Liquidity, Credit Spreads, and Monetary Policy Shocks: Evidence from the U.S. Corporate Bond Market

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Very preliminary draft

Abstract

This paper examines the interplay between corporate bond liquidity, monetary policy, and credit spreads. Using transaction-level data from the Trade Reporting and Compliance Engine (TRACE), I construct comprehensive liquidity measures—including bid-ask spreads and turnover ratios—to assess their contribution to credit spreads. I document that the loading of the liquidity risk factor varies over time and strongly anti-correlates with the slope of the yield curve, suggesting a novel channel monetary policy affects borrowing costs. On the other hand, I find that less liquid corporate bonds experience a larger increase in credit spreads following a monetary policy news shock. My findings contribute to the broader literature on fixed-income markets by shedding light on the transmission mechanisms of monetary policy and the liquidity premium embedded in corporate bond pricing.

1 Introduction

Liquidity in financial markets refers to the ease with which an asset can be traded. In the corporate bond market, liquidity is critical because bonds are often traded over-the-counter (OTC), making liquidity highly variable compared to equity markets. In fact, transactions in the corporate bond market is not as frequent and has to carried out by broker-dealers, that can charge a significant premium on the price. This lower trade frequency, combined with the market power exerted by dealers, contributes to the structural illiquidity of OTC markets. However, the supply of money and money-like assets plays a pivotal role in amplifying or mitigating liquidity constraints, influencing the pricing of bonds and their response to economic shocks. At the same time, liquidity conditions shape how securities traded in OTC markets react to changes in monetary policy. Given these dynamics, understanding the interaction between liquidity and monetary policy is essential for a comprehensive analysis of credit market behavior.

This study explores the extent to which monetary policy and corporate bond liquidity jointly determine borrowing costs. I find that the sensitivity of corporate bond excess returns to liquidity risk—measured through bid-ask spreads and turnover ratios—varies with the level and slope of the yield curve, suggesting that investors incorporate both current and expected monetary policy stances into bond pricing decisions. This relationship is further reinforced by the observation that liquidity influences how corporate bond spreads react to monetary policy shocks, with less liquid bonds exhibiting a stronger response. These findings underscore the importance of liquidity as a transmission channel for monetary policy and highlight its role in shaping credit market outcomes.

Understanding how monetary policy affects corporate borrowing costs is essential for both financial stability and macroeconomic policy formulation. By examining the interaction between liquidity and monetary policy, this study provides new insights into the mechanisms driving credit market dynamics and the pricing of corporate bonds.

1.1 Literature Review

1.1.1 On Liquidity

Empirical research has developed a range of proxies to measure liquidity in financial markets. Beyond traditional measures such as turnover ratios—the ratio of traded volume to outstanding securities—and bid-ask spreads, the literature has introduced more sophisticated metrics. Notable contributions include price impact measures Kyle (1985), the effective bid-ask spread Roll (1984), and the illiquidity measure of Amihud (2002), which captures the price impact of trading volume by computing the daily average return per dollar traded. Edwards et al. (2007) employ bid-ask spreads to assess direct trading costs, while Bao et al. (2011) introduce a market-adjusted liquidity measure, which accounts for transitory price movements to reflect varying trading conditions.

Early studies by Amihud and Mendelson (1986) and Amihud (2002) highlight the relationship between liquidity risk, asset prices, and required returns in equity markets. These empirical findings were later formalized in theoretical models such as those of Acharya and Pedersen (2005). In the context of corporate bonds, Chen et al. (2007) and Bao et al. (2011) confirm that liquidity accounts for a substantial share of the variation in corporate bond spreads. The importance of liquidity becomes even more pronounced during periods of financial distress, as illiquidity exacerbates credit spreads, particularly for bonds with higher default risk Lin et al. (2011). Liquidity shocks can also heighten refinancing risk and default probabilities, emphasizing the need for liquidity provisions during crises to prevent market disruptions He and Xiong (2012).

The liquidity of corporate bonds is shaped by multiple factors, including bond characteristics, market structure, and macroeconomic conditions. Empirical evidence suggests that bonds with lower credit ratings and longer maturities tend to be less liquid Houweling et al. (2005). Additionally, callable and structured bonds exhibit lower liquidity due to their complex valuation Helwege et al. (2014). The over-the-counter (OTC) nature of corporate bond trading also contributes to fragmented liquidity, distinguishing it from centralized equity exchanges Bessembinder et al. (2006). Macroeconomic conditions further influence liquidity, with studies showing that liquidity deteriorates and trading volumes decline during financial crises (see Acharya et al. (2013) and Dick-Nielsen et al. (2012)). These patterns were particularly evident during the Global Financial Crisis, when bond markets experienced a sharp contraction in liquidity.

1.1.2 On Monetary Policy and Asset Prices

Monetary policy shocks play a critical role in shaping asset prices and returns by influencing interest rates, risk premia, and expectations about future economic conditions. Classic asset pricing theories suggest that monetary policy primarily affects risk-free rates, which serve as a discounting mechanism for valuing financial assets. However, empirical research has shown that monetary shocks have broader effects on risk premia and asset valuation, often through unexpected changes in central bank policy decisions. Bernanke and Kuttner (2005) develop an identification strategy to isolate unanticipated monetary policy shocks using expectation revisions, showing that asset prices respond almost immediately to policy changes. Similarly, Gertler and Karadi (2015) provide evidence that contractionary monetary shocks lead to declines in equity prices, driven by increases in the cost of capital and deteriorating expectations about future earnings. Rigobon and Sack (2004) find that monetary policy surprises result in significant declines in stock indices, adopting an identification strategy based on the heteroskedasticity of policy shocks.

Monetary policy also affects bond liquidity. Krishnamurthy and Vissing-Jorgensen (2011) argue that higher interest rates can reduce liquidity by increasing holding costs, while quantitative easing (QE)

programs improve liquidity by reducing spreads and stimulating trading activity. The risk-taking channel of monetary policy further influences market liquidity and risk appetite Borio and Zhu (2012). Monetary tightening leads to wider credit spreads, reflecting higher default risk and liquidity constraints Hanson and Stein (2014).

2 Data

The TRACE database provides detailed trade-level information essential for analyzing corporate bond market dynamics. Each transaction is uniquely identified by its CUSIP code, which links the bond to its issuer and characteristics. The dataset also records the trade date and time in Eastern Standard Time (EST), facilitating an analysis of intraday liquidity fluctuations. In addition to trade timestamps, TRACE specifies the counterparty type, indicating whether the transaction occurred between two dealers or between a dealer and a customer, and the counterparty side, which denotes whether the trade represented a purchase or a sale for the reporting dealer.

The dataset further includes key pricing and volume measures. The trade price represents the transaction price per $100 face value, while the yield-to-maturity (YTM) is computed based on the bond's trade price, coupon payments, and time to maturity. The trade volume captures the total par value exchanged in a given trade, with large transactions subject to dissemination caps to limit market impact.

To enrich the dataset with firm-level characteristics, I merge TRACE with the Mergent-FISD database, which provides bond issuance details, including the credit rating at the time of trade and the total amount of outstanding debt for each issuer. Additionally, I integrate financial statement data from COMPUSTAT, focusing on variables related to profitability, liquidity, and leverage. Specifically, I consider operating margin (before depreciation), return on assets, cash ratio, current ratio, debt-to-capital ratio, and debt-to-EBITDA ratio, ensuring a comprehensive view of firm-specific determinants of bond spreads.

2.1 Liquidity Measures

Liquidity is measured either using turnover or the bid-ask spread. I will perform all the empirical analysis using both these proxies, bearing in mind that higher turnover implies more liquid bonds whereas higher bid-ask spreads imply stronger dependence on dealers and, therefore, more illiquid bonds.

First, I compute the bid price as the average daily sell price from dealer to customer for a specific bond i during day t. In formulas:

$$\text{Bid}_{it} = \frac{1}{N} \sum_{hh \in t} P_{i,hh}(S, D \to C) \tag{1}$$

where $P_{i,hh}$ represents the price for bond i in transaction hh classified as a dealer-to-customer sale $(S, D \to C)$. The ask price, on the other hand, corresponds to the average daily transaction price for customer-to-dealer purchases, given by:

$$\text{Ask}_{it} = \frac{1}{N} \sum_{hh \in t} P_{i,hh}(B, C \to D) \tag{2}$$

The bid-ask spread is then computed as the normalized difference between bid and ask prices:

$$\text{Bid-Ask Spread}_{it} = 2 \times \frac{\text{Bid}_{it} - \text{Ask}_{it}}{\text{Bid}_{it} + \text{Ask}_{it}} \tag{3}$$

In addition to bid-ask spreads, turnover is employed as an alternative liquidity measure, capturing the frequency of trading activity relative to outstanding bond issuance. Turnover is defined as:

$$\text{Turnover}_{it} = \frac{1}{N} \sum_{hh \in t} \frac{\text{volume}_{i,hh}}{\text{outstanding}_{it}} \tag{4}$$

where $\text{volume}_{i,hh}$ represents the traded volume of bond i in transaction hh, and outstanding_{it} denotes the total outstanding amount of the bond.

Clearly, higher daily turnover implies a much more liquid bond, since it is easier for market participants to transact large volumes. On the other hand, Bid-Ask spreads proxy the *illiquidity* of the bond, as higher spreads imply increased dealers' market power. Hence, I homogenize my analysis by considering the following liquidity risk factors:

$$(\log \text{Bid-Ask}, -\log \text{Turnover})$$

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2.2 Credit Spreads

To compute credit spreads, I estimate the risk-free yield curve using the model in Nelson and Siegel (1987). For each day t, the risk-free yield at maturity τ is given by:

$$y_t^{rf}(\tau) = \theta_{1,t} + \theta_{2,t} \left(\frac{1 - \exp(-\lambda_t \tau)}{\lambda_t \tau} \right) + \theta_{3,t} \left(\frac{1 - \exp(-\lambda_t \tau)}{\lambda_t \tau} - \exp(-\lambda_t \tau) \right) \tag{5}$$

where the parameters $(\lambda_t, \theta_{1,t}, \theta_{2,t}, \theta_{3,t})$ are estimated using daily yield curve data. The daily credit spread for bond i is then calculated as the difference between the bond's yield and the estimated risk-free yield at the same maturity:

$$\text{cs}_{it} = \text{YTM}_{it} - y_t^{rf}(\text{TTM}_{it}) \tag{6}$$

where YTM_{it} and TTM_{it} denote the bond's yield to maturity and time to maturity, respectively.

2.3 Summary Statistics

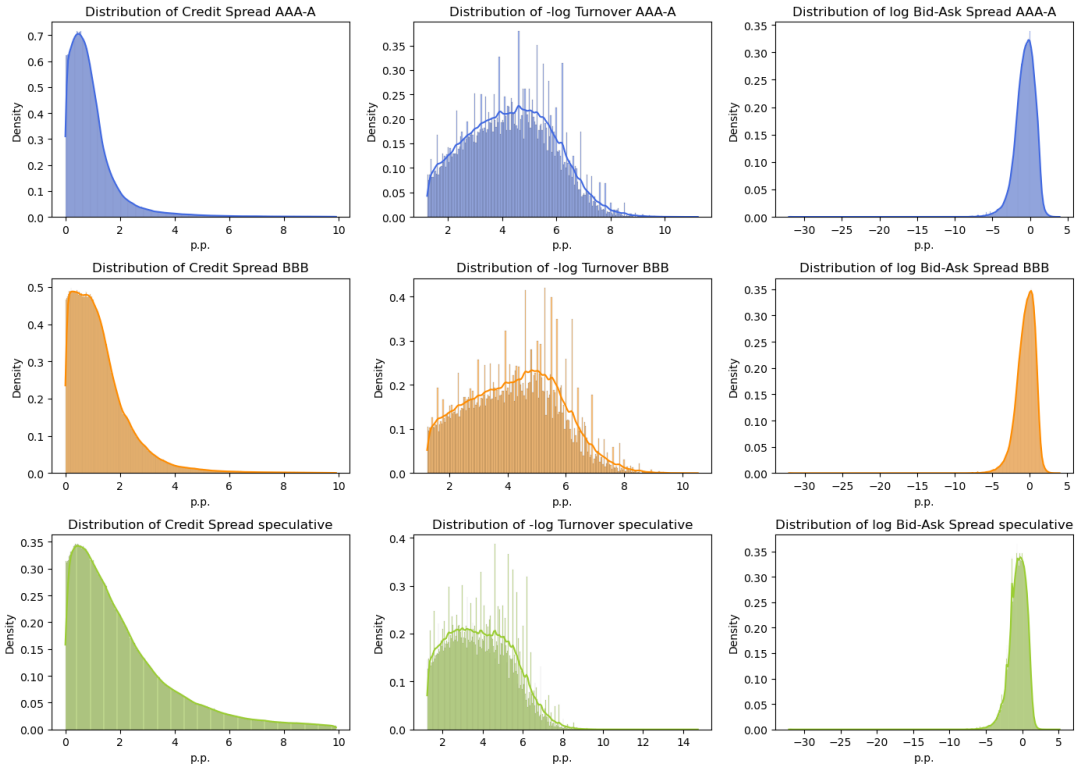

Figure 1: Distribution of credit spreads, $-$ log Turnover, and log bid-ask spreads across different corporate bond rating categories.

Figure 1 shows the distribution of credit spreads and liquidity risk factors, i.e. $-$ log turnover, and log bid-ask spreads, across different corporate bond rating categories: AAA-A, BBB, and speculative-grade bonds. As expected, speculative-grade bonds exhibit fatter right tail in credit spreads distribution, indicating a higher mean and greater dispersion compared to investment-grade bonds, reflecting their greater default risk. BBB-rated bonds have a slightly fatter right tail compared to AAA-A but less than speculative-grade bonds. Similarly, the distribution of $-$ log turnover for speculative bonds is seems to first-order stochastically dominate the other two, suggesting lower liquidity.

Figure 2, on the other hand, displays the time series of the daily average of the variable of interest, and the bands within 1 standard deviation from the mean. A clear cyclical pattern emerges, with spikes in credit spreads and bid-ask spreads during periods of financial distress, most notably around the 2008 Global Financial Crisis and the 2020 COVID-19 market shock. Turnover also exhibits cyclical variations, with declining liquidity during stress periods, particularly for lower-rated bonds. Additionally, speculative-grade bonds show a consistently higher and more volatile credit spread compared to investment-grade bonds, reinforcing the notion that riskier bonds face greater borrowing costs and more pronounced liquidity fluctuations in response to market conditions. The overall trends highlight the

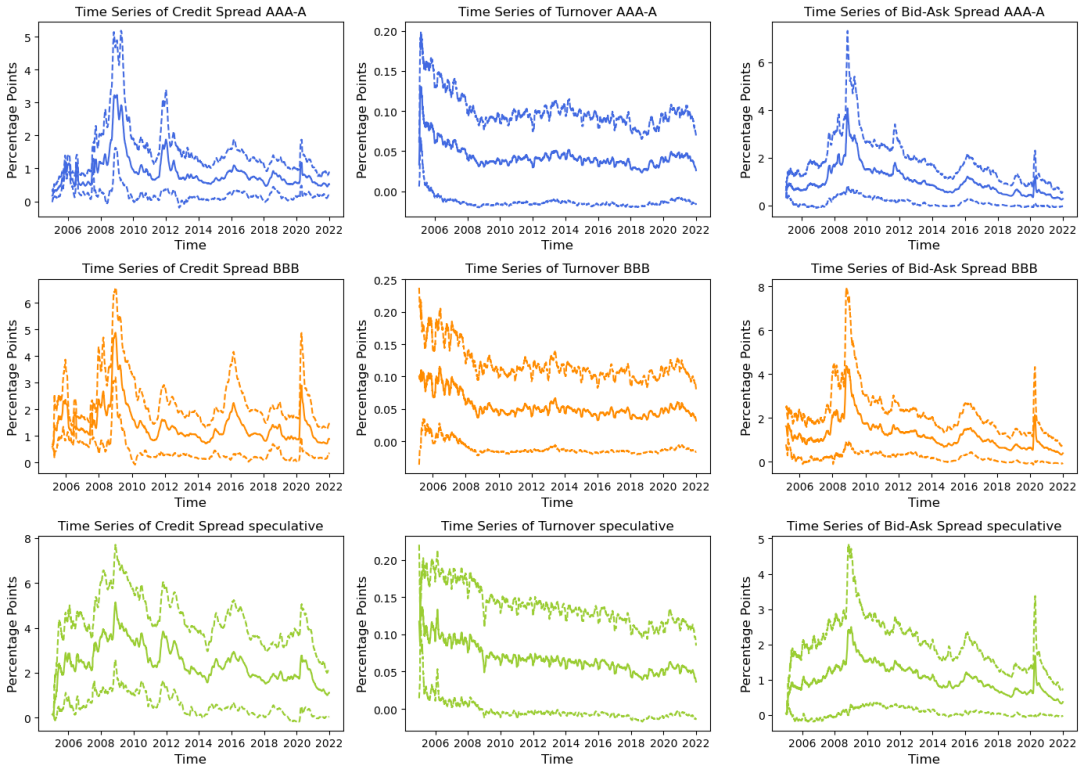

Figure 2: Time series of daily average credit spreads, turnover, and bid-ask spreads across different corporate bond rating categories. Bands represent 1 standard deviation above and below average.

strong relationship between market liquidity, bond risk premia, and macroeconomic conditions over time.

3 Exposure to Liquidity Risk

To assess the time varying nature of the relationship between liquidity risk and credit spreads, for each month m I estimate the following panel regression model:

$$\text{cs}_{i,t} = \alpha_m + \alpha_m^R + \beta_m \text{liq}_{it} + \gamma'_{m,0}\mathbf{x}_t^{agg} + \gamma'_{m,1}\mathbf{x}_{i,t}^{fr} + \epsilon_{it} \qquad t \in m \tag{7}$$

where liq_{it} represents a liquidity risk factor, and $\mathbf{x}_t^{agg}$ and $\mathbf{x}_{i,t}^{fr}$. denote aggregate and firm-specific control variables, respectively. Aggregate controls include the level and slope of the yield curve, the VIX index, and the ICE-BofA spread between high-yield and investment-grade bonds. Firm-specific controls capture profitability, liquidity leverage.

Given potential endogeneity concerns, I employ an instrumental variable (IV) approach, using the average number of trades in the previous 30 days as an instrument for liq_{it}. This variable is strongly correlated with liquidity but is exogenous to *current* credit spreads.

3.1 Preliminary Results

Figure 3 and 4 show the dynamics of the coefficient β over time, plotted against major financial market events.

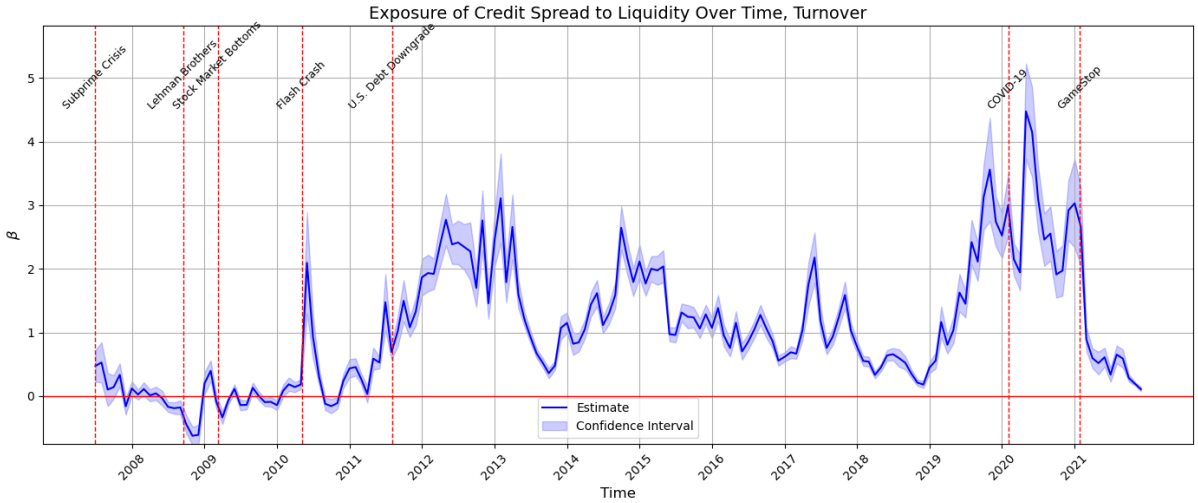

Figure 3: Time series of the coefficient $\{\beta_m\}_m$ from the rolling regression displayed in Equation 7, along with major financial market events. The liquidity measure employed is $-\log$ Turnover.

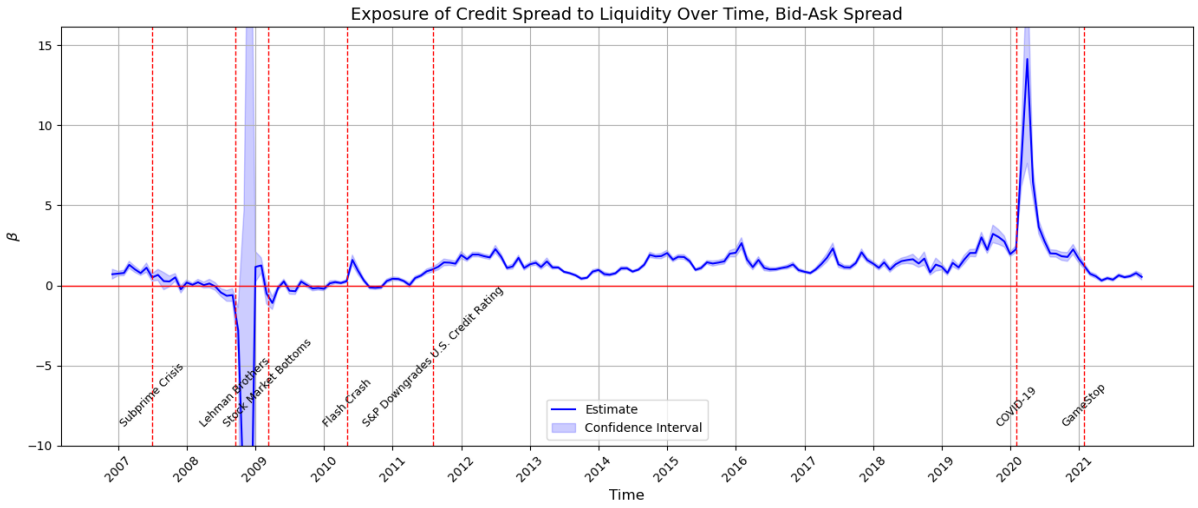

Figure 4: Time series of the coefficient $\{\beta_m\}_m$ from the rolling regression displayed in Equation 7, along with major financial market events. The liquidity measure employed is the $\log$ Bid-Ask$_{it}$.

Figure 5 and 6, on the other hand, plot these two coefficient against the slope of the yield curve, measured as the spread between the 10 year Treasury yield and the 3 month Treasury rate. Both charts hints at a strong anti-correlation between the two variables. To quantify this relationship, I run the regression:

$$\beta_m^{\text{liq}} = \alpha + \phi_r r_m^{1\text{ mo}} + \phi_{slope}\text{spread}_m^{\text{10Y-3Mo}} + \phi_{stock}\text{SP500}_m + \phi_{VIX}VIX_m + \nu_m \tag{8}$$

with liq $\in \{-\log \text{Turnover}, \log \text{Bid-Ask}\}$. The results are displayed in Table 1.

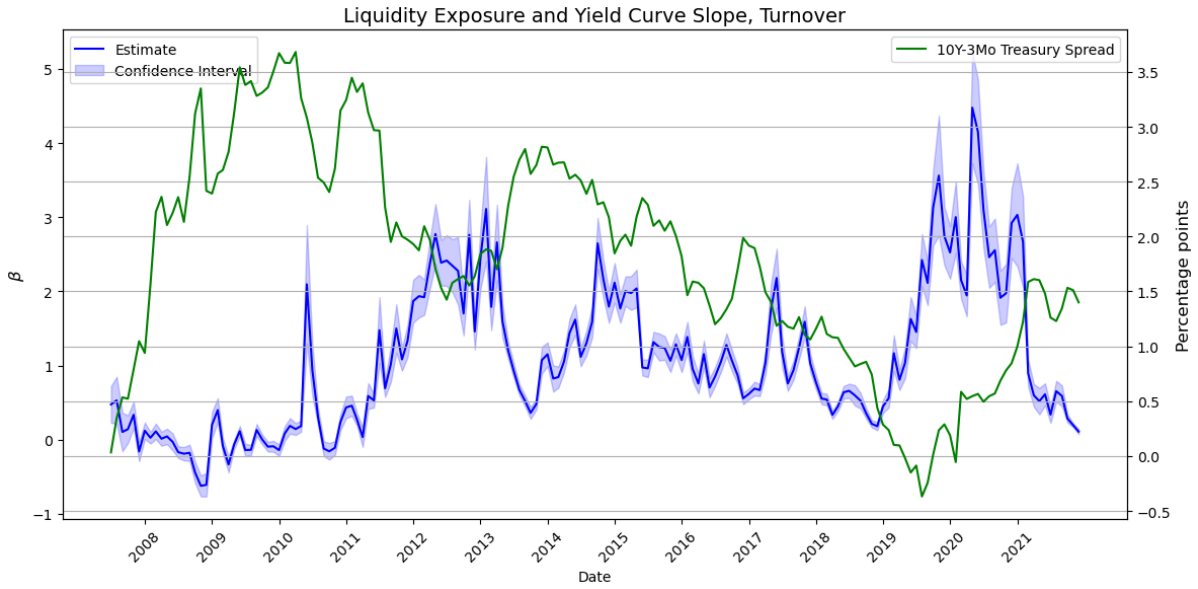

Figure 5: The loading on the liquidity risk factor plotted against the 10 year - 3 month spread highlights a comovement between the to variables. Liquidity is proxied by $-\log$ Turnover.

	Dependent variable: β^{liq}	
	$-\log$ Turnover	log Bid-Ask
const	3.135***	2.916***
	(0.029)	(0.210)
r^{1Mo}	-0.682***	-0.561***
	(0.007)	(0.102)
spread$^{10Y-3Mo}$	-0.697***	-0.784***
	(0.011)	(0.074)
SP500	0.000	0.000*
	(0.000)	(0.000)
VIX	-0.022***	-0.007
	(0.001)	(0.006)
Observations	138	120
R^2	0.557	0.581
Adjusted R^2	0.544	0.567
Residual Std. Error	0.557	0.449
F Statistic	41.832***	39.912***

Table 1: Results of OLS estimation of Equation 8. Note: *p<0.1; **p<0.05; ***p<0.01

4 Response to Monetary Policy Shocks

To explore the impact of monetary policy shocks, I partition bonds in two ways. First, I classify them into high, medium and low liquidity, depending on the percentile of the liquidity distribution. I then run

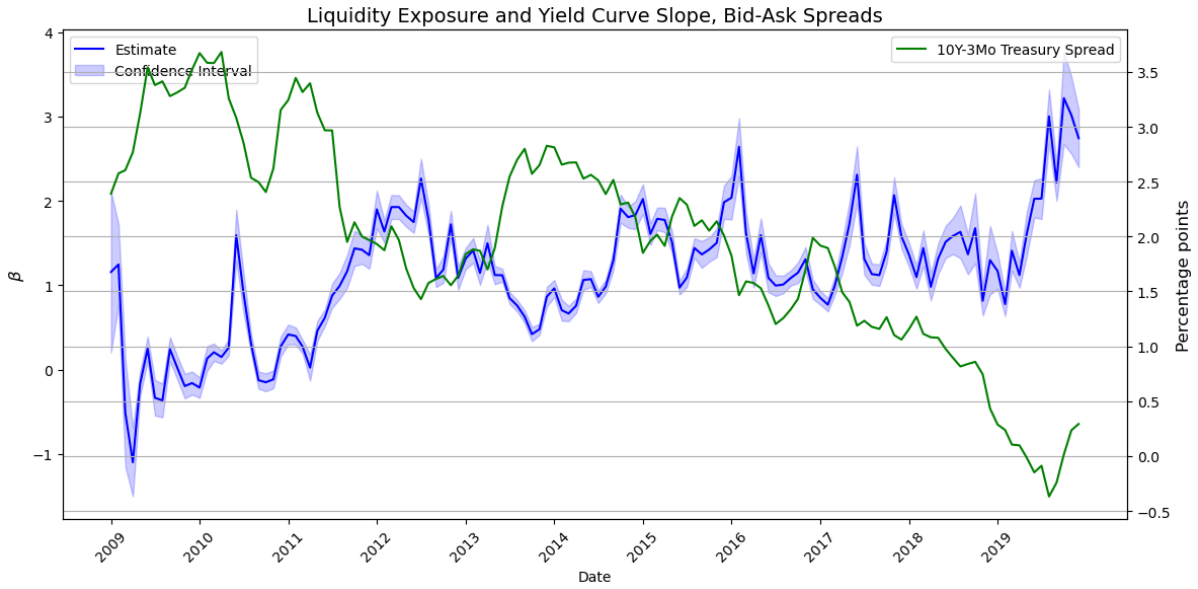

Figure 6: The loading on the liquidity risk factor plotted against the 10 year - 3 month spread highlights a negative comovement between the to variables. Liquidity is proxied by $\log \text{Bid-Ask}_{it}$. Only pre-Covid sample is displayed.

the following regression:

$$\text{cs}_{i,t+h} = \alpha + \alpha^R + \beta_h^{(k)} \Delta i_t + \gamma_0' \mathbf{x}_t^{agg} + \gamma_1' \mathbf{x}_{i,t}^{fr} + \epsilon_{it} \qquad (k) \in \{\text{high, medium, low}\} \tag{9}$$

where Δi_t represents the high-frequency identified monetary policy shock. By doing so, I am applying the logic of local projection introduced by Jordà (2005), according to which the impulse response function of a shock is the coefficient in the above regression: $IRF(h) = \beta_h$.

Then, I split bonds into six portfolios, sorted by credit rating (Investment Grade vs. High Yield) and liquidity (Low, High). I estimate the following regression separately for each portfolio:

$$\text{cs}_{i,t+h} = \alpha + \alpha^p + \beta_h^p \Delta i_t + \gamma_0' \mathbf{x}_t^{agg} + \gamma_1' \mathbf{x}_{i,t}^{fr} + \epsilon_{it} \qquad i \in p \tag{10}$$

where Δi_t represents the high-frequency identified monetary policy shock, and p indexes the four risk-liquidity portfolios:

$$p \in \{\text{HY-low}, \text{HY-high}, \text{IG-low}, \text{IG-high}\}$$

This framework allows me to quantify how monetary policy differentially affects credit spreads based on liquidity and risk exposure, providing insights into the transmission mechanisms of monetary policy in corporate bond markets.

4.1 Preliminary Results

Figure 7 shows the IRF generated by estimating Equation 9. Both groups of bonds experience an increase in credit spread following a positive monetary policy shock, but less liquid bonds experience a significantly larger and more persistent response.

Figure 8 shows that generated by Equation 10. This shows that the portfolio most affected both in terms of magnitude and persistence is IG-low liquidity.

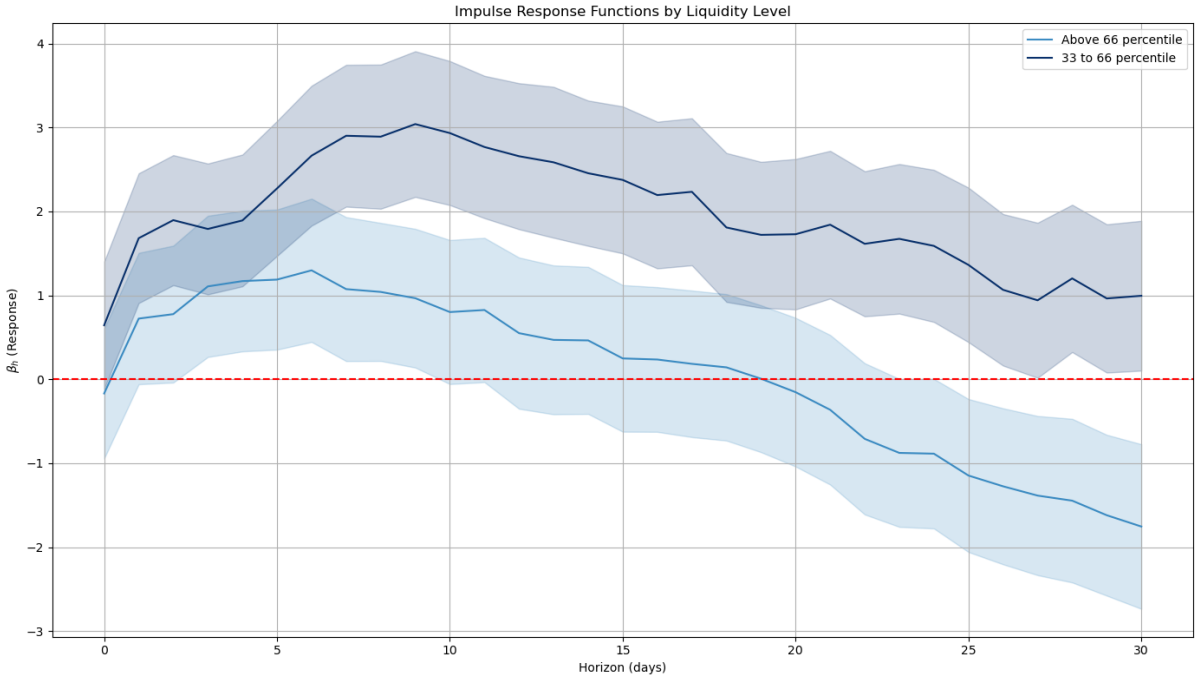

Figure 7: Impulse responses of credit spreads to monetary policy shocks, bonds are divided in low and high liquidity according to their turnover.

5 Conclusion

This research highlights the crucial role of liquidity in determining how monetary policy shocks affect corporate credit spreads. The empirical results provide evidence that more liquid bonds display lower credit spreads all else equal, but they also experience smaller responses to monetary policy shocks. This suggests that liquidity dampens away the effects of rate hikes. These findings have implications for policymakers and market participants, emphasizing the need for liquidity considerations in financial stability assessments and monetary policy design.

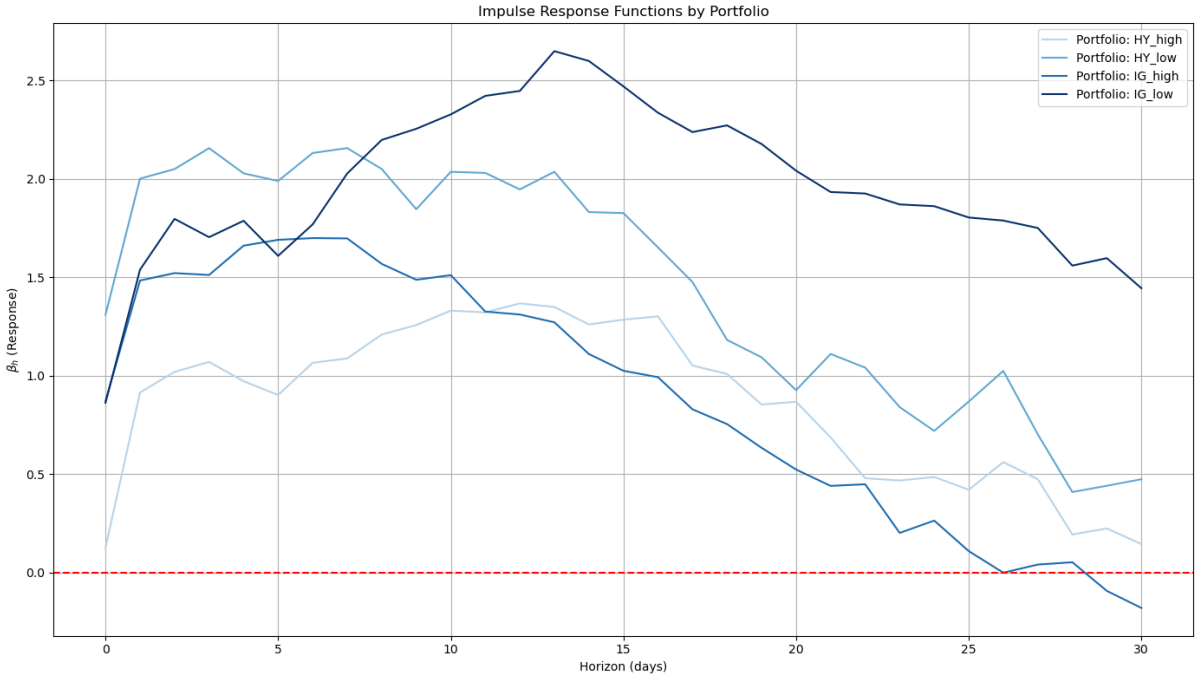

Figure 8: Impulse responses of credit spreads to monetary policy shocks. Bonds are divided in portfolios sorted by liquidity and risk.

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