Internet Appendix to "Stock Market Declines and Liquidity" *

Appendix A: Dynamic Conditional Correlation of Spreads and Market Returns

In this appendix, we examine the relationship between market returns and the conditional correlations in stock liquidity, measured by the dynamic conditional correlation (DCC) method proposed by Engle (2002). The DCC model relies on the parsimonious univariate GARCH estimates of liquidity for each asset and has a computational advantage over the multivariate GARCH model. The estimation starts with first obtaining a series of liquidity shocks from a univariate GARCH specification of the liquidity variable and. Then, in the second stage, we estimate the conditional correlation between asset liquidity shocks.

We use the DCC methodology to model the liquidity movements between a pair of portfolios. We consider pairs of size-sorted portfolios (small, medium, and large size portfolios) and also the correlation in liquidity between portfolios composed of S&P and non-S&P constituent stocks. We sort the stocks in our sample into three size portfolios (or S&P and non-S&P portfolios) and take the equally weighted average daily adjusted spread as the portfolio daily spread. As spreads tend to be highly autocorrelated, we fit an AR(1) model for average spreads and use the residuals as our liquidity variable. We obtain weekly dynamic correlation estimates between a pair of portfolio liquidity shocks by taking the average of all the daily DCC estimates in a week. Finally, we report the weekly dynamic correlations for each market state based on the magnitude and sign of market returns, as defined in the text in Section III.

Table IA.AI presents the conditional correlations in liquidity between size portfolios for each market state. The average DCC estimate of the correlation in spreads between large and small stock portfolios increases from 0.25 to 0.31 after a large negative market return. A large drop in market prices has a similar effect on conditional correlations between other pairs of size portfolios. The conditional correlation between liquidity of the S&P and non-S&P constituent stocks exhibits similar behavior: the conditional correlation between these two portfolio spreads increases after a large negative market return from 0.38 to 0.44. The DCC method confirms that the sharp increase in commonality in spreads following large market declines.

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Table IA.AI
DCC Estimates Conditional on Market Returns

The sample stocks are sorted into three size portfolios (or the S&P and non-S&P constituent portfolios). The portfolio daily spread is the equally weighted average of the stock daily adjusted spread in the portfolio. We first obtain the portfolio spread residuals from a first-order autoregression model. The residuals for the corresponding pairs of portfolio spreads are then fitted using the DCC model with mean-reversion. The daily DCC estimates are averaged into the weekly dynamic correlation estimates. The weekly dynamic correlation conditional on market states is reported below. Market states are defined based on the cumulative CRSP value-weighted return from week *t*-4 to week *t*-1. Large Up (Large Down) refers to cumulative market returns being more than 1.5 standard deviations above (below) the mean. Small Up (Small Down) market refers to cumulative market returns between zero and 1.5 (-1.5) standard deviations. The DCC differences that are significant at the 99%, 95%, and 90% confidence level are labelled with ***, **, and *, respectively.

DCC Estimates	Past Market Return					
	(a): Large Up	(b): Small Up	(c): Small Down	(d): Large Down	(e): Average excluding (d)	(d) - (e)
DCC between small and large size portfolios	0.226	0.243	0.260	0.307	0.248	0.060***
DCC between small and medium size portfolios	0.394	0.399	0.405	0.451	0.401	0.051***
DCC between medium and large size portfolios	0.423	0.467	0.497	0.537	0.474	0.063***
DCC between S&P and non-S&P portfolios	0.362	0.372	0.393	0.442	0.378	0.063***

Appendix B: Supplementary Tables

Table IA.BI
Proportional Effective Spreads and Returns

The empirical tests in this table are based on the proportional effective spread, which is two times the difference between the trade execution price and the midquote scaled by the midquote. Weekly changes in adjusted proportional effective spreads for each security are regressed on lagged market and idiosyncratic stock returns in Panel A, using the following regression specification:

$$\Delta ASPR_{i,t} = \alpha_i + \sum_{k=1}^{4} \beta_{i,k} R_{m,t-k} + \sum_{k=1}^{4} \beta_{DOWN,i,k} R_{m,t-k} D_{DOWN,m,t-k} + \sum_{k=1}^{4} \gamma_{i,k} R_{i,t-k} + \sum_{k=1}^{4} \gamma_{DOWN,i,k} R_{i,t-k} D_{DOWN,i,t-k} + \text{control variables} + \varepsilon_{i,t},$$

where $ASPR_{i,t}$ is stock i's seasonally adjusted proportional effective spread in week t; $R_{m,t}$ is the week t return on the CRSP value-weighted index; and $R_{i,t}$ is the idiosyncratic return on stock i in week t. The firm-specific weekly control variables are: turnover ($TURN_{i,t}$); relative order imbalance ($ROIB_{i,t}$,); and idiosyncratic volatility ($STD_{i,t}$). We also include the volatility of market return in week t ($STD_{m,t}$) . The Δ operator represents the first-order difference operator. We also add lagged changes in spreads to account for any serial correlations. The interaction dummy variable $D_{DOWN,m,t}$ ($D_{DOWN,i,t}$) takes the value of one if and only if $R_{m,t}$ ($R_{i,t}$) is less than zero. This panel corresponds to Table II in the main article.

In Panel B, weekly changes in the adjusted effective spreads for each security i are regressed on signed lagged market returns with an interaction dummy variable, $D_{CAP,t}$, which is equal to one when the funding market is likely to face capital constraints in week t. $D_{CAP,t}$, here is set equal to one when there is a decrease in the aggregate repos on the investment bank balance sheet in week t.

$\Delta ASPR_{i,t} = \alpha_i + \sum_{k=1}^{4} \beta_{i,k} R_{m,t-k} + \sum_{k=1}^{4} \beta_{DOWN,i,k} R_{m,t-k} D_{DOWN,m,t-k} + \beta_{DOWN,CAP,i,k} R_{m,t-1} D_{DOWN,m,t-1} D_{CAP,t-1} + \text{control variables} + \varepsilon_{i,t}$. This panel corresponds to Table III in the main article.

In Panel C, weekly changes in the adjusted effective spreads for each security i are regressed on lagged market returns ($R_{m,t}$), idiosyncratic stock returns ($R_{i,t}$), and the change in market average spreads ($\Delta ASPR_{m,t}$) using the specification:

$$\Delta ASPR_{i,t} = \alpha_i + b_{LIQ,i} \Delta ASPR_{m,t} + b_{LIQ,DOWN,i} \Delta ASPR_{m,t} D_{DOWN,m,t} + \sum_{k=1}^{4} \beta_{i,k} R_{m,t-k} +$$
$$\sum_{k=1}^{4} \beta_{DOWN,i,k} R_{m,t-k} D_{DOWN,m,t-k} + \sum_{k=1}^{4} \gamma_{i,k} R_{i,t-k} + \sum_{k=1}^{4} \gamma_{DOWN,i,k} R_{i,t-k} D_{DOWN,i,t-k} + \text{control variables} + \varepsilon_{i,t},$$

where $D_{DOWN,m,t}$ is a dummy variable that is equal to one if and only if $R_{m,t}$ is less than zero. This panel corresponds to Table V in the main article.

Panel A: Effective Spreads and Signed Lagged Returns

Estimated Coefficients	$R_{m,t-1}$	$R_{m,t-2}$	$R_{m,t-3}$	$R_{m,t-4}$	$R_{i,t-1}$	$R_{i,t-2}$	$R_{i,t-3}$	$R_{i,t-4}$
Mean	-0.298	-0.249	-0.240	-0.128	-0.361	-0.233	-0.140	-0.091
(t-statistics)	*(-4.03)*	*(-3.74)*	*(-3.68)*	*(-2.01)*	*(-13.14)*	*(-9.83)*	*(-5.93)*	*(-3.89)*
Median	-0.137	-0.115	-0.124	-0.055	-0.232	-0.154	-0.089	-0.054
% positive (negative)	(70.3%)	(69.9%)	(72.6%)	(61.1%)	(90.9%)	(89.0%)	(78.7%)	(71.2%)
% positive (negative) significant	(14.8%)	(13.0%)	(13.2%)	(6.5%)	(56.6%)	(42.0%)	(23.1%)	(15.1%)
Estimated Coefficients	$R_{m,t-1} \times D_{Down,m,t-1}$	$R_{m,t-2} \times D_{Down,m,t-2}$	$R_{m,t-3} \times D_{Down,m,t-3}$	$R_{m,t-4} \times D_{Down,m,t-4}$	$R_{i,t-1} \times D_{Down,i,t-1}$	$R_{i,t-2} \times D_{Down,i,t-2}$	$R\,i_{,t-3} \times D_{Down,i,t-3}$	$R\,i_{,t-4} \times D_{Down,i,t-4}$
Mean	-0.509	-0.073	0.228	0.151	-0.069	0.016	0.009	0.043
(t-statistics)	*(-4.10)*	*(-0.66)*	*(2.08)*	*(1.40)*	*(-1.91)*	*(0.37)*	*(0.21)*	*(1.03)*
Median	-0.281	-0.033	0.138	0.082	-0.054	0.011	0.009	0.025
% positive (negative)	(74.1%)	(54.1%)	66.0%	59.7%	(58.8%)	51.9%	51.8%	56.0%
% positive (negative) significant	(16.1%)	(6.0%)	9.2%	6.6%	(13.3%)	7.0%	6.3%	8.8%
Estimated Coefficients	$\Delta STD_{m,t-1}$	$\Delta STD_{i,t-1}$	$\Delta Turn_{i,t-1}$	$\Delta OIB_{i,t-1}$	$\Delta STD_{m,t}$	$\Delta STD_{i,t}$	$\Delta ASPR_{i,t-1}$	$\Delta ASPR_{i,t-2}$
Mean	0.089	0.083	-0.010	0.005	0.294	0.077	-0.568	-0.381
(t-statistics)	*(0.92)*	*(2.77)*	*(-2.81)*	*(0.67)*	*(5.33)*	*(4.14)*	(-73.72)	(-44.29)
Median	0.092	0.057	-0.004	0.003	0.174	0.067	-0.590	-0.395
% positive (negative)	62.0%	65.7%	(67.9%)	53.3%	79.5%	70.6%	(100.0%)	(100.0%)
% positive (negative) significant	10.7%	16.9%	(13.8%)	10.0%	26.9%	32.4%	(99.0%)	(97.6%)
Estimated Coefficients	$\Delta ASPR_{i,t-3}$	$\Delta ASPR_{i,t-4}$						
Mean	-0.241	-0.122						
(t-statistics)	*(-28.37)*	*(-16.32)*						
Median	-0.249	-0.122						
% positive (negative)	(98.2%)	(95.0%)						
% positive (negative) significant	(93.0%)	(75.0%)						

Panel B: Effective Spreads, Signed Lagged Returns, and Changes in Aggregate Repos

Estimated Coefficients	$R_{m,t-1}$	$R_{m,t-2}$	$R_{m,t-3\sim t-4}$	$R_{m,t-1} \times D_{Down,m,t-1}$	$R_{m,t-2} \times D_{Down,m,t-2}$	$R_{m,t-3\sim t-4} \times D_{Down,m,t-3\sim t-4}$	$R_{m,t-1} \times D_{Down,m,t-1} \times D_{CAP,t-1}$
Mean	-0.311	-0.256	-0.165	-0.305	-0.074	0.183	-0.493
(t-statistics)	*(-4.34)*	*(-3.99)*	*(-3.68)*	*(-2.40)*	*(-0.69)*	*(2.32)*	*(-4.93)*
Median	-0.140	-0.124	-0.085	-0.168	-0.038	0.127	-0.284
% positive (negative)	(71.2%)	(72.6%)	(71.4%)	(64.5%)	(54.0%)	69.8%	(76.7%)
% positive (negative) significant	(14.9%)	(13.4%)	(12.4%)	(10.0%)	(6.3%)	10.5%	(22.8%)

Panel C: Effective Spreads, Signed Lagged Returns, and Liquidity Betas

Estimated Coefficients	$R_{m,t-1}$	$R_{m,t-2}$	$R_{m,t-3\sim t-4}$	$R_{m,t-1} \times D_{Down,m,t-1}$	$R_{m,t-2} \times D_{Down,m,t-2}$	$R_{m,t-3\sim t-4} \times D_{Down,m,t-3\sim t-4}$	$\Delta ASPR_{m,t}$	$\Delta ASPR_{m,t} \times D_{Down,m,t}$
Mean	-0.307	-0.185	-0.129	-0.175	-0.203	0.090	0.555	0.270
(t-statistics)	*(-16.82)*	*(-11.01)*	*(-10.84)*	*(-5.94)*	*(-7.53)*	*(4.50)*	*(40.40)*	*(14.81)*
Median	-0.131	-0.073	-0.059	-0.098	-0.128	0.068	0.354	0.199
%positive(negative)	(70.4%)	(62.2%)	(66.3%)	(58.7%)	(63.5%)	62.0%	90.9%	71.1%
%positive(negative) significant	(15.1%)	(9.2%)	(9.1%)	(7.6%)	(9.2%)	6.7%	56.8%	30.3%

Table IA.BII
Seasonally Adjusted Quoted Spreads

The daily quoted spreads are adjusted for seasonality to obtain the adjusted spreads, $ASPR_{i,s}$:

$$QSPR_{i,s} = \sum_{k=1}^{4} d_{i,k}\, DAY_{k,s} + \sum_{k=1}^{11} e_{i,k} MONTH_{k,s} + f_{1,i}\, HOLIDAY_s + f_{2,i}\, TICK1_s + f_{3,i}\, TICK2_s + f_{4,i}\, YEAR1_s + f_{5,i}\, YEAR2_s + ASPR_{i,s} \quad ,$$

where we employ (i) day of the week dummies ($DAY_{k,s}$) for Monday through Thursday ; (ii) month dummies ($MONTH_{k,s}$) for January through November; (iii) a dummy for the trading days around holidays ($HOLIDAY_s$); (iv) tick change dummies ($TICK1_s$, $TICK2_s$) to capture the tick change from 1/8 to 1/16 on 06/24/1997 and the change from 1/16 to the decimal system on 01/29/2001, respectively; (v) and time trend variables $YEAR1_s$ ($YEAR2_s$), equal to the difference between the current calendar year and the year 1988 (1997) or the first year when the stock is traded on NYSE, whichever is later. Cross-sectional means and medians of the coefficient estimates are reported below. The mean coefficients that are significant at the 99%, 95%, and 90% confidence levels are indicated by ***, **, and *, respectively.

Estimated Coefficients	Monday	Tuesday	Wednesday	Thursday
Mean	0.005*	-0.007***	-0.004**	-0.003*
Median	0.000	-0.005	-0.004	-0.002
Estimated Coefficients	January	February	March	April
Mean	0.006	-0.007	-0.020	-0.019
Median	0.031	0.024	0.013	0.012
Estimated Coefficients	May	June	July	August
Mean	-0.054***	-0.062***	-0.044***	-0.030**
Median	-0.011	-0.017	-0.012	-0.008
Estimated Coefficients	September	October	November	Holiday
Mean	-0.020*	0.028**	0.016	0.018**
Median	-0.003	0.022	0.007	0.010
Estimated Coefficients	Tick1	Tick2	Year1	Year2
Mean	-0.579***	-0.297***	-0.047***	0.035***
Median	-0.404	-0.148	-0.040	0.000

Table IA.BIII
Spreads and Returns: Additional Lagged Returns

Weekly changes in adjusted spreads for each security ($\Delta ASPR_{i,t}$) are regressed on lagged market and idiosyncratic stock returns, with lagged returns of up to eight weeks:

$$\Delta ASPR_{i,t} = \alpha_i + \sum_{k=1}^{8} \beta_{i,k} R_{m,t-k} + \sum_{k=1}^{8} \beta_{DOWN,i,k} R_{m,t-k} D_{DOWN,m,t-k} + \sum_{k=1}^{8} \gamma_{i,k} R_{i,t-k} + \sum_{k=1}^{8} \gamma_{DOWN,i,k} R_{i,t-k} D_{DOWN,i,t-k} + \text{control variables} + \varepsilon_{i,t},$$

where $ASPR_{i,t}$ is stock i's seasonally adjusted proportional spread in week t; $R_{m,t}$ is the week t return on the *CRSP* value-weighted index; and $R_{i,t}$ is the idiosyncratic return on stock i in week t. The interaction dummy variable $D_{DOWN,m,t}$ ($D_{DOWN,i,t}$) takes the value of one if and only if $R_{m,t}$ ($R_{i,t}$) is less than zero. For ease of exposition, we report the coefficients for the combined market (and idiosyncratic) returns in weeks t-3 and t-4, and the combined market (and idiosyncratic) returns from week t-5 to t-8. The control variables are defined in Table II. The Δ operator represents the first-order difference of the corresponding variables. Cross-sectional means (t-statistics), medians, and percentage of significant coefficient estimates at the 5% level (one-tailed) are reported below.

Estimated Coefficients	$R_{m,t-1}$	$R_{m,t-2}$	$R_{m,t-3\sim t-4}$	$R_{m,t-5\sim t-8}$	$R_{i,t-1}$	$R_{i,t-2}$	$R_{i,t-3\sim t-4}$	$R_{i,t-5\sim t-8}$
Mean	-0.395	-0.344	-0.268	-0.112	-0.475	-0.316	-0.185	-0.051
(t-statistics)	*(-3.75)*	*(-3.68)*	*(-4.09)*	*(-2.61)*	*(-12.27)*	*(-9.54)*	*(-7.58)*	*(-2.75)*
Median	-0.214	-0.198	-0.142	-0.070	-0.333	-0.223	-0.115	-0.030
% positive (negative)	(73.5%)	(75.4%)	(73.8%)	(69.8%)	(91.6%)	(89.8%)	(81.9%)	(64.8%)
% positive (negative) significant	(13.8%)	(15.3%)	(14.8%)	(12.0%)	(56.1%)	(43.6%)	(30.3%)	(11.3%)
Estimated Coefficients	$R_{m,t-1} \times D_{Down,m,t-1}$	$R_{m,t-2} \times D_{Down,m,t-2}$	$R_{m,t-3\sim t-4} \times D_{Down,m,t-3\sim t-4}$	$R_{m,t-5\sim t-8} \times D_{Down,m,t-5\sim t-8}$	$R_{i,t-1} \times D_{Down,i,t-1}$	$R_{i,t-2} \times D_{Down,i,t-2}$	$R_{i,t-3\sim t-4} \times D_{Down,i,t-3\sim t-4}$	$R_{i,t-5\sim t-8} \times D_{Down,i,t-5\sim t-8}$
Mean	-0.833	-0.069	0.159	0.075	-0.180	0.027	0.009	-0.004
(t-statistics)	*(-4.67)*	*(-0.44)*	*(1.39)*	*(0.89)*	*(-2.56)*	*(0.46)*	*(0.20)*	*(-0.13)*
Median	-0.479	0.020	0.109	0.071	-0.133	0.033	0.005	0.003
% positive (negative)	(77.4%)	(48.8%)	62.5%	60.6%	(65.1%)	54.5%	50.8%	(48.7%)
% positive (negative) significant	(18.8%)	(4.6%)	8.3%	7.1%	(16.4%)	7.2%	6.4%	(5.7%)

Table IA.BIV
Spreads and Return Dummies

Weekly changes in adjusted spreads for each security are regressed on lagged market return dummies and idiosyncratic stock return status dummies.
Panel A uses the following regression specification:

$$\Delta ASPR_{i,t} = \alpha_i + \sum_{k=1}^{4} \mu 1_{DOWN,i,k} D_{DOWN,m,t-k} + \sum_{k=1}^{4} \mu 2_{DOWN,i,k} D_{DOWN,i,t-k} + \text{control variables} + \varepsilon_{i,t},$$

where $ASPR_{i,t}$ is stock i's seasonally adjusted proportional spread in week t; $D_{DOWN,m,t}$ ($D_{DOWN,i,t}$) is a dummy variable that is equal to one if and only if $R_{m,t}$ ($R_{i,t}$) is less than zero. $R_{m,t}$ is the week t return on the *CRSP* value-weighted index; and $R_{i,t}$ is the idiosyncratic return on stock i in week t. For ease of exposition, we report the coefficients for the combined market (and idiosyncratic) return dummies in weeks t-3 and t-4. The control variables are defined in Table II. The Δ operator represents the first-order difference of the corresponding variables.
Panel B uses the following regression specification:

$$\Delta ASPR_{i,t} = \alpha_i + \sum_{k=1}^{4} \omega 1_{DOWN\ LARGE,i,k} R_{m,t-k} D_{DOWN\ LARGE,m,t-k} + \sum_{k=1}^{4} \omega 2_{DOWN\ SMALL,i,k} R_{m,t-k} D_{DOWN\ SMALL,m,t-k}$$
$$+ \sum_{k=1}^{4} \theta 1_{DOWN\ LARGE,i,k} R_{i,t-k} D_{DOWN\ LARGE,i,t-k} + \sum_{k=1}^{4} \theta 2_{DOWN\ SMALL,i,k} R_{i,t-k} D_{DOWN\ SMALL,i,t-k} + \text{control variables} + \varepsilon_{i,t},$$

where $D_{DOWN\ LARGE,m,t}$ ($D_{DOWN\ LARGE,i,t}$) is a dummy variable that is equal to one if and only if $R_{m,t}$ ($R_{i,t}$) is more than 1.5 standard deviations below its unconditional mean, and $D_{DOWN\ SMALL,m,t}$ ($D_{DOWN\ SMALL,i,t}$) is a dummy variable that is equal to one if and only if $R_{m,t}$ ($R_{i,t}$) is between zero and -1.5 standard deviations below its unconditional mean.
Cross-sectional means (*t*-statistics), medians, and percentage of significant coefficient estimates at the 5% level (one-tailed) are reported below.

Panel A: Spreads and Lagged Return Dummies

Estimated Coefficients	$D_{Down,m,t-1}$	$D_{Down,m,t-2}$	$D_{Down,m,t-3\sim t-4}$	$D_{Down,i,t-1}$	$D_{Down,i,t-2}$	$D_{Down,i,t-3\sim t-4}$
Mean	0.028	0.012	0.005	0.040	0.018	0.010
(t-statistics)	*(11.70)*	*(4.89)*	*(2.12)*	*(16.59)*	*(7.49)*	*(4.33)*
Median	0.017	0.007	0.002	0.026	0.011	0.006
%positive(negative)	96.2%	80.0%	62.4%	97.9%	86.8%	75.7%
%positive(negative) significant	62.5%	20.4%	8.1%	80.5%	34.7%	17.1%

Panel B: Spreads and Large/Small Lagged Return Dummies

Estimated Coefficients	$D_{DownLarge,m,t-1}$	$D_{DownLarge,m,t-2}$	$D_{DownLarge,m,t-3\sim t-4}$	$D_{DownLarge,i,t-1}$	$D_{DownLarge,i,t-2}$	$D_{DownLarge,i,t-3\sim t-4}$
Mean	0.062	0.021	-0.003	0.088	0.032	0.018
(t-statistics)	*(12.59)*	*(4.32)*	*(-0.70)*	*(15.11)*	*(5.55)*	*(3.12)*
Median	0.036	0.010	-0.004	0.053	0.017	0.007
%positive(negative)	95.3%	71.4%	(61.0%)	95.4%	77.8%	64.9%
%positive(negative) significant	63.1%	15.3%	(8.6%)	71.5%	25.8%	14.5%
Estimated Coefficients	$D_{DownSmall,m,t-1}$	$D_{DownSmall,m,t-2}$	$D_{DownSmall,m,t-3\sim t-4}$	$D_{DownSmall,i,t-1}$	$D_{DownSmall,i,t-2}$	$D_{DownSmall,i,t-3\sim t-4}$
Mean	0.022	0.010	0.007	0.036	0.017	0.009
(t-statistics)	*(9.15)*	*(4.27)*	*(2.64)*	*(15.08)*	*(7.03)*	*(3.77)*
Median	0.014	0.006	0.003	0.023	0.010	0.005
%positive(negative)	91.9%	77.3%	66.9%	96.9%	85.7%	73.8%
%positive(negative) significant	47.5%	18.6%	8.9%	74.1%	32.6%	15.5%

Table IA.BV
Spreads and Misperceived Volatility

Weekly changes in adjusted spreads for each security are regressed on lagged market returns and idiosyncratic stock return and misperceived volatility (*MisSTD*) as defined in Deuskar (2007):

$$\Delta ASPR_{i,t} = \alpha_i + \sum_{k=1}^{4} \beta_{i,k} R_{m,t-k} + \sum_{k=1}^{4} \gamma_{i,k} R_{i,t-k} + \sum_{k=0}^{1} \Delta MisSTD_{m,t-k} + \sum_{k=0}^{1} \Delta STD_{m,t-k} + \sum_{k=0}^{1} \Delta STD_{i,t-k} + \text{control variables} + \varepsilon_{i,t},$$

where $ASPR_{i,t}$ refers to stock i's seasonally adjusted daily proportional quoted spread averaged across all trading days in week t; $R_{m,t}$ is the week t return on the CRSP value-weighted index; $R_{i,t}$ is the idiosyncratic return on stock i in week t, where idiosyncratic stock returns are calculated as individual stock returns minus market returns; $STD_{m,t}$ is the volatility of the market return in week t; and $STD_{i,t}$ is the volatility of stock i's idiosyncratic returns in week t. Other control variables are defined in equation (2) in the text. The Δ operator represents the first-order difference of the corresponding variables.

Estimate Statistics	$R_{m,t-1}$	$R_{m,t-2}$	$R_{m,t-3}$	$R_{m,t-4}$	$R_{i,t-1}$	$R_{i,t-2}$	$R_{i,t-3}$	$R_{i,t-4}$
Mean	-0.990	-0.505	-0.236	-0.151	-0.584	-0.312	-0.191	-0.099
(t-statistics)	*(-18.12)*	*(-10.19)*	*(-4.83)*	*(-3.11)*	*(-29.79)*	*(-15.82)*	*(-9.68)*	*(-5.05)*
Median	-0.704	-0.343	-0.130	-0.073	-0.464	-0.233	-0.137	-0.059
% positive (negative)	(96.0%)	(86.6%)	(67.4%)	(61.9%)	(98.2%)	(93.0%)	(82.7%)	(69.7%)
% positive (negative) significant	(66.4%)	(37.1%)	(13.1%)	(10.0%)	(86.4%)	(56.5%)	(32.8%)	(14.3%)

Estimate Statistics	$\Delta STD_{m,t-1}$	$\Delta STD_{i,t-1}$	$\Delta STD_{m,t}$	$\Delta STD_{i,t}$	$\Delta MisSTD_{i,t-1}$	$\Delta MisSTD_{i,t}$	$\Delta Turn_{i,t-1}$	$\Delta OIB_{i,t-1}$
Mean	0.311	0.274	0.280	0.241	0.940	0.455	-0.024	0.007
(t-statistics)	*(2.21)*	*(3.55)*	*(7.06)*	*(10.00)*	*(5.51)*	*(11.00)*	*(-4.04)*	*(0.71)*
Median	0.263	0.168	0.204	0.193	0.619	0.334	-0.013	0.006
% positive (negative)	64.3%	66.9%	78.7%	84.7%	75.4%	87.2%	(75.4%)	54.0%
% positive (negative) significant	12.9%	13.8%	25.2%	40.7%	36.9%	45.8%	(19.4%)	8.1%

Table IA.BVI
Proportion of Small Trades and Market Returns

Weekly changes in percentage of small trades for each security ($\Delta SmallTrade\%_{i,t}$) are regressed on lagged market and idiosyncratic stock returns:

$$\Delta SmallTrade\%_{i,t} = \alpha_i + \sum_{k=1}^{4} \beta_{UP,i,k} R_{m,t-k} D_{UP,m,t-k} + \sum_{k=1}^{4} \beta_{DOWN,i,k} R_{m,t-k} D_{DOWN,m,t-k} + \sum_{k=1}^{4} \gamma_{UP,i,k} R_{i,t-k} D_{UP,i,t-k} + \sum_{k=1}^{4} \gamma_{DOWN,i,k} R_{i,t-k} D_{DOWN,i,t-k} + \text{control variables} + \varepsilon_{i,t},$$

where $SmallTrade\%_{i,t}$ is the number of small trades, defined as the trade whose size is below $5000, divided by the total number of trades for stock i in week t; $R_{m,t}$ is the week t return on the *CRSP* value-weighted index; and $R_{i,t}$ is the idiosyncratic return on stock i in week t. The interaction dummy variable $D_{UP,m,t}$ ($D_{UP,i,t}$) takes the value of one if and only if $R_{m,t}$ ($R_{i,t}$) is greater than zero, and the interaction dummy variable $D_{DOWN,m,t}$ ($D_{DOWN,i,t}$) takes the value of one if and only if $R_{m,t}$ ($R_{i,t}$) is less than zero. The control variables are defined in Table II. The Δ operator represents the first-order difference of the corresponding variables. Cross-sectional means (*t*-statistics), medians, and percentage of significant coefficient estimates at the 5% level (one-tailed) are reported below.

Estimated Coefficients	$R_{m,t-1} \times D_{Up,m,t-1}$	$R_{m,t-2} \times D_{Up,m,t-2}$	$R_{m,t-3} \times D_{Up,m,t-3}$	$R_{m,t-4} \times D_{Up,m,t-4}$
Mean	0.073	0.044	0.042	0.041
(t-statistics)	*(3.45)*	*(2.32)*	*(2.25)*	*(2.25)*
Median	0.042	0.026	0.026	0.008
% positive (negative)	56.3%	54.4%	54.9%	52.2%
% positive (negative) significant	9.2%	6.7%	6.4%	5.2%
Estimated Coefficients	$R_{m,t-1} \times D_{Down,m,t-1}$	$R_{m,t-2} \times D_{Down,m,t-2}$	$R_{m,t-3} \times D_{Down,m,t-3}$	$R_{m,t-4} \times D_{Down,m,t-4}$
Mean	0.011	0.013	0.008	0.019
(t-statistics)	*(0.58)*	*(0.69)*	*(0.43)*	*(1.02)*
Median	0.001	0.000	0.000	0.000
% positive (negative)	50.1%	49.4%	47.7%	47.3%
% positive (negative) significant	5.3%	5.0%	4.5%	4.2%

Table IA.BVII
Spreads, Market Returns, and Impact of the Funding Market Proxies

Weekly changes in the adjusted spreads for each security ($\Delta ASPR_{i,t}$) are regressed on signed lagged market returns with an interaction dummy variable $D_{CAP,t}$ that is equal to one when the funding market is likely to face capital constraints in week *t*:

$$\Delta ASPR_{i,t} = \alpha_i + \sum_{k=1}^{4} \beta_{i,k} R_{m,t-k} + \sum_{k=1}^{4} \beta_{DOWN,i,k} R_{m,t-k} D_{DOWN,m,t-k} + \sum_{k=1}^{4} \beta_{DOWN,CAP,i,k} R_{m,t-k} D_{DOWN,m,t-k} D_{CAP,t-k} + \text{control variables} + \varepsilon_{i,t}.$$

All other variables are defined in Table II. In Panel A, $D_{CAP,t}$ is equal to one when the excess return on a portfolio of investment banks in week *t* is negative. $D_{CAP,t}$ in Panel B is equal to one when there is a decrease in the aggregate repos in week *t*. Finally, when there is an increase in the commercial paper spread, we assign a value of one to $D_{CAP,t}$ in Panel C. For ease of exposition, we report the coefficients for the combined market (and idiosyncratic) returns and funding market constraint dummies in weeks *t*-3 and *t*-4. Cross-sectional means (*t*-statistics), medians, and percentage of significant coefficient estimates at the 5% level (one-tailed) are reported below.

Panel A: Investment Bank & Broker Sector Returns

Estimated Coefficients	$R_{m,t-1}$	$R_{m,t-2}$	$R_{m,t-3\sim t-4}$	$R_{m,t-1} \times D_{Down,m,t-1}$	$R_{m,t-2} \times D_{Down,m,t-2}$	$R_{m,t-3\sim t-4} \times D_{Down,m,t-3\sim t-4}$	$R_{m,t-1} \times D_{Down,m,t-1} \times D_{CAP,t-1}$	$R_{m,t-2} \times D_{Down,m,t-2} \times D_{CAP,t-2}$	$R_{m,t-3\sim t-4} \times D_{Down,m,t-3\sim t-4} \times D_{CAP,t-3\sim t-4}$
Mean	-0.422	-0.326	-0.226	-0.658	-0.052	0.154	-0.302	0.009	0.087
(t-statistics)	*(-4.23)*	*(-3.67)*	*(-3.66)*	*(-3.75)*	*(-0.33)*	*(1.26)*	*(-2.26)*	*(0.07)*	*(0.83)*
Median	-0.215	-0.193	-0.118	-0.354	0.030	0.119	-0.153	-0.002	0.015
% positive (negative)	(73.8%)	(73.6%)	(70.5%)	(72.0%)	(47.9%)	62.6%	(61.5%)	49.7%	51.9%
% positive (negative) significant	(15.0%)	(15.4%)	(11.8%)	(14.9%)	(4.6%)	8.6%	(10.6%)	4.6%	7.1%

Panel B: Change in Repos

Estimated Coefficients	$R_{m,t-1}$	$R_{m,t-2}$	$R_{m,t-3\sim t-4}$	$R_{m,t-1} \times D_{Down,m,t-1}$	$R_{m,t-2} \times D_{Down,m,t-2}$	$R_{m,t-3\sim t-4} \times D_{Down,m,t-3\sim t-4}$	$R_{m,t-1} \times D_{Down,m,t-1} \times D_{CAP,t-1}$	$R_{m,t-2} \times D_{Down,m,t-2} \times D_{CAP,t-2}$	$R_{m,t-3\sim t-4} \times D_{Down,m,t-3\sim t-4} \times D_{CAP,t-3\sim t-4}$
Mean	-0.450	-0.334	-0.214	-0.490	-0.176	0.156	-0.655	0.307	0.138
(t-statistics)	*(-4.61)*	*(-3.84)*	*(-3.54)*	*(-2.84)*	*(-1.14)*	*(1.35)*	*(-4.83)*	*(2.26)*	*(1.32)*
Median	-0.249	-0.196	-0.114	-0.242	-0.044	0.111	-0.367	0.191	0.070
% positive (negative)	(76.0%)	(74.2%)	(69.3%)	(66.6%)	(53.5%)	62.3%	(74.9%)	66.2%	58.5%
% positive (negative) significant	(16.3%)	(15.9%)	(11.0%)	(9.7%)	(6.2%)	6.8%	(20.2%)	11.0%	6.8%

Panel C: Commercial Paper Spread

Estimated Coefficients	$R_{m,t-1}$	$R_{m,t-2}$	$R_{m,t-3\sim t-4}$	$R_{m,t-1} \times D_{Down,m,t-1}$	$R_{m,t-2} \times D_{Down,m,t-2}$	$R_{m,t-3\sim t-4} \times D_{Down,m,t-3\sim t-4}$	$R_{m,t-1} \times D_{Down,m,t-1} \times D_{CAP,t-1}$	$R_{m,t-2} \times D_{Down,m,t-2} \times D_{CAP,t-2}$	$R_{m,t-3\sim t-4} \times D_{Down,m,t-3\sim t-4} \times D_{CAP,t-3\sim t-4}$
Mean	-0.434	-0.323	-0.219	-0.500	-0.147	0.242	-0.458	0.137	-0.062
(t-statistics)	*(-4.35)*	*(-3.61)*	*(-3.56)*	*(-2.62)*	*(-0.84)*	*(1.85)*	*(-3.40)*	*(1.01)*	*(-0.57)*
Median	-0.239	-0.187	-0.113	-0.254	-0.032	0.137	-0.263	0.073	0.004
% positive (negative)	(74.7%)	(73.4%)	(70.0%)	(65.3%)	(52.4%)	62.2%	(71.7%)	57.0%	(49.2%)
% positive (negative) significant	(15.7%)	(14.5%)	(11.3%)	(8.5%)	(6.0%)	7.7%	(14.1%)	6.6%	(5.1%)

Table IA.BVIII
Contrarian Profits, Market Returns, and Liquidity Commonality

Weekly stock returns are sorted into winner (loser) portfolios if the returns are above (below) the median of all positive (negative) returns in week *t*. The contrarian portfolio weight for stock *i* in week *t* is given by $w_{p,i,t} = (R_{i,t-1}Turn_{i,t-1}) / \sum_{i=1}^{Np} R_{i,t-1}Turn_{i,t-1}$, where $R_{i,t}$ and $Turn_{i,t}$ are stock *i*'s return and turnover in week *t*. We report contrarian profits conditional on market returns and liquidity commonality. Large Up (Large Down) refers to cumulative market returns from week *t*-4 to *t*-1 being more than 1.5 standard deviations above (below) the mean. Small Up (Small Down) market refers to cumulative market returns between zero and 1.5 (-1.5) standard deviations. We further split the sample based on whether liquidity commonality is above (below) the median.

	Week t+1							
	Past Market Return:							
Portfolio	Large Up Liquidity Commonality:		Small Up Liquidity Commonality:		Small Down Liquidity Commonality:		Large Down Liquidity Commonality:	
	High	Low	High	Low	High	Low	High	Low
loser	1.40%	-0.33%	0.97%	0.69%	0.39%	0.56%	1.99%	0.74%
winner	0.67%	-0.87%	0.52%	0.06%	-0.06%	-0.02%	0.27%	0.11%
loser-winner	0.73%	0.55%	0.44%	0.63%	0.45%	0.58%	1.73%	0.64%
(*t*-statistic)	(0.98)	(0.56)	(2.09)	(3.71)	(1.21)	(3.04)	(3.16)	(1.40)

	Week t+2							
	Past Market Return:							
Portfolio	Large Up Liquidity Commonality:		Small Up Liquidity Commonality:		Small Down Liquidity Commonality:		Large Down Liquidity Commonality:	
	High	Low	High	Low	High	Low	High	Low
loser	1.07%	0.65%	0.55%	0.33%	0.13%	0.28%	1.76%	0.17%
winner	0.87%	-0.01%	0.53%	0.28%	-0.10%	0.27%	0.45%	-0.32%
loser-winner	0.19%	0.66%	0.02%	0.05%	0.23%	0.01%	1.31%	0.49%
(*t*-statistic)	(0.41)	(1.28)	(0.13)	(0.35)	(1.08)	(0.06)	(1.91)	(0.70)

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