Internet Appendix

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Credit Default Swaps, Fire Sale Risk and the Liquidity Provision in the Bond Market

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We utilize additional features of the Markit CDS dataset to further evaluate the impact of CDSs on bond liquidity. We concentrate on the difference in bond illiquidity between long-term bonds and short-term bonds for *the same bond issuer* and relate it to the difference in the presence of long-term maturity CDS contracts and short-term maturity CDS contracts. We link the differences in bond illiquidity between long-term bonds and short-term bonds of the same issuer, to the differences in the presence of long-term and short-term maturity CDS contracts. We use the sample average bond time-to-maturity (9 years) as the cutoff to define long-term and short-term bonds. We define the long-term CDS presence as an indicator equal to 1 if the issuer has CDS contracts outstanding of 10-year maturity, 15-year maturity, 20-year maturity, and 30-year maturity, and 0 otherwise. We define the short-term CDS presence as an indicator equal to 1 if the issuer has CDS contracts outstanding of 1-year maturity, 2-year maturity, 3-year maturity, 4-year maturity, 5-year maturity, and 7-year maturity, and 0 otherwise.

We report the results in Table IA-1. For each issuer-month, the dependent variable is the average difference in bond illiquidity between its long-term bonds and short-term bonds. Columns (1) and (2) are based on the Roll measure of bond illiquidity, while columns (3) and (4) and based on the Amihud measure. Columns (1) and (3) are for investment grade bonds, while columns (2) and (4) are for high yield bonds. Our variable of focus is the difference between the long-term CDS presence and the short-term CDS presence. The average differences in bond characteristics between long-term bonds and short-term bonds of the same issuer are additional control variables.

The results support the liquidity provision role of CDSs on the underlying bonds. The long-term CDS presence in excess of the short-term CDS presence significantly reduces the difference in Roll (Amihud) bond illiquidity between long-term bonds and short-term bonds

for investment grade bonds. No significant effect is observed for high yield bonds.

In the main analyses, we use as instrument the level of loan concentration of the lending banks that the bond issuer borrows from. The intuition is that banks use credit derivatives to hedge their loan positions. The less diversified their overall loan portfolio is, the higher is the incentive they have to purchase CDSs for hedging purposes. To provide evidence of this claim, we link the degree of concentration of a bank's loan portfolio across different industries and geographical regions to its use of credit derivatives, foreign exchange derivatives and interest rate derivatives (for hedging purposes).

The analysis is done at the bank level. First, for each bank, we define a measure of loan concentration based on the bank loan data from LPC Dealscan. Dealscan is a comprehensive dataset that contains detailed information relating to the start and expiration dates of loan deals along with the names of the lending banks, loan amounts, and terms and conditions of the loans. We focus on all the loan transactions in the US. For each bank-year, we classify its existing loans into different industries (the Fama-French 48 Industry classification)-states pairs. Then, we calculate the Herfindahl index as the proxy for loan concentration. We expect banks whose loans are more concentrated in a specific region and industry to face a higher credit risk and to have greater incentives to purchase credit derivatives for protection.

Next, we link (by name matching) LPC Dealscan with the Bank Regulatory database, which contains balance sheet and off-balance sheet information of US banks, and more importantly, detailed information on the banks' use of interest rate, foreign exchange and credit derivatives specifically for hedging purposes. We require the bank's total amount of commercial and industrial loans (RCON1766) to be larger than $100 million. This requirement makes sure that the banks we use are commercial banks actively involved in the corporate loan market. We focus on the notional amounts of such derivatives positions. Finally, we regress the use of credit derivatives, foreign exchange derivatives and interest rate

derivatives on the degree of concentration of a bank's loan portfolio across different industries and geographical regions.

We report the results in Table IA-2. The results show a significantly positive relationship between the use of credit derivatives for hedging and the degree of concentration of the loan portfolio of the bank, both for the notional amount and for the notional amount standardized by bank assets. The economic significance is sizable. One standard deviation more concentrated portfolio is related to 59% (133%) higher use of credit derivatives in notional amount (notional amount standardized by the bank asset), compared to the sample average. The last two columns provide some interesting placebo tests. They show that such a relationship does not exist in the case of interest rate derivatives and foreign exchange derivatives. This suggests that the concentration of the loan portfolio is directly related to credit risk, but not to interest risk and foreign exchange risk, which are arguably more systematic than credit risk and are less likely to be managed by loan diversification. Not surprisingly, we document that bank size is significantly related to the use of derivatives for hedging interest rate risk, foreign exchange risk and credit risk. These findings make us confident in exploiting the concentration of the loan portfolio of the banks as a proxy for the market demand for credit protection – i.e., as an instrument for the presence of CDS contracts.

One potential concern may be that the geographic and industry loan concentration of banks may be correlated with bond liquidity because of local proximity in bank lending (e.g., Hollander and Verriest, 2016). To deal with this concern, we drop local firms (i.e., headquartered in the same state) when we estimate bank portfolio concentration at the bank level and exclude local banks when calculating loan Herfindahl at the issuer level. We report the results based on the presence of CDS contracts in Table IA-3. Further, we consider the subsample of bonds issued by firms with CDS contracts trading in the market, and report the results based on the depth of CDSs in Table IA-4. The fact that we find similar results to the ones reported in the main analyses further justifies the concentration of the loan portfolio of

the banks as a proxy for the market demand for credit protection.

For an additional robustness check, we consider the fact that the probability of observing a CDS contract is likely to be a function of the total amount of bonds outstanding by the issuer. The higher the total amount of bonds outstanding, the more likely we observe CDS contracts written on such bond issuers. Therefore, in the first stage of the IV specification, we include the total amount of bonds outstanding by the issuer. We report the results in Table IA-5. We find that it is indeed the case that the probability of observing a CDS contract is significantly positively related to the total amount of bonds outstanding but not the size of the individual bond. The second stage results are consistent with the reported ones in the main analyses, showing a significantly negative relationship between the presence of CDS contracts and both proxies of bond illiquidity for investment grade bonds, while no effect is observed for high yield bonds. Similarly, we also consider the subsample of bonds issued by firms with CDS contracts trading in the market, and report the results based on the depth of CDSs in Table IA-6. Consistently with the reported ones in the main analyses, there is a significantly negative relationship between the CDS depth and both proxies of bond illiquidity for investment grade bonds, while no effect is observed for high yield bonds.

Table IA-1
Long-term vs. Short-term CDS Presence

In this table, at the bond issuer level, we link the differences in bond illiquidity between long-term bonds and short-term bonds of the same issuer, to the differences in the presence of long-term maturity CDS contracts and short-term maturity CDS contracts. We use the sample average bond time-to-maturity (9 years) as the cutoff to define long-term and short-term bonds. For each issuer-month, the dependent variable is the average difference in bond illiquidity between its long-term bonds and short-term bonds. We define the long-term CDS presence as an indicator equal to 1 if the issuer has CDS contracts outstanding of 10-year maturity, 15-year maturity, 20-year maturity, and 30-year maturity, and 0 otherwise. We define the short-term CDS presence as an indicator equal to 1 if the issuer has CDS contracts outstanding of 1-year maturity, 2-year maturity, 3-year maturity, 4-year maturity, 5-year maturity, and 7-year maturity, and 0 otherwise. Our variable of focus is the difference between the long-term CDS presence and the short-term CDS presence. The average differences in bond characteristics between long-term bonds and short-term bonds are included as control variables. Columns (1) and (2) are based on the Roll measure of bond illiquidity, while columns (3) and (4) and based on the Amihud measure. Columns (1) and (3) are for investment grade bonds, while columns (2) and (4) are for high yield bonds. ***, ** and * represent significance levels at 1%, 5% and 10% respectively.

Dep. Var.: Difference in Illiquidity (Long-term – Short-term)	*Bond Illiquidity (Roll)*		*Bond Illiquidity (Amihud)*	
	Investment Grade	*High Yield*	*Investment Grade*	*High Yield*
	1	2	3	4
DIFFERENCE_IN_CDS_PRESENCE				
(Long-term – Short-term)	-0.063**	0.059	-0.033**	-0.015
	(-2.57)	(1.14)	(-2.02)	(-0.66)
Controls				
DIFFERENCE_IN_OFFERING_AMOUNT	-0.849***	-0.288	-0.351**	-0.384**
	(-4.10)	(-0.94)	(-2.56)	(-2.27)
DIFFERENCE_IN_COUPON_RATE	-0.843	-7.269***	-0.648	-3.472***
	(-0.73)	(-3.45)	(-0.80)	(-3.21)
DIFFERENCE_IN_DURATION	0.058***	0.127***	0.009***	0.035***
	(12.56)	(8.31)	(2.73)	(4.77)
DIFFERENCE_IN_BOND_AGE	0.041***	0.053***	0.032***	0.036***
	(8.09)	(5.10)	(6.59)	(6.40)
DIFFERENCE_IN_CALLABILITY	0.003	0.093	-0.000	0.055
	(0.07)	(0.87)	(-0.01)	(0.79)
DIFFERENCE_IN_FUNGIBILITY	0.036	-0.005	0.012	0.010
	(1.39)	(-0.07)	(0.58)	(0.30)
DIFFERENCE_IN_CREDIT_ENHANCEMENT	-0.098	0.225***	-0.048	0.044
	(-1.65)	(3.17)	(-1.31)	(0.84)
DIFFERENCE_IN_NEWLY_ISSUED_BOND	-0.200**	-0.743	-0.007	-0.456
	(-2.31)	(-1.52)	(-0.11)	(-1.65)
EQUITY_VOLATILITY	1.228	2.111	-0.389	-1.808**
	(0.87)	(1.07)	(-0.38)	(-2.16)
EQUITY_BETA	0.003	-0.022	0.007	0.003
	(0.18)	(-1.03)	(0.67)	(0.37)
BOOK_SIZE	-0.026**	0.014	0.000	0.001
	(-2.06)	(0.56)	(0.02)	(0.08)
MARKET-TO-BOOK	-0.018	-0.114**	0.008	-0.021
	(-1.09)	(-2.57)	(0.61)	(-0.88)
BOOK_LEVERAGE	-0.116	0.351***	-0.202***	0.150*
	(-1.45)	(2.75)	(-2.73)	(1.79)
PROFITABILITY	-0.004	-0.126	0.017	0.076
	(-0.02)	(-1.34)	(0.14)	(1.24)
CASH_HOLDING	0.163	0.387	0.147*	-0.109
	(1.42)	(1.66)	(1.78)	(-0.82)
DIVIDEND_PAYER	0.099**	0.103**	0.067	0.085***
	(2.14)	(2.15)	(1.33)	(3.10)
Time FE	Y	Y	Y	Y
Clustering	Issuer	Issuer	Issuer	Issuer
Number of Obs.	19,270	3,971	19,270	3,971
R-squared	0.100	0.206	0.153	0.306

Table IA-2
Banks' Loan Concentration and the Use of Derivatives for Hedging

In this table, we regress the use of credit derivatives, foreign exchange derivatives and interest rate derivatives on the degree of concentration of a bank's loan portfolio across different industries and geographical regions. The dependent variable in columns (1)-(2) is the log value of the notional amount of credit derivatives (RCFDA535). The dependent variable in columns (3)-(4) is the notional amount of credit derivatives divided by the bank's total asset (RCFDA535/RCFD2170). The dependent variable in column (5) is the notional amount of foreign exchange derivatives divided by the bank's total asset (RCFD8726/RCFD2170), while in column (6) it is the notional amount of interest rate derivatives divided by the bank's total asset (RCFD8725/RCFD2170). Bank size is the log value of total asset (RCFD2170). ***, ** and * represent significance levels at 1%, 5% and 10% respectively using heteroscedasticity robust standard errors.

Dep. var.:	*Credit Derivatives (log of notional amount)*		*Credit Derivatives (notional amount/assets)*		*FX (notional amount/assets)*	*Interest Rate (notional amount/assets)*
	1	2	3	4	5	6
LOAN HERFINDAHL	3.318***	3.318***	0.051***	0.051***	0.000	0.005
	(8.97)	(4.70)	(4.39)	(3.06)	(0.20)	(0.08)
BANK SIZE	2.695***	2.695***	0.029***	0.029***	0.001***	0.082***
	(22.26)	(9.27)	(4.98)	(3.13)	(2.99)	(3.28)
Year FE	Y	Y	Y	Y	Y	Y
Clustering	-	Bank	-	Bank	Bank	Bank
Number of obs.	922	922	922	922	922	922
R-squared	0.559	0.559	0.208	0.208	0.025	0.109

Table IA-3
IV for CDS Presence: Excluding Banks in the Same State

We use the level of geographic and industry concentration of the lending banks, from which the bond issuer borrows its bank debt to identify the demand for CDS contracts, as an instrument for the presence of CDS contracts. Specifically, at the issuer level, we calculate the loan Herfindahl instrument as the minimum loan concentration among all the banks from which the issuer borrows in the last 5 years. We construct banks' loan portfolio concentration based on the syndicated loan data from LPC Dealscan. We focus on relatively large bank loans with loan amount more than $100 million. For each bank, we group its existing loans into industry (the Fama-French 48 industry classification) - state pairs. We then calculate the Herfindahl across those pairs as the concentration of the bank's loan portfolio. We drop local firms (i.e., headquartered in the same state) when we estimate bank portfolio concentration at the bank level, and exclude local banks when calculating loan Herfindahl at the issuer level. The table layout is the same as in Table VI. In all the specifications, we include industry, time and credit rating fixed effects, and cluster the standard errors at the issuer level. ***, ** and * represent significance levels at 1%, 5% and 10% respectively using heteroscedasticity robust standard errors.

Dep. Var.	*CDS Presence*	*Bond Illiquidity (Roll)*		*Bond Illiquidity (Amihud)*	
	First Stage (Probit Regression)	*Investment Grade*	*High Yield*	*Investment Grade*	*High Yield*
	1	2	3	4	5
CDS_PRESENCE (instrumented)		-0.470**	-0.393	-0.434**	-0.089
		(-2.20)	(-1.42)	(-2.40)	(-0.77)
LOAN_HERFINDAHL	1.835***				
	(3.27)				
Controls					
OFFERING_AMOUNT	-0.112	-0.163***	-0.248***	-0.055***	-0.146***
	(-1.63)	(-9.59)	(-6.89)	(-3.43)	(-9.17)
COUPON_RATE	-3.111	-2.401***	-4.331**	-1.737***	-3.091***
	(-1.18)	(-3.04)	(-2.54)	(-2.69)	(-3.73)
DURATION	0.013	0.083***	0.095***	0.023***	0.023***
	(1.45)	(22.43)	(6.18)	(8.14)	(3.36)
BOND_AGE	0.051***	0.047***	0.038***	0.040***	0.033***
	(3.92)	(10.89)	(4.14)	(10.42)	(7.97)
CALLABILITY	0.117	0.027	0.141*	0.016	0.019
	(1.19)	(0.81)	(1.75)	(0.60)	(0.34)
FUNGIBILITY	0.099	0.014	0.036	0.028	-0.034
	(1.33)	(0.77)	(0.81)	(1.64)	(-1.54)
CREDIT_ENHANCEMENT	-0.204	-0.069	-0.109	-0.017	-0.019
	(-1.28)	(-1.52)	(-1.29)	(-0.45)	(-0.48)
NEWLY_ISSUED_BOND	0.058	-0.320***	-0.457***	-0.216***	-0.168***
	(0.92)	(-10.26)	(-4.36)	(-12.46)	(-4.17)
EQUITY_VOLATILITY	4.110	12.711***	16.097***	2.399***	2.430***
	(1.60)	(9.03)	(8.01)	(3.63)	(4.02)
EQUITY_BETA	0.112***	0.004	-0.011	0.011	0.002
	(3.41)	(0.35)	(-0.76)	(1.36)	(0.43)
BOOK_SIZE	0.302***	-0.048***	0.089***	-0.014	0.038**
	(4.60)	(-3.03)	(2.59)	(-1.14)	(2.45)
MARKET-TO-BOOK	-0.239***	-0.110***	-0.205***	-0.057***	-0.085***
	(-3.52)	(-5.04)	(-2.68)	(-3.04)	(-3.01)
BOOK_LEVERAGE	1.701***	0.182*	0.473	0.079	0.156
	(3.66)	(1.83)	(1.28)	(1.00)	(1.03)
PROFITABILITY	0.175	-0.156	-0.195	-0.076	0.015
	(0.44)	(-1.24)	(-1.31)	(-0.70)	(0.25)
CASH_HOLDING	0.571	0.080	0.692	0.047	0.177
	(0.74)	(0.66)	(1.50)	(0.51)	(0.88)
DIVIDEND_PAYER	0.210	0.036	0.051	0.024	0.014
	(1.47)	(0.81)	(0.91)	(0.65)	(0.57)
On-the-run indicators	Y	Y	Y	Y	Y
Industry FE, Time FE, Rating FE	Y	Y	Y	Y	Y
Clustering	Issuer	Issuer	Issuer	Issuer	Issuer
Number of Obs.	261,374	143,454	27,687	143,454	27,687
R-squared	-	0.380	0.413	0.267	0.433

Table IA-4
IV for CDS Depth: Excluding Banks in the Same State

In this table, we focus the subsample of bonds issued by firms with CDS contracts trading in the market. Specifically, we link the depth of CDS contracts to bond illiquidity. Following Qiu and Yu (2012), we use the number of dealers providing CDS quotes as a proxy for the depth of CDS contract. We define CDS composite depth as the log number of dealers in the CDS contracts with 5-year maturity. We focus on the instrumental variable regression, with CDS depth instrumented by the loan concentration of the lending banks. We construct the instrument based on the loan Herfindahl defined in the same way as in Table IA-2. The table layout is the same as in Table X. In all the specifications, we include industry, time and credit rating fixed effects, and cluster the standard errors at the issuer level. ***, ** and * represent significance levels at 1%, 5% and 10% respectively using heteroscedasticity robust standard errors with t-statistics given in parentheses.

Dep. Var.	*CDS Depth*	*Bond Illiquidity (Roll)*		*Bond Illiquidity (Amihud)*	
	First Stage	*Investment Grade*	*High Yield*	*Investment Grade*	*High Yield*
	1	2	3	4	5
CDS_PRESENCE (instrumented)		-0.364***	-0.009	-0.282***	0.179
		(-5.10)	(-0.01)	(-6.82)	(0.46)
LOAN_HERFINDAHL	0.360***				
	(3.30)				
Controls					
OFFERING_AMOUNT	-0.009	-0.158***	-0.342***	-0.045***	-0.185***
	(-0.91)	(-9.50)	(-6.21)	(-2.86)	(-7.38)
COUPON_RATE	0.699	-2.715***	-6.744**	-1.466***	-5.087***
	(1.65)	(-3.72)	(-2.20)	(-2.87)	(-3.44)
DURATION	-0.000	0.087***	0.112***	0.024***	0.028***
	(-0.13)	(22.75)	(5.64)	(8.65)	(3.36)
BOND_AGE	0.002	0.044***	0.030***	0.036***	0.031***
	(1.16)	(11.20)	(3.41)	(11.55)	(7.20)
CALLABILITY	0.014	0.044	0.199**	0.013	0.093*
	(0.96)	(1.38)	(2.42)	(0.56)	(1.72)
FUNGIBILITY	0.030**	0.021	0.075	0.026	-0.047
	(2.38)	(1.12)	(1.24)	(1.54)	(-1.59)
CREDIT_ENHANCEMENT	-0.048*	-0.093*	-0.028	-0.059	0.034
	(-1.80)	(-1.78)	(-0.30)	(-1.52)	(0.63)
NEWLY_ISSUED_BOND	0.002	-0.331***	-0.672***	-0.228***	-0.228***
	(0.24)	(-10.28)	(-5.71)	(-13.25)	(-5.54)
EQUITY_VOLATILITY	1.514***	14.324***	14.572***	3.831***	2.320***
	(3.36)	(8.33)	(6.14)	(5.41)	(2.81)
EQUITY_BETA	0.025***	-0.003	-0.008	0.009	0.008
	(2.80)	(-0.27)	(-0.34)	(1.35)	(0.97)
BOOK_SIZE	0.146***	0.008	0.095	0.024**	0.017
	(10.96)	(0.56)	(0.88)	(2.40)	(0.28)
MARKET-TO-BOOK	0.031*	-0.044**	-0.174***	-0.009	-0.105***
	(1.69)	(-2.09)	(-3.10)	(-0.63)	(-4.07)
BOOK_LEVERAGE	0.312***	0.312***	0.146	0.168**	0.096
	(3.69)	(2.76)	(0.36)	(2.21)	(0.55)
PROFITABILITY	0.079	-0.140	-0.275	0.026	-0.035
	(0.64)	(-1.56)	(-0.69)	(0.38)	(-0.17)
CASH_HOLDING	-0.073	-0.076	-0.428	-0.090	-0.147
	(-0.62)	(-0.55)	(-0.63)	(-0.92)	(-0.58)
DIVIDEND_PAYER	0.126***	0.056	-0.013	0.031	-0.031
	(2.84)	(1.14)	(-0.07)	(0.96)	(-0.32)
On-the-run indicators	Y	Y	Y	Y	Y
Industry FE, Time FE, Rating FE	Y	Y	Y	Y	Y
Clustering	Issuer	Issuer	Issuer	Issuer	Issuer
R-squared	0.622	0.388	0.464	0.305	0.464
Number of Obs.	197,754	112,672	14,933	112,672	14,933

Table IA-5
IV for CDS Presence: Including Total Bond Outstanding in the First Stage

This table presents the instrumental variable regression results to examine the relation between CDS presence and bond illiquidity. We consider two instrumental variables. First, we use the level of geographic and industry concentration of the lending banks, from which the bond issuer borrows its bank debt to identify the demand for CDS contracts, as an instrument for the presence of CDS contracts. Specifically, at the issuer level, we calculate the loan Herfindahl instrument as the minimum loan concentration among all the banks from which the issuer borrows in the last 5 years. We construct banks' loan portfolio concentration based on the syndicated loan data from LPC Dealscan. We focus on relatively large bank loans with loan amount more than $100 million. For each bank, we group its existing loans into industry (the Fama-French 48 industry classification) - state pairs. We then calculate the Herfindahl across those pairs as the concentration of the bank's loan portfolio. Second, we use the logarithm of total amount of bond outstanding for the bond issuer as another instrument. The table layout is the same as in Table VI. In all the specifications, we include industry, time and credit rating fixed effects, and cluster the standard errors at the issuer level. ***, ** and * represent significance levels at 1%, 5% and 10% respectively using heteroscedasticity robust standard errors.

Dep. Var.	*CDS Presence*	*Bond Illiquidity (Roll)*		*Bond Illiquidity (Amihud)*	
	First Stage (Probit Regression)	*Investment Grade*	*High Yield*	*Investment Grade*	*High Yield*
	1	2	3	4	5
CDS_PRESENCE (instrumented)		-0.913***	0.011	-0.521***	0.212
		(-2.62)	(0.02)	(-2.63)	(0.93)
LOAN_HERFINDAHL	4.106***				
	(3.19)				
TOTAL_BONDS_OUTSTANDING	0.217***				
	(3.02)				
Controls					
OFFERING_AMOUNT	-0.167**	-0.170***	-0.256***	-0.056***	-0.152***
	(-2.45)	(-7.39)	(-7.62)	(-3.35)	(-9.01)
COUPON_RATE	-2.691	-2.644**	-4.379**	-1.786**	-3.126***
	(-1.01)	(-2.57)	(-2.56)	(-2.57)	(-3.57)
DURATION	0.011	0.085***	0.095***	0.023***	0.023***
	(1.23)	(20.88)	(6.30)	(8.02)	(3.38)
BOND_AGE	0.050***	0.051***	0.031***	0.041***	0.028***
	(3.84)	(8.95)	(2.69)	(9.91)	(5.47)
CALLABILITY	0.114	0.033	0.122	0.017	0.004
	(1.18)	(0.85)	(1.51)	(0.62)	(0.08)
FUNGIBILITY	0.106	0.022	-0.004	0.030	-0.064**
	(1.42)	(0.90)	(-0.06)	(1.58)	(-1.98)
CREDIT_ENHANCEMENT	-0.200	-0.051	-0.010	-0.014	0.055
	(-1.27)	(-0.75)	(-0.08)	(-0.33)	(0.85)
NEWLY_ISSUED_BOND	0.045	-0.306***	-0.435***	-0.213***	-0.152***
	(0.71)	(-9.24)	(-4.06)	(-11.87)	(-3.23)
EQUITY_VOLATILITY	4.236*	12.735***	16.431***	2.403***	2.679***
	(1.66)	(7.98)	(8.63)	(3.40)	(4.56)
EQUITY_BETA	0.112***	0.009	-0.015	0.012	-0.001
	(3.44)	(0.52)	(-0.99)	(1.30)	(-0.15)
BOOK_SIZE	0.136*	-0.049**	0.076**	-0.014	0.028
	(1.75)	(-2.15)	(2.33)	(-1.04)	(1.61)
MARKET-TO-BOOK	-0.256***	-0.142***	-0.140	-0.064***	-0.037
	(-3.74)	(-4.02)	(-1.60)	(-2.99)	(-0.89)
BOOK_LEVERAGE	1.274**	0.275*	0.135	0.097	-0.096
	(2.54)	(1.66)	(0.27)	(1.01)	(-0.41)
PROFITABILITY	0.146	-0.215	-0.291*	-0.087	-0.057
	(0.36)	(-1.16)	(-1.79)	(-0.75)	(-0.77)
CASH_HOLDING	0.535	0.079	0.283	0.047	-0.128
	(0.69)	(0.39)	(0.48)	(0.44)	(-0.43)
DIVIDEND_PAYER	0.179	0.065	0.060	0.029	0.020
	(1.25)	(0.96)	(1.14)	(0.71)	(0.84)
On-the-run indicators	Y	Y	Y	Y	Y
Industry FE, Time FE, Rating FE	Y	Y	Y	Y	Y
Clustering	Issuer	Issuer	Issuer	Issuer	Issuer
Number of Obs.	261,457	143,461	27,687	143,461	27,687
R-squared	-	0.320	0.427	0.233	0.422

Table IA-6
IV for CDS Depth: Including Total Bond Outstanding in the First Stage

In this table, we perform another robustness check, by focusing the subsample of bonds issued by firms with CDS contracts trading in the market. Specifically, we link the depth of CDS contracts to bond illiquidity. Following Qiu and Yu (2012), we use the number of dealers providing CDS quotes as a proxy for the depth of CDS contract. We define CDS composite depth as the log number of dealers in the CDS contracts with 5-year maturity. We consider two instrumental variables. We construct the first instrument based on the loan Herfindahl defined in the same way as in Table IV. We use the logarithm of total amount of bond outstanding for the bond issuer as the second instrument. The table layout is the same as in Table X. In all the specifications, we include industry, time and credit rating fixed effects, and cluster the standard errors at the issuer level. ***, ** and * represent significance levels at 1%, 5% and 10% respectively using heteroscedasticity robust standard errors with t-statistics given in parentheses.

Dep. Var.	*CDS Depth*	*Bond Illiquidity (Roll)*		*Bond Illiquidity (Amihud)*	
	First Stage	*Investment Grade*	*High Yield*	*Investment Grade*	*High Yield*
	1	2	3	4	5
CDS_PRESENCE (instrumented)		-0.457***	1.338	-0.320***	0.856
		(-3.34)	(1.04)	(-4.82)	(1.45)
LOAN_HERFINDAHL	0.776***				
	(3.09)				
TOTAL_BONDS_OUTSTANDING	0.036**				
	(2.19)				
Controls					
OFFERING_AMOUNT	-0.016	-0.158***	-0.310***	-0.045***	-0.169***
	(-1.51)	(-9.49)	(-4.78)	(-2.89)	(-5.59)
COUPON_RATE	0.811*	-2.684***	-10.258**	-1.455***	-6.856***
	(1.90)	(-3.67)	(-2.23)	(-2.83)	(-3.01)
DURATION	-0.000	0.087***	0.116***	0.024***	0.031***
	(-0.23)	(22.82)	(6.85)	(8.68)	(4.07)
BOND_AGE	0.002	0.045***	0.034***	0.036***	0.033***
	(1.17)	(10.99)	(3.33)	(11.53)	(5.94)
CALLABILITY	0.012	0.045	0.204*	0.014	0.095
	(0.86)	(1.41)	(1.87)	(0.58)	(1.40)
FUNGIBILITY	0.031**	0.024	0.074	0.027	-0.048
	(2.51)	(1.20)	(1.05)	(1.61)	(-1.24)
CREDIT_ENHANCEMENT	-0.049*	-0.098*	0.093	-0.061	0.095
	(-1.83)	(-1.79)	(0.56)	(-1.53)	(1.06)
NEWLY_ISSUED_BOND	0.003	-0.333***	-0.699***	-0.228***	-0.242***
	(0.24)	(-10.17)	(-4.62)	(-13.13)	(-3.87)
EQUITY_VOLATILITY	1.557***	14.537***	15.439***	3.916***	2.757***
	(3.44)	(8.27)	(7.17)	(5.32)	(3.09)
EQUITY_BETA	0.027***	-0.002	-0.005	0.010	0.009
	(2.92)	(-0.14)	(-0.22)	(1.43)	(0.97)
BOOK_SIZE	0.120***	0.018	-0.101	0.028**	-0.082
	(6.72)	(0.91)	(-0.54)	(2.46)	(-0.94)
MARKET-TO-BOOK	0.027	-0.042*	-0.181***	-0.008	-0.109**
	(1.44)	(-1.90)	(-2.62)	(-0.55)	(-2.54)
BOOK_LEVERAGE	0.248***	0.339***	0.383	0.179**	0.216
	(2.84)	(2.79)	(0.89)	(2.25)	(1.15)
PROFITABILITY	0.075	-0.135	-0.717	0.028	-0.257
	(0.63)	(-1.45)	(-1.53)	(0.41)	(-1.01)
CASH_HOLDING	-0.064	-0.097	-0.890	-0.099	-0.380
	(-0.53)	(-0.65)	(-1.43)	(-0.96)	(-1.29)
DIVIDEND_PAYER	0.117***	0.064	-0.320	0.035	-0.185
	(2.64)	(1.20)	(-1.06)	(1.01)	(-1.27)
On-the-run indicators	Y	Y	Y	Y	Y
Industry FE, Time FE, Rating FE	Y	Y	Y	Y	Y
Clustering	Issuer	Issuer	Issuer	Issuer	Issuer
R-squared	0.624	0.384	0.438	0.300	0.376
Number of Obs.	197,790	112,679	14,933	112,679	14,933