

Managing Regulatory Pressure: Bank Regulation and Corporate Bond Intermediation*

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Abstract

We examine how Basel regulations impact corporate bond intermediation across differently regulated bank dealers. Using intra-quarter variation in the intensity of Basel requirements, we document pronounced contractions in bank dealers' capital commitment near quarter ends. Unlike in short-term money markets, U.S. bank dealers do not absorb regulatory selling pressure in corporate bonds. Instead, bank dealers sell to nonbank intermediaries at price concessions, offloading investment-grade bonds to institutional investors and high-yield bonds to nonbank dealers. Risk but primarily non-risk-weighted regulations impair bond market liquidity, especially in balance sheet-intensive trades. Our findings have implications for regulation of bank and non-bank financial intermediaries.

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1 Introduction

Dealer intermediation is essential to trading in decentralized bond markets, where buyers and sellers arrive asynchronously and search costs are high. By committing their own capital, dealers smooth temporary order flow imbalances and provide liquidity to investors. However, in response to prudential regulations implemented in the aftermath of the global financial crisis (GFC), bank dealers appear to have become more reluctant to intermediate corporate bonds. Not only have bank dealers reduced their capital commitment in the aggregate, but the cost of immediacy has increased and liquidity conditions deteriorate rapidly when the market faces increased selling pressure.¹

Given dealers' pivotal role in corporate bond trading, regulators have called for a better understanding of how post-GFC banking regulations, particularly those implemented with Basel III in 2015, affect bond intermediation (FSB, 2020; Bank of England, 2021).² In contrast to dealer-intermediated markets where the traded assets are risk-free (Duffie, 2018), the varied credit risk profiles of corporate bonds require understanding how risk-weighted capital regulation *and* non-risk-weighted leverage regulation impact bank dealers. To date, however, relatively little is known about the combined effect of these regulations on dealers, their strategic responses, and how these responses affect interactions with nonbank financial intermediaries, liquidity conditions, and the pass-through of regulatory costs.

In this paper, we address these important questions by studying how corporate bond dealers manage regulatory pressure. We show that—contrary to evidence from short-term money markets (Correa, Du, and Liao, 2025)—risk-weighted but especially non-risk-weighted capital requirements constrain bank dealers' bond intermediation, irrespective of regulatory jurisdiction. Still, cross-jurisdictional differences in the implementation of the leverage ratio establish conditions where U.S. bank dealers are somewhat less constrained than their foreign counterparts. In combination, this has significant implications

¹For evidence on declining capital commitment, see, for example, Bessembinder et al. (2018); for increased cost of immediacy, see, for example, Bao, O'Hara, and Zhou (2018); Dick-Nielsen and Rossi (2019); and for liquidity deterioration, see, for example, Kargar et al. (2021); O'Hara and Zhou (2021).

²Prior to 2015, bank-affiliated dealers were already subject to risk-based capital requirements, which disproportionately increase the cost of holding higher-risk bonds. The leverage ratio requirement introduced with Basel III added a new, non-risk-weighted constraint by mandating minimum capital against all exposures regardless of risk, effectively limiting bank dealers' overall balance sheet size.

for broader corporate bond market functioning: First, regulation creates a more immediate role for nonbank intermediaries who, in part, adopt liquidity-supplying trading strategies in response to the leverage ratio constraint. Second, liquidity conditions deteriorate at quarter ends—particularly in balance sheet-intensive customer-to-dealer trades—leading to a temporary redistribution of intermediation rents toward less constrained U.S. bank dealers.

To study how dealers’ regulatory constraints impact bond intermediation in the U.S. corporate bond market, we use quarter-end periods as our empirical laboratory. This setting is insightful because key Basel Accord metrics are reported on the last trading day of each quarter, making regulatory constraints bind most tightly in the lead-up to these dates. Using the regulatory version of the Trade Reporting and Compliance Engine (TRACE) bond transaction data, we identify dealers’ bank-affiliation status and jurisdiction of incorporation. This granularity allows us to exploit intra-quarter variation in regulatory pressures between bank and nonbank dealers and across jurisdictions for empirical identification. We distinguish between U.S. as well as European and Japanese bank dealers because differences in the implementation of bank regulation create varying incentives for balance sheet management near reporting dates: U.S. bank dealers report based on quarter averages, potentially giving them more flexibility to manage inventories throughout the quarter. By contrast, dealers from Europe and Japan report based on quarter-end snapshots.³

Our empirical design then uses nonbank dealers as a control group to contrast bond intermediation across different regulatory periods and heterogeneously regulated dealers.⁴ Additionally, by analyzing dealers’ trades with different counterparty groups, including a detailed examination of transactions with U.S. insurance companies, we explore how nonbank intermediaries adjust their trading style to assist constrained dealers in managing

³A growing literature examines banking regulation effects on dealer behavior in money markets, documenting heterogeneous quarter-end effects between U.S. and foreign bank dealers linked to jurisdictional differences in reporting requirements (see, for example, Munyan (2017); Du, Tepper, and Verdelhan (2018); Cenedese, Della Corte, and Wang (2021); Ranaldo, Schaffner, and Vasios (2021); Correa, Du, and Liao (2025); Wallen (2022)).

⁴We differentiate between the pre-leverage-ratio period (January 2010, the start of our sample, to December 2014) and the leverage ratio period (January 2015 to December 2019, the end of our sample).

their regulatory exposure.

Our analysis reveals novel findings that highlight how risk and non-risk-weighted Basel regulations impact corporate bond intermediation: consistent with the optimization of regulatory metrics prior to reporting dates, bank dealers, but not nonbank dealers, contract their capital commitment near quarter ends. These contractions are not only statistically but also economically significant, translating into a daily reduction of around 6% of a standard deviation in dealer capital commitment (that is, 2.20 divided by 33.41) among those bank dealers who handle approximately 80% of daily transaction volume during the leverage-ratio period.

To disentangle the effects of individual Basel regulations, we compare quarter-end effects during the pre-leverage ratio period (characterized exclusively by risk-weighted capital requirements) with those in the leverage-ratio period (characterized by both risk-weighted and non-risk-weighted capital requirements). We find that bank dealers—irrespective of jurisdiction—significantly reduce their capital commitment at quarter ends, with this effect occurring earlier and much more intensively after the 2015 introduction of the leverage ratio. We further show a strategic shift from contracting capital commitment in high-yield bonds to investment-grade bonds in the leverage-ratio period. This shift aligns with the notion that the leverage ratio’s disregard for asset risk incentivizes banks to primarily sell lower-yielding, balance-sheet-intensive assets (Duffie, 2018). However, it also reflects the interplay between risk-weighted and non-risk-weighted capital requirements. By selling investment-grade bonds, dealers simultaneously reduce both total assets (for the leverage ratio) and, to a lesser extent, risk-weighted assets, allowing them to sell fewer high-yield bonds than would be required under risk-weighted capital requirements alone.

In the cross-section of bank dealers, we document substantial heterogeneity in the intensity of quarter-end contractions depending on regulatory jurisdiction: European and Japanese bank dealers contract their capital commitment by almost 40% more than their U.S. counterparts, consistent with the Basel III leverage ratio exerting a more constraining effect on foreign bank dealers. Notably, U.S. bank dealers do not act as residual buyers at quarter ends, contrasting with evidence from money markets. Instead, they also reduce

their bond holdings, albeit less aggressively than their European and Japanese counterparts. This suggests that quarter-average reporting provides U.S. dealers with somewhat greater flexibility, but not enough to avoid meaningful quarter-end constraints—likely because they do not systematically preserve balance sheet capacity during the quarter. This dynamic is largely driven by the impact of considerably higher risk weights on corporate bonds compared with nearly risk-free money market instruments.⁵ It explains why corporate bond dealers face tighter constraints and cannot employ the same balance sheet management strategies observed in safe asset markets.

Next, we document the important role of nonbank financial intermediaries—both customers and nonbank dealers—as liquidity suppliers in constrained bank dealers’ intermediation networks. We show a clear market segmentation, where customers absorb investment-grade bonds, while nonbank dealers take on high-yield exposures. These findings highlight an important unintended consequence of Basel regulations: a periodic transfer of the riskiest corporate bond exposures to the least regulated intermediaries within the network. Our analysis also reveals that bank dealers offer price concessions of up to 4% to facilitate these transactions. By studying a subset of investors in the customer counterparty group in more detail, we find that insurance companies’ participation, particularly property and casualty (P&C) insurers, plays an important role in providing liquidity for investment-grade bonds within dealers’ intermediation networks.

Lastly, we capture the impact of the leverage ratio on dealers’ willingness to intermediate balance sheet-intensive trades and quantify the pass-through of regulatory costs. While European and Japanese bank dealers markedly reduce the volume of balance sheet-intensive trades at quarter ends, U.S. bank dealers exhibit this behavior to a lesser extent. In balance sheet-intensive trades where customers critically rely on dealers’ balance sheets, we document sizable markups on customers’ transaction costs. These markups concentrate in investment-grade bonds, aligning with the interpretation that investment-grade bonds are more affected by leverage ratio constraints. They are also more pronounced in large trade

⁵Unlike short-term money markets, where dealers can engage in reserve-draining intermediation at quarter ends to extend lending without expanding their balance sheets, corporate bond intermediation inherently expands dealers’ balance sheets. Bonds purchased for liquidity provision directly impact both capital and leverage ratios until sold.

sizes, consistent with higher offsetting costs, as order splitting leads to extended balance sheet exposure and higher search costs. Taken together, our results suggest that jurisdictional differences in the leverage ratio affect the distribution of intermediation rents. While U.S. bank dealers face weaker quarter-end reporting pressure than their foreign counterparts, they increase transaction costs to levels similar to their more constrained foreign peers. This suggests that U.S. bank dealers temporarily operate in a less competitive market environment, allowing them to exert market power by pricing large customer trades above marginal cost.

Our findings enhance our understanding of how risk and non-risk-weighted Basel regulations affect intermediation in the U.S. corporate bond market. A growing literature examines how the Basel III leverage ratio impacts intermediation in short-term money markets. Du, Tepper, and Verdelhan (2018) relate deviations from the covered interest rate parity (CIP) to dealer banks' increased balance sheet costs. Cenedese, Della Corte, and Wang (2021) link leverage ratio requirements to dealer banks' increased funding costs and CIP deviations. Munyan (2017) and Anbil and Senyuz (2022) show that in the U.S. tri-party repo market, quarter-end reductions in net repo supply are primarily driven by foreign banks that aim to improve their regulatory metrics. Correa, Du, and Liao (2025) demonstrate that U.S. globally systemically important banks (G-SIBs) use their excess reserve buffers to lend during quarter-end dislocations in repo and FX swap markets, and thus act as effective "lenders-of-second-to-last-resort."

We contribute to this literature in three ways: First, we demonstrate that regulatory-driven quarter-end effects extend beyond markets for risk-free short-term funding instruments, leading to temporary dislocations in the U.S. corporate bond market, the world's largest corporate funding market.⁶ Second, compared with money markets, we document an important interplay between risk-weighted and non-risk-weighted capital requirements that becomes relevant only in markets with inherently risky assets such as corporate bonds. Third, unlike in short-term money markets, U.S. bank dealers contract rather than expand their capital commitment at quarter ends. Bank dealers' inability to lean against the wind

⁶Relatedly, Favara, Infante, and Rezende (2022) examine the leverage ratio's impact on Treasury market intermediation, focusing primarily on the COVID-19 sell-off in March 2020.

leads to a more immediate role for unregulated nonbank financial intermediaries as liquidity suppliers in the corporate bond market.⁷

Our results also provide new insights into the determinants of liquidity in the corporate bond market. Several research papers focus on the impact of post-crisis banking regulation on bond dealers' capital commitment and aggregate liquidity conditions, as well as on the impact of regulation during stress periods.⁸ With the exception of Breckenfelder and Ivashina (2021), existing work primarily focuses on risk-based regulation or the Volcker Rule in place prior to the implementation of Basel III.⁹ We contribute to this literature by disentangling the impact of risk-weighted and non-risk-weighted regulations implemented under the Basel Accords on different dealer groups absent specific stress events. Our work also highlights the impact of heterogeneous regulatory implementation on liquidity conditions and its effects on dealer market power in the corporate bond market (Wallen, 2022). Lastly, our results confirm the theoretical predictions of Dyskant, Silva, and Bruno (2023), showing that the pass-through of regulatory costs is concentrated in balance sheet-intensive trades.¹⁰

Our paper adds to the literature on relationship trading and networks in OTC markets. Prior empirical research primarily focuses on the role and structure of interdealer markets or the value of repeat business in customer-dealer trading relationships.¹¹ We provide new insights into the role of networks for corporate bond intermediation. In contrast to OTC models that put an emphasis on the core-periphery structure of dealer networks, our findings illustrate that bank dealers primarily turn to customers—and to a smaller degree to nonbank dealers—to offset their selling pressure within their intermediation networks.

⁷See, for example, Anand, Jotikasthira, and Venkataraman (2021); Choi, Huh, and Shin (2024); O'Hara, Rapp, and Zhou (2024); Giannetti et al. (2024).

⁸For the former, see, for example, Adrian, Boyarchenko, and Shachar (2017); Bessembinder et al. (2018); Trebbi and Xiao (2019); Breckenfelder and Ivashina (2021); Haselmann et al. (2022). And for the latter, see, for example, Bao, O'Hara, and Zhou (2018); Dick-Nielsen and Rossi (2019).

⁹Breckenfelder and Ivashina (2021) document a negative impact of the Basel III leverage ratio on corporate bond liquidity in the European corporate bond market, focusing primarily on the COVID-19-induced bond mutual fund run in March 2020.

¹⁰This finding is also consistent with Shim and Todorov (2023), who document that dealer holding costs are passed to investors in the form of larger ETF discounts.

¹¹For the former, see, for example, Di Maggio, Kermani, and Song (2017); Li and Schürhoff (2019); Goldstein and Hotchkiss (2020); Dick-Nielsen, Poulsen, and Rehman (2022). And for the latter, see, for example, O'Hara, Wang, and Zhou (2018); Hendershott et al. (2020); Jurkatis et al. (2022).

This emphasizes the importance of the composition of dealers’ customer networks relative to dealers’ interdealer networks (Comerton-Forde et al., 2025), particularly during periods in which regulated core dealers are constrained.

Lastly, our work provides an empirical foundation for theoretical models in which intermediary capital plays an important role.¹² By highlighting the relevance of both the capital and the leverage-ratio requirements, we inform the specification of an empirical intermediary factor in the corporate bond market. Moreover, by documenting the importance of heterogeneously binding constraints across intermediaries and time, we show that bank dealers’ intermediation behavior changes in the leverage-ratio period, thus creating intra-quarter variation in the extent to which intermediary factors should be relevant for corporate bond prices.

2 Background on Banking Regulations

Following the GFC, banks have been required to comply with a range of additional regulations affecting their capital and liquidity requirements (Greenwood et al., 2017). These regulations have raised balance sheet costs for bank dealers’ market-making activities, thereby influencing their willingness and capacity to intermediate in bond markets. This section outlines these regulatory changes and their implications for bond intermediation. We distinguish between risk-weighted and non-risk-weighted capital requirements within the Basel frameworks, as well as other post-crisis regulations such as G-SIB surcharges, the Volcker Rule, and liquidity directives such as the Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR).¹³

The pre-leverage ratio period, from January 2010 to December 2014,¹⁴ is characterized exclusively by risk-weighted capital requirements under the Basel II framework. Banks’

¹²See, for example, He and Krishnamurthy (2013); Adrian, Etula, and Muir (2014); He, Khorrami, and Song (2022); Siriwardane, Sunderam, and Wallen (2025).

¹³See Panel A of Figure A1 in the Appendix for a detailed overview of the timing and scope of the bank regulations discussed.

¹⁴We follow Du, Tepper, and Verdelhan (2018) in defining the pre-leverage ratio and leverage ratio periods. Although banks began reporting leverage metrics to national supervisors in January 2013, the effects on financial markets have been found to coincide with the first public disclosure of these ratios in January 2015. While compliance with the leverage ratio requirements became mandatory only in 2018, we follow the literature in using 2015 as the effective start of the regulation, given the role of public disclosure. Finally, the quarter-end dynamics we document empirically are consistent with this assumption.

capital charges depend on the riskiness of their assets, imposing higher costs for holding riskier bonds.¹⁵ Under Basel standards II and III, the common equity Tier 1 (CET1) capital ratio requires all banks in our sample to maintain a minimum level of capital relative to risk-weighted assets.¹⁶ Consequently, intermediating corporate bonds in a principal capacity affects a bank dealer’s capital ratio through changes in risk-weighted assets.¹⁷ Because all bank dealers have to report the capital ratio as a quarter-end snapshot, regardless of their jurisdiction, the balance sheet cost of intermediating risky bonds increases in the run-up to the regulatory reporting date. Since both the mechanism of risk-based Basel standards and the risk weights attached to a given rating remained stable over time, the capital ratio poses a homogeneous constraint for all bank dealers throughout our sample period.

In January 2015, the Basel III leverage ratio introduced a non-risk-weighted capital requirement, obliging banks to hold a minimum amount of capital against all on- and off-balance-sheet exposures irrespective of risk.¹⁸ That is, the size of a bank’s balance sheet mattered rather than its riskiness. To this end, the regulation has increased the per-unit regulatory cost of holding safe, low-margin assets relative to their return, primarily constraining dealers’ willingness to maintain large inventories of assets such as investment-grade corporate bonds. Although these bonds have lower risk weights under risk-based requirements, they still consume significant balance sheet space. Intermediating a corporate bond in a principal capacity thus also affects a bank dealer’s leverage ratio requirement by

¹⁵This incentivized the buildup of large balance sheets concentrated in highly rated (but potentially still risky) debt instruments. While such assets carried low regulatory risk weights and required little capital buffers, they still expanded total balance sheet size. As a result, banks maintained high leverage when measured as equity relative to total assets, but appeared well-capitalized in terms of equity relative to risk-weighted assets. Among banks, this dynamic contributed to large exposures to ultimately risky securities, such as subprime ABS, leading up to the GFC.

¹⁶While the overall capital ratio remained constant across our sample period (Ma, 2016), the CET1 ratio increased from 2% under Basel II to a minimum of 7% under Basel III. This minimum consists of a 4.5% CET1 capital requirement and a stress capital buffer of at least 2.5%, and it applies uniformly across banks (see [Federal Reserve: Bank Capital Requirements](#)).

¹⁷As illustrated in Figure A2 in the Appendix, taking riskier bonds into inventory, all else equal, increases total risk-weighted assets and lowers the capital ratio. For simplicity, we assume a passive asset change from cash to bonds to isolate the risk-based effect of bond intermediation on regulatory costs. Furthermore, we do not differentiate between slight variations in regulatory treatment depending on whether the bond is held in a bank’s trading book or credit book. This is justified because, regardless of the chosen approach, bank dealers incur higher regulatory costs when intermediating riskier bonds (see Haselmann et al. (2022)).

¹⁸For non-U.S. banks, the leverage ratio did not exist before the GFC and is now at 3%. For U.S. banks, the leverage ratio existed before the crisis but became more stringent following the implementation of the supplementary leverage ratio in 2014 and is now equal to between 5% and 6% for systemically important financial institutions.

increasing the cost of balance sheet expansion.¹⁹

In contrast to the capital ratio, leverage ratio reporting requirements differ across regulatory jurisdictions: While U.S. bank dealers report the leverage ratio based on quarter averages, European and Japanese bank dealers report it using quarter-end snapshots.²⁰ Although reporting based on quarter averages gives U.S.-regulated dealers more flexibility to manage their inventories throughout the quarter, they still face binding constraints as the reporting date approaches unless they have preserved balance sheet capacity in advance. If a dealer has already expanded its balance sheet earlier in the quarter, it lacks the capacity to further increase its bond inventories at quarter end.²¹ Thus, despite these reporting differences, the incremental regulatory burden at quarter ends—compared to the pre-leverage ratio period—has intensified for all affected banks.

Our paper documents that the introduction of the leverage ratio led to an interplay between risk-weighted and non-risk-weighted capital requirements, incentivizing a notable shift in quarter-end balance sheet contractions from high-yield toward investment-grade bonds. Although selling investment-grade bonds provides less capital relief per dollar than selling high-yield bonds, disposing of them in sufficient volume can alleviate both risk-weighted and non-risk-weighted capital requirements, ultimately reducing dealers' need to sell high-yield bonds to meet risk-weighted capital requirements alone. This dynamic arises because intermediating a corporate bond is fundamentally different from intermediating secured funding instruments such as FX swaps or repos.²² Corporate bonds pose a wider range of inventory and regulatory risks. First, corporate bonds are riskier financial in-

¹⁹When a corporate bond dealer takes a bond into inventory, the position is typically funded with short-term funding (Macchiavelli and Zhou, 2022). As illustrated in Figure A2 in the Appendix, taking a bond into the inventory while funding the investment on a levered basis (for instance, through repos) increases the dealer bank's total balance sheet size by the amount of the bond transaction.

²⁰Starting in 2017, U.K. banks also shifted to reporting the leverage ratio based on quarter averages.

²¹This interpretation is consistent with findings on the repo market in Correa, Du, and Liao (2025). First, dealers affiliated with U.S.-regulated banks engage in reserve-draining intermediation at quarter ends to extend lending without expanding their balance sheets, indicating that the leverage ratio constraint is binding. Second, quarter-end spikes in repo rates indicate that binding constraints prevent U.S.-regulated dealers from fully exploiting investment opportunities.

²²Dollar lending through FX swaps is effectively secured lending collateralized by foreign currency. Due to this collateralization, FX swaps do not subject bank dealers to risk-based capital requirements (see Correa, Du, and Liao (2025)). Similarly, the collateralization of repos with high-quality liquid assets (HQLA) makes them irrelevant for capital ratio calculations (compare Bassi, Behn, Grill, and Waibel (2024)).

struments, exposing dealers to higher levels of default, price, and interest rate risk. Thus, in addition to the capital charges associated with larger balance sheets, regulated dealers also incur charges under the risk-weighted capital ratio while the bonds remain on their books. Second, corporate bonds are much less liquid, have considerably longer maturities, and do not have fixed contract tenors. As a result, bonds can remain on a dealer’s balance sheet for an indeterminate period, complicating balance sheet management.²³ Third, while the intermediation of FX swaps and repos is concentrated among a narrow set of similarly regulated global banks, corporate bonds are intermediated by a broader and more diverse group of institutions, including nonbank dealers as well as unregulated nonbank intermediaries such as mutual funds and insurance companies.

Our empirical analysis exploits the tightening of Basel regulations at quarter-end reporting dates to identify the effects of these bank regulation, and the leverage ratio constraint in particular. Specifically, we rely on the within-quarter timing of dealers’ inventory changes across regulatory periods, as well as cross-sectional differences in their exposure to the leverage ratio constraint across jurisdictions. We also account for variation in dealers’ capitalization, which may influence how binding the leverage ratio constraint is for each dealer.

Although several other overlapping banking regulations were introduced after the global financial crisis, they do not generate the same distinct within-quarter variation or quarter-end dynamics. First, G-SIB surcharges increase the cost of balance sheet space for bank dealers when the bank holding company has been designated as a G-SIB (Behn, Manganite, Parisi, and Wedow (2022)). However, G-SIB scores are reported only at year end and have uniform requirements across jurisdictions. By testing our empirical analysis on the first three quarters, we avoid potentially confounding effects from G-SIB surcharges. Second, by prohibiting proprietary trading, the Volcker Rule can affect dealers’ cost of bond intermediation, as higher values of certain bond inventory metrics may signal proprietary trading (Schultz, 2017; Bao, O’Hara, and Zhou, 2018). Although the Volcker Rule’s

²³For example, in the repo market, Ranaldo, Schaffner, and Vasios (2021) and Bassi, Behn, Grill, and Waibel (2024) show that fixed tenors allow dealers to adjust pricing and intermediation activity flexibly according to balance sheet intensity. For instance, a one-week repo entered eight days before the reporting date will mature and thus leave the balance sheet by quarter end.

implementation overlaps with the phase-in of the leverage ratio and the G-SIB surcharges, the channels through which it affects dealers' behavior do not vary around quarter ends and are expected to be most pronounced in the high-yield bond segment.²⁴ Therefore, the Volcker Rule does not have a quarter-end-specific effect that could materially impact our results. Lastly, the liquidity coverage ratio (LCR) aims to ensure that a bank holds sufficient high-quality liquid assets, while the net stable funding ratio (NSFR) ensures that banks maintain reliable funding sources in a stressed environment. The NSFR addresses the liability side of the balance sheet and may increase the cost of holding corporate bond inventories by requiring more stable funding. However, public disclosure of the NSFR began on a staggered basis that falls outside our sample period. The LCR, which addresses the asset side and affects intraday liquidity, differs from the leverage ratio in that it is strengthened by holdings of liquid investment-grade bonds. Accordingly, it should incentivize banks to retain more liquid investment-grade rather than high-yield bonds.

3 Data and Sample Construction

3.1 Data Description

Our primary data source is the regulatory version of TRACE corporate bond transaction data, provided by the Financial Industry Regulatory Authority (FINRA). The TRACE data include detailed trade-level information on all secondary market corporate bond transactions, such as the bond identifier, trade execution date and time, price and quantity, a flag distinguishing customer-dealer from inter-dealer trades, and a trade direction indicator specifying whether a trade was a dealer purchase or sale. We use data from January 2010 to December 2019.

The regulatory version of the TRACE data includes dealer identifiers for each bond trade, allowing us to classify dealers by their bank affiliation and jurisdiction of regulatory incorporation. Based on bank affiliation, we separate dealers subject to banking regula-

²⁴Banks with more than \$50 billion in trading assets must report their respective metrics to the regulator within 10 days of the end of each calendar month. For details, see <https://www.federalreserve.gov/supervisionreg/faq.htm>.

tion (bank dealers) from those not directly affected (nonbank dealers).²⁵ In our analysis, nonbank dealers provide a natural control group to study the effects of bank regulation on bank dealers. Based on regulatory jurisdiction, we further examine cross-sectional differences in the leverage ratio constraint, differentiating U.S. bank dealers from European and Japanese bank dealers.²⁶ Identifying dealers' regulatory jurisdiction is essential, as it enables us to examine their bond intermediation behavior in the days leading up to quarter ends, when constraints may tighten heterogeneously.

Next, we use the Mergent Fixed Income Securities Database (FISD) to obtain bond characteristics, including bond and coupon type, issue and maturity dates, outstanding amount history, and credit ratings from S&P, Moody's, and Fitch.²⁷ If a bond is not rated, we assign it to a separate not-rated category.

To be included in our sample, a bond must be a non-puttable, U.S. dollar-denominated corporate debenture, medium-term note, or banknote with a fixed or zero coupon (bond types CDEB, CMTN, and USBN). We clean the TRACE data to remove same-day corrections, cancellations, and reversals, following Dick-Nielsen and Poulsen (2019). Moreover, we keep only secondary market transactions and exclude trades with data issues concerning the price (missing, negative, or unreasonably large prices), the par value traded (missing, negative, or larger than the offering size and amount outstanding, respectively), the frequency of trades (excluding bonds with fewer than five trades over the sample period), or the timing of trades (trades before a bond's offering date or after its maturity date, and trades on weekends and trading holidays). After these filters have been applied, our TRACE sample consists of 135,927,917 bond trades. These trades occurred in 30,413 bonds issued by 6,082 corporate issuers, transacted by 161 dealer holding companies. Panel A

²⁵Similar to Bessembinder et al. (2018), we restrict our analysis to the 95% most active dealer identities in TRACE (based on both trade count and trading volume) and then link these identities to dealer holding companies. This ensures that if a holding company has multiple bond trading desks, we aggregate transactions at the holding level. Our cleaned TRACE sample yields 161 dealer holding companies, of which 90 are bank dealers and 71 are nonbank dealers.

²⁶Following Munyan (2017) and Correa, Du, and Liao (2025), we restrict the non-U.S. group to European (including the United Kingdom and Switzerland) and Japanese bank dealers, which represent most large non-U.S. bank dealers active in the U.S. corporate bond market and account for about two-thirds of non-U.S. bank dealers in our sample.

²⁷For each bond on each day, we assign a numeric value to each rating and, if multiple ratings are available, use the lower rating (for two ratings) or the median (for three ratings).

in Table 1 contains summary statistics for the bonds included in our sample. The median bond has an offering amount of around \$500 million, an age of 1.6 years, a remaining time-to-maturity of 5.6 years, and a median credit rating of BBB+.

[Insert Table 1 here]

For each trading day, we also collect supplementary financial market data to control for changes in market conditions. We include daily changes in the VIX and the 3-month LIBOR rate to capture aggregate uncertainty and funding conditions, respectively. Additionally, we control for S&P 500 returns and spread changes in the ICE BofA U.S. corporate investment-grade and high-yield bond indices, as fluctuations in risky asset prices may influence dealers' liquidity provision, as well as the 10-year-minus-2-year term spread, which serves as a proxy for investor expectations about the economic environment.

Lastly, to augment our analysis and examine whether insurers provide liquidity to bank dealers at quarter ends, we use corporate bond transaction data from insurance companies, sourced from the National Association of Insurance Commissioners (NAIC). Specifically, we obtain quarterly reports of corporate bond transactions by life and P&C insurance companies from Parts 3 to 5 of Schedule D. The NAIC data provide detailed information including issue and issuer identifiers, insurer and dealer identifiers, execution dates, dollar amounts, par values, and buy/sell indicators. After cleaning the data, our NAIC sample consists of 3,618,855 insurer-day observations, across 3,026 insurance companies, trading in 13,276 bonds.

3.2 Measuring Dealers' Capital Commitment

The goal of our analysis is to examine how regulatory constraints impact bond intermediation across corporate bond dealers. To do this, we require a proxy for dealers' bond inventories. Because TRACE does not include initial inventory positions, it is not possible to construct dealer-specific total inventories at any given point in time. We therefore follow Bessembinder et al. (2018) in constructing a dealer-level inventory measure based on daily net purchases. Specifically, we compute each dealer's overnight capital commit-

ment, defined as the difference between cumulative buying and selling volume since the beginning of the trading day. This measure is zero if the dealer’s buying volume equals the selling volume, and it is positive (negative) if the buying (selling) volume exceeds the selling (buying) volume. Our measure thus differs from Bessembinder et al. (2018) in that we use signed rather than absolute inventory changes. Positive values imply that a dealer, on net, absorbs bonds onto its balance sheets, thereby incurring higher regulatory costs. Negative values indicate that the dealer reduces bond positions, freeing up balance sheet capacity and saving regulatory costs.

Panel B of Table 1 shows that dealers, on average, let their inventories fluctuate around zero, consistent with the idea that capital commitment exposes them to regulatory costs and bond-specific inventory risks. Importantly, at a mean (median) of \$0.73 (0) million and \$-0.03 (0) million, respectively, bank and nonbank dealers show similar levels of daily capital commitment, with the only difference being that bank dealers allow slightly larger fluctuations.

3.3 Measuring Transaction Costs

As part of our analysis, we differentiate between trades executed in a principal or agency capacity. In a principal capacity, a dealer offers immediacy to the liquidity-demanding counterparty by absorbing a bond position onto its balance sheet until it is subsequently offset to another customer or in the inter-dealer market. For the dealer, providing balance sheet capacity entails regulatory costs and inventory risks. In contrast, in an agency capacity, the liquidity-seeking counterparty retains the bond position until the dealer locates another counterparty willing to take the other side. In this case, the dealer acts as a broker and incurs no relevant regulatory costs or inventory risks, which typically reduces transaction costs but may increase the time needed to complete the trade (Goldstein and Hotchkiss, 2020; Wu, 2020). Distinguishing between these trade types provides a more complete picture of market liquidity and dealers’ balance sheet usage around quarter ends, allowing us to examine how they pass through regulatory costs to their customers (Kargar et al., 2021).

To capture the transaction costs of balance sheet-intensive principal trades, we use the transaction classification algorithm developed by Choi, Huh, and Shin (2024), which categorizes each customer transaction as either a prearranged agency trade that does not require balance sheet capacity or a principal trade that does. We then compute the cost for transaction k in bond j at time t intermediated by dealer i as

$$Cost_{i,j,k,t}^s = 2Q \cdot \frac{price_{i,j,k,t}^{transaction,s} - price_{j,t}^{reference}}{price_{j,t}^{reference}}, \quad \text{for } s \in \text{principal, agency,}$$

where $Q = 1$ for a customer buy and $Q = -1$ for a customer sell. The reference price is calculated as the volume-weighted price of inter-dealer transactions (excluding trades within a 15-minute window around the respective customer transaction) with a volume greater than \$100,000 in the same bond-day. Because corporate bonds often trade infrequently, the holding period specification and inter-dealer reference price may be stale. We therefore winsorize the top and bottom 1% of transaction cost measures to limit the impact of noisy observations. Panel D of Table 1 reports average principal transaction costs across all trades of around 34.20 basis points over the entire sample period (excluding the financial crisis).

4 Dealer Inventories at Quarter End

4.1 Event-Study Evidence on Quarter-End Capital Commitment

To evaluate how both Basel II and III regulations affect dealers' bond intermediation, we analyze how they adjust their capital commitment as regulatory pressure increases close to quarter ends. We conjecture that regulatory constraints bind on reporting dates for regulated bank dealers, while unregulated nonbank dealers remain unaffected. By temporarily contracting their capital commitment before reporting dates, bank dealers can reduce their capital and leverage ratio costs. Consequently, if balance sheet management is driven by regulatory cost considerations, we expect bank dealers—but not nonbank dealers—to reduce their liquidity provisioning and engage in net selling of bonds in the days leading up to quarter-end reporting dates.

To empirically test this hypothesis, we begin our analysis with an event study of dealer capital commitment around quarter ends, spanning our entire sample period from 2010 to 2019. Specifically, we estimate a nonparametric event-study regression of capital commitment for the 41-day window surrounding quarter ends (event days -20 to +20) to illustrate the dynamics of dealers’ balance sheet adjustments near reporting dates. In doing so, we restrict our analysis to quarters 1 through 3, excluding quarter 4. This approach avoids potentially confounding effects from year-end G-SIB surcharges (see Subsection 4.4 for a robustness test) and mitigates distortions from reduced December trading volumes around U.S. holidays (see Figure A3 in the Internet Appendix). Figure 1 plots the estimated event-study coefficients for bank and nonbank dealers. These coefficients, estimated relative to the middle of the quarter,²⁸ represent dealers’ average change in net purchases compared to a period least affected by regulatory pressure from capital and leverage ratios.

Panel (a) of Figure 1 reveals a pronounced V-shaped pattern around quarter ends. The average bank starts to significantly reduce capital commitment about ten trading days before the reporting date and then rebuilds balance sheet positions a few days into the new quarter. These contractions are both statistically and economically significant. Over the ten-day window, the average bank dealer sells, on net, bonds worth approximately \$50 million from its balance sheet, representing a more than one standard deviation move in capital commitment outside of quarter ends. A simple back-of-the-envelope calculation, based on our sample average and thus largely representative of the entire market, suggests this translates into an aggregate contraction of around \$4.2 billion across all bank dealers in our sample. Panel (b) of Figure 1 shows that nonbank dealers do not exhibit similar balance sheet contractions or any notable patterns around quarter ends, with their capital provisioning remaining essentially flat. This strongly supports our hypothesis that the quarter-end effects are driven by bank regulation.²⁹ Finally, Panels (c) and (d) of Figure

²⁸We define the middle of the quarter as the average of all days outside the event window $[-20, 20]$. We choose this period as the baseline because it is least affected by regulatory pressure, thus serving as a good proxy for dealer behavior absent such constraints. As a result, the event-study estimates cannot be directly interpreted as net selling because they report changes relative to the middle of the quarter.

²⁹The evidence for balance sheet contractions among bank dealers, coupled with the absence of such contractions among nonbank dealers—both reliant on short-term funding for trade financing—suggests that these patterns are not merely artifacts of quarter-end repo market dislocations. This contrast reinforces our interpretation that the observed behavior is primarily driven by regulatory constraints specific to bank

1 illustrate the evolution of bank dealers’ contractions across regulatory periods. While they were relatively short-lived during the pre-leverage ratio period, the introduction of the leverage ratio flattens the V-shaped pattern, prompting dealers to reduce their capital commitment significantly earlier and thus to a greater extent overall.

4.2 Dealer Capital Commitment under Basel II and III

Our event-study estimates demonstrate that bank dealers temporarily reduce their capital commitment before Basel reporting dates. Building on this finding, we next test formally how these quarter-end dynamics differ between regulatory periods. We do so by exploiting intra-quarter variation in capital commitment and the transition from the Basel II to the Basel III framework in 2015. This approach allows us to disentangle the effects of capital ratio and leverage ratio requirements. While risk-weighted capital ratio requirements, if binding, should have already influenced bank dealers’ bond intermediation—particularly in bonds with higher risk weights—before 2015, we expect quarter-end effects to become significantly more pronounced as the leverage ratio increases the cost of bank balance sheet space.

We test these conjectures using a difference-in-differences model, estimating how capital commitment changes near quarter ends for dealers affected by regulation (bank dealers) relative to an unaffected control group (nonbank dealers) once the Basel III leverage ratio increases the cost of bank balance sheet space. By contrasting quarter-end effects across regulatory periods, our design helps account for time-varying trends in dealers’ capital commitment that might otherwise confound the estimated effect of the leverage ratio. To this end, we construct a dealer-day-level dataset and estimate the following regression:

$$\begin{aligned}
 \text{Capital Commitment}_{i,t} = & \beta_1 \mathbb{1}[\text{Bank} - \text{aff.}] + \beta_2 \mathbb{1}[\text{QE}] \\
 & + \beta_3 \mathbb{1}[\text{QE}] \times \mathbb{1}[\text{Bank} - \text{aff.}] \\
 & + \boldsymbol{\theta}' \mathbf{M}_t + \alpha_{i,q} + \varepsilon_{i,t},
 \end{aligned} \tag{1}$$

where $\text{Capital Commitment}_{i,t}$ denotes the daily net capital commitment by dealer i on

dealers.

day t . This measure is negative when dealer i net sells bonds and positive when dealer i net buys on a given day. The indicator $\mathbb{1}[Bank-aff.]$ equals one if the dealer is affiliated with a bank holding company. $\mathbb{1}[QE]$ equals one on each of the last 10 trading days of the quarter.³⁰ The vector \mathbf{M}_t includes daily financial market controls. We also include dealer-quarter fixed effects, $\alpha_{i,q}$, to control for dealer-specific, time-varying balance sheet conditions.

In Equation (1), our coefficient of interest, β_3 , captures the impact of bank capital regulation on dealers' capital commitment around quarter-end reporting dates. If the leverage ratio indeed poses a binding constraint on corporate bond intermediation by limiting balance sheet capacity, we should observe a more pronounced reduction in bank dealers' capital commitment at quarter ends once it is in place. That is, a significantly negative and economically large estimate for β_3 during the leverage ratio period, but not before.

[Insert Table 2 here]

Panel A of Table 2 confirms this hypothesis. Columns 1 and 2 show that during the pre-leverage ratio period, we do not observe significant quarter-end effects for either bank or nonbank dealers. Similarly, Column 3 shows no significant difference in quarter-end capital commitment between bank and nonbank dealers prior to the implementation of the leverage ratio in 2015.

In contrast, Columns 4 to 6 demonstrate that after the introduction of the leverage ratio, bank dealers exhibit pronounced and highly significant quarter-end reductions in capital commitment, while nonbank dealers show no such effect. Finally, a triple difference-in-differences estimate in Column 7 confirms that these stronger quarter-end contractions are statistically significant and economically meaningful across regulatory periods, supporting the view that the leverage ratio raised bank dealers' regulatory constraint with respect to balance sheet size.³¹ To rule out that the documented effect is driven by differences in

³⁰We choose a 10-day window to account for bond market illiquidity. This is longer than in studies of more liquid debt instruments, such as repos (Munyan, 2017; Correa, Du, and Liao, 2025). Notably, our choice of a longer window yields more conservative estimates, as unreported results using shorter windows show qualitatively similar but quantitatively larger effects.

³¹A potential concern for our results is that larger quarter-end effects in the leverage ratio period could be an artifact of growing bond inventories amid an expanding bond market. We argue against this

inventory sizes between bank and nonbank dealers, we follow the literature and standardize capital commitment by each dealer’s daily standard deviation in Column 8 (see, for example, Di Maggio, Kermani, and Song (2017); He, Khorrami, and Song (2022)). The standardized coefficient illustrates that the effect is not only highly statistically significant but also economically relevant, since average daily quarter-end contractions increase by around 6.4% of a standard deviation. Thus, our findings support the hypothesis that non-risk-weighted leverage requirements increased the cost of corporate bond intermediation close to reporting dates, over and above the costs from risk-weighted capital regulation.

The absence of a clear quarter-end effect from the Basel II risk-based capital ratio, as indicated by the negative but insignificant coefficient in Column 2 of Table 2, might be explained by smaller or more selective selling volumes by bank dealers during the pre-leverage ratio period. In this period—characterized exclusively by risk-based capital requirements—dealers may have primarily reduced their inventories of high-yield bonds, which provide the highest capital relief per dollar sold. In line with this conjecture, Panel B of Table 2 shows that prior to the leverage ratio period bank dealers significantly contract their inventories in high-yield bonds but not in investment-grade bonds. In contrast, once the leverage ratio increases dealer balance sheet space, bank dealers primarily shift to contracting their holdings in safer investment-grade bonds. These results are consistent with the view that risk-weighted capital requirements constrained bank dealers’ intermediation in bonds with high risk weights before the leverage ratio was introduced. Our findings highlight an important and previously undocumented mechanism, particularly relative to studies of short-term money markets where the underlying assets are riskless: Even before the introduction of leverage ratio requirements, risk-based capital requirements constrained bank dealers’ corporate bond intermediation, primarily affecting high-yield bonds.

To further differentiate the impacts of Basel II and III regulations, we examine the timing of balance sheet contractions within each regulatory period. Panel C of Table 2

explanation for two reasons: First, by including a time indicator, $\mathbb{1}[LR]$, our regression design accounts for common time trends. Second, even if the time trend were not fully captured, we would need to observe larger dealer inventories during the leverage ratio period for this concern to hold. However, Figure A4 in the Internet Appendix shows that aggregate dealer inventories declined after the GFC and reached all-time lows during the leverage ratio period.

illustrates how bank dealers structure their quarter-end selling across different bond risk segments and regulatory periods, distinguishing between early ($[T - 10, T - 6]$) and late ($[T - 5, T]$) quarter-end effects. During the pre-leverage ratio period, dealer selling is concentrated in high-yield bonds during the last 5 days of the quarter (compare Columns 1 and 2). The marginally significant and negative coefficient for investment-grade bond sales can be attributed to selling in the highest investment-grade bond risk bucket of BBB+ to BBB- rated bonds, which carried risk weights of 100% under the Basel II standardized approach.³²

After the implementation of the leverage ratio, bank dealers adjust their capital commitment strategy. As shown in Columns 3 and 4, while dealers continue to reduce their high-yield bond holdings, they now significantly contract their capital commitment in investment-grade bonds as well. This shift is particularly noteworthy, as we observe more pronounced and significantly negative coefficients for investment-grade bonds not only in the late but also in the earlier event-day bin, indicating that dealers start reducing their investment-grade bond inventories earlier and more aggressively after 2015. This shift in quarter-end contractions toward investment-grade bonds can be understood as a strategic response to the interplay between risk-weighted and non-risk-weighted capital requirements. While selling investment-grade bonds provides less capital relief per dollar of risk-weighted assets than high-yield bonds, it can still alleviate both regulatory requirements when executed in sufficient quantities ultimately reducing dealers' need to sell high-yield bonds to meet risk-weighted capital requirements alone. This approach allows dealers to achieve the necessary regulatory relief while potentially minimizing price impact, given the higher liquidity of investment-grade bonds.

Taken together, our findings in Tables 2 provide novel insights into how the two major Basel requirements jointly impact corporate bond intermediation. Our empirical evidence suggests that the leverage ratio not only incentivizes bank dealers to reduce capital commitment earlier and more extensively but also shapes the composition of their quarter-end

³²In contrast, under the same approach, AAA to AA- rated bonds carry a 20% risk weight and A+ to A- rated bonds a 50% risk weight, while BB+ to BB- rated bonds have a 100% risk weight (just as the BBB bucket), and B+ and below rated bonds come with a 150% risk weight.

sales, resulting in significantly larger total quarter-end contractions in capital commitment of investment-grade bonds.

In Table A2 in the Internet Appendix, we further explore how the introduction of the leverage ratio affected the composition of bank dealers' net selling at quarter ends. Specifically, we examine whether dealers prioritize sales of more liquid securities to minimize price impact during quarter-end contractions. To test this, we estimate a regression at the dealer-bond-day level, regressing the logarithm of one plus daily selling volume on prior bond illiquidity, a quarter end indicator, and their interaction, while controlling for a host of bond, dealer, and market characteristics. We find that dealers tend to sell larger volumes of more liquid bonds at quarter ends to begin with. However, the propensity to sell more liquid bonds increases after the introduction of the leverage ratio, suggesting that liquidity considerations also become more critical when dealers' strategies to reduce regulatory costs at quarter ends necessitates larger inventory contractions. Consequently, beyond timing and magnitude, the leverage ratio also reshapes the strategic choice of which bonds dealers liquidate.

4.3 Cross-Sectional Heterogeneity in Leverage Constraints

Building on our previous analysis of aggregate dealer behavior, we now delve into the cross-sectional heterogeneity in leverage constraints among bank dealers to gain a more nuanced understanding of how regulatory differences impact balance sheet management. Our data and empirical setting allows us to separately estimate the effect of the leverage ratio for bank dealers from different regulatory jurisdictions and for those with varying distances to the regulatory minimum. This enables us to infer whether jurisdictional differences in implementation or varying capital buffers manifest differently in dealers' balance sheet behavior.

While the capital ratio is implemented uniformly across jurisdictions, leverage ratio reporting varies. As outlined in Section 2, U.S. bank dealers report based on quarter averages, potentially giving them more flexibility to manage inventories throughout the quarter—*unless* they have already used up their balance sheet capacity earlier in the quar-

ter. This approach makes U.S. bank dealers relatively less constrained than their European and Japanese counterparts, who report based on quarter-end snapshots. To test this hypothesis, we compare inventory contractions across these dealer groups by re-estimating Columns 7 and 8 in Panel A of Table 2 separately for each group.

Table 3 presents results from regressions for U.S. bank dealers (Columns 1 and 3) and European and Japanese bank dealers (Columns 2 and 4). For both groups, we find negative and significant triple interaction terms, indicating that, regardless of jurisdiction, quarter-end contractions become markedly more pronounced once the leverage ratio is in place. Although the coefficient is notably smaller for U.S. bank dealers (Column 1 versus 2), these dollar-level results do not account for differences in inventory sizes. Since U.S. bank dealers, on average, have larger balance sheets than their European and Japanese peers, observing similar dollar contractions may still reflect relatively stronger effects on European and Japanese dealers.

For a more meaningful comparison, we use a standardized measure of capital commitment that is scaled by each dealer's standard deviation. This allows us to express contractions relative to dealers' typical inventory fluctuations. Notably, the standardized contractions of European and Japanese dealers are about 36% larger than those of their U.S. counterparts once the leverage ratio is in place (Column 3 versus 4). This differential impact on European and Japanese dealers compared to their U.S. counterparts indicates tighter quarter-end constraints, pointing to important empirical questions about potential variations in liquidity provision and transaction costs across dealer jurisdictions near reporting dates (see Section 6). It also confirms that while U.S. bank dealers are somewhat less constrained due to quarter-average reporting than their foreign counterparts, they still significantly reduce capital commitment at quarter ends, indicating that they do not systematically preserve inventory capacity ahead of reporting dates.

[Insert Table 4 here]

To further corroborate that the documented effects are indeed a response to the leverage ratio requirement, we next examine heterogeneity with respect to proximity to the

regulatory minimum. Bank dealers with less capital buffer to the minimum leverage ratio requirement should be more reluctant to accumulate or maintain inventories before reporting dates, leading to stronger contractions in the days leading up to quarter ends. To capture these dynamics, we focus only on the subset of G-SIBs, linking their capital buffers to changes in capital commitment. For these dealers, we retrieve reported leverage ratio data from S&P Global SNL Financials,³³ and compute each dealer’s distance to the regulatory leverage ratio minimum. We rescale these distances across dealers using a min-max normalization and subtract the resulting normalized value from 1. This transformation yields a proximity measure ranging from 0 to 1, where higher values indicate closer proximity to the regulatory minimum and thus tighter balance sheet constraints. We estimate a regression that interacts the quarter-end indicator with the proximity measure for the subset of G-SIB dealers in the leverage ratio period. Our results in Table 4 show that those dealers closer to the regulatory minimum indeed experience significantly larger contractions in capital commitment at quarter ends. Consistent with our earlier insights that the leverage regulation particularly constrains safer assets, we document that the effect is contained in investment-grade bonds (Column 2), but not in high-yield bonds (Column 4).

Taken together, our findings in Tables 2 to 4 provide novel insights into how the leverage ratio affects corporate bond intermediation across dealer types. In contrast to evidence from money markets (Correa, Du, and Liao, 2025), we show that U.S. bank dealers do not act as residual buyers at quarter ends. Instead, they also contract their bond inventories—albeit less aggressively than their European and Japanese counterparts. This suggests that quarter-average reporting provides U.S. dealers with somewhat greater flexibility, but not enough to avoid meaningful quarter-end constraints—likely because they do not systematically preserve balance sheet capacity during the quarter.³⁴

³³S&P Global SNL Financials includes information on U.S. banks’ supplementary leverage ratios from FRY-9C filings. We hand-collect data from publicly available balance sheets for bank-affiliated intermediaries not covered in S&P Global SNL Financials.

³⁴Unlike short-term money markets, where dealers can engage in reserve-draining intermediation at quarter ends to extend lending without expanding their balance sheets, corporate bond intermediation inherently expands dealers’ balance sheets. Bonds purchased for liquidity provision directly impact capital and leverage ratios until sold. This fundamental difference explains why corporate bond dealers face tighter constraints and cannot employ the same balance sheet management strategies observed in riskless asset

Despite jurisdictional differences, the incremental regulatory burden from the leverage ratio has intensified quarter-end balance sheet pressures for all affected banks. This has implications for bond intermediation and liquidity provision: Bank-affiliated corporate bond dealers, regardless of jurisdiction, function as liquidity providers of “first resort,” lacking both the capacity and willingness to absorb selling pressure in corporate bonds near regulatory reporting dates.

4.4 Robustness: Effects of Other Regulations

Thus far, we have attributed the reduction in bank-affiliated dealers’ capital commitment at quarter ends to the leverage ratio constraint. However, other post-crisis regulations introduced during our sample period may have had similar effects, potentially confounding our findings. Isolating the effect of the leverage ratio is crucial not only for econometric identification but also for accurately assessing its specific impact on bond intermediation. Moreover, the distinction from other regulations is important for informing targeted regulatory adjustments. In this section, we provide a series of robustness checks to examine whether our findings might be influenced by these other regulations.

We begin with the G-SIB surcharges, which are solely based on year-end balance sheet metrics (Behn et al., 2022). To avoid potential confounding from G-SIB surcharges and reduce year-end trading volumes, our empirical specifications have so far focused only on quarters one through three. While this approach rules out that the observed inventory contractions reflect G-SIB reporting rather than leverage ratio constraints, we expect the leverage ratio to also have a constraining effect at year end. In fact, the effect should be as strong or even more pronounced when leverage ratio and G-SIB reporting coincide. To evaluate this, we re-estimate our main specification for all quarters, including the fourth. Table A4 in the Internet Appendix confirms that our results hold also for the last quarter. Moreover, the estimated effects are somewhat larger in quarter four, suggesting that the additional year-end regulatory burden amplifies the impact of the leverage ratio during the final quarter of the year. The effect appears more pronounced for U.S. bank dealers, markets.

possibly due to their frequent presence in higher G-SIB buckets,³⁵ while the coefficient for European and Japanese banks, though correctly signed, is insignificant, potentially reflecting their concentration in lower G-SIB buckets or non-G-SIB status. Importantly, while the underlying economic mechanism—temporary withdrawal from bond intermediation due to regulatory costs—is similar for both G-SIB surcharges and leverage ratio constraints, distinguishing between the two effects is crucial for accurate policy evaluation.

Next, we consider the Volcker Rule, which took full effect in July 2015 and prohibits proprietary trading by banking entities. To ensure compliance, bank-affiliated dealers are required to report a set of metrics indicative of proprietary trading during the first ten business days of each month (Bao, O’Hara, and Zhou, 2018). The Volcker Rule might potentially affect capital commitment by discouraging dealers from holding large inventories that could be misconstrued as proprietary trading positions, particularly for less liquid bonds with longer holding periods. Although our analysis centers on quarter-end effects—which cannot be directly attributed to the Volcker Rule’s monthly reporting schedule—we assess whether Volcker-Rule-related reporting might influence dealers’ capital commitment, potentially amplifying or interacting with quarter-end effects. To this end, we perform two tests: First, we re-estimate our main regression specification, replacing the quarter end indicator with an indicator for non-quarter-end months. As shown in Table A5 of the Internet Appendix, we find no significant reduction in capital commitment in these months. This finding suggests that Volcker Rule reporting does not drive recurring balance sheet contractions at month ends outside of quarter ends, making it unlikely that the observed quarter-end effects are driven or amplified by the Volcker Rule’s monthly reporting requirements. Second, we shift our focus from the last ten trading days to the first ten trading days of each month—corresponding to the Volcker Rule reporting period—and examine dealer behavior in both quarter-end and non-quarter-end months. While we find some contraction in capital commitment at month starts, this effect predates the Volcker Rule and remains consistent across regulatory periods, suggesting that Volcker-Rule-related dy-

³⁵As discussed in Section 2, the supplementary leverage ratio applicable to U.S. G-SIBs imposes a 2% to 3% higher baseline leverage requirement compared to their foreign counterparts. Combined with often higher G-SIB bucket allocations, this likely results in more stringent year-end regulatory constraints for U.S. bank dealers.

namics are unlikely to interact with the observed quarter-end effects.

Lastly, we consider whether our findings are sensitive to the choice of baseline period. Our main specification uses the years 2010 through 2014 as the pre-leverage ratio baseline, a period characterized by both implemented reforms, such as the Dodd-Frank Act, and anticipated regulatory changes, including Basel reforms and the Volcker Rule. This changing regulatory environment could potentially confound dealers' capital commitment in the baseline period and thus our identification of the leverage ratio's effects. To address this concern, we re-estimate our regressions using an extended baseline period from January 2003 through December 2014, excluding the GFC period (January 2007 through April 2009). Table A6 in the Internet Appendix shows that our results remain robust even with the extended baseline period, as coefficient estimates remain stable in magnitude and statistical significance.

5 Managing Regulatory Pressure at Quarter Ends

5.1 Nonbank Intermediaries and Quarter-End Liquidity Supply

Given the documented quarter-end contractions by bank-affiliated dealers, a natural question arises: Who provides liquidity when regulated dealers are selling? To address this, we examine how bank dealers rely on different counterparty groups within their networks to offload their regulation-induced selling pressure at quarter ends. That is, we disaggregate the overall effect to analyze the role of different counterparties. We begin by characterizing the set of counterparty groups that could potentially absorb this selling pressure.

First, nonbank dealers may exploit their greater balance sheet flexibility at quarter ends to purchase bonds from bank dealers. While their overall lower balance sheet capacity makes it unlikely that they absorb all of the selling pressure, nonbank dealers may be able to absorb select exposures to profit from potential liquidation discounts. Second, bank dealers' customers may also serve as another group of buyers, in line with recent evidence highlighting the growing importance of customer liquidity provisioning in corporate bond markets (Anand, Jotikasthira, and Venkataraman (2021); O'Hara, Rapp, and Zhou (2024);

Choi, Huh, and Shin (2024)). Third, despite being subject to regulation themselves, other bank dealers that face less regulatory pressure may absorb some of the selling pressure.

To examine how bank dealers distribute quarter-end selling pressure across counterparties in their networks, we analyze their net selling volumes among the three counterparty groups (customers, nonbank dealers, and bank dealers from different regulatory jurisdictions). Specifically, for each dealer i on date t , we construct measures of both aggregate buying and selling volumes as well as a measure of net sales against a particular counterparty group m . Focusing on the leverage-ratio period, we estimate the following regression model separately by dealer jurisdiction:

$$\begin{aligned} Net\ Sales_{i,m,t} = & \beta_1 \mathbb{1}[QE] + \beta_2 \mathbb{1}[LR] + \beta_3 \mathbb{1}[QE] \times \mathbb{1}[LR] \\ & + \theta' \mathbf{M}_t + \alpha_i + \alpha_q + \varepsilon_{i,m,t}, \end{aligned} \tag{2}$$

where $Net\ Sales_{i,m,t}$ refers to the net selling volume of dealer i at day-end of day t vis-à-vis counterparty type m .³⁶ $\mathbb{1}[QE]$ is an indicator variable that takes the value one on each of the last 10 trading days of the quarter, $\mathbb{1}[LR]$ is an indicator variable that equals one from January 2015 onwards, and \mathbf{M}_t contains daily controls for financial market conditions. Lastly, we include dealer and year-quarter fixed effects.

Our analysis reveals that bank dealers primarily rely on the customers and nonbank dealers in their networks to absorb their quarter-end selling pressure, with clear segmentation by bond type and dealer jurisdiction. Table 5, Panel A, documents that during the leverage ratio period, U.S. bank dealers heavily rely on their customers to offload investment-grade bonds at quarter ends. In Column 1, the positive and significant coefficient on $\mathbb{1}[QE]$ indicates that U.S. bank dealers systematically tilt their net sales of investment-grade bonds to customers, helping them reduce inventories at quarter ends. Column 2 shows no similar effect for high-yield bonds, in which U.S. bank dealers instead appear to weakly increase capital commitment towards customers. Columns 3 and

³⁶For ease of interpretation, we adapt our capital commitment measure to create counterparty-group-specific measures of dealer net sales, denoted as $Net\ Sales_{i,m,t}$. This measure is defined as sells minus buys, such that a positive value indicates net sales from dealer i to counterparty group m , while a negative value indicates net purchases by dealer i from counterparty group m .

4 confirm that the effect in investment-grade bonds is driven by increased sales relative to purchases. These findings likely reflect customer preferences, possibly due to investment mandates or regulatory constraints.³⁷ Finally, Columns 5 and 6 further corroborate that this effect is indeed emerging with the introduction of the leverage ratio: U.S. bank dealers primarily offload investment-grade volume to customers at quarter ends only after the leverage ratio is phased in, but not before. Consistent with our hypothesis, we do not observe a similar effect for high-yield bonds. Panel B shows that U.S. bank dealers also fall back on nonbank dealers to offload part of their regulatory pressure during the leverage ratio period. Interestingly, while nonbank dealers do not absorb U.S. bank dealers' net sales in investment-grade bonds, Column 2 highlights that they do take on U.S. bank dealers' increased net sales in high-yield bonds. For instance, by on net passing on high-yield positions acquired from customers during quarter ends (Column 2 of Panel A). Columns 5 and 6 suggest that with the introduction of the leverage ratio nonbank dealers—particularly those active in riskier bond segments—play an important role in absorbing quarter-end dislocations in high-yield bonds.³⁸ Lastly, Panel C shows limited evidence of cross-border net sales. The small and mostly insignificant coefficients suggest that U.S. bank dealers only sell bonds to their foreign counterparts to a very limited extent. This aligns with the idea that non-U.S. bank dealers are themselves constrained and unwilling to take on additional exposures.

[Insert Table 5 and Table 6 here]

Table 6 presents analogous results from the same set of regressions for European and Japanese bank dealers. While the qualitative patterns mirror those of U.S. bank dealers, we find even more concentrated selling to customers: On average, European and Japanese

³⁷A substantial fraction of institutional investors in the corporate bond market is bound by either investment mandates (mutual funds and pension funds) or regulation (insurance companies) to invest primarily in investment-grade-rated bonds.

³⁸In Table A8 in the Internet Appendix we use a measure of network centrality (eigenvector centrality) to test whether sales are concentrated among core versus peripheral nonbank dealers. We find that constrained bank dealers—both in the U.S. and abroad—primarily offload to highly central nonbank dealers. This suggests that peripheral nonbank dealers do not possess the necessary balance sheet capacity or willingness to absorb significant selling volumes in high-yield bonds, thus indicating that balance sheet depth appears to be an important determinant of absorption capacity.

dealers' net quarter-end sales in investment-grade bonds are directed exclusively towards customers, while all net sales in high-yield bonds go to nonbank dealers, with virtually no net selling to other bank dealers.

Taken together, our findings indicate that when faced with increased quarter-end regulatory pressure from the leverage ratio, bank dealers turn primarily to nonbank financial intermediaries in their networks to manage their exposures: Customers provide liquidity in investment-grade bonds, while nonbank dealers absorb high-yield positions. This highlights an important unintended consequence of the Basel regulatory framework: Regulations designed to curb risk and leverage in the banking sector (BIS, 2014) periodically induce banks to transfer the riskiest corporate bond exposures to some of the least regulated intermediaries.

5.2 Price Concessions for Customer Liquidity Supply

In light of the above results, the question arises whether customers grant price discounts in exchange for their quarter-end liquidity support. For this equilibrium mechanism to be consistent with our finding that customers primarily absorb dealers' selling pressure in investment-grade bonds, we would expect any price concessions to materialize predominantly in safer bonds. Regarding trade sizes, bank dealers likely face a trade-off: While they have an incentive to sell large amounts of bonds quickly, customers may simply not be able or willing to absorb large block trades. Moreover, the price impact of large liquidations may become too large for dealers. This suggests that price concessions should primarily materialize in smaller trade sizes.

To test this empirically, we run the following trade-level regression on bond rating tier and trade size subsamples, using dealer sells to customers during the leverage-ratio period:

$$Cost_{k,j,i,t} = \beta_1 \mathbb{1}[QE] + \theta'_1 \mathbf{M}_t + \theta'_2 \mathbf{M}_{j,t} + \alpha_{j,q,s} + \alpha_r + \alpha_{i,q} + \varepsilon_{k,j,i,t}, \quad (3)$$

where $Cost_{k,j,i,t}$ denotes the transaction costs for transaction k in bond j at time t intermediated by dealer i (see Section 3.3), $\mathbb{1}[QE]$ is an indicator variable equal to one on

each of the last 10 trading days of the quarter, and \mathbf{M}_t contains daily controls for financial market conditions. $\mathbf{M}_{j,t}$ contains time-varying bond-specific controls, such as the bond’s age and time-to-maturity—defined as the logarithm of the number of years since issuance and the number of years to maturity, respectively, as well as a bond’s amount outstanding, which is given by the logarithm of a bond’s total par amount outstanding. $\alpha_{j,q,s}$ represents bond-year-quarter-trade size fixed effects, α_r refers to rating bucket fixed effects, and $\alpha_{i,q}$ refers to dealer-year-quarter fixed effects.

[Insert Table 7 here]

Table 7 supports our hypothesis that bank dealers offer meaningful price concessions in investment-grade bonds and smaller trade sizes to customers in exchange for quarter-end liquidity support. Controlling for a comprehensive set of bond characteristics, we find significant discounts of 1.18 and 2.6 basis points in the average investment-grade transaction costs for U.S. bank dealers (Panel A) and European and Japanese bank dealers (Panel B), respectively. We do not document similar concessions in high-yield bonds. These concessions are not only statistically significant but also economically meaningful: Relative to the average selling spread outside quarter-ends, they represent a reduction in transaction costs of around 3.2% for U.S. bank dealers and a nearly 7.3% reduction for their non-U.S. bank counterparts. These findings suggest that institutional investors, likely constrained by their investment mandates, primarily absorb bank dealers’ quarter-end sales in investment-grade segments and smaller trade sizes.

5.3 Quarter-End Liquidity Supply by Insurance Companies

As nonbank intermediaries become liquidity suppliers to constrained bank dealers at quarter ends, it is important to study the mechanism of customer liquidity supply in more detail. Due to the absence of counterparty identifiers in TRACE, we focus on the trades of U.S. insurance companies—the largest holders of corporate bonds during the leverage-ratio period—and examine whether they adjust their trading at quarter ends in a way that helps

absorb dealers’ regulatory selling pressure.³⁹

Specifically, we use detailed trade-level data reported in parts 3 to 5 of Schedule D provided by the National Association of Insurance Commissioners (NAIC). These data allow us to observe insurers’ daily bond-level trading activity and directly test for quarter-end liquidity supply by individual insurance companies. Moreover, for each insurer trade, the NAIC data provide us with a dealer identity, enabling us to proxy for prior trading relationships between an insurer and a dealer based on their transaction history. Our final sample spans the period from 2010 to 2019 and contains 3,026 insurers, of which 2,344 are property and casualty (P&C) insurers and 682 are life insurers.

[Insert Table 8 here]

If insurers indeed act as quarter-end liquidity suppliers, we should observe an increase in their net purchases from dealers. For such behavior to reflect a response to regulation-induced dealer selling, this effect should be concentrated in investment-grade bonds and emerge only after the implementation of the leverage ratio. Moreover, given life insurers’ longer-term, duration-driven investment style, we would expect short-term liquidity supply at quarter ends to be more concentrated in relative value-driven P&C insurers.⁴⁰

To test these conjectures, we construct a sample at insurer-day level that spans the period from January 2010 to December 2019. We then estimate the following regression:

$$\begin{aligned} \text{Insurer Net Purchases}_{n,t} = & \beta_1 \mathbb{1}[QE] + \beta_2 \mathbb{1}[LR] + \beta_3 \mathbb{1}[QE] \times \mathbb{1}[LR] \\ & + \theta' \mathbf{M}_{\mathbf{n},\mathbf{y}} + \alpha_n + \alpha_q + \varepsilon_{n,t}, \end{aligned} \tag{4}$$

where $\text{Insurer Net Purchases}_{n,t}$ denotes the log-modulus transformation of net purchases

³⁹In the U.S. corporate bond market, bond holdings are highly concentrated among insurance companies and bond investment funds. Right before the implementation of leverage ratio reporting, Federal Reserve Financial Accounts data from the end of 2014 showed that insurers (life and property & casualty) owned approximately 34% of outstanding corporate bonds, while bond mutual funds held 25%. The remaining 41% was distributed among pension funds (15%), banks (12%), and others (14%).

⁴⁰Bretscher et al. (2025) show that P&C insurers have a much higher price elasticity than life insurers—2.7 vs. 0.5—and are more responsive to market conditions despite smaller balance sheets. Related, we document that P&C insurers trade more actively relative to their portfolio size (see Table A3 in the Internet Appendix).

volume by insurance company n on day t .⁴¹ We add the logarithm of an insurer’s assets, 5-year asset growth, the logarithm of an insurer’s RBC ratio, the leverage ratio, and the cash-to-assets ratio as controls and further include insurer and quarter fixed effects. If insurers indeed help absorb dealers’ quarter-end selling pressure, we expect a positive and significant coefficient on the quarter-end indicator, $\mathbb{1}[QE]$.

Consistent with stronger dealer selling pressure in investment-grade bonds, Panel A of Table 8 shows that insurance companies significantly increase their net purchases at quarter ends in investment-grade bonds (Column 1), but not in high-yield bonds (Column 2). Furthermore, Columns 3 and 4 highlight that quarter-end liquidity supply is primarily concentrated in P&C insurers, in line with evidence documenting a larger price elasticity of P&C insurers compared to life insurers (Bretscher, Schmid, Sen, and Sharma (2025)). Lastly, consistent with dealers needing to sell rather than buy, Columns 5 and 6 confirm that P&C insurers significantly increase their quarter-end purchases from dealers, while not materially changing their sales.⁴² Supporting the view that this behavior is driven by the leverage ratio, Panel B shows that insurers’ quarter-end liquidity provision is concentrated entirely in the post-2015 leverage-ratio period. Additional analysis, presented in Table A7 of the Internet Appendix, indicates that P&C insurers focus their quarter-end liquidity provision toward dealers with whom they have prior trading relationships.

Taken together, our findings demonstrate that once the leverage ratio raises bank dealers’ balance sheet costs, insurance companies—primarily P&C insurers—appear to adopt a liquidity-supplying trading strategy that facilitates regulatory balance sheet reductions for bank dealers.

⁴¹Net purchases are defined as the difference between an insurer’s purchases and sales on day t . We then transform this using $sign(y) \times \ln(1 + |y|)$ to accommodate both positive and negative values. Untabulated results using untransformed dollar volumes yield qualitatively similar findings.

⁴²We find that P&C insurers retain the bonds they purchase during quarter ends rather than selling them back to dealers: One quarter (60 trading days) after the quarter-end purchase the average P&C insurer still retains 92% of the initial purchase volume (compare Figure A5 in the Internet Appendix).

6 Leverage Regulation and Bond Liquidity

So far, we have shown that bank dealers become less willing to absorb bond positions at quarter ends. Yet the ability to sell bonds quickly remains critical for institutional investors, especially following bond downgrades (Ellul, Jotikasthira, and Lundblad, 2011) or index exclusions (Dick-Nielsen and Rossi, 2019). Dealers typically facilitate such transactions by acting in a principal capacity, providing immediacy at the cost of taking positions onto their balance sheets. As discussed in Subsection 3.3, principal trades expose dealers to regulatory capital charges but allow for rapid execution, whereas agency trades are less balance-sheet-intensive but involve longer execution times (Kargar et al., 2021). Thus, when customers demand immediacy near regulatory reporting dates, constrained bank dealers must either pass on their increased costs through higher transaction spreads, or forgo the trade entirely, reducing the amount of balance sheet space supplied to customers.

To accurately distinguish agency from principal trades and to capture the transaction costs of the latter, we use the algorithm and cost measure proposed by Choi, Huh, and Shin (2024).⁴³ This approach allows us to assess the potential liquidity erosion at quarter ends through both changes in dealers' willingness to intermediate and the costs borne by customers.

While regulatory costs likely represent an important component of observed spreads at quarter ends, we also expect variation in customer-dealer bargaining power to influence transaction costs. Jurisdictional differences in the leverage ratio implementation—where European and Japanese bank dealers face relatively tighter quarter-end constraints than U.S. dealers—may reduce the number of dealers able or willing to intermediate on a principal basis. This diminished competition lowers customers' bargaining power when seeking immediacy. If U.S. bank dealers can leverage their relatively lower balance sheet costs, we should observe European and Japanese bank dealers, more than U.S. bank dealers, reducing their volume of costly principal trades once the leverage ratio is implemented. At the same time, we expect transaction costs on principal trades to rise significantly for

⁴³While TRACE flags principal and agency trades, Choi, Huh, and Shin (2024) argue that some principal trades, likely due to pre-arrangement, are effectively riskless and thus much closer to agency than to risky principal trades.

customers trading with European and Japanese bank dealers. Additionally, if U.S. bank dealers can exert market power, they may increase prices to match those of their more constrained European and Japanese counterparts, extracting higher intermediation rents while retaining customer flow.

6.1 Dealer Trade Capacity at Quarter Ends

To test the first hypothesis, we construct a dataset at the dealer-day level and separately study the transaction volume of balance sheet-intensive principal trades and less capital-intensive agency trades for different dealer groups around quarter-ends. Specifically, we test whether bank dealers adjust their trading capacity at quarter ends following the introduction of the leverage ratio by estimating the following regression:

$$Volume_{k,i,j,t} = \beta_1 \mathbb{1}[QE] + \theta'_1 \mathbf{M}_t + \theta'_2 \mathbf{M}_{j,t} + \alpha_j + \alpha_r + \alpha_{i,q} + \varepsilon_{k,j,i,t}, \quad (5)$$

where $Volume_{k,j,i,t}$ represents the transaction volume in USD millions of transaction k in bond j at time t intermediated by dealer i for a given trade capacity (see Section 3.3), $\mathbb{1}[QE]$ is an indicator variable equal to one on each of the last ten trading days of the quarter. We further include daily market (\mathbf{M}_t) and bond controls ($\mathbf{M}_{j,t}$) as well as bond fixed effects, α_j , rating-bucket fixed effects, α_r , and dealer-year-quarter fixed effects, $\alpha_{i,q}$.

[Insert Table 9 here]

The results in Table 9 support the interpretation that more constrained European and Japanese bank dealers significantly reduce the volume of costly principal trades at quarter ends, whereas less constrained U.S. bank dealers also reduce it, but to a lower extent. In particular, Panel A shows a significantly negative quarter-end effect for bond purchases on a principal basis for both U.S. and foreign bank dealers, but not (or less so) for agency trades. This corroborates our earlier results and points to the leverage ratio as the underlying dealer constraint. Interestingly, we also document insignificant results for nonbank dealers, suggesting that their limited balance sheet capacity prevents them from taking

advantage of bank dealers’ constraints. Consistent with the fact that bond purchases but not sales increase regulatory costs under the leverage ratio, Panel B shows that this effect is not present for bond sales. Finally, these trading capacity adjustments also align with our broader findings on jurisdictional differences in leverage ratio implementation, which disproportionately constrain European and Japanese bank dealers.

6.2 Cost of Immediacy at Quarter Ends

To assess whether regulatory constraints also increase customers’ transaction costs, we fall back on our trade capacity classification. Since agency trades are not balance-sheet-intensive, their spreads should not be affected by regulatory pressure. In contrast, higher spreads for principal trades—particularly around quarter ends—would be consistent with dealers passing on regulatory costs to customers. Moreover, if the Basel III leverage ratio is the primary driver of these cost increases, we expect such effects to materialize only after its implementation. We test this hypothesis by estimating the following regression model:

$$Cost_{k,j,i,t} = \beta_1 \mathbb{1}[QE] + \theta'_1 \mathbf{M}_t + \theta'_2 \mathbf{M}_{j,t} + \alpha_j + \alpha_r + \alpha_{i,q} + \varepsilon_{k,j,i,t}, \quad (6)$$

where the dependent variable, $Cost_{k,j,i,t}$, refers to the transaction spread for principal transaction k in bond j at time t intermediated by dealer i (see Section 3.3). The other variables are as defined in Equation 5.

If bank dealers indeed pass regulatory costs to customers, we expect a positive and significant coefficient on $\mathbb{1}[QE]$ in the subset of principal trades, but not agency trades, intermediated by bank dealers. Panel A of Table 10 confirms this prediction: We observe statistically significant increases in customer transaction costs for both bank dealer groups at quarter ends for principal trades that emerge only after the leverage ratio is implemented. These findings suggest that bank dealers pass on the increased balance sheet costs to customers when they intermediate principal trades near quarter ends.

To better understand this mechanism, we re-estimate Equation (3) by trade size buckets and bond rating tiers. Columns 1 to 4 in Panel B of Table 10 show that the pass-through

of regulatory costs by bank dealers is monotonically increasing in trade size. Column 5 and 6 further indicate that the transaction cost increase is concentrated in investment-grade bonds, which are more affected by the leverage ratio constraints. This pattern is consistent with larger trades exposing dealers to higher regulatory costs, as they are harder to offset and may require time-consuming splitting and greater search effort. These markups are not only statistically significant but economically relevant: For large trades, bank dealers increase transaction costs on average by approximately 7.5% relative to costs outside quarter ends. Given the duration of the quarter-end window, this implies a substantial and persistent liquidity contraction for customers seeking immediacy.

[Insert Table 10 here]

Taken together, our results provide suggestive evidence that U.S. bank dealers are able to exploit the relatively lower regulatory burden at quarter ends to extract rents due to a temporary increase in market power. As we have shown in Table 9, U.S. bank dealers reduce the share of balance-sheet-intensive principal trades at quarter ends to a lesser extent. Combined with our findings that U.S. dealers experience smaller inventory contractions (see Table 3), this suggests that U.S. bank dealers are less constrained by the leverage ratio and face lower marginal costs for balance sheet intensive trades than their foreign counterparts. Yet, despite this advantage, U.S. dealers increase transaction costs at quarter ends by a comparable amount to their more constrained foreign peers as shown in Table 10). This behavior thus appears consistent with U.S. dealers leveraging a temporary reduction in market competition to exert market power, price large customer trades above marginal cost, and capture intermediation rents.

7 Conclusion

We examine the cross-sectional implications of Basel regulations on dealer intermediation in the U.S. corporate bond market. Our findings reveal that bank dealers, regardless of jurisdiction, significantly reduce their capital commitment at quarter ends, with this effect intensifying after the 2015 introduction of the leverage ratio. These regulatory-driven

quarter-end effects—more pronounced for foreign banks due to jurisdictional differences in leverage ratio implementation—impair liquidity conditions, particularly in balance sheet-intensive principal trades where customers often rely on large bank dealers.

Moreover, unlike short-term money markets, the corporate bond market sees U.S. bank dealers refraining from acting as residual liquidity providers. This is driven by the complex interplay between risk-weighted and non-risk-weighted capital requirements, which is particularly relevant for inherently risky assets such as corporate bonds. Instead, bank dealers rely on customers to offload investment-grade bonds and nonbank dealers for high-yield bonds. This distinct dynamic creates a more immediate role for nonbank financial intermediaries in liquidity provision and highlights the periodic transfer of risky corporate bond exposures to the least regulated entities (FSB, 2025).

Taken together, our findings point to a trade-off between enhanced financial stability through stricter bank regulation and potential increased fragility in corporate bond markets (FSB, 2021). While we refrain from drawing normative conclusions, our study underscores the need for policymakers to weigh the unintended consequences against the intended benefits of current regulatory frameworks. As discussions on overhauling key Basel III metrics continue, our research highlights the importance of a nuanced perspective that considers the unique characteristics of the corporate bond market and the evolving role of nonbank financial intermediaries.

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Table 1
Summary Statistics

This table provides summary statistics for our bond variables, dealer-day capital commitment (in USD and standardized), and average customer transaction costs from January 2010 to December 2019. The sample contains 135,927,917 transactions. For each variable, we report the number of observations, mean, standard deviation, and 25th, 50th, and 75th percentiles. Panel A presents selected bond characteristics: Offering amount, age at transaction, remaining time to maturity, and credit rating (AAA = 1, AA+ = 2, etc.). Panel B shows dealers' overnight capital commitment, separately for bank and nonbank dealers. Panel C presents customer transaction costs.

Panel A: Bond Characteristics

Variable	# Bonds	Mean	SD	Q25	Median	Q75
<i>Offering Amount [\$ mn]</i>	30,413	698.54	664.42	300.00	500.00	900.00
<i>Age [years]</i>	30,413	3.04	4.23	0.25	1.56	4.09
<i>Time-to-Maturity [years]</i>	30,413	8.16	8.66	3.00	5.60	9.42
<i>Credit Rating [\$ mn]</i>	30,413	9.06	3.89	6.00	9.00	11.00

Panel B: Dealer Capital Commitment (daily, \$mn, all periods)

Dealer Group	Observations	Mean	SD	Q25	Median	Q75
<i>All Dealer</i>	329,013	0.41	33.41	-0.41	0.00	0.74
<i>Bank-Aff. Dealer</i>	188,426	0.73	40.17	-0.13	0.00	0.53
<i>Nonbank Dealer</i>	140,587	-0.03	21.20	-0.69	0.00	0.90

Panel D: Customer Transaction Costs (all trades)

Dealer Group	Observations	Mean	SD	Q25	Median	Q75
<i>All Dealer</i>	9,945,676	34.20	89.81	-0.40	14.64	50.84
<i>Bank-Aff. Dealer</i>	7,614,142	36.56	93.85	-1.81	16.33	54.97
<i>Nonbank Dealer</i>	2,331,534	26.51	74.60	0.00	11.57	38.74

Table 2
Dealer Capital Commitment at Quarter Ends

The sample is constructed at the dealer-day level and restricted to quarters 1 through 3, spanning the period from January 2010 through December 2019. We perform variations of the following regression:

$$\begin{aligned} \text{Capital Commitment}_{i,t} = & \beta_1 \mathbb{1}[\text{Bank} - \text{aff.}] + \beta_2 \mathbb{1}[\text{LR}] + \beta_3 \mathbb{1}[\text{QE}] + \beta_4 \mathbb{1}[\text{Bank} - \text{aff.}] \times \mathbb{1}[\text{QE}] \\ & + \beta_5 \mathbb{1}[\text{Bank} - \text{aff.}] \times \mathbb{1}[\text{LR}] + \beta_6 \mathbb{1}[\text{QE}] \times \mathbb{1}[\text{LR}] \\ & + \beta_7 \mathbb{1}[\text{QE}] \times \mathbb{1}[\text{LR}] \times \mathbb{1}[\text{Bank} - \text{aff.}] + \theta' \mathbf{M}_t + \alpha_{i,q} + \varepsilon_{i,t}. \end{aligned}$$

The dependent variable, $\text{Capital Commitment}_{i,t}$, represents dealer i 's capital commitment (in USD million) on day t . $\mathbb{1}[\text{Bank} - \text{aff.}]$ is an indicator variable that takes the value one if the dealer is bank-affiliated. $\mathbb{1}[\text{QE}]$ is an indicator variable that equals one if the transaction day is among the last ten trading days of the quarter. $\mathbb{1}[\text{LR}]$ is an indicator variable that equals one from January 2015 onwards, coinciding with the implementation of the Basel III leverage ratio and G-SIB surcharges. \mathbf{M}_t is a vector of daily market controls including changes in the VIX and 3-month LIBOR, the S&P 500 return, the ICE BofA IG corporate bond index spread, the difference between ICE BofA HY and IG corporate bond indexes, and the 10y-2y term spread. $\alpha_{i,q}$ represents dealer-year-quarter fixed effects. Panel A displays regressions by regulatory period (pre-leverage ratio vs. leverage ratio) and dealer type (bank vs. nonbank). Panel B shows bank-affiliated dealers' capital commitment by bond rating (investment-grade vs. high-yield). Panel C presents bank-affiliated dealers' capital commitment, distinguishing between early ($[T - 10, T - 6]$) and late ($[T - 5, T]$) quarter-end effects. In Panel A, Columns 1 through 7 measure the dependent variable in USD, while Column 8 uses a standardized measure (mean zero, standard deviation one). Panels B and C use the standardized measure throughout. Standard errors, clustered at the dealer level, are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Dealers' Capital Commitment by Period and Dealer Type

Dependent Variable	Capital Commitment (USD)						Capital Comm. (Std.)	
	Pre-Leverage Ratio			Leverage Ratio			All	
	Nonbank	Bank	All	Nonbank	Bank	All	All	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\mathbb{1}[\text{QE}]$	0.116 (0.142)	-0.111 (0.380)	0.085 (0.141)	0.708 (0.761)	-1.808*** (0.591)	0.528 (0.695)	0.156 (0.137)	0.005 (0.004)
$\mathbb{1}[\text{QE}] \times \mathbb{1}[\text{Bank} - \text{aff.}]$			-0.173 (0.374)			-2.202*** (0.841)	-0.172 (0.374)	-0.005 (0.012)
$\mathbb{1}[\text{QE}] \times \mathbb{1}[\text{LR}]$							0.373 (0.682)	0.012 (0.022)
$\mathbb{1}[\text{Bank} - \text{aff.}] \times \mathbb{1}[\text{QE}] \times \mathbb{1}[\text{LR}]$							-2.029** (0.902)	-0.064** (0.029)
R-Squared	0.04	0.02	0.02	0.09	0.04	0.05	0.04	0.04
Observations	71,391	95,775	167,166	69,223	92,666	161,889	329,055	329,055
Dealer \times Year-Quarter FE	✓	✓	✓	✓	✓	✓	✓	✓
Market Controls	✓	✓	✓	✓	✓	✓	✓	✓

Table 2 - continued

Panel B: Bank Dealers' Capital Commitment by Bond Rating and Period

Dependent Variable	Capital Commitment (Std.)					
	Investment-Grade			High-Yield		
	Pre-LR	LR	All	Pre-LR	LR	All
Regulatory Period	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{1}[QE]$	-0.019 (0.014)	-0.060*** (0.018)	-0.015 (0.014)	-0.035** (0.014)	-0.016 (0.012)	-0.035** (0.014)
$\mathbb{1}[QE] \times \mathbb{1}[LR]$			-0.043** (0.019)			0.020 (0.015)
R-Squared	0.02	0.03	0.03	0.04	0.07	0.06
Observations	95,775	92,666	188,441	95,775	92,666	188,441
Dealer \times Year-Quarter FE	✓	✓	✓	✓	✓	✓
Market Controls	✓	✓	✓	✓	✓	✓

Panel C: Bank Dealers' Dynamics of Quarter-End Capital Commitment

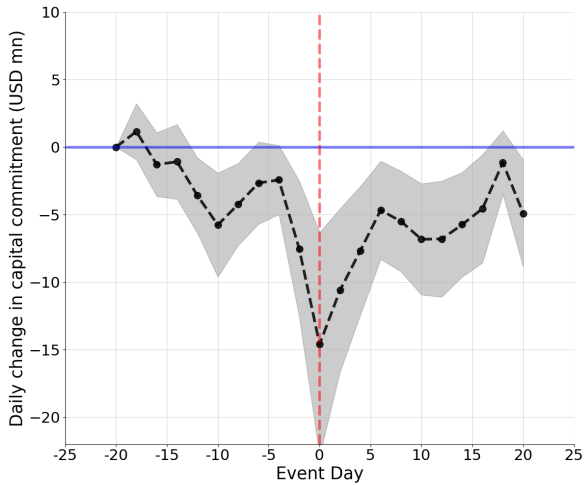
Dependent Variable	Capital Commitment (Std.)			
	Pre-Leverage Ratio		Leverage Ratio	
	Investment-Grade	High-Yield	Investment-Grade	High-Yield
	(1)	(2)	(3)	(4)
$\mathbb{1}[T - 10, T - 6]$	0.021 (0.016)	-0.009 (0.011)	-0.067*** (0.020)	0.002 (0.016)
$\mathbb{1}[T - 5, T]$	-0.043* (0.023)	-0.041** (0.016)	-0.072*** (0.023)	-0.029*** (0.011)
R-Squared	0.02	0.04	0.03	0.08
Observations	167,194	167,194	161,876	161,876
Dealer \times Year-Quarter FE	✓	✓	✓	✓
Market Controls	✓	✓	✓	✓

Figure 1
Capital Commitment at Quarter Ends by Dealer Type

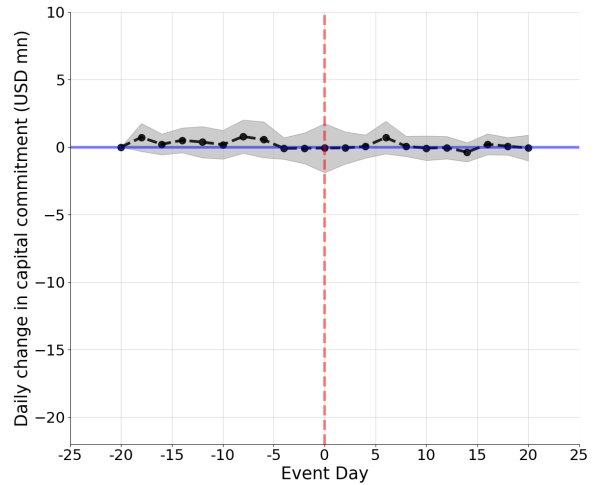
This figure presents coefficients from a nonparametric event-study regression around quarter-ends. The sample is constructed at the dealer-day level, spanning the period from January 2010 through December 2019. We perform the following regression:

$$Capital\ Commitment_{i,t} = \sum_{k=-20}^{k+20} \beta_k D_k + \theta' \mathbf{M}_t + \alpha_{i,q} + \epsilon_{i,t},$$

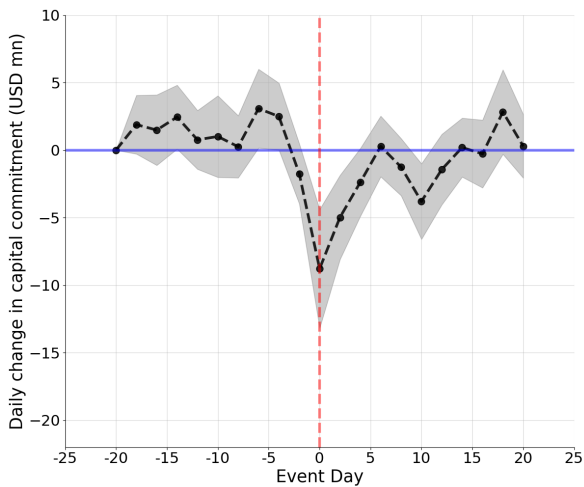
where $Capital\ Commitment_{i,t}$ represents dealer i 's capital commitment (cumulative buys minus sells) at day-end on day t . D_k is an indicator variable equal to one on event day k for $k \in [-20, 20]$. The coefficients are estimated relative to the middle of the quarter, defined as the average of all days outside the event window $[-20, 20]$. This allows the regression coefficients to be interpreted as dealers' average change in net purchases on a given event day compared to a period least affected by regulatory pressure from capital and leverage ratios. \mathbf{M}_t is a vector of daily market controls including changes in the VIX and 3-month LIBOR, the S&P 500 return, the ICE BofA IG corporate bond index spread, the difference between ICE BofA HY and IG corporate bond indexes, and the 10y-2y term spread. $\alpha_{i,q}$ represents dealer-year-quarter fixed effects. Panel (a) displays the event study coefficients for bank dealers, while Panel (b) shows those for nonbank dealers. Panels (c) and (d) display the event study coefficients for bank dealers, separately for the pre-leverage ratio period and the leverage ratio period, respectively. Black dots indicate coefficient estimates, with gray shaded lines showing 95% confidence intervals. The red dashed line indicates the regulatory reporting date. Standard errors are clustered at the dealer level.



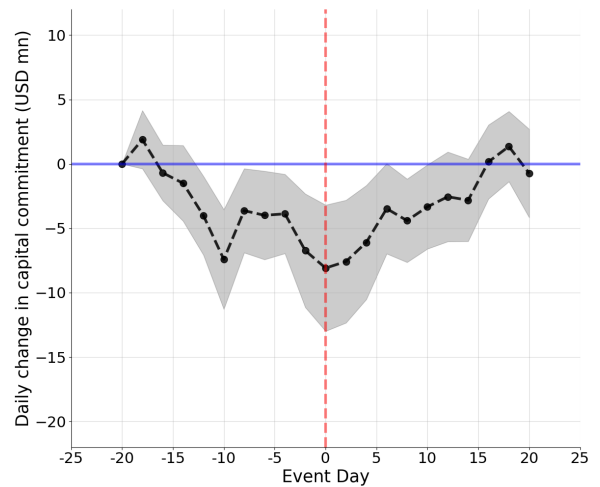
(a) Bank Dealers



(b) Nonbank Dealers



Bank Dealers during
(c) Pre-Leverage Ratio Period



Bank Dealers during
(d) Leverage Ratio Period

Table 3
Bank Dealers' Quarter-End Capital Commitment by Jurisdiction

The sample is constructed at the dealer-day level and restricted to quarters 1 through 3, spanning the period from January 2010 through December 2019. We perform the following regression:

$$\begin{aligned} \text{Capital Commitment}_{i,t} = & \beta_1 \mathbb{1}[\text{Bank} - \text{aff.}] + \beta_2 \mathbb{1}[\text{LR}] + \beta_3 \mathbb{1}[\text{QE}] + \beta_4 \mathbb{1}[\text{Bank} - \text{aff.}] \times \mathbb{1}[\text{QE}] \\ & + \beta_5 \mathbb{1}[\text{Bank} - \text{aff.}] \times \mathbb{1}[\text{LR}] + \beta_6 \mathbb{1}[\text{QE}] \times \mathbb{1}[\text{LR}] \\ & + \beta_7 \mathbb{1}[\text{QE}] \times \mathbb{1}[\text{LR}] \times \mathbb{1}[\text{Bank} - \text{aff.}] + \theta' \mathbf{M}_t + \alpha_{i,q} + \varepsilon_{i,t}. \end{aligned}$$

The dependent variable, $\text{Capital Commitment}_{i,t}$, represents dealer i 's capital commitment (in USD million) on day t . $\mathbb{1}[\text{Bank} - \text{aff.}]$ is an indicator variable that takes the value one if the dealer is bank-affiliated. $\mathbb{1}[\text{QE}]$ is an indicator variable that equals one if the transaction day is among the last ten trading days of the quarter. $\mathbb{1}[\text{LR}]$ is an indicator variable that equals one from January 2015 onwards, coinciding with the implementation of the Basel III leverage ratio and G-SIB surcharges. \mathbf{M}_t is a vector of daily market controls including changes in the VIX and 3-month LIBOR, the S&P 500 return, the ICE BofA IG corporate bond index spread, the difference between ICE BofA HY and IG corporate bond indexes, and the 10y-2y term spread. $\alpha_{i,q}$ represents dealer-year-quarter fixed effects. We split the regressions by regulatory jurisdiction of bank dealers: Columns 1 and 3 include only U.S.-incorporated bank-affiliated dealers, while Columns 2 and 4 focus on non-U.S. bank dealers (that is, European and Japanese). Moreover, Columns 1 and 2 measure the dependent variable in USD, while Columns 3 and 4 use a standardized measure (mean zero, standard deviation one). Standard errors, clustered at the dealer level, are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent Variable Regulatory Jurisdiction of Bank Dealer	Capital Commitment _{i,t} (USD)		Capital Commitment _{i,t} (Std.)	
	U.S.	Europ. & Jpn.	U.S.	Europ. & Jpn.
	(1)	(2)	(3)	(4)
$\mathbb{1}[\text{QE}]$	0.145 (0.138)	0.155 (0.137)	0.005 (0.004)	0.005 (0.004)
$\mathbb{1}[\text{Bank} - \text{aff.}] \times \mathbb{1}[\text{QE}]$	-0.394 (0.553)	0.231 (0.627)	-0.012 (0.017)	0.007 (0.020)
$\mathbb{1}[\text{QE}] \times \mathbb{1}[\text{LR}]$	0.389 (0.690)	0.444 (0.697)	0.012 (0.022)	0.014 (0.022)
$\mathbb{1}[\text{Bank} - \text{aff.}] \times \mathbb{1}[\text{QE}] \times \mathbb{1}[\text{LR}]$	-2.239* (1.134)	-3.078** (1.226)	-0.071* (0.036)	-0.097** (0.039)
R-Squared	0.04	0.06	0.04	0.06
Observations	245,094	193,602	245,094	193,602
Dealer \times Year-Quarter FE	✓	✓	✓	✓
Market Controls	✓	✓	✓	✓

Table 4
Dealer Capital Commitment by Distance to Regulatory Minimum

The sample is restricted to bank dealers affiliated with Global Systemically Important Banks (GSIBs) and constructed at the dealer-day level for quarters 1 through 3, spanning only the leverage ratio period from January 2015 through December 2019. We perform the following regression:

$$\begin{aligned} \text{Capital Commitment}_{i,t} (\text{Std.}) = & \beta_1 \mathbb{1}[QE] + \beta_2 \Delta LR Distance \\ & + \beta_3 \mathbb{1}[QE] \times \Delta LR Distance + \theta' \mathbf{M}_t + \alpha_{i,q} + \varepsilon_{i,t}. \end{aligned}$$

The dependent variable, *Capital Commitment*_{*i,t*} (Std.), represents dealer *i*'s standardized capital commitment (mean zero, standard deviation one) on day *t*. $\mathbb{1}[QE]$ is an indicator variable that equals one if the transaction day is among the last ten trading days of the quarter. $\Delta LR Distance$ represents each dealer's proximity to their regulatory leverage ratio minimum. We compute this measure by first calculating each dealer's distance to their applicable leverage ratio minimum. These distances are then rescaled across dealers using min-max normalization, and the resulting values are subtracted from 1. This transformation yields a proximity measure ranging from 0 to 1, where higher values indicate closer proximity to the regulatory minimum. \mathbf{M}_t is a vector of daily market controls including changes in the VIX and 3-month LIBOR, the S&P 500 return, the ICE BofA IG corporate bond index spread, the difference between ICE BofA HY and IG corporate bond indexes, and the 10y-2y term spread. $\alpha_{i,q}$ represents dealer-year-quarter fixed effects. Columns 1 and 2 present the analysis for investment-grade bonds, while Columns 3 and 4 focus on high-yield bonds. Standard errors, clustered at the dealer level, are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent Variable	Capital Commitment _{<i>i,t</i>} (Std.)			
	Investment-Grade		High-Yield	
Bond Rating	(1)	(2)	(3)	(4)
$\mathbb{1}[QE]$	-0.178*** (0.049)	0.105 (0.097)	-0.068** (0.026)	0.022 (0.081)
$\mathbb{1}[QE] \times \Delta LR Distance$		-0.441** (0.169)		-0.141 (0.137)
R-Squared	0.02	0.02	0.07	0.07
Observations	29,906	29,906	29,906	29,906
Dealer x Year-Quarter FE	✓	✓	✓	✓
Market Controls	✓	✓	✓	✓

Table 5
U.S. Bank-Aff. Dealers' Trading with Counterparties

The sample is constructed at the dealer-day level and restricted to quarters 1 through 3, spanning the period from January 2010 through December 2019. We perform variations of the following regression:

$$Net\ Sales_{i,m,t} = \beta_1 \mathbb{1}[QE] + \beta_2 \mathbb{1}[LR] + \beta_3 \mathbb{1}[QE] \times \mathbb{1}[LR] + \theta' \mathbf{M}_t + \alpha_i + \alpha_q + \varepsilon_{i,m,t}.$$

The dependent variable, $Net\ Sales_{i,m,t}$, represents dealer i 's daily net sales (cumulative sells minus buys) to counterparty type m at day-end on date t . $\mathbb{1}[QE]$ is an indicator variable that equals one if the transaction day is among the last ten trading days of the quarter. $\mathbb{1}[LR]$ is an indicator variable that equals one from January 2015 onwards, coinciding with the implementation of the Basel III leverage ratio and G-SIB surcharges. \mathbf{M}_t is a vector of daily market controls including changes in the VIX and 3-month LIBOR, the S&P 500 return, the ICE BofA IG corporate bond index spread, the difference between ICE BofA HY and IG corporate bond indexes, and the 10y-2y term spread. α_i represent dealer fixed effects, and α_q refer to year-quarter fixed effects. The sample is restricted to U.S. bank-affiliated dealers as the reporting entities. Panel A focuses on customers as counterparties. Panel B examines nonbank dealers as counterparties. Panel C considers foreign bank-affiliated dealers (those not incorporated in the United States) as counterparties. In each panel, we disaggregate net sales into buys and sells, and separately report results for investment-grade and high-yield bonds. Standard errors, clustered at the dealer level, are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

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Table 5 — continued

Panel A: Net Sales to Customers

Regulatory Period	Leverage Ratio				All	
	Net Sales		Sells	Buys	Net Sales	
Bond Rating	IG	HY	IG		IG	HY
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{1}[QE]$	4.246*** (1.535)	-1.065* (0.590)	8.934** (3.410)	4.639** (2.147)	0.944 (0.674)	-0.887** (0.387)
$\mathbb{1}[QE] \times \mathbb{1}[LR]$					3.290** (1.349)	-0.107 (0.598)
R-Squared	0.08	0.04	0.86	0.85	0.05	0.03
Observations	22,599	20,757	22,222	21,343	46,398	41,986

Panel B: Net Sales to Nonbank Dealers

Regulatory Period	Leverage Ratio				All	
	Net Sales		Sells	Buys	Net Sales	
Bond Rating	IG	HY	HY		IG	HY
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{1}[QE]$	-0.303 (0.458)	1.557*** (0.562)	1.309*** (0.466)	-0.460* (0.245)	0.753* (0.387)	0.073 (0.297)
$\mathbb{1}[QE] \times \mathbb{1}[LR]$					-1.101* (0.604)	1.420** (0.560)
R-Squared	0.12	0.03	0.75	0.72	0.08	0.02
Observations	26,416	23,338	21,313	21,591	55,648	47,054

Panel C: Net Sales to Foreign Bank-Affiliated Dealers

Regulatory Period	Leverage Ratio				All	
	Net Sales		Sells	Buys	Net Sales	
Bond Rating	IG	HY	IG		IG	HY
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{1}[QE]$	0.403** (0.180)	0.264* (0.148)	0.116 (0.200)	-0.303 (0.227)	0.101 (0.146)	0.162 (0.126)
$\mathbb{1}[QE] \times \mathbb{1}[LR]$					0.296 (0.220)	0.103 (0.217)
R-Squared	0.08	0.01	0.68	0.66	0.04	0.01
Observations	23,572	18,226	20,006	21,543	47,132	34,655

Dealer FE	✓	✓	✓	✓	✓	✓
Year-Quarter FE	✓	✓	✓	✓	✓	✓
Market Controls	✓	✓	✓	✓	✓	✓

Table 6
Europ. and Jpn. Bank-Aff. Dealers' Trading with Counterparties

The sample is constructed at the dealer-day level and restricted to quarters 1 through 3, spanning the period from January 2010 through December 2019. We perform variations of the following regression:

$$Net\ Sales_{i,m,t} = \beta_1 \mathbb{1}[QE] + \beta_2 \mathbb{1}[LR] + \beta_3 \mathbb{1}[QE] \times \mathbb{1}[LR] + \theta' \mathbf{M}_t + \alpha_i + \alpha_q + \varepsilon_{i,m,t}.$$

The dependent variable, $Net\ Sales_{i,m,t}$, represents dealer i 's daily net sales (cumulative sells minus buys) to counterparty type m at day-end on date t . $\mathbb{1}[QE]$ is an indicator variable that equals one if the transaction day is among the last ten trading days of the quarter. $\mathbb{1}[LR]$ is an indicator variable that equals one from January 2015 onwards, coinciding with the implementation of the Basel III leverage ratio and G-SIB surcharges. \mathbf{M}_t is a vector of daily market controls including changes in the VIX and 3-month LIBOR, the S&P 500 return, the ICE BofA IG corporate bond index spread, the difference between ICE BofA HY and IG corporate bond indexes, and the 10y-2y term spread. α_i represent dealer fixed effects, and α_q refer to year-quarter fixed effects. The sample is restricted to European and Japanese bank-affiliated dealers as the reporting entities. Panel A focuses on customers as counterparties. Panel B examines nonbank dealers as counterparties. Panel C considers foreign bank-affiliated dealers (those not incorporated in Europe or Japan) as counterparties. In each panel, we disaggregate net sales into buys and sells, and separately report results for investment-grade and high-yield bonds. Standard errors, clustered at the dealer level, are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

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Table 6 — continued

Panel A: Net Sales to Customers

Regulatory Period	Leverage Ratio				All	
	Net Sales		Sells	Buys	Net Sales	
Bond Rating	IG	HY	IG		IG	HY
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{1}[QE]$	3.900*** (1.200)	-0.598 (0.757)	4.563** (2.110)	0.460 (1.450)	0.686 (1.086)	-0.666 (0.418)
$\mathbb{1}[QE] \times \mathbb{1}[LR]$					3.290** (1.349)	-0.107 (0.598)
R-Squared	0.07	0.03	0.65	0.61	0.05	0.02
Observations	16,605	14,245	15,732	15,577	29,459	24,986

Panel B: Net Sales to Nonbank Dealers

Regulatory Period	Leverage Ratio				All	
	Net Sales		Sells	Buys	Net Sales	
Bond Rating	IG	HY	HY		IG	HY
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{1}[QE]$	-0.551 (0.332)	1.191* (0.626)	1.217** (0.499)	-0.0456 (0.469)	-0.841 (0.720)	-0.227 (0.238)
$\mathbb{1}[QE] \times \mathbb{1}[LR]$					0.302 (0.733)	1.371* (0.697)
R-Squared	0.12	0.03	0.78	0.78	0.08	0.02
Observations	26,416	23,338	23,787	25,244	55,648	47,054

Panel C: Net Sales to Foreign Bank-Affiliated Dealers

Regulatory Period	Leverage Ratio				All	
	Net Sales		Sells	Buys	Net Sales	
Bond Rating	IG	HY	IG		IG	HY
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{1}[QE]$	-0.249 (0.189)	0.015 (0.125)	-0.046 (0.224)	0.201 (0.275)	-0.143 (0.371)	0.002 (0.212)
$\mathbb{1}[QE] \times \mathbb{1}[LR]$					-0.085 (0.443)	0.003 (0.210)
R-Squared	0.08	0.01	0.68	0.66	0.04	0.01
Observations	23,572	18,226	20,006	21,543	47,132	34,655

Dealer FE	✓	✓	✓	✓	✓	✓
Year-Quarter FE	✓	✓	✓	✓	✓	✓
Market Controls	✓	✓	✓	✓	✓	✓

Table 7
Quarter-End Price Concessions for Dealer-to-Customer Sells

The sample is constructed at the transaction level and restricted to quarters 1 through 3, spanning only the leverage ratio period from January 2015 through December 2019. We further restrict the sample to transactions in which a dealer sells to a customer. We perform the following regression:

$$Cost_{k,j,i,t} = \beta_1 \mathbb{1}[QE] + \theta'_1 \mathbf{M}_t + \theta'_2 \mathbf{M}_{j,t} + \alpha_j + \alpha_r + \alpha_{i,q} + \varepsilon_{k,j,i,t}.$$

The dependent variable, $Cost_{k,j,i,t}$, represents the transaction cost (in basis points) for transaction k by dealer i in bond j on day t , as described in Section 3. $\mathbb{1}[QE]$ is an indicator variable that equals one if the transaction day is among the last ten trading days of the quarter. \mathbf{M}_t is a vector of daily market controls including changes in the VIX and 3-month LIBOR, the S&P 500 return, the ICE BofA IG corporate bond index spread, the difference between ICE BofA HY and IG corporate bond indexes, and the 10y-2y term spread. $\mathbf{M}_{j,t}$ is a vector of bond-level controls, including bond age (logarithm of years since issuance), time-to-maturity (logarithm of years to maturity), and amount outstanding (logarithm of bond's total par amount outstanding). α_j represents bond fixed effects, α_r refers to rating-bucket fixed effects, and $\alpha_{i,q}$ refers to dealer-year-quarter fixed effects. Panel A presents results for U.S. bank-affiliated dealers, while Panel B shows European and Japanese bank-affiliated dealers. Each panel separates transactions by bond rating (investment-grade vs. high-yield) and trade size (less than USD 1 million vs. USD 1 million and above). Standard errors, double-clustered at the dealer and bond-year-quarter levels, are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Panel A: U.S. Bank-affiliated Dealers

Dependent Variable	Cost (bps)			
	Bond Rating		Trade Size (USD mn)	
	HY	IG	≤ 1	> 1
	(1)	(2)	(3)	(4)
$\mathbb{1}[QE]$	-0.168 (1.273)	-1.179* (0.672)	-1.357* (0.660)	-0.638 (0.503)
R-Squared	0.35	0.38	0.40	0.08
Observations	774,493	2,204,837	2,581,289	521,605

Panel B: European & Japanese Bank-affiliated Dealers

Dependent Variable	Cost (bps)			
	Bond Rating		Trade Size (USD mn)	
	HY	IG	≤ 1	> 1
	(1)	(2)	(3)	(4)
$\mathbb{1}[QE]$	-1.120 (1.515)	-2.644*** (0.582)	-3.018*** (0.447)	-0.159 (0.655)
R-Squared	0.23	0.36	0.37	0.09
Observations	246,751	660,242	597,128	196,773
Dealer x Year-Quarter FE	✓	✓	✓	✓
Bond FE	✓	✓	✓	✓
Rating Bucket FE	✓	✓	✓	✓
Market Controls	✓	✓	✓	✓

Table 8
Insurance Companies' Quarter-End Liquidity Supply

This sample is constructed at the insurer-day level and restricted to quarters 1 through 3, spanning the period from January 2010 through December 2019. We perform variations of the following regression:

$$Net\ Purchases_{n,t} = \beta_1 \mathbb{1}[QE] + \beta_2 \mathbb{1}[LR] + \beta_3 \mathbb{1}[QE] \times \mathbb{1}[LR] + \theta' \mathbf{M}_{n,y} + \alpha_n + \alpha_q + \varepsilon_{n,t}.$$

The dependent variable, $Net\ Purchases_{n,t}$, represents the logarithm of 1 plus the net bond purchases (cumulative buying minus selling) by insurance company n on trading day t . $\mathbb{1}[QE]$ is an indicator variable that equals one if the transaction day is among the last ten trading days of the quarter. $\mathbb{1}[LR]$ is an indicator variable that equals one from January 2015 onwards, coinciding with the implementation of the Basel III leverage ratio and G-SIB surcharges. $\mathbf{M}_{n,y}$ captures annual insurer controls and includes: $Log(Total\ Assets)$ defined as the logarithm of insurer's total assets. $Asset\ Growth$ is the five-year compound annual growth rate of total assets. $Log(RBC\ Ratio)$ is the logarithm of the ACL risk-based capital ratio. $Leverage$ is one minus the ratio of equity to total assets. $Cash-to-Assets$ is insurer's cash holdings over total assets. α_q represents year-quarter fixed effects, and α_n represents insurer fixed effects. Panel A shows insurers' liquidity supply during the leverage ratio period (January 2015 - December 2019), separating net purchases by bond rating (investment-grade vs. high-yield) and insurer type (life vs. property & casualty). Panel B compares insurers' liquidity supply between the leverage ratio period and the pre-leverage ratio period (January 2010 - December 2014), separating net purchases by insurer type (life vs. property & casualty). Standard errors, double-clustered at the insurer and year-quarter levels, are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Panel A: Insurers' Quarter-End Liquidity Supply in the LR Period

Specifications	Bond Rating		Insurer Type			
	IG	HY	Life	Property & Casualty		
Dependent Variable	Net Purchases			Buying	Selling	
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{1}[QE]$	0.024** (0.012)	0.016 (0.010)	-0.014 (0.024)	0.058*** (0.015)	0.045*** (0.014)	-0.007 (0.011)
R-Squared	0.03	0.02	0.04	0.03	0.17	0.24
Observations	1,592,659	1,592,659	393,469	1,199,190	1,199,190	1,199,190
Year-quarter FE	✓	✓	✓	✓	✓	✓
Insurer controls	✓	✓	✓	✓	✓	✓

Panel B: Insurers' Quarter-End Liquidity Supply by Regulatory Period

Insurer Type	All	Life	Property & Casualty		
	Net Purchases		Buying	Selling	
Dependent Variable	(1)	(2)	(3)	(4)	(5)
$\mathbb{1}[QE]$	-0.005 (0.012)	0.019 (0.030)	-0.012 (0.009)	0.007 (0.009)	0.017** (0.007)
$\mathbb{1}[QE] \times \mathbb{1}[LR]$	0.035* (0.020)	-0.034* (0.045)	0.070*** (0.018)	0.037** (0.016)	-0.024* (0.013)
R-Squared	0.03	0.03	0.02	0.13	0.17
Observations	3,598,232	909,072	2,709,783	2,709,783	2,709,783
Year-Quarter FE	✓	✓	✓	✓	✓
Insurer Controls	✓	✓	✓	✓	✓

Table 9
Quarter-End Transaction Volumes of Principal and Agency Trades

The sample is constructed at the transaction level for quarters 1 through 3, spanning only the leverage ratio period from January 2015 through December 2019. We perform the following regression:

$$Volume_{k,j,i,t} = \beta_1 \mathbb{1}[QE] + \theta'_1 \mathbf{M}_t + \theta'_2 \mathbf{M}_{j,t} + \alpha_j + \alpha_r + \alpha_{i,q} + \varepsilon_{k,j,i,t}.$$

The dependent variable, $Volume_{k,j,i,t}$, represents the transaction volume (in USD millions) of transaction k by dealer i in bond j on day t . $\mathbb{1}[QE]$ is an indicator variable that equals one if the transaction day is among the last ten trading days of the quarter. \mathbf{M}_t is a vector of daily market controls including changes in the VIX and 3-month LIBOR, the S&P 500 return, the ICE BofA IG corporate bond index spread, the difference between ICE BofA HY and IG corporate bond indexes, and the 10y-2y term spread. $\mathbf{M}_{j,t}$ is a vector of bond-level controls, including bond age (logarithm of years since issuance), time-to-maturity (logarithm of years to maturity), and amount outstanding (logarithm of bond's total par amount outstanding). α_j represents bond fixed effects, α_r refers to rating-bucket fixed effects, and $\alpha_{i,q}$ refers to dealer-year-quarter fixed effects. Panel A presents results for transactions in which a dealer buys a bond from a customer, while Panel B shows results for transactions in which a dealer sells a bond to a customer. Each panel separates transactions by dealer jurisdiction and type (U.S. bank dealers vs. European & Japanese bank dealers vs. nonbank dealers) as well as trade capacity (principal vs. agency). Standard errors, double-clustered at the dealer and bond-year-quarter levels, are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Panel A: Dealer Buys

Dependent Variable	Trade Volume					
	U.S. Bank		Europ. & Jpn. Bank		Nonbank	
	Principal	Agency	Principal	Agency	Principal	Agency
Dealer Type						
Trade Type	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{1}[QE]$	-0.063*** (0.014)	-0.010 (0.008)	-0.107*** (0.017)	-0.056** (0.024)	-0.029 (0.018)	0.002 (0.005)
R-Squared	0.13	0.30	0.14	0.28	0.25	0.32
Observations	3,736,706	2,186,447	981,857	751,559	737,759	1,438,574

Panel B: Dealer Sells

Dependent Variable	Trade Volume					
	U.S. Bank		Europ. & Jpn. Bank		Nonbank	
	Principal	Agency	Principal	Agency	Principal	Agency
Dealer Type						
Trade Type	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{1}[QE]$	0.023* (0.011)	0.005 (0.004)	0.014 (0.009)	0.025 (0.016)	-0.029 (0.018)	0.002 (0.005)
R-Squared	0.14	0.29	0.15	0.31	0.25	0.32
Observations	3,964,276	3,872,493	1,149,876	1,336,074	737,759	1,438,574
Dealer x Year-Quarter FE	✓	✓	✓	✓	✓	✓
Bond FE	✓	✓	✓	✓	✓	✓
Rating Bucket FE	✓	✓	✓	✓	✓	✓
Market & Bond Controls	✓	✓	✓	✓	✓	✓

Table 10
Customers' Transaction Costs at Quarter End

The sample is restricted to transactions in which a dealer buys a bond from a customer and constructed at the transaction level for quarters 1 through 3, spanning only the leverage ratio period from January 2015 through December 2019. We perform variations of the following regression:

$$Cost_{k,j,i,t} = \beta_0 + \beta_1 \mathbb{1}[QE] + \beta_2 \mathbb{1}[LR] + \beta_3 \mathbb{1}[QE] \times \mathbb{1}[LR] + \theta'_1 \mathbf{M}_t + \theta'_2 \mathbf{M}_{j,t} + \alpha_{i,q} + \alpha_j + \alpha_r + \varepsilon_{k,j,i,t}.$$

The dependent variable, $Cost_{k,j,i,t}$, represents the transaction cost (in basis points) for transaction k by dealer i in bond j on day t , as described in Section 3. $\mathbb{1}[QE]$ is an indicator variable that equals one if the transaction day is among the last ten trading days of the quarter. $\mathbb{1}[LR]$ is an indicator variable that equals one from January 2015 onwards, coinciding with the implementation of the Basel III leverage ratio and G-SIB surcharges. $\mathbb{1}[Trade\ Size \geq 50\%]$ is an indicator variable that equals one for trade sizes above the sample median. \mathbf{M}_t is a vector of daily market controls including changes in the VIX and 3-month LIBOR, the S&P 500 return, the ICE BofA IG corporate bond index spread, the difference between ICE BofA HY and IG corporate bond indexes, and the 10y-2y term spread. $\mathbf{M}_{j,t}$ is a vector of bond-level controls, including bond age (logarithm of years since issuance), time-to-maturity (logarithm of years to maturity), and amount outstanding (logarithm of bond's total par amount outstanding). α_j represents bond fixed effects, α_r refers to rating-bucket fixed effects, and $\alpha_{i,q}$ refers to dealer-year-quarter fixed effects. Panel A separates transactions by dealer jurisdiction and type (U.S. bank dealers vs. European & Japanese bank dealers vs. nonbank dealers) as well as trade capacity (principal vs. agency). Panel B focuses on costs of principal trades and presents results across trade size (up to USD 0.5 million vs. USD 0.5 to 1 million vs. USD 1 to 3 million vs. above USD 3 million) and bond rating (investment-grade vs. high-yield). Standard errors, double-clustered at the dealer and bond-year-quarter levels, are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Cont'd next page

Table 10 - continued

Panel A: Transaction Costs by Trade Type

Dependent Variable	Cost (bps)							
	U.S. Bank			Europ. & Jpn. Bank			Nonbank	
Dealer Type	Leverage Ratio		All	Leverage Ratio		All	Leverage Ratio	
Regulatory Period	Agency		Principal	Agency		Principal	Agency	
Transaction Type	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\mathbb{1}[QE]$	0.254 (1.091)	1.322*** (0.402)	-0.930 (0.455)	0.233 (0.804)	1.582* (0.787)	-1.493 (0.763)	-0.852** (0.402)	0.623 (0.622)
$\mathbb{1}[QE] \times \mathbb{1}[LR]$			3.042*** (1.077)			2.252*** (0.623)		
R-Squared	0.22	0.12	0.13	0.14	0.10	0.11	0.17	0.20
Observations	165,220	612,384	1,075,122	107,591	199,915	390,326	212,294	138,550
Dealer x Year-Quarter FE	✓	✓	✓	✓	✓	✓	✓	✓
Bond FE	✓	✓	✓	✓	✓	✓	✓	✓
Rating Bucket FE	✓	✓	✓	✓	✓	✓	✓	✓
Market & Bond Controls	✓	✓	✓	✓	✓	✓	✓	✓

Panel B: Transaction Costs of Principal Trades by Trade Size and Bond Rating

Dependent Variable	Costs (bps) of Principal Trades						
	All				IG	HY	
Bond Rating	≤0.50		(0.50, 1]	(1, 3]	>3	All	
Trade Size (USD mn)	(1)	(2)	(3)	(4)	(5)	(6)	
$\mathbb{1}[QE]$	0.970* (0.570)	0.984* (0.548)	1.387*** (0.468)	1.814** (0.819)	0.377 (0.432)	2.039** (0.857)	
$\mathbb{1}[Trade Size \geq 50\%]$					-2.093 (1.317)	-8.960*** (2.702)	
$\mathbb{1}[QE] \times \mathbb{1}[Trade Size \geq 50\%]$					1.066* (0.572)	-0.584 (0.971)	
R-Squared	0.14	0.14	0.09	0.14	0.12	0.11	
Observations	208,670	308,418	374,787	100,505	589,055	410,694	
Dealer x Year-Quarter FE	✓	✓	✓	✓	✓	✓	
Bond FE	✓	✓	✓	✓	✓	✓	
Rating Bucket FE	✓	✓	✓	✓	✓	✓	
Market & Bond Controls	✓	✓	✓	✓	✓	✓	

Managing Regulatory Pressure: Bank Regulation and Corporate Bond Intermediation

Internet Appendix

ANDREAS C. RAPP[‡]

Federal Reserve Board of Governors

MARTIN WAIBEL[†]

Stockholm School of Economics

October, 2025

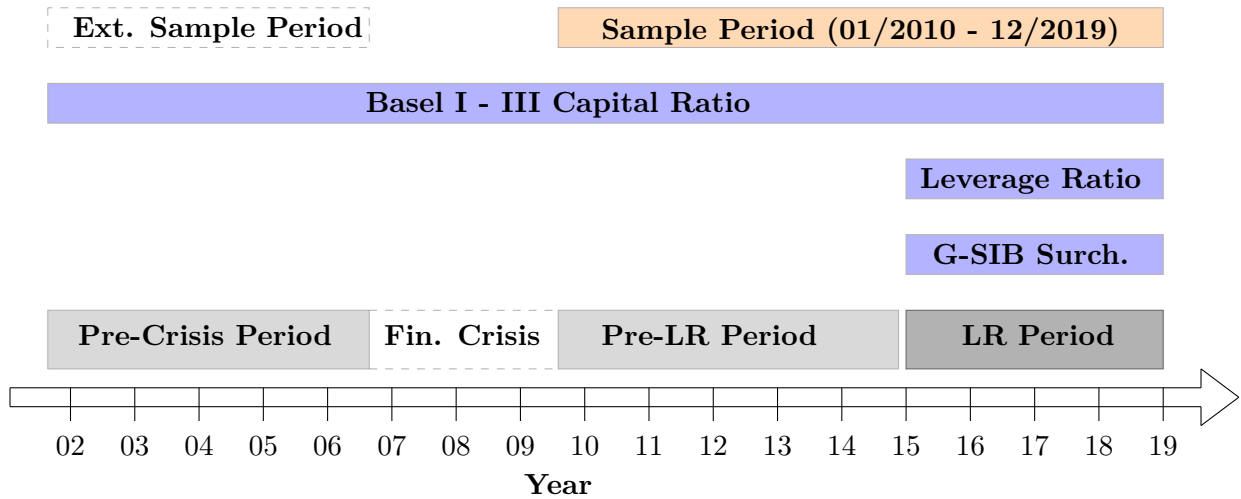
[‡]Federal Reserve Board of Governors, 20th Street and Constitution Ave NW, Washington, DC 20551.
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Figure A1 Overview of Relevant Banking Regulations

This figure illustrates the implementation of relevant banking regulations over our sample period (January 2010 to December 2019). Panel (a) shows the periods during which each regulation is in effect (highlighted in blue) and defines the regulatory periods (pre-leverage ratio and leverage ratio) used in our regression specifications. The period before 2010 (excluding the GFC period), while not part of our sample, serves as an extended baseline for the robustness test in Table A6. Panel (b) sketches the intra-quarter reporting schedule for key regulatory metrics by bank dealers. The left figure depicts the pre-leverage ratio period (July 2010 to December 2014), while the right figure shows the leverage ratio period (January 2015 to December 2019). Green shaded areas indicate quarter-end periods (last 10 trading days of each quarter). Yellow boxes represent risk-based capital ratio (CR) requirements under Basel I-III. Dark and light orange boxes denote non-risk-based leverage ratio (LR) requirements under Basel III, differentiating between reporting based on quarter-end snapshots and quarter averages, respectively. The blue box represents G-SIB surcharges reported at year end.

(a) Banking Regulations over the Sample Period



(b) Regulatory Constraints by Period and Quarter

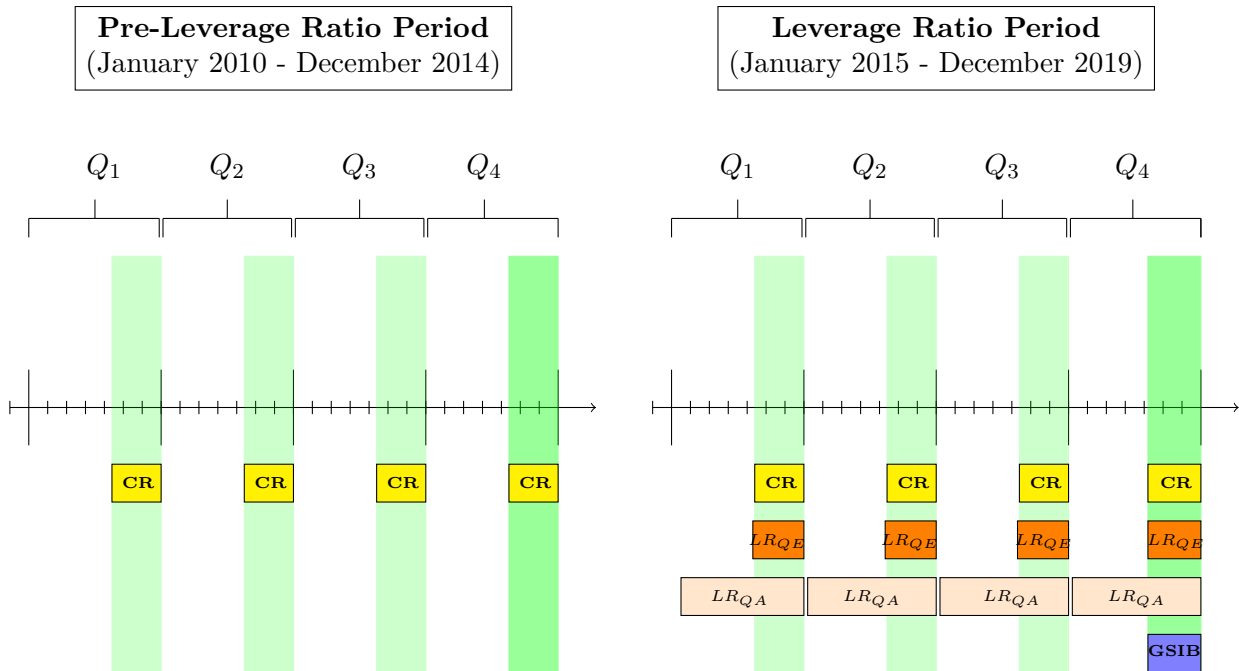


Figure A2
Corporate Bond Intermediation and Regulatory Costs

This figure illustrates, in a stylized manner, how different regulatory constraints impact corporate bond intermediation. Panel (a) displays the impact of corporate bond intermediation on a bank dealer's risk-weighted capital ratio. To isolate the risk-based effect, we assume the dealer purchases corporate bonds using cash positions. The leftmost balance sheet shows the state prior to purchasing a corporate bond. The middle balance sheet depicts the scenario where the dealer absorbs an order of volume 10 in a safe bond (risk weight 20%) using cash. The rightmost balance sheet illustrates the absorption of a risky bond (risk weight 100%) of volume 10 using cash. In these scenarios, the dealer incurs a cost in the form of a decreasing risk-weighted capital ratio. Panel (b) shows the impact of corporate bond intermediation on a bank dealer's non-risk-weighted leverage ratio. We assume the dealer funds the bond position by entering into a repo contract, rolled over until the bond is offloaded from the dealer's balance sheet. Funding the bond with repos deteriorates the leverage ratio through an increase in balance sheet size, irrespective of bond risk. For simplicity, we do not differentiate between Tier 1 and Core Tier 1 equity in this illustration.

(a) Impact on the Risk-Weighted Capital Ratio

Cash (20) (RW = 0%)	Equity (8)
Other Assets (200) (RW = 50%)	Debt (212)

$$\text{CET1} = \frac{8}{100+0} = 8\%$$

Cash (10) (RW = 0%)	Equity (8)
Bond (10) (RW = 20%)	
Other Assets (200) (RW = 50%)	Debt (212)

$$\text{CET1} = \frac{8}{100+2+0} = 7.84\%$$

Cash (10) (RW = 0%)	Equity (8)
Bond (10) (RW = 100%)	
Other Assets (200) (RW = 50%)	Debt (212)

$$\text{CET1} = \frac{8}{100+10+0} = 7.34\%$$

(b) Impact on the Non-Risk-Weighted Leverage Ratio

Cash (20) (RW = 0%)	Equity (8)
Other Assets (200) (RW = 50%)	Debt (212)

$$\text{LR} = \frac{8}{200+20} = 3.6\%$$

Cash (20) (RW = 0%)	Equity (8)
Other Assets (200) (RW = 50%)	Debt (212)
Bond (10) (RW = 20%)	Repo (10)

$$\text{LR} = \frac{8}{200+20+20} = 3.3\%$$

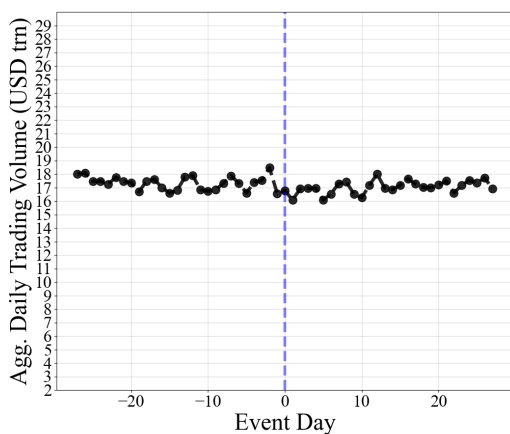
Cash (20) (RW = 0%)	Equity (8)
Other Assets (200) (RW = 50%)	Debt (212)
Bond (10) (RW = 100%)	Repo (10)

$$\text{LR} = \frac{8}{200+20+20} = 3.3\%$$

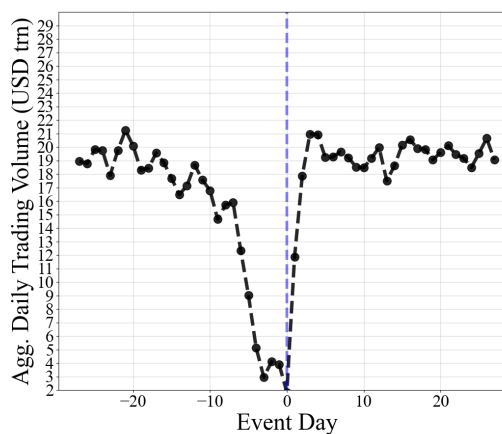
Figure A3
Aggregate Trading Volume Around Quarter- & Year-Ends

This figure displays the aggregate daily U.S. corporate bond market transaction volume in USD trillions, including both customer-dealer and interdealer transactions. Panels (a) and (c) show trading volumes around quarter ends, while panels (b) and (d) focus on year ends. The pre-leverage ratio period is represented in panels (a) and (b), and the leverage ratio period in panels (c) and (d). The blue vertical line in each panel indicates the regulatory reporting date.

Pre-Leverage Ratio Period

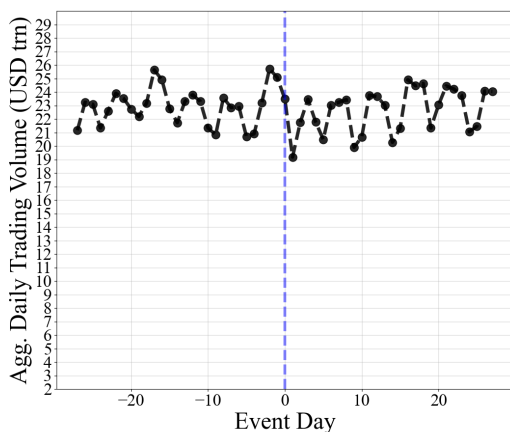


(a) Quarter End

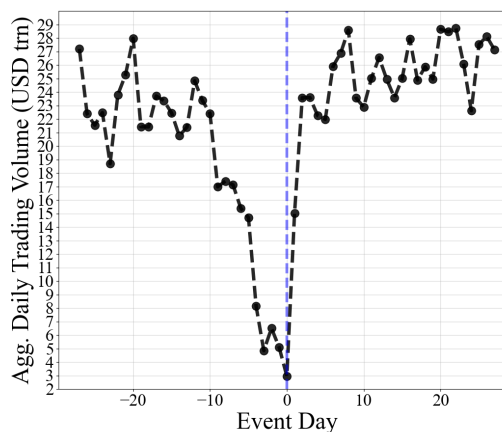


(b) Year End

Leverage Ratio Period



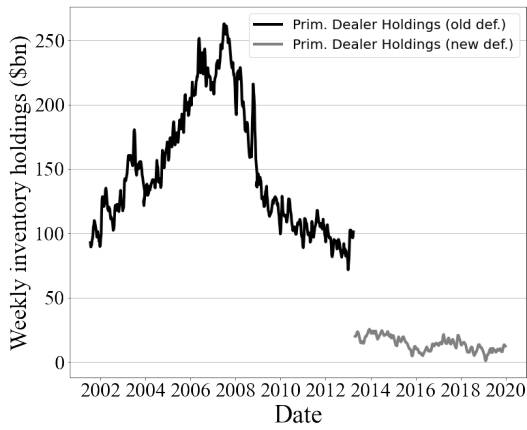
(c) Quarter End



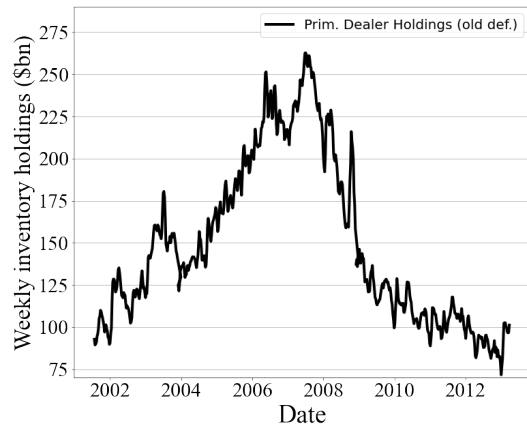
(d) Year End

Figure A4
Aggregate Corporate Bond Inventories of Primary Dealers

This figure presents the publicly available time series of aggregate corporate bond inventories across all primary dealers registered with the Federal Reserve Bank of New York. Panel (a) shows the full sample period, encompassing both definitions of corporate bond holdings. Prior to April 2013, the primary corporate bond positions data included non-agency RMBS and CMBS, resulting in higher aggregate levels. After April 2013, only corporate bond holdings are included. Panel (b) covers the period from 2001 to April 2013, when corporate bond inventories included RMBS and CMBS under the old definition. Panel (c) illustrates the period from May 2013 to December 2019, when corporate bond inventories excluded RMBS and CMBS under the new definition. Panel (d) focuses on the period from May 2013 to December 2019 and additionally separates the evolution of investment-grade (IG) and high-yield (HY) bond inventory positions.



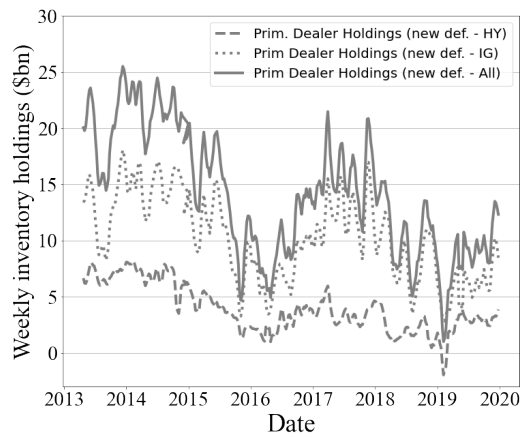
(a) Years 2001 - 2019



(b) Years 2001 - 2013



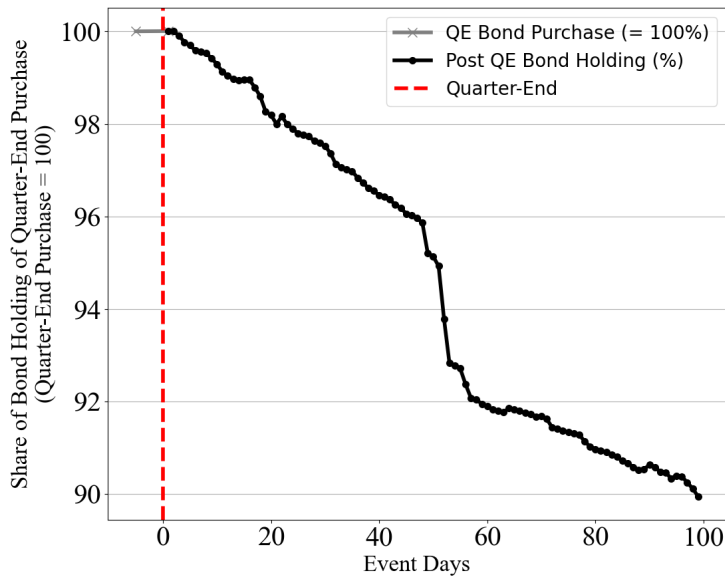
(c) Years 2013 - 2019



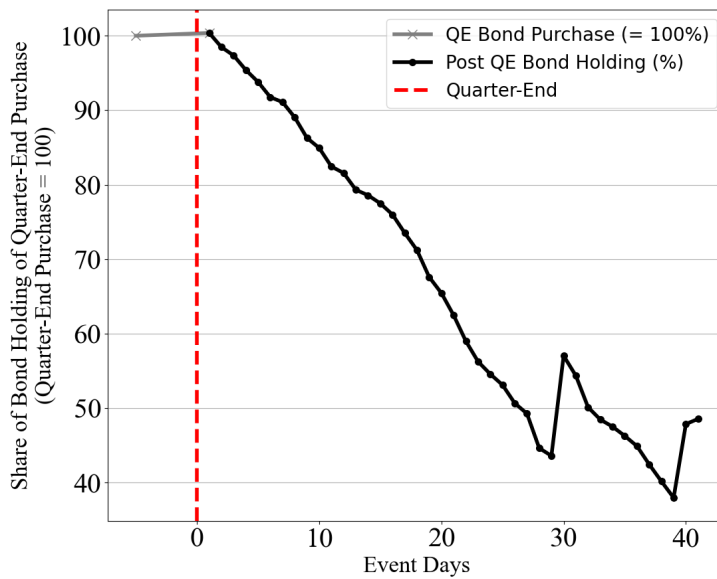
(d) Years 2013 - 2019 (IG vs.HY)

Figure A5 Holding Periods of P&C Insurers' Quarter-End Purchases

This figure illustrates the selling behavior of property and casualty (P&C) insurers for bonds acquired during quarter-end periods (that is, the last ten trading days of a quarter). Panel (a) normalizes a P&C insurer's quarter-end purchase to 100 and traces the bond holdings for the first 100 trading days after acquisition. For each trading day, we compute the percentage of the original acquisition remaining in the insurer's portfolio. Panel (b) focuses on insurers that purchase a bond during quarter ends and sell at least a fraction of it within the first quarter (60 trading days) after the acquisition. As in Panel (a), we normalize quarter-end purchases to 100 and trace the insurer's trading behavior in these bonds over the subsequent 60 trading days.



(a) All P&C Insurers



(b) Selling P&C Insurers (post Quarter End)

Table A1 Variable Definitions and Data Sources

This table defines the variables used in the analyses and lists the data sources of the input data.

Variable	Description
Dealer Classification	
<i>Bank Dealer</i>	A dealer identified (via its disclosed name in the regulatory version of TRACE) as part of a bank holding company. Source: TRACE
<i>Nonbank Dealer</i>	A dealer identified (via its disclosed name in the regulatory version of TRACE) as not being part of a bank holding company. Source: TRACE
<i>Europ. & Jpn. Bank-aff. Dealer</i>	A dealer identified as part of a bank holding company incorporated in a European country or Japan. Source: TRACE
<i>U.S. Bank-aff. Dealer</i>	A dealer identified as part of a bank holding company incorporated in the U.S. Source: TRACE
Aggregate Statistics	
<i>Daily Trading Volume</i>	The daily trading volume is computed as the sum of the \$-value of all transactions on a given event day. To account for the par notation in the TRACE dataset, the daily \$-volume of trade j on event day t is computed as $TradeVolume_{j,t}^{\$} = \frac{ReportedVolume_{j,t}}{ParValue_{j,t}} \times \frac{ReportedPrice_{j,t}}{100} \times ParValue_{j,t}$. $ReportedVolume_{j,t}$ is the reported transaction volume in par value and $ReportedPrice_{j,t}$ is the reported price in % of par. Source: TRACE, Mergent FISD

Variable Definitions and Data Sources [continued]

Variable	Description
Dealer Inventories <i>Capital Commitment (\$ mn)</i>	<p>For each dealer, overnight inventory is constructed as the difference between cumulative buy and sell volumes over the course of the trading day. This reflects the net amount the dealer keeps in inventory overnight, interpreted as the dealer's short-term capital commitment. Source: TRACE</p>
<i>Primary Dealer Holdings (\$ bn)</i>	<p>Corporate bond inventories across all primary dealers listed with the Federal Reserve Bank of New York. Prior to April 2013, primary corporate bond positions data included non-agency RMBS and CMBS, thus exhibiting a higher aggregate level. From May 2013 onwards, only corporate bond holdings are included. Data is available on a weekly basis. Source: Federal Reserve Bank of New York</p>
<i>Net Sales to Counterparty (\$ mn)</i>	<p>Net sales vis-à-vis specific counterparty group is constructed as the difference between buys and sells at the dealer-day level for the following counterparty groups: i) <i>customers</i>, ii) <i>bank dealers from a different jurisdiction than the reporting dealer</i>, iii) <i>nonbank dealers</i>. Source: TRACE</p>

Variable Definitions and Data Sources [continued]

Variable	Description
Transaction Costs/Types	
<i>Cost (bp)</i>	Cost reflects the transaction cost measure, calculated separately for agency and principal transactions (see Subsection 3.3 for the equation). We adapt the transaction classification algorithm by Choi, Huh, and Shin (2024) to distinguish between balance-sheet-intensive (principal) trades from balance-sheet-unintensive (agency) trades. Source: TRACE
<i>Volume (\$ mn)</i>	Based on the transaction classification algorithm in Choi, Huh, and Shin (2024), we define two measures: i) the daily dealer transaction volume intermediated on a principal basis via balance sheet-intensive trades, and ii) the daily dealer transaction volume intermediated on an agency basis via balance sheet-unintensive trades. Source: TRACE

Variable Definitions and Data Sources [continued]

Variable	Description
Bond-Level Controls	
<i>Bond Age (years)</i>	The age of a given bond, calculated as the difference between the trade execution date and the bond's offering date. Source: TRACE, Mergent FISD
<i>Time to Maturity (years)</i>	The time to maturity of a given bond, calculated as the difference between the bond's maturity date and the trade execution date. Source: TRACE, Mergent FISD

Variable Definitions and Data Sources [continued]

Variable	Description
<i>Rating (numeric)</i>	A numeric rating variable constructed based on rating information from Moody's, S&P, and Fitch provided in Mergent FISD. The highest rating is assigned the lowest number (AAA: 1, AA+: 2, ..., D: 24, NR: 25). Source: TRACE, Mergent FISD
<i>Basel Risk Weight</i>	<p>Transactions are assigned to a Basel risk weight category based on the risk weight attached to the respective bond rating category in the applicable Basel legislation (BIS, 2001; BIS, 2006; BIS, 2016).</p> $RW_{j,t} = \begin{cases} 1, & \text{if } Rating_{j,t} \in [AAA, \dots, AA-] \\ 2, & \text{if } Rating_{j,t} \in [A+, \dots, A-] \\ 3, & \text{if } Rating_{j,t} \in [BBB+, \dots, BBB-] \\ 4, & \text{if } Rating_{j,t} \in [BB+, \dots, BB-] \\ 5, & \text{if } Rating_{j,t} \in [\text{Below } BB-] \end{cases}$ <p>Source: TRACE, Mergent FISD</p>

Variable Definitions and Data Sources [continued]

Variable	Description
Market Controls (daily)	
<i>Change in VIX</i>	Daily change in the CBOE stock market volatility index (VIX). Source: CBOE
<i>Stock Market Return</i>	Daily return of the S&P 500 index. Source: FRED
<i>Change in 3-Month Libor</i>	Daily change in three-month LIBOR. Source: FRED
<i>Change in ICE BofA IG corp. bond index</i>	Daily change in the option-adjusted spread of the ICE BofA IG corporate bond index. Source: FRED
<i>Change in the difference between the ICE BofA HY and IG corp. bond indexes</i>	Daily change in the difference between the option-adjusted spread of the ICE BofA HY corporate bond index and the ICE BofA IG corporate bond index. Source: FRED
<i>Change in the 10y-2y Term Spread</i>	Daily change in 10-year to 2-year term spread. Source: FRED

Variable Definitions and Data Sources [continued]

Variable	Description
Insurer Trading	
<i>Purchase/Selling Volume</i>	For each insurer and trading day, the total purchase (sale) volume is defined as the sum of an insurer's buying (selling) volume in par. Source: NAIC
<i>Insurer Net Purchases</i>	For each insurer and trading day, the net purchase volume is given by the difference between an insurer's aggregate buying and selling volume in par. For regression specifications, we further apply a log-modulus transformation. Source: NAIC
<i>Past Trading (Volume)</i>	For each insurer-dealer pair and month, the past trading volume is given by the average absolute monthly trading volume over the preceding 24 months. Source: NAIC
<i>Past Trading (Share)</i>	For each insurer-dealer pair, the share of past trading is given by the average share of an insurance company's total monthly trading volume intermediated by a respective dealer over the preceding 24 months. Source: NAIC
$\mathbb{1}[\textit{Relationship Dealer}]$	For each insurer-dealer pair, a dealer is defined as a relationship dealer if the <i>Past Trading Share</i> is among the top 3 dealers for the respective insurance company in a given month. Source: NAIC

Variable Definitions and Data Sources [continued]

Variable	Description
Insurer Controls	
<i>Total Assets (\$ mn)</i>	Total assets of the insurer. Source: S&P Global Market Intelligence
<i>Cash-to-Assets (%)</i>	Ratio of an insurer's cash holdings to total assets. Source: S&P Global Market Intelligence
<i>Leverage (%)</i>	Defined as one minus the ratio of total equity to total assets, where total equity is the difference between total assets and total liabilities. Source: S&P Global Market Intelligence
<i>Asset Growth (%)</i>	Five-year compound annual growth rate of an insurer's total assets. Source: S&P Global Market Intelligence
<i>Risk-based Capital Ratio (%)</i>	Insurer's ACL risk-based capital ratio. Source: S&P Global Market Intelligence

Table A2
Bond Liquidity in Quarter-End Dealer-to-Customer Sales

The sample is constructed at the dealer-bond-day level and restricted to quarters 1-3, spanning the period from January 2010 through December 2019. We perform variations of the following regression:

$$\begin{aligned} \text{Log}(\text{Selling Volume})_{i,j,t} = & \beta_1 \text{Avg. Illiquidity}_{j,t-1} + \beta_2 \mathbb{1}[QE] + \beta_3 \text{Avg. Illiquidity}_{j,t-1} \times \mathbb{1}[QE] \\ & + \theta'_1 \mathbf{M}_{j,t} + \theta'_2 \mathbf{M}_t + \alpha_r + \alpha_d + \alpha_{i,q} + \varepsilon_{i,j,t}. \end{aligned}$$

The dependent variable, $\text{Log}(\text{Selling Volume})_{i,j,t}$, is the logarithm of bank-affiliated dealer i 's daily selling volume in bond j to customers. $\text{Avg. Illiquidity}_{j,t-1}$ represents bond j 's illiquidity, measured as the average transaction spread over the preceding 90 days. $\mathbb{1}[QE]$ is an indicator variable that equals one if the transaction day is among the last ten trading days of the quarter. \mathbf{M}_t is a vector of daily market controls including changes in the VIX and 3-month LIBOR, the S&P 500 return, the ICE BofA IG corporate bond index spread, the difference between ICE BofA HY and IG corporate bond indexes, and the 10y-2y term spread. $\mathbf{M}_{j,t}$ is a vector of bond-level controls, including bond age (logarithm of years since issuance), time-to-maturity (logarithm of years to maturity), and amount outstanding (logarithm of bond's total par amount outstanding). α_r refer to rating fixed effects, α_d represents industry fixed effects, and $\alpha_{i,q}$ refers to dealer-year-quarter fixed effects. We run regressions by regulatory period: The pre-leverage ratio period spans January 2010 to December 2014, while the leverage ratio period covers January 2015 to December 2019. We further split the regressions by regulatory jurisdiction of bank dealers: Columns 1 and 3 include only U.S.-incorporated bank-affiliated dealers, while Columns 2 and 3 focus on non-U.S. bank dealers (that is, European and Japanese). Standard errors, clustered at the bond and year-quarter levels, are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent Variable	Log(Selling Volume)			
	U.S.		Europ. & Jpn.	
	Pre-LR	LR	Pre-LR	LR
Regulatory Jurisdiction of Bank Dealer	(1)	(2)	(3)	(4)
<i>Avg. Illiquidity</i> _{$j,t-1$}	-0.274*** (0.022)	-0.343*** (0.033)	-0.325*** (0.018)	-0.424*** (0.036)
$\mathbb{1}[QE]$	0.049* (0.024)	0.029 (0.021)	0.011 (0.034)	0.015 (0.026)
$\mathbb{1}[QE] \times \text{Avg. Illiquidity}_{j,t-1}$	-0.035* (0.018)	-0.046** (0.018)	-0.032 (0.032)	-0.076** (0.035)
R-Squared	0.18	0.18	0.19	0.19
Observations	588,914	942,238	190,094	242,646
Dealer x Year-Quarter FE	✓	✓	✓	✓
Rating FE	✓	✓	✓	✓
Industry FE	✓	✓	✓	✓
Bond Controls	✓	✓	✓	✓
Market Controls	✓	✓	✓	✓

Table A3
Summary Statistics of Insurer Sample

This table presents summary statistics for insurer characteristics (Panel A), and insurer trading variables (Panel B). In Panel A, we obtain annual balance sheet variables from S&P Global Market Intelligence for the period from 2010 to 2019. *All insurer* refers to all insurance companies included in our sample. *Property and Casualty insurer* and *Life insurer* refers to the subset of the respective insurer type. We include the following insurer characteristics: *Total Assets*, *Asset Growth* defined as the five-year compound annual growth rate of total assets, *RBC Ratio* defined as the ACL risk-based capital ratio, *Leverage* defined as one minus the ratio of equity to total assets, and *Cash-to-Assets* defined as an insurer's cash holdings over total assets. All balance sheet variables and financial ratios are winsorized at the 0.5th and 99.5th percentile. We require insurers to have at least \$10 million in net total assets as well as an RBC ratio above 200. In Panel B, we report summary statistics of insurers' trading variables. *Insurer Purchases* are defined as the daily purchase volume across all insurer trades. *Insurer Sales* are defined as the daily selling volume across all insurer sales. *Insurer Net Trading* is defined as the difference between daily insurer purchases and insurer sales. All insurer trading variables are expressed using a log-modulus transformation, that is, $\text{sing}(y) \times \ln(1 + |y|)$ where y reflects the respective insurer's trading variable. *Insurer Trading (% of TA)* is defined as the ratio of the dollar par change relative to an insurer's total assets.

Panel A: Insurer Characteristics

	All Insurer (N = 3026)					Property & Casualty Insurer (N = 2344)					Life Insurer (N = 682)				
	Mean	Std	25%	50%	75%	Mean	Std	25%	50%	75%	Mean	Std	25%	50%	75%
Cash-to-Assets (%)	9.3	12.6	1.8	4.6	11.3	9.8	12.6	2.1	5.1	12.2	7.7	12.3	1.1	2.8	8.1
Leverage (%)	51.8	27.0	33.7	55.8	71.2	46.1	24.1	28.7	52.0	65.3	71.1	27.1	54.0	82.6	92.4
RBC Ratio (%)	6221.6	14,588.3	648.4	1044.0	2697.4	7249.1	15900.8	640.4	1103.8	3596.7	2731.4	7820.8	666.9	921.5	1560.7
Asset Growth (%)	5.5	20.1	-1.0	3.3	8.9	5.5	20.1	-1.0	3.4	9.1	5.6	20.0	-1.1	2.9	8.2
Total Assets (\$ mn)	232.1	923.2	3.0	11.6	54.3	90.1	401.6	2.8	9.5	36.3	714.6	1702.6	5.3	41.6	367.6

Panel B: Insurer Trading

	All Insurer (3,618,855 insurer-day observations)					Property & Casualty Insurer (2,709,783 insurer-day observations)					Life Insurer (909,072 insurer-day observations)				
	Mean	Std	25%	50%	75%	Mean	Std	25%	50%	75%	Mean	Std	25%	50%	75%
Insurer Net Trading	0.08	3.65	0.00	0.00	0.00	0.04	3.10	0.00	0.00	0.00	0.21	4.93	0.00	0.00	0.00
Insurer Net Trading (IG)	0.06	3.18	0.00	0.00	0.00	0.03	2.69	0.00	0.00	0.00	0.15	4.33	0.00	0.00	0.00
Insurer Net Trading (HY)	0.03	2.65	0.00	0.00	0.00	0.01	2.23	0.00	0.00	0.00	0.08	3.65	0.00	0.00	0.00
Insurer Purchases	0.74	2.87	0.00	0.00	0.00	0.54	2.42	0.00	0.00	0.00	1.34	3.86	0.00	0.00	0.00
Insurer Sales	0.66	2.71	0.00	0.00	0.00	0.50	2.33	0.00	0.00	0.00	1.14	3.57	0.00	0.00	0.00
Insurer Trading (% of TA)	0.11	0.48	0.02	0.04	0.09	0.12	0.35	0.02	0.05	0.10	0.10	0.74	0.01	0.02	0.07

Table A4
Bank Dealers' Capital Commitment at Quarter Ends vs. Year Ends

The sample is constructed at the dealer-day level and restricted to quarters 1 through 3, spanning the period from January 2010 through December 2019. We perform the following regression:

$$\begin{aligned} \text{Capital Commitment}_{i,t} (\text{Std.}) = & \beta_1 \mathbb{1}[\text{Bank} - \text{aff.}] + \beta_2 \mathbb{1}[\text{LR}] + \beta_3 \mathbb{1}[\text{QE}] + \beta_4 \mathbb{1}[\text{Bank} - \text{aff.}] \times \mathbb{1}[\text{QE}] \\ & + \beta_5 \mathbb{1}[\text{Bank} - \text{aff.}] \times \mathbb{1}[\text{LR}] + \beta_6 \mathbb{1}[\text{QE}] \times \mathbb{1}[\text{LR}] \\ & + \beta_7 \mathbb{1}[\text{QE}] \times \mathbb{1}[\text{LR}] \times \mathbb{1}[\text{Bank} - \text{aff.}] + \theta' \mathbf{M}_t + \alpha_{i,q} + \varepsilon_{i,t}. \end{aligned}$$

The dependent variable, $\text{Capital Commitment}_{i,t} (\text{Std.})$, represents dealer i 's standardized capital commitment (mean zero, standard deviation one) on day t . $\mathbb{1}[\text{Bank} - \text{aff.}]$ is an indicator variable that takes the value one if the dealer is bank-affiliated. $\mathbb{1}[\text{QE}]$ is an indicator variable that equals one if the transaction day is among the last ten trading days of the quarter. $\mathbb{1}[\text{LR}]$ is an indicator variable that equals one from January 2015 onwards, coinciding with the implementation of the Basel III leverage ratio and G-SIB surcharges. \mathbf{M}_t is a vector of daily market controls including changes in the VIX and 3-month LIBOR, the S&P 500 return, the ICE BofA IG corporate bond index spread, the difference between ICE BofA HY and IG corporate bond indexes, and the 10y-2y term spread. $\alpha_{i,q}$ represents dealer-year-quarter fixed effects. Columns 1 and 4 present aggregate results. The remaining columns split the regressions by regulatory jurisdiction of bank dealers: Columns 2 and 5 include only U.S.-incorporated bank-affiliated dealers, while Columns 3 and 6 focus on non-U.S. bank dealers (that is, European and Japanese). Moreover, Columns 1 through 3 restrict the analysis to quarters 1 through 3, while Columns 4 through 6 focus on quarter 4 (that is, year-ends). Standard errors, clustered at the dealer level, are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent Variable	Capital Commitment (Std.)					
	Quarter End (Q1-3)			Year End (Q4)		
	All	U.S.	Europ. & Jpn.	All	U.S.	Europ. & Jpn.
Regulatory Jurisdiction of Bank Dealer	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{1}[\text{QE}]$	0.005 (0.004)	0.005 (0.004)	0.005 (0.004)	-0.021** (0.010)	-0.020** (0.010)	-0.022** (0.010)
$\mathbb{1}[\text{Bank} - \text{aff.}] \times \mathbb{1}[\text{QE}]$	-0.005 (0.012)	-0.012 (0.017)	0.007 (0.020)	-0.112*** (0.037)	-0.132** (0.058)	-0.123** (0.049)
$\mathbb{1}[\text{QE}] \times \mathbb{1}[\text{LR} - \text{Period}]$	0.012 (0.022)	0.012 (0.022)	0.014 (0.022)	0.015 (0.018)	0.015 (0.018)	0.017 (0.018)
$\mathbb{1}[\text{Bank} - \text{aff.}] \times \mathbb{1}[\text{QE}] \times \mathbb{1}[\text{LR} - \text{Period}]$	-0.064** (0.029)	-0.071* (0.036)	-0.097** (0.039)	-0.070** (0.031)	-0.078* (0.042)	-0.067 (0.046)
R-Squared	0.04	0.04	0.06	0.04	0.04	0.06
Observations	329,045	245,054	193,628	110,086	81,887	64,842
Dealer x Year-Quarter FE	✓	✓	✓	✓	✓	✓
Market Controls	✓	✓	✓	✓	✓	✓

Table A5
Bank Dealers' Capital Commitment at Month Ends and Starts

The sample is constructed at the dealer-day level and restricted to quarters 1 through 3, spanning the period from January 2010 through December 2019. We perform the following regression:

$$\begin{aligned} \text{Capital Commitment}_{i,t} (\text{Std.}) = & \beta_1 \mathbb{1}[\text{Bank} - \text{aff.}] + \beta_2 \mathbb{1}[\text{LR}] + \beta_3 \mathbb{1}[\text{QE}] + \beta_4 \mathbb{1}[\text{Bank} - \text{aff.}] \times \mathbb{1}[\text{QE}] \\ & + \beta_5 \mathbb{1}[\text{Bank} - \text{aff.}] \times \mathbb{1}[\text{LR}] + \beta_6 \mathbb{1}[\text{QE}] \times \mathbb{1}[\text{LR}] \\ & + \beta_7 \mathbb{1}[\text{QE}] \times \mathbb{1}[\text{LR}] \times \mathbb{1}[\text{Bank} - \text{aff.}] + \theta' \mathbf{M}_t + \alpha_{i,q} + \varepsilon_{i,t}. \end{aligned}$$

The dependent variable, *Capital Commitment*_{*i,t*} (*Std.*), represents dealer *i*'s standardized capital commitment (mean zero, standard deviation one) on day *t*. $\mathbb{1}[\text{Bank} - \text{aff.}]$ is an indicator variable that takes the value one if the dealer is bank-affiliated. $\mathbb{1}[\text{ME}]$ is an indicator variable that equals one if the transaction day is among the last ten trading days of a non-quarter-end month (that is, months January, February, April, May, July, August, October, November). $\mathbb{1}[\text{MS}]$ is an indicator variable that equals one if the transaction day is among the first ten trading days of a month. $\mathbb{1}[\text{LR}]$ is an indicator variable that equals one from January 2015 onwards, coinciding with the implementation of the Basel III leverage ratio and G-SIB surcharges. \mathbf{M}_t is a vector of daily market controls including changes in the VIX and 3-month LIBOR, the S&P 500 return, the ICE BofA IG corporate bond index spread, the difference between ICE BofA HY and IG corporate bond indexes, and the 10y-2y term spread. $\alpha_{i,q}$ represents dealer-year-quarter fixed effects. Columns 1 and 4 present aggregate results. The remaining columns split the regressions by regulatory jurisdiction of bank dealers: Columns 2 and 5 include only U.S.-incorporated bank-affiliated dealers, while Columns 3 and 6 focus on non-U.S. bank dealers (that is, European and Japanese). Moreover, Columns 1 through 3 examine non-quarter-end months, while Columns 4 through 6 study month starts. Standard errors, clustered at the dealer level, are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent Variable Regulatory Jurisdiction of Bank Dealer	Capital Commitment (Std.)					
	All			Europ. & Jpn.		
	All	U.S.	Europ. & Jpn.	All	U.S.	Europ. & Jpn.
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{1}[\text{ME}]$	-0.007** (0.003)	-0.008** (0.003)	-0.007** (0.003)			
$\mathbb{1}[\text{Bank} - \text{aff.}] \times \mathbb{1}[\text{ME}]$	-0.032** (0.015)	-0.052** (0.025)	-0.015 (0.019)			
$\mathbb{1}[\text{ME}] \times \mathbb{1}[\text{LR} - \text{Period}]$	0.019 (0.012)	0.019 (0.012)	0.018 (0.012)			
$\mathbb{1}[\text{Bank} - \text{aff.}] \times \mathbb{1}[\text{ME}] \times \mathbb{1}[\text{LR}]$	0.012 (0.019)	0.037 (0.026)	-0.020 (0.017)			
$\mathbb{1}[\text{MS}]$				-0.010 (0.007)	-0.009 (0.007)	-0.009 (0.007)
$\mathbb{1}[\text{Bank} - \text{aff.}] \times \mathbb{1}[\text{MS}]$				-0.068*** (0.021)	-0.071** (0.032)	-0.094*** (0.034)
$\mathbb{1}[\text{MS}] \times \mathbb{1}[\text{LR} - \text{Period}]$				0.030 (0.023)	0.030 (0.023)	0.029 (0.023)
$\mathbb{1}[\text{Bank} - \text{aff.}] \times \mathbb{1}[\text{MS}] \times \mathbb{1}[\text{LR}]$				-0.012 (0.029)	-0.042 (0.036)	0.023 (0.035)
R-Squared	0.06	0.05	0.08	0.04	0.04	0.05
Observations	162,999	123,692	103,274	336,125	250,237	197,841
Dealer x Year-Quarter FE	✓	✓	✓	✓	✓	✓
Market Controls	✓	✓	✓	✓	✓	✓

Table A6
Bank Dealers' Quarter-End Capital Commitment (Extd. Baseline)

The sample is constructed at the dealer-day level and restricted to quarters 1 through 3, spanning an extended sample period from January 2003 through December 2019 (excl. the GFC period from January 2007 through April 2009). We perform the following regression:

$$\begin{aligned} \text{Capital Commitment}_{i,t} (\text{Std.}) = & \beta_1 \mathbb{1}[\text{Bank} - \text{aff.}] + \beta_2 \mathbb{1}[\text{LR}] + \beta_3 \mathbb{1}[\text{QE}] + \beta_4 \mathbb{1}[\text{Bank} - \text{aff.}] \times \mathbb{1}[\text{QE}] \\ & + \beta_5 \mathbb{1}[\text{Bank} - \text{aff.}] \times \mathbb{1}[\text{LR}] + \beta_6 \mathbb{1}[\text{QE}] \times \mathbb{1}[\text{LR}] \\ & + \beta_7 \mathbb{1}[\text{QE}] \times \mathbb{1}[\text{LR}] \times \mathbb{1}[\text{Bank} - \text{aff.}] + \theta' \mathbf{M}_t + \alpha_{i,q} + \varepsilon_{i,t}. \end{aligned}$$

The dependent variable, $\text{Capital Commitment}_{i,t} (\text{Std.})$, represents dealer i 's standardized capital commitment (mean zero, standard deviation one) on day t . $\mathbb{1}[\text{Bank} - \text{aff.}]$ is an indicator variable that takes the value one if the dealer is bank-affiliated. $\mathbb{1}[\text{ME}]$ is an indicator variable that equals one if the transaction day is among the last ten trading days of a non-quarter-end month (that is, months January, February, April, May, July, August, October, November). $\mathbb{1}[\text{MS}]$ is an indicator variable that equals one if the transaction day is among the first ten trading days of a month. $\mathbb{1}[\text{LR}]$ is an indicator variable that equals one from January 2015 onwards, coinciding with the implementation of the Basel III leverage ratio and G-SIB surcharges. \mathbf{M}_t is a vector of daily market controls including changes in the VIX and 3-month LIBOR, the S&P 500 return, the ICE BofA IG corporate bond index spread, the difference between ICE BofA HY and IG corporate bond indexes, and the 10y-2y term spread. $\alpha_{i,q}$ represents dealer-year-quarter fixed effects. Column 1 presents aggregate results. The remaining columns split the regressions by regulatory jurisdiction of bank dealers: Column 2 includes only U.S.-incorporated bank-affiliated dealers, while Column 3 focuses on non-U.S. bank dealers (that is, European and Japanese). Standard errors, clustered at the dealer level, are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent Variable Regulatory Jurisdiction of Bank Dealer	Capital Commitment (Std.)		
	All	U.S.	Europ. & Jpn.
	(1)	(2)	(3)
$\mathbb{1}[\text{QE}]$	0.003 (0.003)	0.003 (0.003)	0.002 (0.003)
$\mathbb{1}[\text{Bank} - \text{aff.}] \times \mathbb{1}[\text{QE}]$	0.006 (0.010)	0.000 (0.015)	0.018 (0.018)
$\mathbb{1}[\text{QE}] \times \mathbb{1}[\text{LR} - \text{Period}]$	0.014 (0.021)	0.014 (0.021)	0.017 (0.022)
$\mathbb{1}[\text{Bank} - \text{aff.}] \times \mathbb{1}[\text{QE}] \times \mathbb{1}[\text{LR} - \text{Period}]$	-0.075** (0.029)	-0.084** (0.038)	-0.108*** (0.035)
R-Squared	0.04	0.04	0.06
Observations	453,089	340,966	265,915
Dealer x Year-Quarter FE	✓	✓	✓
Market Controls	✓	✓	✓

Table A7
Trading Relationships and Insurers' Quarter-End Liquidity Supply

This sample is constructed at the insurer-day level and restricted to quarters 1 through 3, spanning only the leverage ratio period from January 2015 through December 2019. We perform the following regression:

$$\begin{aligned} \text{Net Purchases}_{n,t} = & \beta_1 \mathbb{1}[QE] + \beta_2 \mathbb{1}[\text{Relationship Dealer}_{n,i}] \\ & + \beta_3 \mathbb{1}[QE] \times \mathbb{1}[\text{Relationship Dealer}_{n,i}] + \theta' \mathbf{M}_{n,y} + \alpha_i + \alpha_q + \varepsilon_{n,i,t}. \end{aligned}$$

The dependent variable, $\text{Net Purchases}_{n,t}$, represents the logarithm of 1 plus the net bond purchases (cumulative buying minus selling) by insurance company n on trading day t . $\mathbb{1}[QE]$ is an indicator variable that equals one if the transaction day is among the last ten trading days of the quarter. $\mathbb{1}[\text{Relationship Dealer}_{n,i}]$ is an indicator variable that equals one if dealer i is among the top three dealers by transaction volume with insurance company n over the preceding 24 months. $\mathbf{M}_{n,y}$ captures annual insurer controls and includes: $\text{Log}(\text{Total Assets})$ defined as the logarithm of insurer's total assets. Asset Growth is the five-year compound annual growth rate of total assets. $\text{Log}(\text{RBC Ratio})$ is the logarithm of the ACL risk-based capital ratio. Leverage is one minus the ratio of equity to total assets. Cash-to-Assets is insurer's cash holdings over total assets. α_q represents year-quarter fixed effects, and α_n represents insurer fixed effects. Column 1 presents aggregate results. The remaining columns split the regressions by insurer type (life vs. property & casualty): Column 2 shows life insurers net purchases, while Columns 3 through 5 contain net purchases, buys, and sells for property & casualty insurers. Standard errors, double-clustered at the insurer and year-quarter levels, are in parentheses. *, **, and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Insurer Type	All	Life	Property & Casualty		
Dependent Variable	Net Purchases		Buying	Selling	
	(1)	(2)	(3)	(4)	(5)
$\mathbb{1}[QE]$	0.001 (0.002)	-0.003 (0.003)	0.003* (0.002)	0.004*** (0.001)	0.001 (0.001)
$\mathbb{1}[\text{Relationship Dealer}]$	0.029*** (0.003)	0.049*** (0.006)	0.019*** (0.002)	0.064*** (0.004)	0.046*** (0.004)
$\mathbb{1}[QE] \times \mathbb{1}[\text{Relationship Dealer}]$	0.002 (0.004)	-0.005 (0.008)	0.007** (0.003)	0.007*** (0.003)	-0.001 (0.002)
R-Squared	0.01	0.01	0.01	0.01	0.01
Observations	30,826,137	9,985,830	20,840,307	20,840,307	20,840,307
Dealer FE	✓	✓	✓	✓	✓
Year-Quarter FE	✓	✓	✓	✓	✓
Insurer Controls	✓	✓	✓	✓	✓

Table A8

Bank-Aff. Dealers' Trading with Nonbank Dealers by Network Centrality

The sample is constructed at the dealer-day level and restricted to high-yield bond trading in quarters 1 through 3, spanning only the leverage ratio period from January 2015 through December 2019. We perform the following regression:

$$Net\ Sales_{i,m,t} = \beta_1 \mathbb{1}[QE] + \theta' \mathbf{M}_t + \alpha_i + \alpha_q + \varepsilon_{i,m,t}.$$

The dependent variable, $Net\ Sales_{i,m,t}$, represents dealer i 's daily net sales (cumulative sells minus buys) to counterparty type m at day-end on date t . $\mathbb{1}[QE]$ is an indicator variable that equals one if the transaction day is among the last ten trading days of the quarter. \mathbf{M}_t is a vector of daily market controls including changes in the VIX and 3-month LIBOR, the S&P 500 return, the ICE BofA IG corporate bond index spread, the difference between ICE BofA HY and IG corporate bond indexes, and the 10y-2y term spread. α_i represent dealer fixed effects, and α_q refer to year-quarter fixed effects. We restrict the counterparty type to nonbank dealers, further categorizing them as central or non-central based on the median of their eigenvector centrality score. Panel A presents results for net sales of U.S. bank-affiliated dealers, while Panel B shows results for net sales of European and Japanese bank-affiliated dealers. We restrict the sample to high-yield bonds and disaggregate net sales into buys and sells. Standard errors, clustered at the dealer level, are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: U.S. Bank-affiliated Dealers

Dependent Variable	Net Sales			Sells	Buys
	All	Periphery		Central	
Network Position	(1)	(2)	(3)	(4)	(5)
$\mathbb{1}[QE]$	1.557*** (0.562)	0.734 (0.496)	1.572** (0.587)	1.204** (0.441)	-0.368* (0.194)
R-Squared	0.03	0.02	0.03	0.75	0.72
Observations	23,408	17,712	17,564	26,057	20,092

Panel B: European & Japanese Bank-affiliated Dealers

Dependent Variable	Net Sales			Sells	Buys
	All	Periphery		Central	
Network Position	(1)	(2)	(3)	(4)	(5)
$\mathbb{1}[QE]$	1.191* (1.90)	1.031** (2.33)	1.613** (2.30)	0.895 (1.53)	-0.718** (-2.22)
R-Squared	0.03	0.02	0.03	0.75	0.72
Observations	14,245	2,412	9,453	9,453	9,453

Dealer FE	✓	✓	✓	✓	✓
Year-Quarter FE	✓	✓	✓	✓	✓
Market Controls	✓	✓	✓	✓	✓