Hedging or Speculating – Implications from different CDS motives

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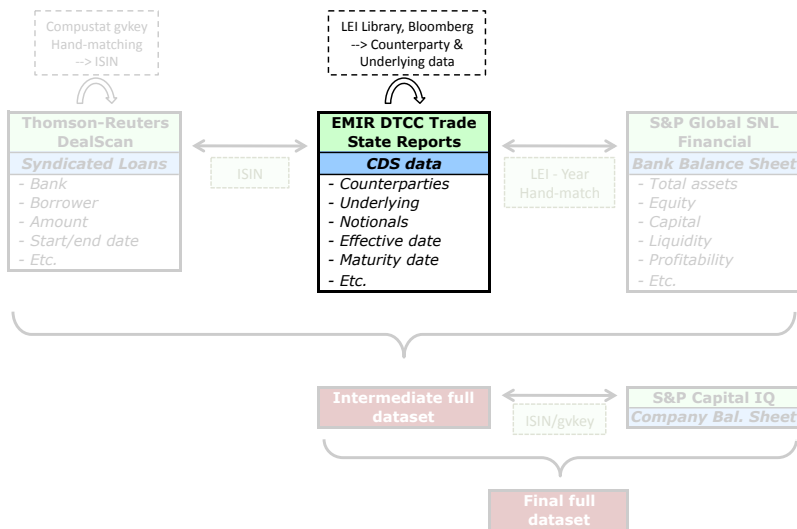Disclaimer: views are our own and not those of our institutions of affiliation.

Background – "Shedding light on dark markets"

- ▶ EMIR regulation a game changer in derivatives' supervision
  - ▶ Mandatory (EU) reporting of derivatives' transactions to authorised trade repositories
  - ▶ Full access to EU-wide data granted to ESRB & ESMA
- ▶ From opacity to transparency
- ▶ Ongoing efforts at ESRB Secretariat to clean and analyze the data
  - ▶ Forthcoming descriptive paper (Abad et al., ESRB OP #11)
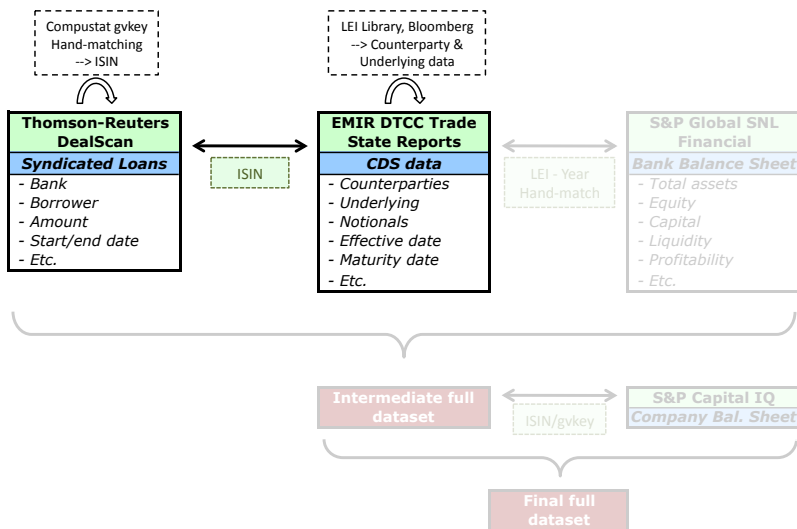 - ▶ "Case studies" (IRS, CDS, FX)

This presentation/project

- ► Part of the efforts on the CDS front
- ► Study connection between NFCs and banks
  - ► CDS written on NFCs...
  - ► by financials
- ► Merge CDS with lending data and balance sheet data
- ► How do financials use the CDS market on NFCs?
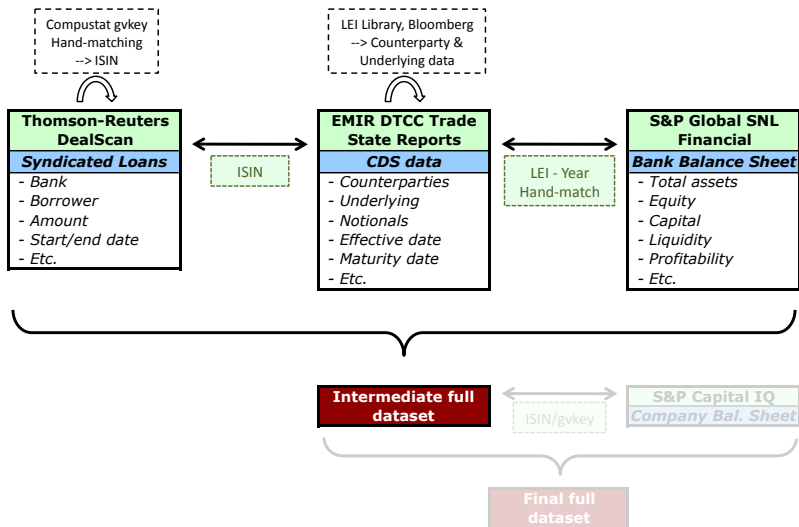- ► How does this affect NFCs? Are there any real effects? (soon!)

A bird's eye view of the project – Starting point

Compustat gvkey
Hand-matching
--> ISIN

LEI Library, Bloomberg
--> Counterparty &
Underlying data

Thomson-Reuters DealScan

Syndicated Loans
- *Bank*
- *Borrower*
- *Amount*
- *Start/end date*
- *Etc.*

ISIN

EMIR DTCC Trade State Reports

CDS data
- *Counterparties*
- *Underlying*
- *Notionals*
- *Effective date*
- *Maturity date*
- *Etc.*

LEI - Year
Hand-match

S&P Global SNL Financial

Bank Balance Sheet
- *Total assets*
- *Equity*
- *Capital*
- *Liquidity*
- *Profitability*
- *Etc.*

Intermediate full dataset

ISIN/gvkey

S&P Capital IQ
Company Bal. Sheet

Final full dataset

A bird's eye view of the project – Lending data

A bird's eye view of the project – Bal. Sheet data (today)

Compustat gvkey
Hand-matching
--> ISIN

LEI Library, Bloomberg
--> Counterparty &
Underlying data

Thomson-Reuters DealScan
Syndicated Loans
- Bank
- Borrower
- Amount
- Start/end date
- Etc.

ISIN

EMIR DTCC Trade State Reports
CDS data
- Counterparties
- Underlying
- Notionals
- Effective date
- Maturity date
- Etc.

LEI - Year
Hand-match

S&P Global SNL Financial
Bank Balance Sheet
- Total assets
- Equity
- Capital
- Liquidity
- Profitability
- Etc.

Intermediate full dataset

ISIN/gvkey

S&P Capital IQ
Company Bal. Sheet

Final full dataset

A bird's eye view of the project – Near future

Compustat gvkey
Hand-matching
--> ISIN

LEI Library, Bloomberg
--> Counterparty &
Underlying data

Thomson-Reuters DealScan
Syndicated Loans
- Bank
- Borrower
- Amount
- Start/end date
- Etc.

ISIN

EMIR DTCC Trade State Reports
CDS data
- Counterparties
- Underlying
- Notionals
- Effective date
- Maturity date
- Etc.

LEI - Year
Hand-match

S&P Global SNL Financial
Bank Balance Sheet
- Total assets
- Equity
- Capital
- Liquidity
- Profitability
- Etc.

Intermediate full dataset

ISIN/gvkey

S&P Capital IQ
Company Bal. Sheet

Final full dataset

Outline

Related literature

- ▶ Hakenes & Schnabel, JFI10: private info on loan quality $\to \uparrow$ incentive to give more bad loans, then transfer via CDS
- ▶ Acharya & Johnson, JFE07: usage of CDS to exploit insider trading opportunities based on info from lending relationship
- ▶ Streitz, RoF16: effect of CDS on loan syndication
- ▶ Hirtle, JFI09; Saretto & Tookes, RFS13: CDS and bank credit supply, inconclusive evidence
- ▶ Augustin et al., FTF14: great (and long!) survey article on CDS

Related literature (cont.)

- ► Gündüz et al. (2016)
  - ► Small Bang (SB) spurred more trading in CDS
  - ► Banks use CDS to manage risks: ↑ credit exposure to riskier firms before SB → ↑ CDS buying on these firms after SB
  - ► Banks do not abuse CDS to take more risks: if they hold more CDS of safer firms, they supply more credit to them
- ► Gündüz (2016)
  - ► Banks purchase protection on global financial counterparties once they are protection buyers from them
  - ► Non-dealers (dealers) manage their counterparty risk only at longer (short & long) horizon
  - ► Banks avoid wrong-way risk mitigation: buy protection from counterparties from different country as the dealer on which protection is sought
  - ► Banks prefer to hedge counterparties with lower past stock returns, higher stock return volatility and higher CDS volatility

Dealscan data – Syndicated loans

- ▶ Comprehensive information on loan pricing and contract details:
    - ▶ Borrower
    - ▶ Lender
    - ▶ Facility start/end date
    - ▶ Facility amount
- ▶ Use loans with "facility end date" > Jan 2013

SNL data – Bank balance sheet information

- ▶ Size
- ▶ Performance Measures
    - ▶ Return on average assets
    - ▶ EBITDA-to-asset ratio
    - ▶ Net income-to-asset ratio
    - ▶ Net interest income-to-asset ratio
- ▶ Funding structure
    - ▶ Short-term wholesale funding-to-asset ratio
    - ▶ Deposits-to-asset ratio
    - ▶ Capitalization ratio
- ▶ Risk
    - ▶ CET1 ratio
    - ▶ Leverage
    - ▶ Non performing loans-to-loans ratio
    - ▶ Loan loss reserves-to-loans ratio
   - ▶ Non-performing asset ratio
    - ▶ Liquid assets-to-asset ratio

Overview of CDS data

- DTCC OTC Trade State Reports (the "EMIR data")
  $\rightarrow$ stock of all outstanding positions as of a given date
- Use information on *who*, *what*, *when*
  - Counterparties (LEIs), their types and countries (use LEI library)
  - Underlying reference entities (ISINs, mix with Bloomberg)
  - Notional amounts (convert to €)
  - Prices
 - Effective and maturity dates
  - Etc.

Overview of CDS data (cont.)

- ▶ Cleaning procedure to eliminate
    - ▶ Outliers
    - ▶ "Dead trades"
    - ▶ Inconsistent observations (based on double reporting obligation)
    - ▶ Duplicates (trade IDs)
    - ▶ Mis-reported counterparties, reference entities, etc.
- ▶ Focus on single-name market
- ▶ End-of-month snapshots from Oct-14 to Apr-16

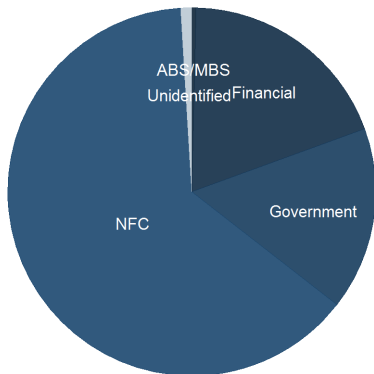# Overview on CDS – Single-name vs. index
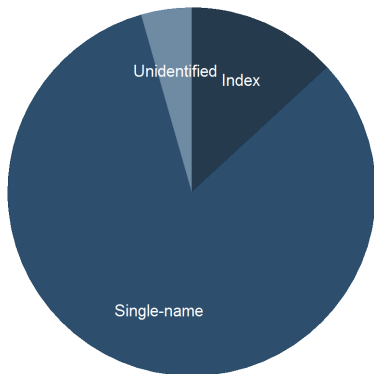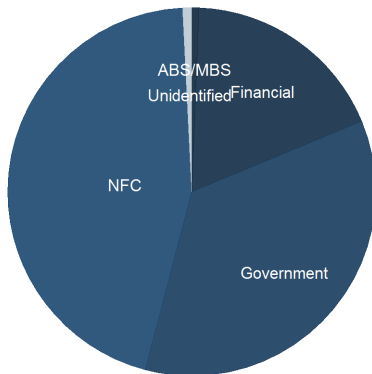

(a) # trades
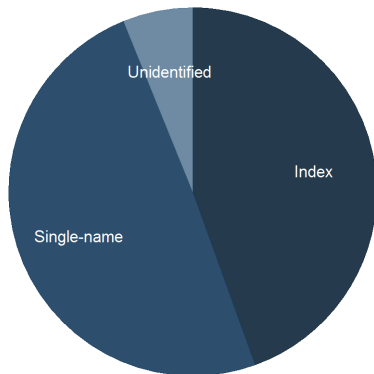
(b) Notional

Figure: Shares by market – DTCC TSR end April 2016.
Trades: 829,439 – Notional (€bln): 7,952

Overview on CDS – Single-name market

(a) # trades

(b) Notional

Figure: Shares by underlying type, single-name market – DTCC TSR end April 2016.

Trades: 681,401 – Notional (€bln): 3,906

Overview on CDS – NFC market
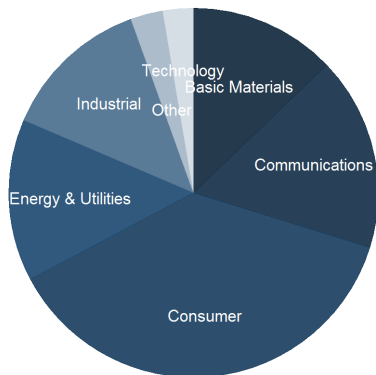
(a) Notional shares by sector   **(b)** Notional by Ref. Ent. ranking
Figure: Notional shares by subsector (left) and notional by reference
entity ranking (right), NFC market – DTCC TSR end April 2016.
Trades: 443,068 – Notional (€bln): 1,825
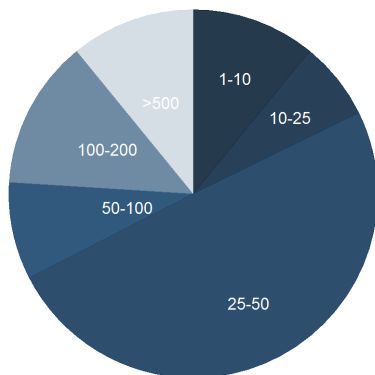
Overview on CDS – Distribution of effective dates on NFCs
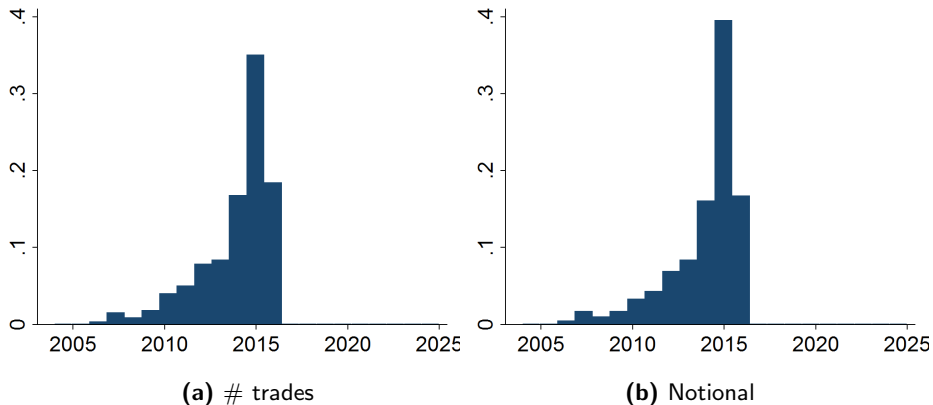
(a) # trades   **(b)** Notional

Figure: Distribution of effective dates – DTCC TSR end April 2016.

Overview on CDS – Distribution of maturities on NFCs
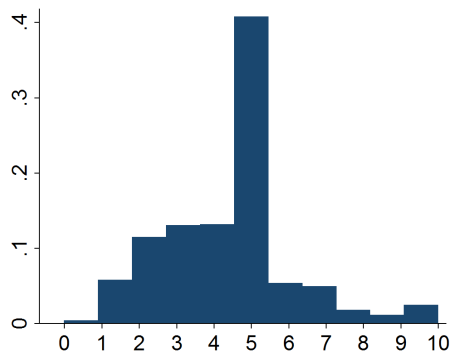
(a) # trades   **(b)** Notional
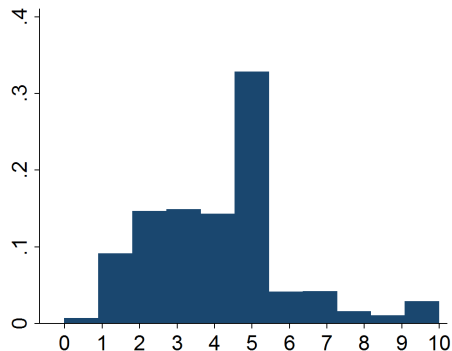
Figure: Distribution of maturities – DTCC TSR end April 2016.

Bilateral positions by counterparty

Buy \ Sell	Intermediaries	Other financials	ICPFs	Non-financial	Other	Total
Intermediaries	59.1%	6.2%	0.3%	0.6%	8.1%	**74.3%**
Other financials	7.9%	0.4%	0.0%	0.0%	0.3%	**8.6%**
ICPFs	0.3%	0.0%	0.0%	0.0%	0.0%	**0.3%**
Non-financial	0.8%	0.0%	0.0%	0.0%	0.0%	**0.8%**
Other	15.6%	0.2%	0.0%	0.0%	0.0%	**15.9%**
Total	**83.7%**	**6.9%**	**0.4%**	**0.6%**	**8.4%**	**100.0%**

Bilateral positions by counterparty – What we use

Buy \ Sell	Intermediaries	Other financials	ICPFs	Non-financial	Other	Total
Intermediaries	59.1%	6.2%	0.3%	0.6%	8.1%	**74.3%**
Other financials	7.9%	0.4%	0.0%	0.0%	0.3%	**8.6%**
ICPFs	0.3%	0.0%	0.0%	0.0%	0.0%	**0.3%**
Non-financial	0.8%	0.0%	0.0%	0.0%	0.0%	**0.8%**
Other	15.6%	0.2%	0.0%	0.0%	0.0%	**15.9%**
Total	**83.7%**	**6.9%**	**0.4%**	**0.6%**	**8.4%**	**100.0%**

Hypotheses and approach

Hypothesis (Hedging versus speculating)

Ceteris paribus, banks with safer characteristics are more likely to use CDS for insurance motives.

Hypothesis (Borrower risk)

Ceteris paribus, the higher the borrower risk, the higher the propensity that a bank uses a CDS for insurance motives.

Hypotheses and approach (cont.)

- ▶ Probit regression:

$P(\text{CDS buying bank issued loan to underlying entity} = 1) = X\beta + \epsilon,$

- ▶ Dummy equals one if
  - ▶ A bank has a lending relation with a firm **AND**
  - ▶ The same bank buys a CDS on the same entity within the time of the credit relation

Hypotheses and approach (cont.)

Hypothesis (Lending Behavior)

Ceteris paribus, banks that buy CDS are less likely to have a binding capital constraint and should issue more loans.

Hypothesis (Lending Behavior)

Ceteris paribus, banks that are net buyers of CDS are less likely to have a binding capital constraint and should issue more loans.

Hypothesis and approach (cont.)

- ▶ OLS regression:

$$LoanVolume_{i,t} = \alpha + \beta \cdot NotionalBuy_{i,t} + \gamma \cdot X_{i,t} + \mu_i + \rho_t + u_{i,t}.$$

$$LoanVolume_{i,t} = \alpha + \beta \cdot NetNotional_{i,t} + \gamma \cdot X_{i,t} + \mu_i + \rho_t + u_{i,t}.$$

- ▶ *LoanVolume* is measured by loan volume of bank *i* on the syndicated loan market
- ▶ Alternatively, use *TotalAssets* as LHS variable

Probit – Performance indicators

VARIABLES	(1) d_lendcds	(2) d_lendcds	(3) d_lendcds	(4) d_lendcds
Size	0.858***	0.570***	0.859***	0.761***
	(0.0142)	(0.0209)	(0.0142)	(0.0206)
ROA	0.0280			
	(0.0265)			
EBITDA/A		1.166		
		(1.588)		
NetIncome/A			3.692	
			(2.594)	
NetIntIncome/A				11.90***
				(1.043)
Constant	-20.72***	-14.54***	-20.74***	-18.77***
	(0.300)	(0.436)	(0.298)	(0.428)
Observations	2,207,087	676,180	2,270,019	2,155,922
Borrower country FE	NO	NO	NO	NO

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Probit – Performance indicators with controls

VARIABLES	(1) d_lendcds	(2) d_lendcds	(3) d_lendcds	(4) d_lendcds
Size	0.856***	0.670***	0.857***	0.781***
	(0.0154)	(0.0237)	(0.0153)	(0.0214)
ROA	0.0476*			
	(0.0285)			
EBITDA/A		0.455		
		(1.779)		
NetIncome/A			5.689**	
			(2.793)	
NetIntIncome/A				9.771***
				(1.095)
Loan size	0.0358***	0.0496***	0.0345***	0.0351***
	(0.00317)	(0.00395)	(0.00313)	(0.00313)
CDS price	3.19e-05***	4.74e-05***	3.12e-05***	3.30e-05***
	(6.55e-06)	(7.52e-06)	(6.54e-06)	(6.42e-06)
Constant	-21.17***	-17.33***	-21.17***	-19.65***
	(0.372)	(0.538)	(0.369)	(0.481)
Observations	1,907,595	640,185	1,968,018	1,858,052
Borrower country FE	YES	YES	YES	YES

Robust standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Probit – Funding indicators

VARIABLES	(1) d_lendcds	(2) d_lendcds	(3) d_lendcds
Size	0.688***	0.888***	0.247***
	(0.0202)	(0.0164)	(0.00274)
Deposits/A	0.875***		
	(0.0415)		
ST Wholesale/A		-0.926***	
		(0.0667)	
Capitalization R.			-0.00450***
			(0.000966)
Constant	-17.38***	-21.17***	-7.731***
	(0.417)	(0.353)	(0.0606)
Observations	2,269,466	1,896,120	2,622,642
Borrower country FE	NO	NO	NO

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Probit – Funding indicators with controls

VARIABLES	(1) d_lendcds	(2) d_lendcds	(3) d_lendcds
Size	0.717***	0.872***	0.273***
	(0.0212)	(0.0171)	(0.00340)
Deposits/A	0.806***		
	(0.0449)		
ST Wholesale/A		-0.839***	
		(0.0673)	
Capitalization R.			-0.00538***
			(0.00103)
Loan size	0.0354***	0.0273***	0.0303***
	(0.00314)	(0.00334)	(0.00252)
CDS price	3.33e-05***	3.59e-05***	2.60e-05***
	(6.33e-06)	(6.10e-06)	(5.59e-06)
Constant	-18.49***	-21.12***	-8.764***
	(0.473)	(0.416)	(0.168)
Observations	1,967,475	1,595,185	2,289,730
Borrower country FE	YES	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Probit – Risk indicators

VARIABLES	(1) d_lendcds	(2) d_lendcds	(3) d_lendcds	(4) d_lendcds	(5) d_lendcds	(6) d_lendcds
Size	0.901***	0.226***	0.461***	0.639***	0.625***	0.259***
	(0.0169)	(0.00281)	(0.0184)	(0.0129)	(0.0236)	(0.00268)
CET1	0.0406***					
	(0.00180)					
Leverage		-0.0167***				
		(0.000320)				
NPL/Loans			-0.00942***			
			(0.00235)			
LLR/Loans				-0.0204***		
				(0.00324)		
NPA Ratio					-0.101***	
					(0.0137)	
Liquid Assets/A						0.230***
						(0.0139)
Constant	-22.08***	-7.027***	-12.19***	-16.00***	-15.67***	-8.118***
	(0.372)	(0.0613)	(0.390)	(0.274)	(0.497)	(0.0556)
Observations	2,040,813	2,840,193	809,405	1,511,353	392,408	2,839,466
Borrower country FE	NO	NO	NO	NO	NO	NO

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Probit – Risk indicators with controls

VARIABLES	(1) d_lendcds	(2) d_lendcds	(3) d_lendcds	(4) d_lendcds	(5) d_lendcds
Size	0.905***	0.548***	0.687***	0.669***	0.286***
	(0.0187)	(0.0209)	(0.0146)	(0.0266)	(0.00336)
CET1	0.0427***				
	(0.00182)				
NPL/Loans		-0.0136***			
		(0.00239)			
LLR/Loans			-0.0264***		
			(0.00331)		
NPA Ratio				-0.104***	
				(0.0141)	
Liquid Assets/A					0.195***
					(0.0141)
Loan size	0.0354***	0.0393***	0.0342***	-0.00776	0.0302***
	(0.00317)	(0.00382)	(0.00316)	(0.00566)	(0.00250)
CDS price	2.74e-05***	4.23e-05***	3.44e-05***	5.22e-05***	2.74e-05***
	(7.03e-06)	(6.82e-06)	(6.18e-06)	(1.06e-05)	(5.49e-06)
Constant	-22.66***	-14.49***	-17.49***	-16.23***	-9.241***
	(0.452)	(0.485)	(0.357)	(0.646)	(0.163)
Observations	1,749,982	763,765	1,365,783	369,747	2,495,601
Borrower country FE	YES	YES	YES	YES	YES

Robust standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Probit – All

	(1)	(2)	(3)	(4)
Size	0.771***	0.699***	0.791***	0.669***
	(0.0263)	(0.0458)	(0.0285)	(0.0479)
ROA	0.0188	0.692***	-0.0612	0.591***
	(0.0363)	(0.0619)	(0.0376)	(0.0665)
Deposits/A	2.408***	1.847***	2.315***	1.946***
	(0.0676)	(0.0880)	(0.0776)	(0.102)
ST Wholesale/A	-0.0152	-1.112***	-0.0362	-1.161***
	(0.0856)	(0.156)	(0.0875)	(0.152)
CET1	0.0623***	0.0295***	0.0621***	0.0353***
	(0.00226)	(0.00496)	(0.00237)	(0.00454)
Loan size			0.0295***	0.0203***
			(0.00342)	(0.00574)
CDS price			3.32e-05***	1.67e-05*
			(6.53e-06)	(9.91e-06)
Constant	-20.27***	-18.01***	-21.02***	-17.47***
	(0.571)	(0.990)	(0.646)	(1.065)
Observations	1,674,397	461,252	1,386,763	362,785
Borrower country FE	NO	NO	YES	YES
Sample	ALL	EUROPE	ALL	EUROPE

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Loan regressions – Monthly & quarterly (buy)

VARIABLES	(1) LoanVolume (m)	(2) LoanVolume (m)	(3) LoanVolume (q)	(4) LoanVolume (q)
NotionalBuy	41.48***		54.38***	
	(7.140)		(7.936)	
L.NotionalBuy		19.00***		34.45***
		(4.234)		(5.520)
L2.NotionalBuy		8.340***		19.59***
		(2.314)		(3.894)
L3.NotionalBuy		3.255		
		(2.773)		
L4.NotionalBuy		9.195***		
		(2.254)		
L5.NotionalBuy		8.399***		
		(2.816)		
L6.NotionalBuy		6.535***		
		(2.040)		
Constant	7.372e+10***	2.743e+11***	1.162e+11***	2.148e+11***
	(2.844e+09)	(1.385e+10)	(5.358e+09)	(1.027e+10)
Observations	60,762	14,198	35,849	19,055
R-squared	0.207	0.254	0.358	0.318
Number of bankid	1,564	412	1,564	1,052
Time FE	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Loan regressions – Monthly & quarterly (net)

VARIABLES	(1) LoanVolume (m)	(2) LoanVolume (m)	(3) LoanVolume (q)	(4) LoanVolume (q)
NetNotional	-9.500 (9.019)		-15.26 (16.27)	
L.NetNotional		-4.498 (5.602)		-9.365 (10.19)
L2.NetNotional		-1.683 (2.305)		-4.722 (10.03)
L3.NetNotional		-5.840* (3.061)		
L4.NetNotional		-1.281 (5.950)		
L5.NetNotional		0.743 (3.056)		
L6.NetNotional		-3.723 (4.976)		
Constant	8.528e+10*** (13.96)	3.409e+11*** (2.381e+08)	1.440e+11*** (10.04)	2.722e+11*** (4.356e+07)
Observations	64,296	15,187	38,068	19,825
R-squared	0.003	0.004	0.005	0.003
Number of bankid	2,251	461	2,251	1,216
Time FE	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Loan regressions – Yearly (buy)

VARIABLES	(1) LoanVolume	(2) Size	(3) LoanVolume	(4) Size
NotionalBuy	26.94***	0***	23.78***	0
	(4.047)	(0)	(2.536)	(0)
Size			-5.641e+12***	
			(2.104e+12)	
Equity			227,192***	8.17e-09***
			(38,346)	(2.72e-09)
ROA_buy			1.261e+11	0.0896***
			(5.247e+11)	(0.0310)
Deposits/A			-1.399e+12	-1.748***
			(7.563e+12)	(0.393)
Constant	1.205e+12***	19.66***	1.122e+14***	19.89***
	(3.219e+10)	(0.00266)	(4.133e+13)	(0.151)
Observations	3,041	334	272	281
R-squared	0.427	0.017	0.603	0.246
Number of bankid	1,313	82	68	73
Time FE	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES
Bank Controls	NO	NO	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Loan regressions – Yearly (net)

	(1) LoanVolume	(2) Size	(3) LoanVolume	(4) Size
NetNotional	-9.556	0	-14.99	0*
	(11.26)	(0)	(10.46)	(0)
Size			-4.127e+12	
			(3.422e+12)	
Equity			327,428***	8.56e-09***
			(91,738)	(2.72e-09)
ROA			4.669e+11	0.0852**
			(6.032e+11)	(0.0323)
Deposits/A			4.493e+12	-1.745***
			(1.278e+13)	(0.391)
Constant	1.274e+12***	19.67***	7.806e+13	19.88***
	(6.135e+08)	(0.000380)	(6.727e+13)	(0.152)
Observations	3,388	334	281	281
R-squared	0.010	0.001	0.207	0.251
Number of bankid	1,564	82	73	73
Time FE	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES
Bank Controls	NO	NO	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Future outlook

- Distinguish CDS buying at the beginning of the credit relation versus CDS buying during the credit relation (i.e. CDS buying due to new information)
- Loan size (as a continuous measure) instead of a dummy regression
- Different maturities of CDS for different motives?
- Do banks hedge before the credit relation takes place?
- Do banks buy CDS via their SPVs?

Conclusions

- Some evidence on correlation between bank characteristics and hedging motives, stronger for risk $\rightarrow$ the lower the risk the higher the propensity to use CDS for hedging
- Preliminary evidence that credit protection buying releases space for more lending
  - But, more refinements needed
- No evidence so far of net CDS positions on lending
  - But: average effect. For near future: distinguish between different borrower characteristics

THANK YOU FOR YOUR ATTENTION!

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