



EUROPEAN CENTRAL BANK

EUROSYSTEM

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# **Do SMEs benefit from Unconventional Monetary Policy and How? Micro-evidence from the Eurozone**

4<sup>th</sup> Research Workshop – TF on Banking  
Analysis for Monetary Policy of the MPC

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Evaluate impact of the OMT announcement on SMEs' credit access using firm-level survey data

Three separate dimensions:

- Evolution of credit access before/after OMT announcement
- Impact of OMT announcement on credit terms
  - *interest rates on loans, loan amounts, loan maturities*
- Changes in small firms' expectations about future funding after OMT announcement

## Our identification strategy

- Comparison of credit access for identical firms borrowing from banks with different degrees of pre-OMT announcement exposure to impaired sovereign debt

Firms borrowing from banks with large balance sheet exposures to impaired sovereign debt:

- became less likely to be credit constrained after the announcement
- experienced lower credit denial rates, lower rates of credit price rationing
- were less discouraged from applying for credit
- experienced an improvement in loan terms (increase in loan amounts and lengthening of loan maturities)
- were more likely to expect further improvement in bank lending in the future

Our results suggest that unconventional monetary policy can have real effects through two separate channels:

- immediate improvement in the access to and the terms of bank credit
- improvement in firms' expectations about the cost and availability of future funding

# Related literature (I)

- Effect of unconventional monetary policy on both nominal and real economic variables
  - Acharya et al., 2015; Eser and Schwaab, 2016; Giannone et al., 2012; Gilchrist and Zakrajsek, 2013; Gilchrist et al., 2015; Krishnamurthy and Vissing-Jorgensen, 2011; Foley-Fisher et al., 2016
  - Acharya et al. (2016): large listed firms & syndicated loan market
- How shocks to lenders affect firms' access to finance: supply and demand effects
  - Exploit natural experiments
    - (Khwaja and Mian 2008; Chava and Purnanandam 2011; Lin and Paravisini, 2013)
  - Examine the substitution between bank loans/ capital market instruments
    - (Kashyap et al., 1993, Becker and Ivashina, 2014)
  - Estimate demand and supply equations in disequilibrium models
    - (Carbo-Valverde et al., 2016; Krempe and Sevestre, 2013)
  - Exploit credit registry data where firms routinely obtain credit from multiple banks ( Albertazzi and Marchetti, 2010; Jimenez et al., 2012; Iyer et al., 2014)
- ❖ Our paper: we measure supply effects directly from a survey dataset
  - (Popov and Udell, 2012; Beck et al., 2017; Pignini et al., 2014; Presbitero et al., 2014)

- Quantity / price dimension of access to finance
  - loan pricing effects: Santos, 2011 and quantity effects: Ivashina and Sharfstein, 2010; Puri et al., 2011; Jimenez et al., 2012
  - ❖ Our paper: both quantity and price dimensions
- Effect of monetary policy on SMEs' expectations about future funding
  - trade credit: Garcia-Apenini and Montoriol-Garriga, 2013; Carbo-Valverde et al., 2016; Ferrando and Mullier, 2015
  - ❖ Our paper: universe of financing sources available to SMEs
    - bank loans, credit lines, retained earnings, trade credit, equity, and debt securities

Main effect of OMT on balance sheets of banks holding large amounts of sovereign debt :

1. Investors perceive banks as less risky and start demanding lower rates to keep funding them (Acharya et al. 2015)
2. Eligibility of sovereign bonds as collateral to secure wholesale funding increases
3. Sovereign’s ability to support the domestic banking sector increases as well

## Our Research Hypothesis:

*“By reducing yields on certain sovereign bonds, the OMT is expected to lead to a relatively larger improvement in credit access by firms borrowing from banks with large holdings of such bonds”*

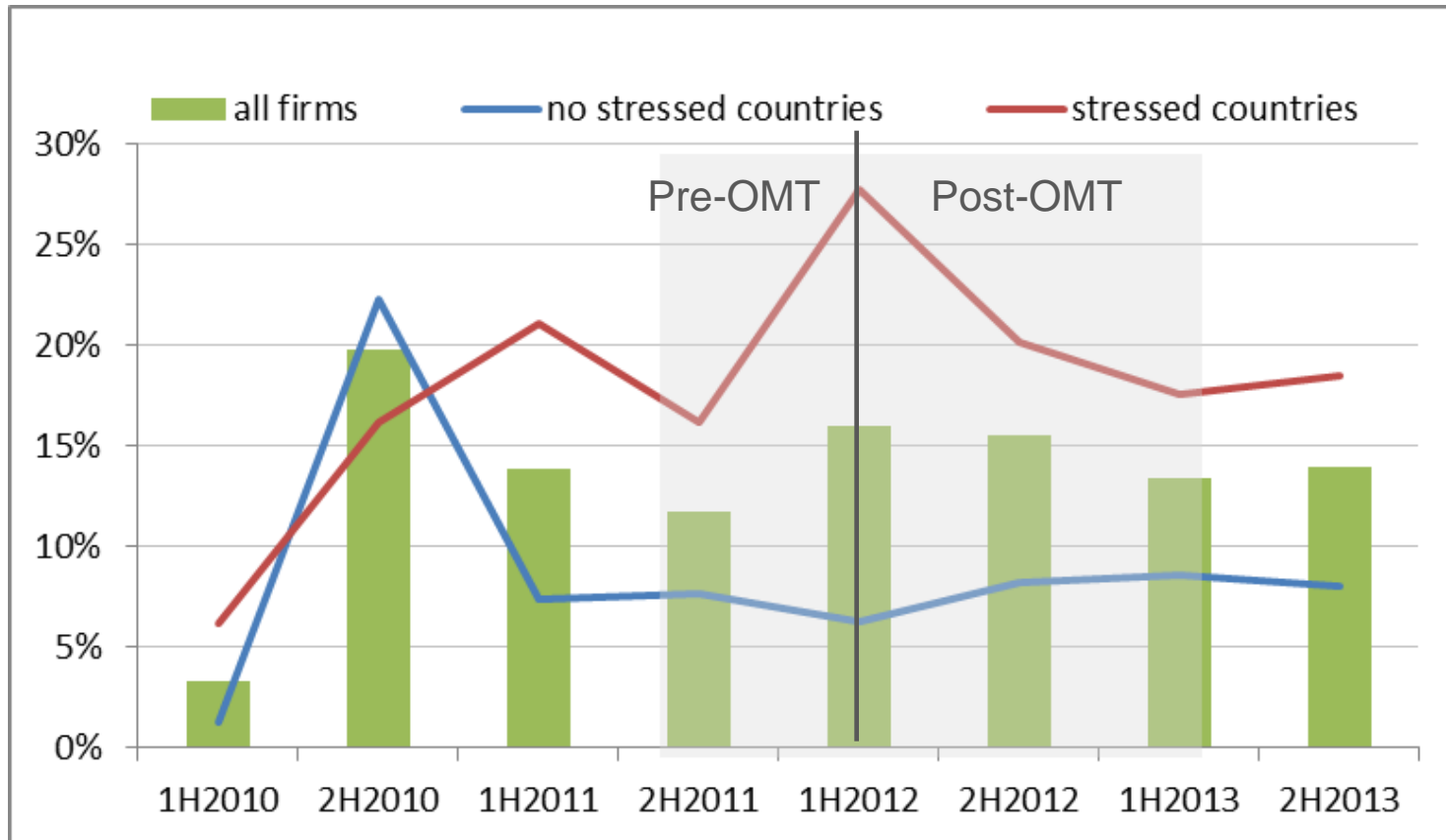
- **Firm-level data from the Survey on the Access of Finance of SMEs (SAFE):**
  - Firms interviewed bi-annual, over a period of 6 months, 10 waves (2009-2014), 11 euro area countries
  - Balance sheet information
    - size, age, ownership, changes in demand conditions and creditworthiness
  - Financing information
    - credit constrained, rejected, discouraged, use/expectations about future availability of bank loans/creditlines/ trade credit/ equity / debt securities
- **SAFE/ Bankscope:**
  - Merge using BANKER variable from matched Bvd Amadeus-SAFE database (variable BANKER as in Kalemlı-Ozcan, Laeven, and Moreno, 2015)
  - Information on 126 banks (Bankscope)
    - Total sovereign bond holdings over total assets (Home Bias)
- **SAFE/ EBA (June 2012 stress tests):**
  - Manual matching out of 90 banks
  - Information on 25 banks
    - Banks' holding of sovereign bonds from stressed countries

## Final sample:

- We focus on the waves around OMT announcement
  - Pre-OMT: 1.10.2011 – 31.09.2012 (waves 6 and 7)
  - Post-OMT: 1.10.2012 – 31.03.2013 (waves 8 and 9)
- We consider 21110 firms - 30040 observations but
- only 9% have information on their creditors:
  - 2628 firms report the identity of a creditor matched with Bankscope
  - 2122 firms report the identity of a creditor matched with EBA
- ❑ *Caveat:* firms with bank information may not be representative of the whole population
- ❑ *Our suggested solution:* In the empirical tests we use of sampling weights to restore representativeness of each individual firm with respect to average firm in the population



# Share of credit constrained firms with bank relationship



- Of the 2628 matched firm-bank observations, 8% (16%) are on average constrained in non-stressed (stressed) countries

# Empirical strategy (using Bankscope data)

DIDID approach with **three sources** to identify variation:

$$\begin{aligned} \text{Prob}(\text{Credit\_Constr}_{iscbt} = 1) = & \varphi \left( \beta_1 \text{Post}_t \times \text{Stressed}_c \times \text{Sov\_bonds/Assets}_{iscb} \right. \\ & + \beta_2 \text{Stressed}_c \times \text{Sov\_bonds/Assets}_{iscb} \\ & + \beta_3 \text{Post}_t \times \text{Sov\_bonds/Assets}_{iscb} \\ & \left. + \beta_4 X_{iscbt} + \beta_5 \phi_{sct} + \beta_6 \eta_b + \varepsilon_{iscbt} \right) \end{aligned}$$

$\text{Credit\_Constr}_{iscbt} = 1$  if firm  $i$  in sector  $s$ , country  $c$  borrowing from bank  $b$  at time  $t$ :  
(rejected/ credit rationed/ price rationed/ discouraged)

$\text{Sov\_bonds/Assets}_{iscb}$  ratio of total sovereign bonds at the time of the OMT  
announcement

$\text{Post}_t = 1$  after OMT announcement

$\text{Stressed}_{isc} = 1$  if firm  $i$  in sector  $s$  is in GR, ES, IE or PT

$X_{iscbt}$  firm-specific controls ( size, age, ownership structure, turnover,  
creditworthiness, etc.)

$\phi_{sct}$  country-sector-time fixed effects

$\eta_b$  bank fixed effects

$\varepsilon_{iscbt}$  idiosyncratic error term

Ho:  $\beta_1 < 0$

# Empirical strategy (using EBA data)

DID approach with **two sources** to identify variation:

$$\text{Prob}(\text{Credit\_Constr}_{iscbt} = 1) = \varphi \left( \beta_1 \text{Post}_t \times \text{Stressed\_sov\_bonds/Assets}_{iscb} + \beta_2 X_{iscbt} + \beta_3 \phi_{sct} + \beta_4 \eta_b + \varepsilon_{iscbt} \right)$$

$\text{Credit\_Constr}_{iscbt} = 1$  if firm  $i$  in sector  $s$ , country  $c$  borrowing from bank  $b$  at time  $t$ :  
(rejected/ credit rationed/ price rationed/ discouraged)

$\text{Stressed\_sov\_bonds/Assets}_{iscb}$  ratio at the time of the OMT announcement of  
sovereign bonds issued by stressed countries

$\text{Post}_t = 1$

after OMT announcement

$X_{iscbt}$

firm-specific controls ( size, age, ownership  
structure, turnover, creditworthiness, etc.)

$\phi_{sct}$

country-sector-time fixed effects

$\eta_b$

bank fixed effects

$\varepsilon_{iscbt}$

idiosyncratic error term

**Ho:  $\beta_1 < 0$**

# Main results

	Credit constrained			
	Bankscope data on sovereign exposures		EBA data on stressed exposures	
	(1)	(2)	(3)	(4)
Sovereign bonds / Assets × Stressed × Post	-0.020*** (0.005)	-0.011*** (0.003)		
Sovereign bonds / Assets × Post	0.015*** (0.004)	0.007*** (0.002)		
Sovereign bonds / Assets × Stressed	0.068*** (0.013)	0.068*** (0.004)		
Stressed bonds / Assets × Post			-0.030*** (0.012)	-0.035*** (0.010)
Selected control variables				
Stand-alone firm		0.078*** (0.026)		0.085*** (0.030)
Age_1		0.595*** (0.041)		0.641*** (0.029)
Age_2		-0.103* (0.036)		
Age_4		0.058*** (0.014)		0.092*** (0.017)
Turnover_4		-0.133*** (0.030)		-0.142*** (0.023)
Capital better		-0.057** (0.023)		-0.090*** (0.0101)
Credit history better		-0.052** (0.027)		
Country × Industry × Time FEs	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
No. Observations	2144	2016	1592	1499
R-squared	0.14	0.19	0.09	0.15

After the OMT announcement, ATF improved more for firms borrowing from banks with large relative holdings of impaired sovereign debt

Results hold when we control for firm-level heterogeneity (demand for credit)

# Falsification tests

- Test for differences in credit access trends across firms within the pre-OMT sample period for reasons unrelated to sovereign stress or to unconventional monetary policy

	Credit constrained: pre-trend, two waves	
	Bankscope data on sovereign exposures	EBA data on stressed exposures
	(1)	(2)
Main bank's sovereign bonds / Assets $\times$ Stressed $\times$ Post	0.018 (0.035)	
Main bank's stressed bonds / Assets $\times$ Post		0.010 (0.048)
Firm-specific controls	Yes	Yes
Country $\times$ Industry $\times$ Time FEs	Yes	Yes
Bank FE	Yes	Yes
No. Observations	513	318
R-squared	0.26	0.01

- No difference in credit access across firms exposed to different credit shocks coming from banks with different degrees of exposure to impaired sovereign debt in the one year before the OMT announcement

# Robustness tests

## Bankscope data on sovereign exposures

	Short run	Firm balance sheet shocks	Excluding Greece	Most creditworthy firms	Panel firms	Heckman correction
	(1)	(2)	(3)	(4)	(5)	(6)
Main bank's sovereign bonds / Assets × Stressed × Post	-0.060*** (0.007)	-0.020*** (0.007)	-0.011*** (0.003)	-0.019*** (0.001)	-0.041* (0.023)	-0.053*** (0.005)
Firm-specific controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm-specific controls × Stressed × Post	No	Yes	No	No	No	No
Country × Industry × Time FEs	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	No	Yes
Firm FE	No	No	No	No	Yes	No
No. Observations	825	2016	1714	179	213	863
R-squared	0.20	0.24	0.20	0.31	0.33	0.31

## EBA data on stressed exposures

	Short run	Firm balance sheet shocks	Excluding Greece	Most creditworthy firms	Panel firms	Heckman correction
	(1)	(2)	(3)	(4)	(5)	(6)
Main bank's stressed bonds / Assets × Post	-0.021* (0.012)	-0.039*** (0.006)	-0.030** (0.015)	-0.050 (0.164)	-0.299** (0.135)	-0.045* (0.030)
Firm-specific controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm-specific controls × Stressed × Post	No	Yes	No	No	No	No
Country × Industry × Time FEs	Yes	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	No	Yes
Firm FE	No	No	No	No	Yes	No
No. Observations	587	1425	1133	147	156	624
R-squared	0.16	0.20	0.18	0.26	0.52	0.29

- Results are robust to different specifications to identify the casual impact of the OMT announcement through the channel of the supply of bank credit

# Types of credit constraints

## Bankscope data on sovereign exposures

	Loan application denied (1)	Rationed (2)	High cost (3)	Discouraged from applying (4)
Main bank's sovereign bonds / Assets × Stressed × Post	-0.002* (0.001)	-0.001 (0.003)	-0.007*** (0.002)	-0.024** (0.012)
Firm-specific controls	Yes	Yes	Yes	Yes
Country × Industry × Time FEs	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
No. Observations	1360	1426	1325	1737
R-squared	0.31	0.19	0.23	0.24

## EBA data on stressed exposures

	Loan application denied (1)	Rationed (2)	High cost (3)	Discouraged from applying (4)
Main bank's stressed bonds / Assets × Post	-0.003** (0.002)	-0.019*** (0.001)	-0.007*** (0.001)	-0.007 (0.008)
Firm-specific controls	Yes	Yes	Yes	Yes
Country × Industry × Time FEs	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
No. Observations	1062	1069	307	1340
R-squared	0.28	0.17	0.20	0.25

- Decline in overall credit constraints is due to decline in loan denial rates and price rationing
- Most sizeable result is the decline in discouragement rates

# Price and non-price loan terms

## Bankscope data on sovereign exposures

	Interest rate	Loan size	Maturity	Collateral requirement:
	(1)	(2)	(3)	(4)
Main bank's sovereign bonds / Assets × Stressed × Post	-0.524*** (0.041)	0.107*** (0.030)	0.033*** (0.007)	-0.030 (0.029)
Firm-specific controls	Yes	Yes	Yes	Yes
Country × Industry × Time FEs	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
No. Observations	712	634	440	800
R-squared	0.45	0.31	0.46	0.24

## EBA data on stressed exposures

	Interest rate	Loan size	Maturity	Collateral requirement:
	(1)	(2)	(3)	(4)
Main bank's stressed bonds / Assets × Post	-0.052*** (0.013)	-0.057** (0.019)	-0.039 (0.047)	-0.077 (0.059)
Firm-specific controls	Yes	Yes	Yes	Yes
Country × Industry × Time FEs	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
No. Observations	522	470	355	588
R-squared	0.39	0.30	0.06	0.22

- OMT announcement has affected both price and non-price terms for both Bankscope and EBA data but maturities are affected only in the Bankscope data



# Expectations about future access to finance

## Bankscope data on sovereign exposures

	Bank loans	Credit lines	Trade credit	Equity	Debt securities
	(1)	(2)	(3)	(4)	(5)
Sovereign bonds / Assets × Stressed × Post	0.042*** (0.015)	0.016 (0.013)	0.180 (0.177)	0.007 (0.046)	0.111 (0.096)
Firm-specific controls	Yes	Yes	Yes	Yes	Yes
Country × Industry × Time FEs	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes
No. Observations	1682	1359	1343	295	127
R-squared	0.19	0.24	0.23	0.01	0.42

## EBA data on stressed exposures

	Bank loans	Credit lines	Trade credit	Equity	Debt securities
	(1)	(2)	(3)	(4)	(5)
Stressed bonds / Assets × Post	0.018 (0.013)	-0.006 (0.014)	0.022 (0.017)	-0.012 (0.050)	-0.361*** (0.146)
Firm-specific controls	Yes	Yes	Yes	Yes	Yes
Country × Industry × Time FEs	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes
No. Observations	1274	1008	1087	290	125
R-squared	0.16	0.22	0.21	0.02	0.49

- Firms associated with banks that experienced a reduction in funding costs thanks to the OMT expected availability of bank loans to further improve in the future

# Conclusions

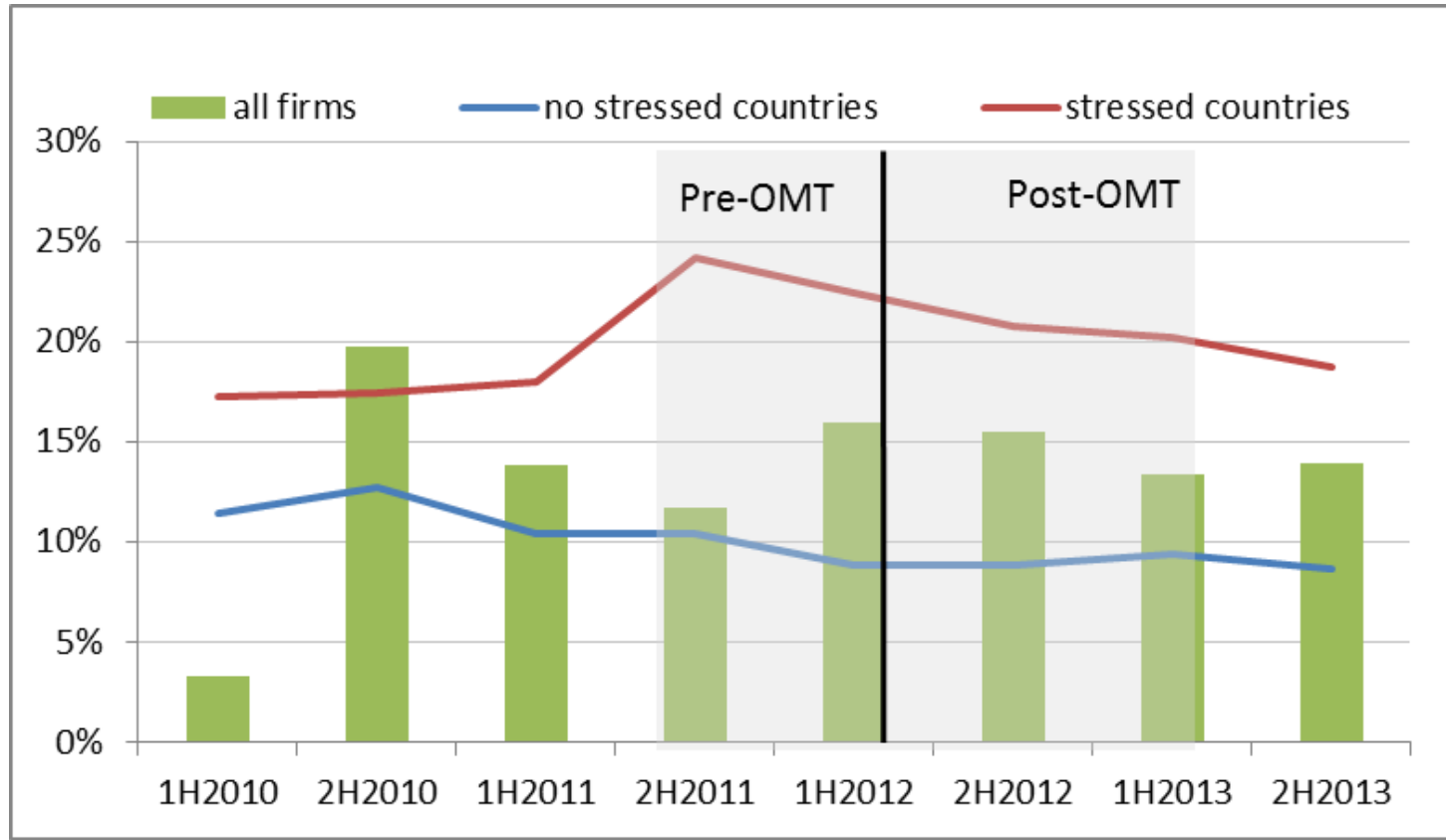
- Announcement of the OMT Program resulted in a strong short-term (six months) and medium-term (one-year) improvement in access to credit by firms borrowing from banks with substantial balance sheet exposures to impaired sovereign debt
- Our results imply that unorthodox monetary policy can lead to an improvement in credit access by reducing the riskiness of a class of assets that weighs heavily on some banks' balance sheets

Some important follow-up are the analysis:

- of the effect of monetary policy on firms' decisions such as capital investment or employment
- on how to design policies which ensure that bank credit supports the Schumpeterian creative destruction during recessions

**THANK YOU!**

# Share credit constrained firms



- Of the 30040 observations, 10% (18%) are on average constrained in non-stressed (stressed) countries