

Regulatory Capital and Bank Lending: The Role of Credit Default Swaps

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- ▶ **But CDS are allowed for bank capital relief in Basel II and III**

CDS-induced Capital Relief

- ▶ Basel II treats CDS and other credit derivatives that are similar to guarantees as instruments of credit risk mitigation

$$\text{Risk-weighted Capital Ratio} = \frac{\text{Total Capital (or Tier 1 Capital)}}{\text{Risk-Weighted Assets (RWA)}}$$

- ▶ Risk-weight of claims on corporate credit (Basel II)

	AAA	A+	BBB+	Below	
Credit Assessment	to AA-	to A-	to BB-	BB-	Unrated
Risk Weight	20%	50%	100%	150%	100%

- ▶ AIG's 2007 Form 10-K: 72% of CDS sold by AIG FP were used for capital relief

What We Did in this Paper

- ▶ Examine the effects of banks' CDS-usage on regulatory capital
 - ▶ However, the usage of CDS could be endogenous – instrumentation
- ▶ Provide bank-level and loan-level evidence on lending
- ▶ Analyze the role of CDS during the crisis
 - ▶ Examine market reaction to CDS-usage

Data

- ▶ Banks' CDS Usage
 - ▶ FR Y-9C
 - ▶ OCC reports
 - ▶ Bank Compustat
- ▶ Loan data
 - ▶ Loan Pricing Corporation's Dealscan database
 - ▶ Link file provided by Chava and Roberts (2008, JF) and extended
 - ▶ More complete data since 1994
- ▶ Firm CDS introduction
 - ▶ Transactions data of GFI and CreditTrade
 - ▶ Validated with Markit quote data
 - ▶ 921 unique firms, 1997-2009
- ▶ Compustat and CRSP

Banks' CDS Usage and Bank Capital

- ▶ Dependent variable: Risk-weighted capital ratio

Variable	Total Risk-Weighted Capital Ratio	Tier 1 Risk-Weighted Capital Ratio
CDS-Usage	-0.001 (0.003)	-0.005 (0.003)
Total Assets	-0.018 (0.038)	-0.035 (0.040)
Deposits/Total Assets	0.058* (0.034)	0.077** (0.033)
Total Loans/Total Assets	-0.182** (0.072)	-0.194*** (0.075)
Intercept	0.237*** (0.057)	0.211*** (0.057)
Year Fixed Effects	Yes	Yes
Bank Fixed Effects	Yes	Yes
R-squared (%)	47.47	57.95
Observations	4280	4280

The Instruments for Banks' CDS Usage

- ▶ Reverse causality or omitted variables may underscore any significant relation between bank capital and CDS Usage
- ▶ Instrument 1: The ratio of borrowers with bond issuance
- ▶ Instrument 2: Pre-1997 weather-induced revenue volatility

Bank CDS-Usage and Bank Capital: IV

Variable	Total Risk-Weighted Capital Ratio		Tier 1 Risk-Weighted Capital Ratio	
CDS-Usage (IV1)	-0.022*** (0.006)		-0.030*** (0.008)	
CDS-Usage (IV2)		-0.029* (0.016)		-0.012* (0.006)
Intercept	0.174*** (0.009)	0.133*** (0.010)	0.155*** (0.020)	0.140*** (0.020)
Bank Characteristics Controls	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes	Yes
R-squared (%)	76.01	75.59	83.44	64.58
Observations	4280	1766	4280	1766

Determinants of Risk-Weighted Capital Ratios

Variable	Total Risk-Weighted Capital Ratio		Tier 1 Risk-Weighted Capital Ratio	
	CDS-Using	Non-CDS-Using	CDS-Using	Non-CDS-Using
	Bank	Bank	Bank	Bank
	(1)	(2)	(3)	(4)
Total Assets	-0.015*	-0.005	-0.016**	-0.036
	(0.008)	(0.058)	(0.007)	(0.058)
Deposits/Total Assets	-0.008	0.077**	-0.014	0.083**
	(0.009)	(0.037)	(0.010)	(0.038)
Deposits/Total Liabilities	0.008	0.009	0.005	0.019
	(0.005)	(0.013)	(0.003)	(0.015)
Total Loans /Total Assets	-0.041**	-0.115**	-0.042**	-0.141**
	(0.018)	(0.053)	(0.019)	(0.056)
Non-Interest Income/ Total Operating Income	0.001	0.001	-0.003	-0.006
	(0.019)	(0.011)	(0.020)	(0.017)
Has Other Derivative Positions	-0.010	-0.017*	-0.015	-0.018*
	(0.012)	(0.010)	(0.014)	(0.010)
Intercept	0.183***	0.159***	0.168***	0.144***
	(0.019)	(0.022)	(0.021)	(0.021)
Year Fixed Effects	Yes	Yes	Yes	Yes
R-squared (%)	45.49	31.27	50.45	42.06
Observations	889	3433	889	3433

Bank CDS-Usage and Bank Capital Quality

► Dependent Variable: Tier 1 Capital/Total Capital

Variable	(1)	(2)	(3)
CDS-Usage	-0.032*** (0.011)		
Instrumented CDS-Usage (1)		-0.088** (0.045)	
Instrumented CDS-Usage (2)			-0.162*** (0.046)
Intercept	0.875*** (0.044)	0.915*** (0.022)	0.844*** (0.018)
Year Fixed Effects	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes
R-squared (%)	70.54	80.71	76.41
Observations	4280	4280	1766

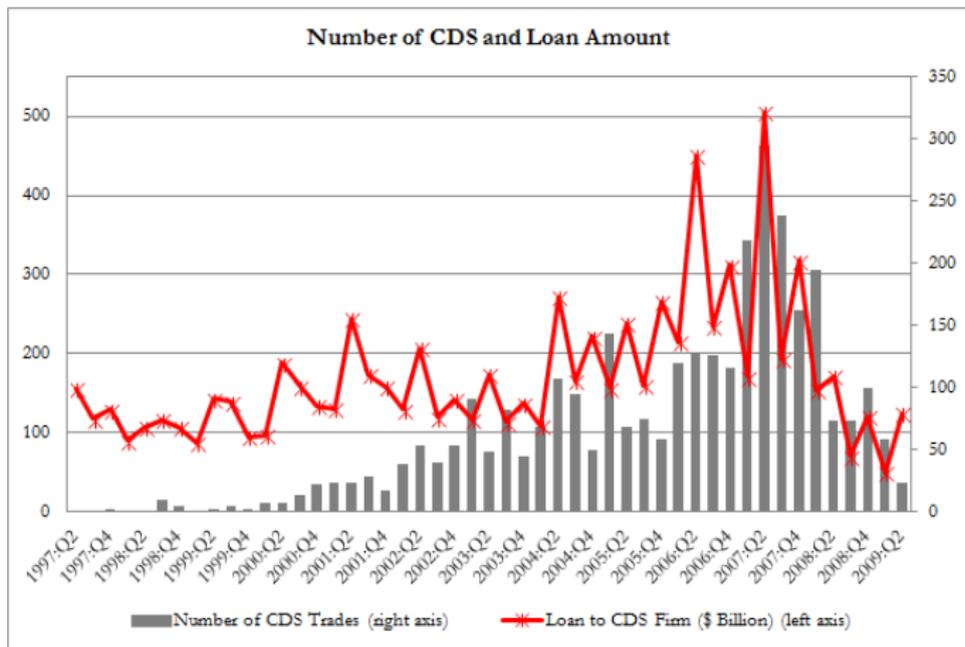
Bank CDS-Usage and Tier 1 Leverage Ratio

Variable	(1)	(2)	(3)
CDS-Usage	0.003 (0.005)		
IV (Ratio of Borrowers with Bond Issuance)		-0.026** (0.034)	
IV (Pre-1997 Weather Induced Revenue Volatility)			-0.011*** (0.002)
Total Assets	0.006 (0.021)	-0.008 (0.021)	-0.01 (0.016)
Deposits/Total Assets	-0.012 (0.017)	0.005 (0.017)	0.022 (0.020)
Loans/Total Assets	0.051** (0.025)	0.042** (0.023)	-0.039 (0.021)
Intercept	0.073*** (0.025)	0.082*** (0.024)	0.107*** (0.017)
Year Fixed Effects	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes
R-squared (%)	52.21	51.23	59.36
Observations	4280	4280	1766

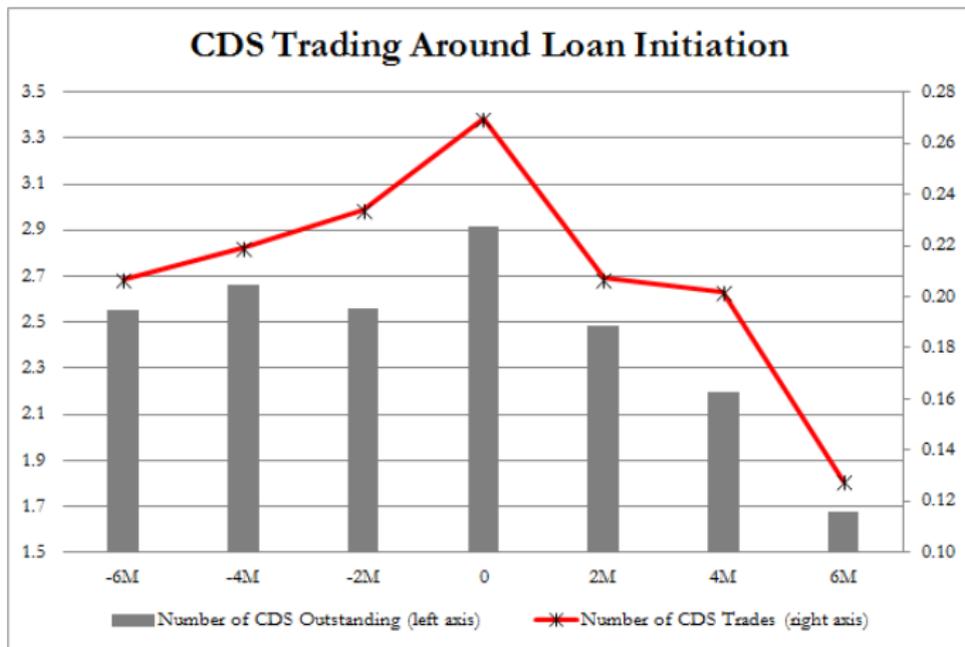
Bank CDS-Usage and C&I Loans

Variable	C&I Loans/Total Loans
CDS-Usage	0.015** (0.006)
Total Assets	0.008 (0.050)
Deposits/Total Assets	0.014 (0.069)
Total Loans/Total Assets	0.161* (0.083)
Market Share Squared	0.385* (0.224)
Intercept	0.02 (0.075)
Year Fixed Effects	Yes
Bank Fixed Effects	Yes
R-squared (%)	78.81
Observations	4280

Bank CDS-Usage and Lending



Bank CDS-Usage and Lending



Baseline Regression: Loan Issuance Amount

- ▶ Dependent variable: Loan issuance amount/total assets

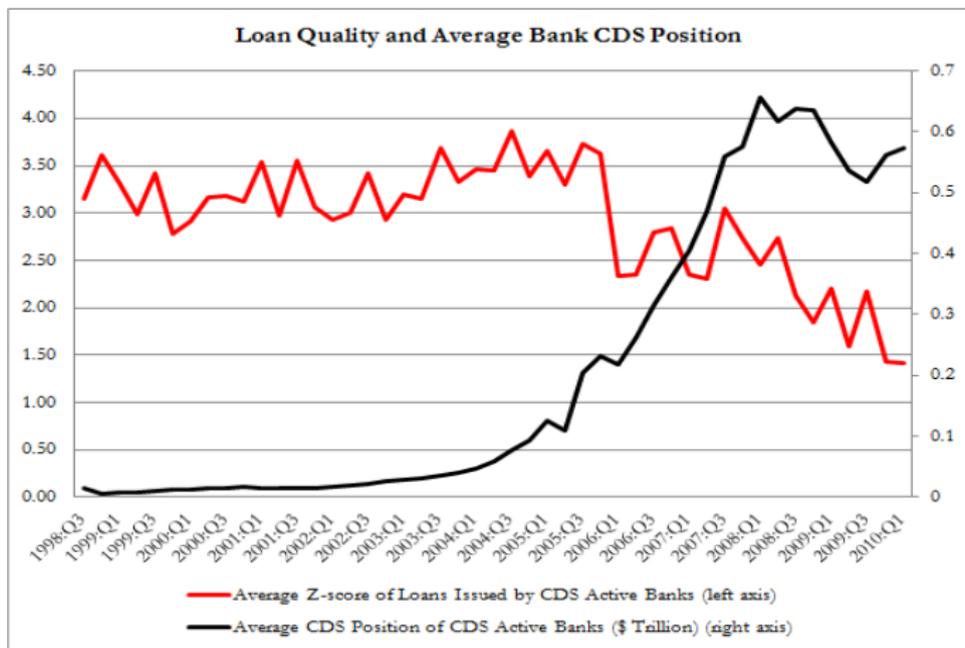
Variable	(1)	(2)
CDS Trading	0.145*** (0.029)	0.185*** (0.031)
CDS Firm	0.064** (0.026)	
Log (Total Assets)	-0.166*** (0.022)	-0.162*** (0.021)
Log (1+Number of Lenders)	3.437*** (0.671)	3.439*** (0.672)
Z-score	-0.017*** (0.006)	-0.017*** (0.006)
Intercept	0.472 (0.323)	0.442 (0.322)
Year and Industry Fixed Effects	Yes	Yes
Borrower and Loan Purpose Controls	Yes	Yes
R-squared (%)	41.14	41.12
Observations	15546	15546

CDS and Bank Lending: CDS-Using vs. Non-CDS-Using Banks

- ▶ Dependent variable: Loan issuance amount/total assets

Variable	CDS-Using Bank		Non-CDS-Using Bank	
	(1)	(2)	(3)	(4)
CDS Trading	0.197*** (0.068)	0.149** (0.064)	0.055 (0.076)	-0.224 (0.171)
CDS Firm		0.063 (0.047)		0.398* (0.208)
Loan Spread	-0.001 (0.000)	-0.001 (0.000)	-0.001 (0.000)	-0.001 (0.000)
Intercept	1.500** (0.698)	1.526** (0.703)	0.449 (0.727)	0.76 (0.581)
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Loan Purpose Fixed Effects	Yes	Yes	Yes	Yes
R-squared (%)	27.52	27.54	39.35	41.19
Observations	3830	3830	734	734

Bank CDS Position and Firm Z-score



CDS-Usage and Loan Loss Provision

Variable	(1)	(2)	(3)
CDS-Usage	0.001*** (0.000)		
Has CDS-Referenced Borrower		0.001** (0.000)	
Loans to CDS Firm Ratio			0.002** (0.001)
Total Assets	0.002 (0.002)	0.001 (0.004)	0.001 (0.004)
Deposits/Total Assets	-0.002 (0.001)	-0.001 (0.002)	-0.001 (0.002)
Total Loans/Total Assets	0.005*** (0.001)	0.005* (0.003)	0.005* (0.003)
Intercept	0.001 (0.001)	0.003 (0.003)	0.003 (0.003)
Year Fixed Effects	Yes	Yes	Yes
Bank Fixed Effects	Yes	Yes	Yes
R-squared (%)	51.29	51.66	51.64
Observations	4280	4280	4280

Bank-CDS Usage and Capital during Crisis

	Full Sample		2005-2009 Sample	
	Tier 1	Total	Tier 1	Total
CDS-Using Bank	-0.003	0.007*	-0.003	0.006
*Crisis 07-08	(0.004)	(0.004)	(0.005)	(0.004)
CDS-Using Bank	0.012**	0.020***	0.009*	0.016***
*Crisis 08-09	(0.005)	(0.004)	(0.005)	(0.005)
CDS-Using Bank	-0.015***	-0.006***	-0.010***	0.000
	(0.001)	(0.002)	(0.002)	(0.002)
Crisis 07-08	-0.002	-0.009**	-0.001	-0.007*
	(0.004)	(0.004)	(0.004)	(0.004)
Crisis 08-09	-0.004	-0.008*	0.000	-0.004
	(0.005)	(0.005)	(0.005)	(0.005)
Intercept	0.152***	0.187***	0.133***	0.160***
	(0.004)	(0.007)	(0.005)	(0.005)
Fixed Year Controls	Yes	Yes	Yes	Yes
R-squared (%)	42.77	31.16	50.18	46.13
Observations	4280	4280	1150	1150

Bank CDS-Usage and Lending during Crisis

Variable	Total Loan /Assets	Revolver /Assets
CDS-Using Bank*Crisis 07-08	-0.008 (0.007)	-0.011** (0.005)
CDS-Using Bank*Crisis 08-09	-0.021*** (0.006)	-0.016*** (0.005)
CDS-Using Bank	0.024*** (0.005)	0.019*** (0.004)
Crisis 07-08	-0.009*** (0.003)	-0.005* (0.003)
Crisis 08-09	-0.013*** (0.003)	-0.010*** (0.003)
Intercept	0.015*** (0.003)	0.006** (0.003)
R-square (%)	31.26	8.12
Observations	937	937

Performance of CDS-Using Bank in Crisis

► Dependent variable: Buy-and-Hold Return

	2008Q3-2008Q4	2007Q3-2009Q2	2006Q3-2007Q2
Variable	(1)	(2)	(3)
CDS-Using Bank in 2008:Q2	-0.245** (0.106')		
CDS-Using Bank in 2007:Q2		-0.292** (0.136')	
CDS-Using Bank in 2006:Q2			0.100*** (0.039)
Return in Current Year	1.493 (0.920)	0.774 (0.659)	-0.237* (0.127)
Intercept	-1.068 (0.729')	-0.741* (0.398')	0.548*** (0.165')
R-squared (%)	73.87	75.38	77.77
Observations	59	57	61

Summary

- ▶ CDS-using banks appear to have similar capital ratios of non-CDS-using banks, but that masks the lower capital levels these banks would have without the capital relief
- ▶ CDS-usage weakens the sensitivity of banks' capital levels to their lending and funding decisions
- ▶ CDS-using banks make larger loans to CDS-referenced firms, with credit quality poor at origination and deteriorating afterwards
- ▶ CDS-using firms enjoyed better financial performance before the crisis, but suffered more financially and raised capital and reduced lending more drastically during the crisis
- ▶ *Capital relief with credit derivatives appears to have encouraged more risky lending and made CDS-using banks more procyclical.*