Credit Default Swaps and Credit Risk Reallocation

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Content

1. Introduction

Motivation

Credit Default Swaps (CDS) impact individual risk. Limited studies so far since:

- No effect on aggregate risk (zero-sum game) but individual risk matters (Gabaix, 2011)
- Lack of investor-level micro data required to identify trading motives

$\Longrightarrow$ **Why do investors trade CDS?**

$\Longrightarrow$ **What is the effect of CDS on individual risk?**

What is a CDS?

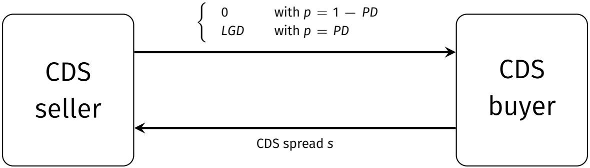


Figure 1: Payoffs of a simple CDS written on a reference with default probability PD and loss given default LGD

- A CDS is a derivative contract on credit risk such that:
  - CDS buyer pays a premium ("spread") to a CDS seller to insure a notional N amount of credit risk on a specific reference entity
    $\Longrightarrow$ **An insurance product to hedge credit risk**
  - Payoffs of selling a CDS akin to those of buying a bond on margin
    $\Longrightarrow$ **A synthetic debt product**

Approach

- CDS can affect individual risk through two effects:
  - Exposure concentration
  - Exposure riskiness
- What we do:
  1. Build a granular database of credit risk holdings
  2. Disentangle positions between three trading strategies: speculators, hedgers and arbitrageurs
  3. Analyze the impact of trading strategies on the two effects above, and conclude on individual risk

Contributions

- Arbitrage is a niche strategy (2% of CDS purchase), hedging a minor strategy (13 – 19% of CDS purchase), and the bulk of trading corresponds to long and short speculation
- CDS decrease exposure concentration:
  - Hedgers diversify their most concentrated exposures
  - Speculators use CDS to gain short credit risk exposures, but also as a substitute for debt when underlying exposures have relatively low concentration
- Dealers and banks use CDS as a substitute for debt for the riskiest references, while the opposite goes for funds

$\Longrightarrow$ Overall, CDS increase investor individual risk as measured by portfolio risk metrics

Literature review

- **Theoretical literature** on risk management trade determinants in general, (Atkeson, Eisfeldt, and Weill, 2015) and with CDS in particular (Oehmke and Zawadowski, 2015; Che and Sethi, 2014)
- **Empirical tests of trade determinants** (Oehmke and Zawadowski, 2017; Bai and Collin-Dufresne, 2019), in particular using **granular data** (Gündüz et al., 2017; Boyarchenko, Costello, and Shachar, 2018; Czech, 2021; Jiang, Ou, and Zhu, 2021)
- **Effect of CDS on reference risk** (Ashcraft and Santos, 2009; Hirtle, 2009; Saretto and Tookes, 2013; Subrahmanyam, Tang, and Wang, 2014)
- **Effect of financial products on investor-level** portfolio risk (Bessler and Wolff, 2015; Hippert, Uhde, and Wengerek, 2019), and risk allocation (Hoffmann et al., 2018)

2. Data

Our data: a large panel of credit risk holdings

- Three types of exposures:
  - **Single-name CDS** from EMIR
  - **Debt securities** from OPC titres, SHS-G and Solvency 2
  - **Loans** from SCR
- Entities are identified using a register built on multiple sources (RIAD, CSDB, supervisory data, GLEIF)
- 70 FR and 904 non-FR NFC referencing CDS
- Two exhaustive perimeters of investors trading CDS:
  - Full coverage of FR investors (6 banks, 214 funds, 3 insurers)
  - Full coverage of EA banks on FR credit risk, except for cross border lending (35 EA banks)
- Quarterly panel with 36k pairs from 2016Q1 to 2019Q4

▶▶ Statdesk ▶▶ Consolidation approach ▶▶ Exposures by sector

3. Disentangling strategies

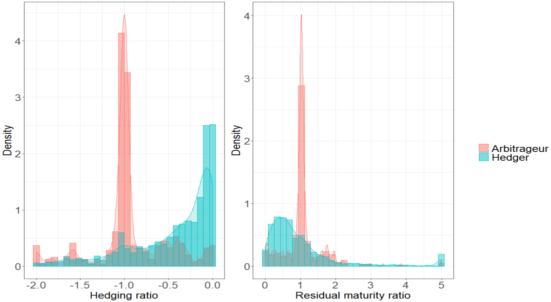
Different motives for trading CDS

- **Speculation:** Use CDS as an alternative trading venue because of higher liquidity (Oehmke and Zawadowski, 2015), lower margin requirements (Che and Sethi, 2014) or lower transparency (Jiang, Ou, and Zhu, 2021)
- **Hedging:**
  - Use CDS to adjust credit risk position to shocks (Rampini and Viswanathan, 2010; Atkeson, Eisfeldt, and Weill, 2015)
  - Use CDS to maintain a lending relationship whilst not being able to bear the associated risks
- **Arbitrage:** capture the basis between the bond and the CDS spread (Bai and Collin-Dufresne, 2019)

$\Longrightarrow$ To disentangle hedging from arbitrage we use the timing of exposure acquisition, and the nature of the debt exposure

Methodology

Does our methodology make sense? Hedgers and arbitrageurs have different maturity and hedging ratio profiles



Note: Distributions before the identification of offsetters already existing as of 2016Q1. By convention, purchasing a CDS gives rise to a negative CDS position hence the negative hedging ratio.

Figure 2: Pooled distribution of hedging ratios $\frac{CDS_{ijt}}{Debt_{ijt}}$ (lhs) and residual maturity ratios $\frac{RESMAT\_CDS_{ijt}}{RESMAT\_Debt_{ijt}}$ (rhs) for hedgers and arbitrageurs purchasing CDS

Basis analysis

Sectors exhibit different strategies

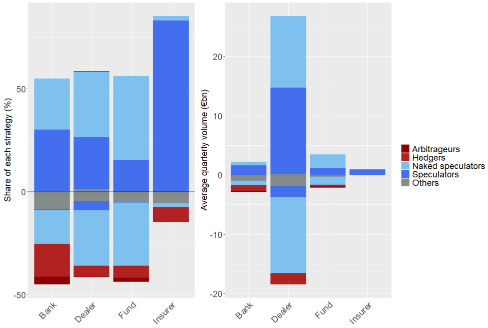


Figure 3: Pooled distribution and average volume of strategies by sector

- Funds participate mainly through naked positions, while banks have highest share of hedging positions, and dealers by far the largest net exposures
- Arbitrage represents 2% of CDS purchases and 0.02% of sales; hedging 13-19% of purchases (19% includes positions with unobserved entry and exit), and almost no relationship hedging

Strategy time series   Strategy descriptive statistics

4. Effect on credit risk allocation

4. Effect on credit risk allocation

4.1 Exposure concentration

Reducing exposure concentration

- We investigate how probability of CDS trading in a given strategy relates to debt concentration:

$$P(Strat_{ijt}|Debt_{ijt} > 0) = \Lambda\left(\beta\frac{DEBT_{ijt}}{TotExp_{it}} + \gamma DEBT_{ijt} + FE_{it} + FE_{jt}\right) + \epsilon_{ijt} \quad (1)$$

- Predictions:
  - Speculators may use CDS to leverage their views (Che and Sethi, 2014) or as an alternative trading venue (Oehmke and Zawadowski, 2015), $\beta >$ or < 0 for speculators
  - Hedgers may cover more their larger and more concentrated exposures because of the fixed costs of hedging (Atkeson, Eisfeldt, and Weill, 2015), $\beta > 0$ and $\gamma > 0$ for hedgers

Investors use CDS to reduce exposures concentration

	P(Hedger)	P(Other Short Offsetter)	P(Speculator)	
	(1)	(2)	(3)	(4)
Share debt exposure	31.43^{***}	-27.83^{**}	-12.47^{**}	-139.07^{***}
	(8.54)	(11.78)	(5.59)	(14.51)
Log Debt	0.46^{***}	0.42^{***}	-0.02	
	(0.03)	(0.04)	(0.01)	
Log Total				-0.07
				(0.07)
Num. obs.	14794	12471	37322	50165

Table 1: Probability to enter strategies and concentration of debt exposure

$\Longrightarrow$ Investors tend to hedge more their most concentrated debt exposures

$\Longrightarrow$ Investors speculate more on their least concentrated exposures... but not at the sector-country level Table

$\Longrightarrow$ Overall reduces investor-level HHI and Gini index Table

4. Effect on credit risk allocation

4.2 Risk-taking

CDS trading and reference risk

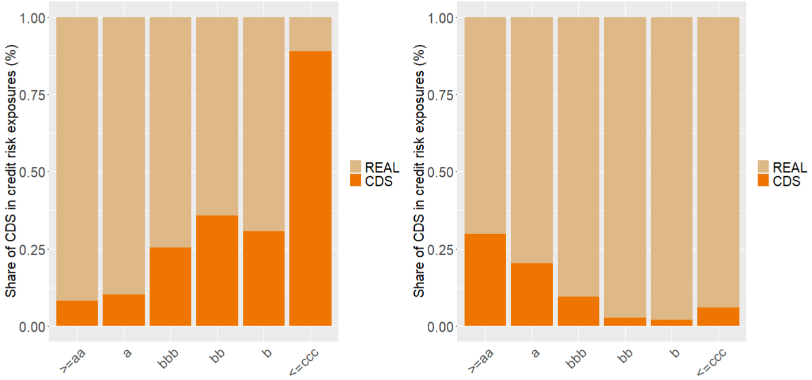
- We explore the relation between CDS trading strategies and reference spreads:

$$\mathbb{P}(CDS_{ijt} \neq 0 | Sign(Debt_{ijt}), Sign(CDS_{ijt})) = \Lambda\Big(\beta Sector_i * Spread_{jt} + \gamma_1 |Total|_{ijt} + \gamma_2 X_{jt} + FE_t\Big) + \epsilon_{ijt}, \quad (2)$$

  with X_{jt}: reference-level controls including bond and CDS measures of liquidity, reference debt, and a dummy if the reference is French

- Arguments that suggest CDS become relatively interesting as rating deteriorates:
  - Higher opacity of CDS relative to debt (Jiang, Ou, and Zhu, 2021)
  - Bond vs CDS difference in margin requirements increases when rating deteriorates according to FINRA rules
    - Investment grade (5Y 100bps): 10% margin requirement for bond vs. 4% for CDS sales
    - High yield (5Y 700bps): 50% vs. 25%

Banks and dealers unconditionally sell more CDS on riskier references



Banks and dealers | Funds

Figure 4: Pooled distribution of the share of CDS positions in investors long credit risk exposures by rating and sector

All strategies relate to underlying risk except short-selling strategies

	$P(CDS \neq 0)$			
	Long Credit Risk Only	Short Credit Risk Only	Short offsetter	Long offsetter
	(1)	(2)	(3)	(4)
Bank:Spread	0.14^{***}	0.10	0.08^{**}	-0.33
	(0.04)	(0.08)	(0.04)	(0.26)
Dealer:Spread	0.08^{*}	-0.01	-0.05	-0.74^{***}
	(0.04)	(0.06)	(0.03)	(0.17)
Fund:Spread	-0.09^{***}	0.20	0.05^{*}	-0.68
	(0.03)	(0.15)	(0.03)	(1.41)
Log |Total|	0.20^{***}	0.10^{***}	0.09^{***}	0.25^{***}
	(0.05)	(0.01)	(0.03)	(0.06)
FR Ref	-0.46^{***}	-2.01^{***}	-0.33^{***}	-1.34^{***}
	(0.07)	(0.25)	(0.11)	(0.48)
CDS bid-ask spread Ref	-3.65^{***}	-3.12^{***}	-5.18^{***}	-7.51^{***}
	(0.29)	(0.41)	(0.45)	(1.08)
Bond bid-ask spread Ref	-0.32^{**}	2.29^{***}	-0.49^{*}	8.05^{**}
	(0.13)	(0.80)	(0.30)	(3.37)
Top1000 CDS liquidity Ref	0.88^{***}	1.42^{***}	1.12^{***}	1.00^{***}
	(0.11)	(0.17)	(0.14)	(0.37)
Log Gross debt Ref	-0.04^{***}	-0.11^{**}	-0.09^{***}	0.05
	(0.01)	(0.05)	(0.02)	(0.06)
Num. obs.	67234	12511	53533	637

Table 2: Probability to trade CDS depending on sector

4. Effect on credit risk allocation

4.3 Portfolio risk

CDS and portfolio risk

- CDS have an ambiguous effect on the riskiness of individual portfolios:
  - CDS increase portfolio diversification
  - CDS seem to facilitate risk-taking for some institutions
- We study how portfolio risk changes when accounting for CDS (Bessler and Wolff, 2015; Hippert, Uhde, and Wengerek, 2019)
- Two complementary measures: volatility (Markowitz, 1952) and Value-at-Risk (Linsmeier and Pearson, 2000), using a simple measure of CDS returns and assuming no CDS-bond basis nor default

CDS significantly increase portfolio volatility and VaR, driven by short and long speculation strategies

	Δ Return	Δ Vol	Δ VaR	Δ Return	Δ Vol	Δ VaR
	(1)	(2)	(3)	(4)	(5)	(6)
Bank	−7.323	18.994**	18.644**			
	(5.854)	(9.584)	(7.948)			
Dealer	11.875***	47.595*	43.375**			
	(2.586)	(26.319)	(19.746)			
Fund	8.618*	50.503***	49.983***			
	(4.618)	(14.163)	(14.003)			
Insurer	0.260***	0.776***	−4.426***			
	(0.000)	(0.000)	(0.000)			
ShortHedger				−128.199	−397.058***	−355.756**
				(91.751)	(100.098)	(141.636)
LongSpeculators				29.875***	13.635	19.501*
				(9.468)	(9.736)	(10.314)
ShortSpeculators				36.879	401.325***	392.110***
				(23.262)	(48.576)	(67.330)
OtherCDS				−76.931	379.031**	313.581**
				(81.632)	(153.121)	(146.828)
Num. Obs.	742	742	742	3,153	3,153	3,149

Notes: Dependent variables are the difference in percentage points between portfolios with CDS and portfolios without CDS. We change the sign of differences in value-at-risk to give the same sign interpretation to volatility and value-at-risk changes: an increase in value-at-risk corresponds to an increase in portfolio risk. Strategies are continuous variables equal to the absolute notional CDS value of each strategy by investor-quarter, divided by the sum of absolute CDS and absolute debt exposure of each investor-quarter. In column (1) to (3), we restrict our regression to investor-quarters holding at least 5 CDS.

Table 3: Effect of investors sectors and CDS trading strategies on portfolio risk

5. Discussion and conclusion

A major assumption: taking debt exposures as given

- Theoretical (Atkeson, Eisfeldt, and Weill, 2015) and empirical CDS papers (Oehmke and Zawadowski, 2017; Boyarchenko, Costello, and Shachar, 2018; Jiang, Ou, and Zhu, 2021) take outstanding debt as given, arguing debt is less liquid than CDS
- In general equilibrium however, the inception of CDS:
  - Affects references decision to issue debt: they typically issue more debt at lower rates (Hirtle, 2009; Saretto and Tookes, 2013; Gündüz et al., 2017), and become riskier (Subrahmanyam, Tang, and Wang, 2014) $\Longrightarrow$ our results are conservative
  - Affects investors decision to hold debt since portfolios jointly determined $\Longrightarrow$ we try to identify the effect of CDS trading

Is there any correlation between CDS trading and debt portfolios?

- Identify the effect of trading CDS between and within investors/references, assuming the timing of the first trade exogenous (Ashcraft and Santos, 2009; Saretto and Tookes, 2013)
- No link between debt concentration and CDS inception at the reference level Table
- No link between debt concentration and CDS trading at the investor level Table
- No relation between exposure risk and portfolio risk, and CDS trading Table spread Table risk

Conclusion

- CDS facilitate risk management, but also short speculation and risk-taking by banks and dealers
- CDS increase individual risk as measured by portfolio risk metrics, due to a limited effect of hedging strategies compared to speculative ones

$\Longrightarrow$ **Important to account for CDS when assessing the vulnerability of investors to granular shocks**

$\Longrightarrow$ **Investor granular risk should matter for welfare in models with CDS**

6. Appendix

Summary statistics

Category	#Obs	CDS sell	CDS buy	#CDS sell	#CDS buy	Bonds long	Bonds short	Loans
Bank FR	3	0.94	-1.94	121.33	142.50	17.68	-0.01	28.71
Bank Non FR	35	2.14	-1.60	157.17	76.17	5.62	-0.13	20.85
Dealer FR	3	24.68	-13.73	811.33	524.50	15.26	-0.94	58.14
Fund FR	214	3.30	-1.83	322.83	258.00	25.89	-0.00	0.00
Insurer FR	3	1.07	-0.06	57.00	8.50	53.94	0.00	0.00
NFC FR	70	6.22	-3.99	333.33	219.50	31.29	-0.28	104.20
NFC NFR	904	25.91	-15.17	1136.33	790.17	87.09	-0.80	3.50
All	35621	32.13	-19.16	1469.67	1009.67	118.38	-1.08	107.70
Bond	135	2.03	-1.31	241.00	190.17	19.83	0.00	0.00
Mixed	54	1.27	-0.50	81.67	57.83	5.08	-0.00	0.00
Other	25	0.00	-0.01	0.17	10.00	0.98	0.00	0.00

Notes: "#Obs" is the number of observations in the pooled post-2018Q2 sample. "#CDS sell" and "#CDS buy" are the average number of positions by period. Other statistics correspond to pooled average net exposures by investor and reference sector x region, in €billion.

Table 4: Descriptive statistics

Back

Our approach to consolidation

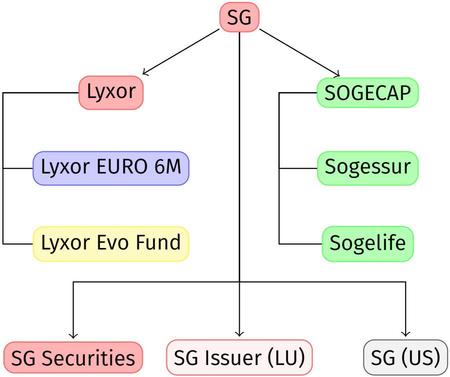
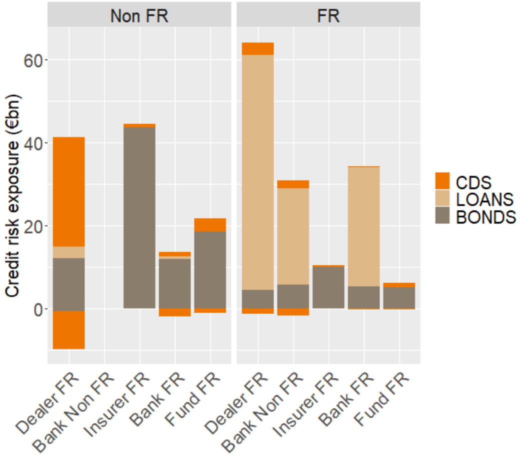


Figure 5: Stylised consolidation for Société Générale

Note: Bank affiliated entities for which we have all exposures are filled in red. We miss loan exposures from light red banks in the EZ, and we do not have any information from non EZ banks in grey. Insurer's affiliated entities are in green. Funds are kept separated, with distinct colors.

- **Bank affiliates** consolidated at the group level and separately from insurance affiliates (separate risk management) and funds under management (no direct exposure to fund assets)
- **Corporate affiliates** consolidated at the group level; no data on liability of parent towards subsidiary (or vice versa) can be problematic (ex: Casino/Rallye)

Different CDS positions at sector x country level



Note: A positive CDS exposure corresponds to the exposure of a net CDS seller.

Figure 6: Debt and single-name CDS exposures to NFC by investment sector and residence of reference (Non FR on the lhs and FR on the rhs) as of Q4 2019

Identifying strategies by investor-reference-time

CDS trader

$CDS_{ijt} \neq 0$

Speculator

$CDS_{ijt} * Debt_{ijt} \geq 0$
OR
$\frac{CDS_{ijt}}{Debt_{ijt}} < -2$

Speculator (naked)

$Debt_{ijt} = 0$ OR $\frac{CDS_{ijt}}{Debt_{ijt}} < -2$

Speculator

$Debt_{ijt} \neq 0$

Offsetter

$CDS_{ijt} * Debt_{ijt} < 0$

Hedger

$CDS_{ij,t-1} * Debt_{ij,t-1} \geq 0$ and $|Debt_{ij,t-1}| > 0$
OR
$CDS_{ij,t-1} = Debt_{ij,t-1} = 0$ and $Loan_{ijt} > 0$

Arbitrageur

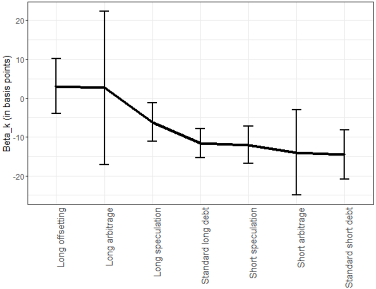
$CDS_{ij,t-1} = Debt_{ij,t-1} = 0$ and $Loan_{ijt} = 0$

Other

Note: for offsetting positions, when pair already observed in first period (2016Q1), we attribute to "other" pairs for which debt and CDS exit not observed, not through CDS, or not simultaneous. If exit through CDS, identify as "hedger". If exit simultaneous in debt and CDS, we attribute strategy based on propensity to belong to "arbitrageur" or "hedger" hedging ratio distribution.

Back

Does our methodology make sense? Arbitrageurs capture the CDS bond basis



Note: Bars represent 90% confidence interval. Standard errors clustered at investor x quarter level. By convention, “Short” strategies involve buying CDS. Speculators include naked speculators. CDS-bond basis winsorized at the 1% level. Data contains 481 short arbitrageurs, and 9 long arbitrageurs.

Figure 7: Mean CDS-bond basis by strategy vs non-arbitraging “Short offsetters”

Specification with investor i, reference j, and quarter t Go to regression :

$$CDSBondBasis_{ijt} = \alpha Spread_{ijt} + \sum_k \beta_k Strategy^k_{ijt} + FE_{it} + \epsilon_{ijt}$$

Arbitrageurs capture the CDS bond basis

	Basis	
	(1)	(2)
Spread	0.084***	0.067***
	(0.008)	(0.008)
Short arbitrage	-13.973**	-19.561***
	(6.732)	(6.775)
Standard long debt	-11.568***	-8.674***
	(2.282)	(2.422)
Standard short debt	-14.497***	-5.663
	(3.837)	(4.129)
Short speculation	-12.091***	-12.322***
	(2.924)	(3.300)
Long speculation	-6.183**	-8.241***
	(3.035)	(3.172)
Long arbitrage	2.606	2.004
	(12.076)	(12.951)
Long offsetting	3.079	-0.718
	(4.326)	(4.844)
Num. Obs.	58,355	47,329
Adjusted R^2	0.104	0.122
Liquidity controls	N	Y

Notes: Strategy wrt short offsetters other than short arbitrageurs. CDS-bond basis are winsorized at the 1% level. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 5: CDS bond basis by strategy

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Time series of strategies

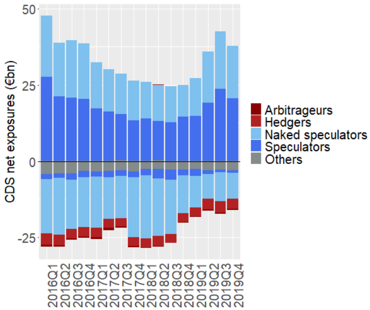

Figure 8: Volume of strategies over time

- Variations in net credit risk positions driven by long speculators and short naked speculators
- Hedging and arbitrage represent stable exposure amounts

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Descriptive statistics by strategy

Strategy	#Positions	Debt	CDS	HedgingRatio	ResMat		ShareCCP	Persistence	Turnover	
					Debt	CDS			Debt	CDS
Normal	8044	13.11	0.00	0.00	5.72	2.09	0.05	5.21	0.24	0.00
Others	155	0.45	0.13	0.89	5.17	2.15	0.10	9.76	0.00	0.00
Speculators	716	64.08	28.48	1.82	7.23	2.67	0.17	2.69	1.60	0.67
Naked speculators	1377	0.72	20.04	10.90	8.45	2.48	0.13	3.26	0.10	0.43
Hedgers	197	164.15	17.47	0.26	5.00	2.58	0.11	2.92	0.26	0.86
Arbitrageurs	35	14.68	12.97	1.00	3.37	2.61	0.03	3.29	0.20	0.19

Notes: Statistics are pooled by strategy, irrespective of the sign of the CDS position. "#Position" corresponds to the average number of non-null positions of each strategy by quarter since 2018Q3. "Debt" and "CDS" correspond to the mean face and notional value of a single position, in €mn. "HedgingRatio" is the median absolute hedging ratio $\frac{|CDS_{ijt}|}{|Debt_{ijt}|}$. "ResMatDebt" and "ResMatCDS" are mean residual maturity of debt and CDS in years. "ShareCCP" is the mean notional-weighted share of positions by investor-reference-quarter cleared through a CCP. "Persistence" is calculated as the mean duration of each strategy in our sample in quarters. "TurnDebt" and "TurnCDS" are debt and CDS turnovers within a strategy (intensive margin), calculated as absolute growth rates, trimmed at the 1% level. Note that *naked speculators* include *offsetters* with hedging ratios below -2, hence the non-null debt exposures for this strategy. Also, note that the high persistence of "Others" is attributable to our strategy identification method which requires the observation of entry or exit to allocate positions to specific strategies.

Table 6: Descriptive statistics by strategy

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Speculating strategies increase country and sector level exposure concentration

	Country database				Sector database	
	P(Buy CDS)	P(Sell CDS)	P(Buy CDS)	P(Sell CDS)	P(Buy CDS)	P(Sell CDS)
Share debt exposure	6.22^{***}	9.94^{***}	6.88^{***}	10.83^{***}	7.58^{***}	10.23^{***}
	(1.36)	(1.46)	(1.75)	(1.79)	(1.73)	(1.80)
Log Debt	0.06	-0.15^{***}	0.18^{***}	-0.14^{***}	0.09^{**}	-0.01
	(0.04)	(0.03)	(0.04)	(0.03)	(0.04)	(0.05)
Num. obs.	9315	10773	7528	8517	8116	8948
Perimeter	ALL	ALL	NFR Ref	NFR Ref	ALL	ALL

Table 7: Probability to buy or sell CDS and concentration of debt exposure at country and sector level

$\Longrightarrow$ Che and Sethi (2014) view prevails at sector/country level: investors use CDS to leverage up their views on their specialization

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CDS overall reduce the concentration of credit risk

	Δ HHI Inv		Δ Gini Inv	
	(1)	(2)	(3)	(4)
Short Hedger	0.052	−0.239	0.149	−0.130***
	(0.285)	(0.197)	(0.095)	(0.046)
Long Speculators	−0.425***	−0.221*	−0.320**	−0.227***
	(0.139)	(0.126)	(0.126)	(0.084)
Short Speculators	−1.717**	−0.619***	−0.134	−0.134***
	(0.759)	(0.191)	(0.136)	(0.041)
Naked Speculators	−0.666***	−0.586***	−0.218***	−0.159***
	(0.050)	(0.079)	(0.033)	(0.028)
Other CDS	0.442***	−0.192	0.124**	−0.128***
	(0.156)	(0.141)	(0.056)	(0.045)
Num. Obs.	3,171	3,171	3,171	3,171
Adjusted R^2	0.708	0.872	0.651	0.885
Investor FE	N	Y	N	Y

Table 8: CDS trading strategies and changes in HHI and Gini coefficients

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Sectors and exposure concentration

	Δ HHI Inv (1)	Δ HHI Ref (2)	Δ Gini Inv (3)	Δ Gini Ref (4)
Bank	-0.15^{***}		-0.04^{***}	
	(0.05)		(0.01)	
Dealer	-0.43^{***}		-0.18^{***}	
	(0.05)		(0.02)	
Fund	-0.19^{***}		-0.02^{***}	
	(0.03)		(0.00)	
Insurer	0.00^{***}		-0.00	
	(0.00)		(0.00)	
Non FR Ref		-0.01		-0.02^{***}
		(0.03)		(0.00)
FR Ref		-0.04^{***}		-0.01^{***}
		(0.01)		(0.00)
Num. obs.	742	2151	24101	2151

Note: We estimate the following specification $\frac{HHI\_total_{it} - HHI\_real_{it}}{HHI\_real_{it}} = SECTOR_i + \epsilon_{it}$.

Table 9: Investor-level effect of CDS on credit risk concentration: changes in HHI and Gini coefficient

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CDS trading and reference concentration

	HHI Ref					
	(1)	(2)	(3)	(4)	(5)	(6)
CDS Ref	0.02	0.00	0.00	0.03	−0.00	0.03
	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)
Log Gross debt Ref	−0.04***		−0.02***	−0.02	−0.08	−0.04
	(0.01)		(0.00)	(0.01)	(0.08)	(0.13)
Num. obs.	12757	41392	32466	6575	454	554
Ref FE	Y	Y	Y	Y	Y	Y
Quarter FE	N	Y	Y	Y	N	N
Rating FE	Y	N	N	N	N	N
Adj. R^2	0.77	0.76	0.77	0.79	0.71	0.68
Cluster SE	Ref	Ref	Ref	Ref	Ref	Ref

Notes: "CDS Ref" is a dummy taking value 1 if there is a CDS traded on the reference at a given period. "Log Gross debt Ref" stands for the reference gross debt. The sample includes firms that reference CDS and the 3000 largest ones that do not reference CDS. Specifications (1) and (2) are OLS made on the full sample. Specifications (3) and (4) are staggered difference and difference estimations. Control groups are firms that start (3) or end (4) referencing CDS during the period and treatment groups are firms that never (3) or always (4) reference CDS during the period. Specifications (5) and (6) instead run an event study on ± 4 quarters around the change in CDS referencing for firms that start (5) or stop (6) referencing CDS. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 10: Reference debt concentration (HHI) and CDS referencing

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CDS trading and investor concentration

	HHI Inv					
	(1)	(2)	(3)	(4)	(5)	(6)
CDS trading	0.00	0.00	−0.01	0.01	−0.01	−0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.03)	(0.00)
Log Total Exp Inv	−0.03***		−0.03***	0.01	−0.06	−0.01
	(0.00)		(0.00)	(0.02)	(0.04)	(0.01)
Num. obs.	26752	26752	25110	919	125	120
Inv FE	Y	Y	Y	Y	Y	Y
Quarter FE	N	Y	Y	Y	N	N
Adj. R^2	0.76	0.75	0.76	0.89	0.89	0.99
Cluster SE	Inv	Inv	Inv	Inv	Inv	Inv

Notes: "CDS Ref" is a dummy taking value 1 if there is a CDS traded on the reference at a given period. "Log Gross debt Ref" stands for the reference gross debt. The sample includes firms that reference CDS and the 3000 largest ones that do not reference CDS. Specifications (1) and (2) are OLS made on the full sample. Specifications (3) and (4) are staggered difference and difference estimations. Control groups are firms that start (3) or end (4) referencing CDS during the period and treatment groups are firms that never (3) or always (4) reference CDS during the period. Specifications (5) and (6) instead run an event study on ±4 quarters around the change in CDS referencing for firms that start (5) or stop (6) referencing CDS. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 11: Investor debt portfolio concentration (HHI) and CDS trading

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Banks and dealers sell more CDS on riskier references, while the opposite holds for funds

	$P(CDS > 0)$					
	(1)	(2)	(3)	(4)	(5)	(6)
a	0.79***	0.53***	0.37***	0.03	−0.32***	0.05
	(0.08)	(0.11)	(0.09)	(0.08)	(0.07)	(0.13)
bbb	1.17***	0.95***	0.73***	−0.29***	−0.75***	−0.00
	(0.08)	(0.11)	(0.11)	(0.09)	(0.08)	(0.13)
bb-b	1.04***	1.02***	0.82***	−0.98***	−1.31***	−0.32*
	(0.11)	(0.14)	(0.17)	(0.13)	(0.14)	(0.18)
<=ccc	1.37***	1.29**	0.41	0.35	−0.00	3.71***
	(0.18)	(0.51)	(0.54)	(0.28)	(0.47)	(0.95)
CDS bid-ask spread Ref		−2.76***	−3.45***		−4.62***	−4.13***
		(0.41)	(0.51)		(0.65)	(0.60)
Bond bid-ask spread Ref		−0.56***	−0.68***		−0.33	−0.39*
		(0.20)	(0.23)		(0.20)	(0.21)
Top1000 CDS liquidity Ref		0.78***	1.13***		0.24**	0.26*
		(0.10)	(0.11)		(0.12)	(0.14)
Log Gross debt Ref	−0.08***	−0.14***	−0.15***	−0.08***	−0.07***	−0.08***
	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.02)
Num. obs.	23108	13258	11905	90256	49783	15678
Inv x Quarter FE	N	N	Y	N	N	Y
Quarter FE	Y	Y	N	Y	Y	N
Sector	Banks	Banks	Banks	Funds	Funds	Funds

Table 12: Probability to sell CDS by rating for long speculators by sector

$\Longrightarrow$ Banks and dealers benefit more than funds from the margin advantage of CDS

CDS trading and investor risk-taking

	Mean spread debt portfolio					
	(1)	(2)	(3)	(4)	(5)	(6)
CDS trading	1.09	2.12	7.59	−0.89	8.94*	−0.51
	(2.12)	(1.89)	(6.60)	(2.67)	(5.13)	(1.46)
Log Total Exp Inv	−1.52*	−0.36	−0.24	−6.94**	0.96	−6.49
	(0.79)	(0.68)	(0.70)	(3.49)	(3.79)	(4.59)
Share FR Ref	−11.61***	−9.96***	−9.87***	−12.33	34.31	−61.67***
	(2.54)	(2.19)	(2.24)	(14.70)	(57.81)	(18.51)
Num. obs.	16801	16801	15314	860	102	115
Inv FE	Y	Y	Y	Y	Y	Y
Quarter FE	N	Y	Y	Y	N	N
Adj. R^2	0.47	0.68	0.69	0.69	0.72	0.78
Cluster SE	Inv	Inv	Inv	Inv	Inv	Inv

Notes: The dependent variable is the mean debt portfolio spread in basis points at the investor period level. “CDS trading” is a dummy taking value 1 if the investor is trading at least a CDS at a given period. “Log Total Exp Inv” corresponds to $Log(TotExp_i t)$. “Share FR Ref” is the share of French references in the investor’s debt portfolio at a given period. The sample includes investors trading CDS as well as those not trading CDS and it restricts to standard debt or long speculating strategies. Specifications (1) and (2) are OLS made on the full sample. Specifications (3) and (4) are staggered difference and difference estimations on the effect of trading CDS on HHI. Control groups are investors that start (3) or end (4) trading CDS during the period and treatment groups are investors that never (3) or always (4) trade CDS during the period. Specifications (5) and (6) instead run an event study on ± 4 quarters around the change in CDS trading for investors that start (5) or stop (6) trading CDS. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 13: Investor debt portfolio spread and CDS trading

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Methodology

- We assume bond and CDS spreads are equal (null CDS bond basis)
- We compute excess return of reference i at time t from Junge et Trolle (2015), and take averages per quarter:

$$r_{i,t} \sim -(S_{i,t} - S_{i,t-1}) \left(T - \frac{1}{250} \right) + \frac{S_{i,t}}{250}, \tag{3}$$

  with $S_{i,t}$ the par spread, T the time to maturity (assumed 2.5 years), where 250 corresponds to the average number of open trading days per year
- We calculate 10-day VaR using filtered historical simulation method (Barone-Adesi, Giannopoulos, and Vosper, 1999)

CDS trading and portfolio risk

	Δ VaR					
	(1)	(2)	(3)	(4)	(5)	(6)
CDS trading	−0.0001	−0.0002	−0.0002	0.0001	−0.0003	−0.0002
	(0.0002)	(0.0001)	(0.0003)	(0.0004)	(0.0005)	(0.0003)
Log Total Exp Inv	0.0001		0.0001**	0.0005	−0.0003	0.0006
	(0.0000)		(0.0000)	(0.0003)	(0.0015)	(0.0008)
Num. obs.	27096	27096	25471	912	121	120
Inv FE	Y	Y	Y	Y	Y	Y
Quarter FE	N	Y	Y	Y	N	N
Adj. R^2	0.4081	0.6646	0.6623	0.6979	0.8251	0.6411
Cluster SE	Inv	Inv	Inv	Inv	Inv	Inv

Notes: The dependent variable is the portfolio value-at-risk. It corresponds to the 10-day value-at-risk using the filtered historical simulation method. "CDS trading" is a dummy taking value 1 if the investor is trading at least a CDS at a given period. "Log Total Exp Inv" corresponds to $Log(TotExp_i t)$. The sample includes investors trading CDS as well as those not trading CDS. Specifications (1) and (2) are OLS made on the full sample. Specifications (3) and (4) are staggered difference and difference estimations on the effect of trading CDS on HHI. Control groups are investors that start (3) or end (4) trading CDS during the period and treatment groups are investors that never (3) or always (4) trade CDS during the period. Specifications (5) and (6) instead run an event study on ± 4 quarters around the change in CDS trading for investors that start (5) or stop (6) trading CDS. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 14: Investor debt portfolio risk (VaR) and CDS trading

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