dealer capacity and U.S. treasury market functionality. Staff Report 1070, Federal Reserve Bank of New York.

Duffie, D. and F. M. Keane (2023). Market-function asset purchases. *FRB of New York Staff Report* (1054).

Endo, H., K. Pallara, M. Sfregola, and L. Zanotti (2026). The treasury does monetary policy. Working paper.

Favara, G., S. Infante, and M. Rezende (2026). Leverage regulations and treasury market participation: Evidence from credit line drawdowns. Technical report, Available at SSRN.

Fleming, M. J., W. Liu, and G. Nguyen (2026). Intraday price pressure and order flow around u.s. treasury auctions. Staff Report 1188, Federal Reserve Bank of New York. Revised October 2026.

Fleming, M. J., G. Nguyen, and J. V. Rosenberg (2024). How do treasury dealers manage their positions? *Journal of Financial Economics 158*, 103885.

Garbade, K. and M. Rutherford (2007). Buybacks in treasury cash and debt management. *FRB of New York Staff Report* (304).

Gürkaynak, R. S., B. Sack, and J. H. Wright (2007). The us treasury yield curve: 1961 to the present. *Journal of monetary Economics 54*(8), 2291–2304.

Han, B., F. A. Longstaff, and C. Merrill (2007). The us treasury buyback auctions: The cost of retiring illiquid bonds. *The Journal of Finance 62*(6), 2673–2693.

He, Z., S. Nagel, and Z. Song (2022). Treasury inconvenience yields during the covid-19 crisis. *Journal of Financial Economics 143*(1), 57–79.

Hendershott, T., D. Li, D. Livdan, and N. Schürhoff (2020). Relationship trading in over-the-counter markets. *The Journal of Finance 75*(2), 683–734.

Hu, G. X., J. Pan, and J. Wang (2013). Noise as information for illiquidity. *The Journal of Finance 68*(6), 2341–2382.

Kashyap, A. K., J. C. Stein, J. L. Wallen, and J. Younger (2025). Treasury market dysfunction and the role of the central bank. *Brookings Papers on Economic Activity 2025*(1), 221–265.

Liang, N. and H. Zhu (2025). Clearing the path for treasury market resilience. Hutchins Center Working Paper 103, Brookings Institution. Updated February 2026.

Lou, D., H. Yan, and J. Zhang (2013). Anticipated and repeated shocks in liquid markets. *The Review of Financial Studies 26*(8), 1891–1912.

Phillot, M. (2025). US treasury auctions: A high-frequency identification of supply shocks. *American Economic Journal: Macroeconomics 17*(1), 245–273.

Sambalaibat, B. (2025). Heterogeneous clienteles and dealer networks. *Journal of Financial Economics 174*, 104185.

Somogyi, F., J. Wallen, and L. Xu (2024). What treasury auctions reveal about investor demand. *Available at SSRN 5025427*.

Trebbi, F. and K. Xiao (2019). Regulation and market liquidity. *Management Science 65*(5), 1949–1968.

U.S. Department of the Treasury. Faqs for treasury securities buybacks. TreasuryDirect, accessed November 2026.

U.S. Department of the Treasury (2024). Regular treasury buyback program details. Quarterly Refunding supplemental materials, May 2024.

U.S. Department of the Treasury (2025, July). Quarterly refunding statement of deputy assistant secretary for federal finance brian smith. July 30, 2025.

U.S. Department of the Treasury (2026a, September). Remarks by deputy secretary of the treasury francis brooke before the treasury market conference. September 22, 2026.

U.S. Department of the Treasury (2026b, August). Treasury announces increased sizes of nominal long-end liquidity support buybacks beginning september 9. Press Release.

U.S. Department of the Treasury, Bureau of the Fiscal Service (2026). Marketable treasury securities redemption operations. Final rule, 31 CFR Part 375, Docket No. FISCAL-2025-0001. Federal Register, March 30, 2026.

Zhou, J. (2025). *Testing the liquidity support effects of the US Treasury Buyback Program.* International Monetary Fund.

A Additional Empirical Results

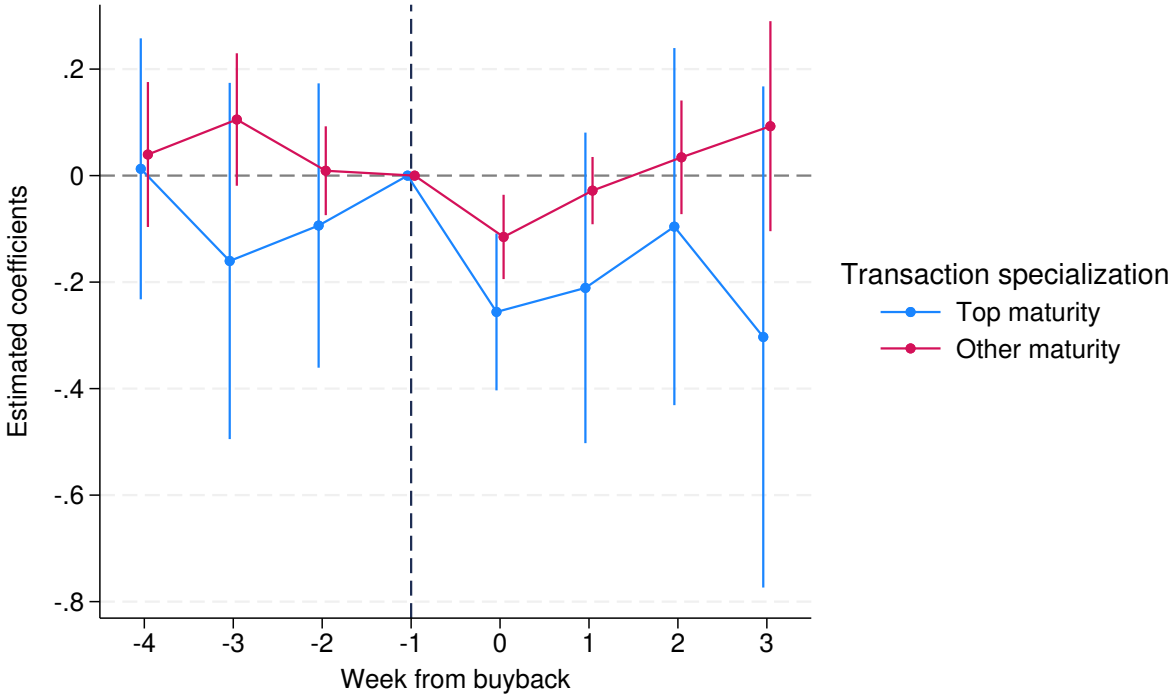


Figure A.1: Dealer Long Inventories by Top Transaction Maturity Specialization

Notes: Figure plots the coefficients β_j estimated in the following regression, estimated separately on two sub-samples as defined by dealers' top transaction specialization in their respective maturity segments as opposed to other maturities:

$$Inv^{\text{long}}_{dmt,h} = \sum_{\substack{j=-4 \\ j\neq -1}}^{3} \beta_j \cdot \left(\mathbb{1}\{j = h\} \times BB^{\$}_{mt} \right) + \alpha_d + \delta_h + \gamma_{mt} + \varepsilon_{dmt,h} \tag{15}$$

Transaction specialization is defined over four maturity segments: bills, less than 3 years, 3 to 11 years, more than 11 years. $BB^{\$}_{mt}$ is the total amount purchased in buyback operations in maturity bucket m during week t, scaled by the total publicly available amount outstanding of all Treasury securities in maturity bucket m as of week $t-1$ expressed in basis points. $Inv^{\text{long}}_{dmt,h}$ is dealer d's long inventory in maturity bucket m at date $t+k$ scaled by the total publicly available amount outstanding in maturity bucket m as of $t-1$ expressed in basis points, and α_d, δ_h, γ_{mt} are dealer, buyback horizon, and buyback date-by-maturity bin fixed effects respectively. Standard errors are two-way clustered by dealer and buyback time. The confidence intervals are at the 95% level.

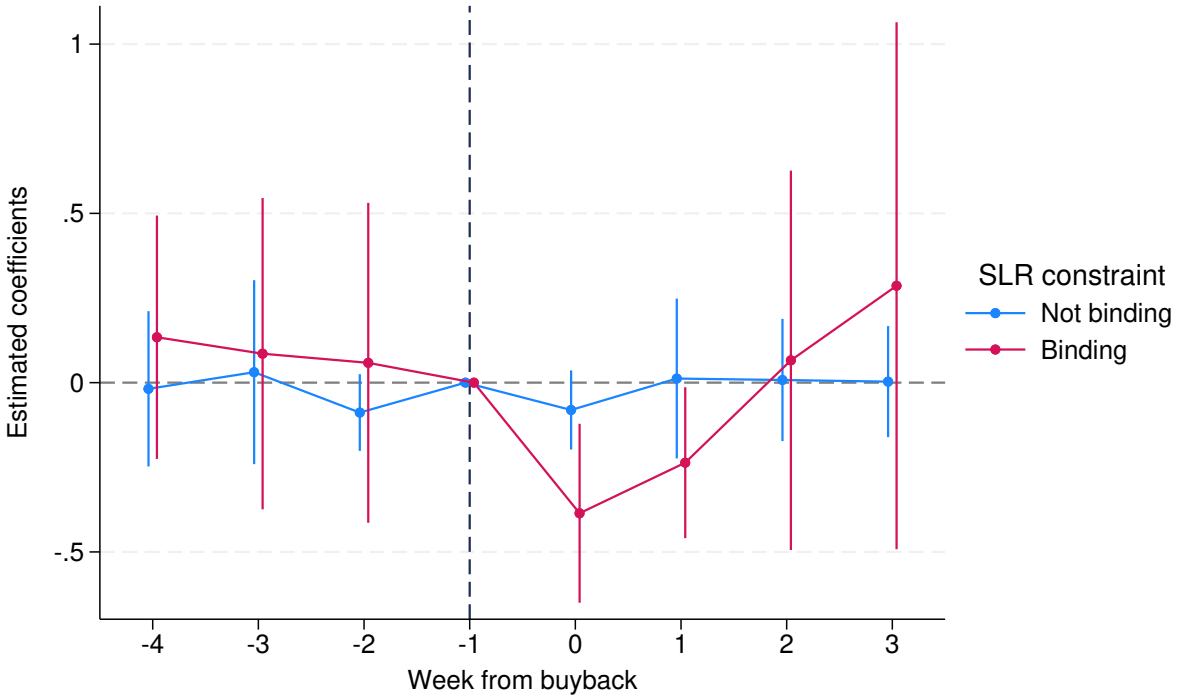


Figure A.2: Dealer Long Inventories by Distance to Required SLR

Notes: Figure plots the coefficients β_j estimated in the following regression, estimated separately on two sub-samples as defined by dealers' distance to their required Supplementary Leverage Ratio (SLR):

$$Inv^{\text{long}}_{dmt,h} = \sum_{\substack{j=-4 \\ j\neq -1}}^{3} \beta_j \cdot \left(\mathbb{1}\{j = h\} \times BB^{\$}_{mt} \right) + \alpha_d + \delta_h + \gamma_{mt} + \varepsilon_{dmt,h} \tag{16}$$

The SLR is defined to be binding if the dealer's holding company reported SLR is less than two percentage points away from its required SLR and not binding otherwise. $BB^{\$}_{mt}$ is the total amount purchased in buyback operations in maturity bucket m during week t, scaled by the total publicly available amount outstanding of all Treasury securities in maturity bucket m as of week $t-1$ expressed in basis points. $Inv^{\text{long}}_{dmt,h}$ is dealer d's long inventory in maturity bucket m at date $t+k$ scaled by the total publicly available amount outstanding in maturity bucket m as of $t-1$ expressed in basis points, and α_d, δ_h, γ_{mt} are dealer, buyback horizon, and buyback date-by-maturity bin fixed effects respectively. Standard errors are two-way clustered by dealer and buyback time. The confidence intervals are at the 95% level.

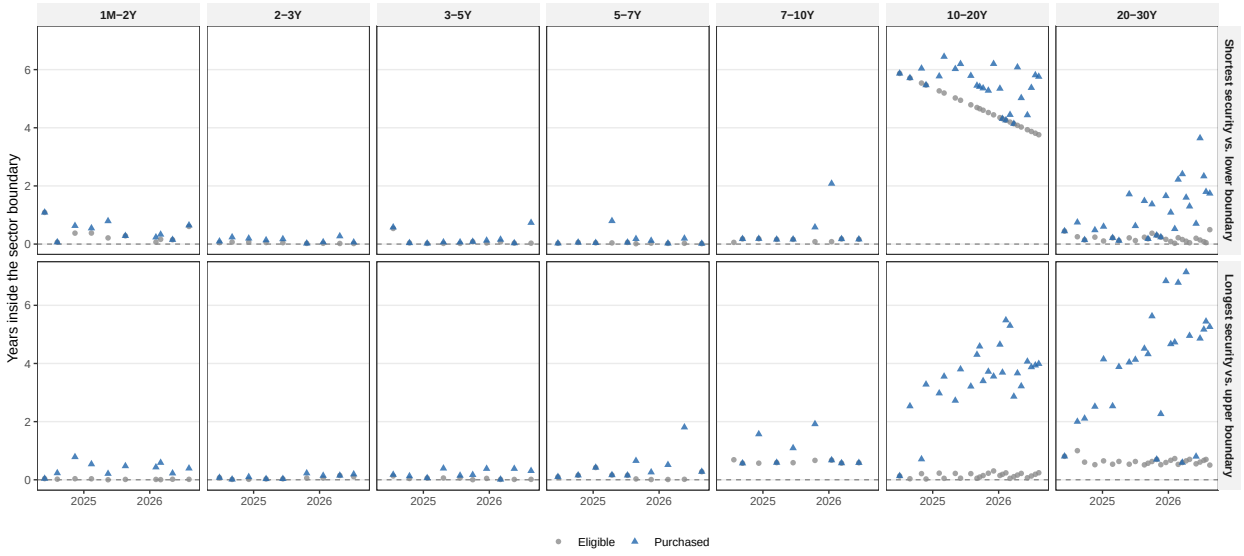


Figure A.3: Distance of Eligible and Purchased Securities from Sector Boundaries: All Sectors

Notes: Each point corresponds to one nominal coupon liquidity support operation between May 2024 and August 2026. The top row plots the remaining maturity of the shortest eligible (circles) and shortest purchased (triangles) security minus the lower boundary of the operation's maturity sector. The bottom row plots the upper boundary minus the remaining maturity of the longest eligible and longest purchased security. Positive values indicate that the security lies inside the sector, and zero that it lies exactly at the boundary. Remaining maturity is measured in years from the operation date. Source: U.S. Treasury buyback operation results(Fiscal Data, Treasury Securities Buybacks dataset).