

# **Bank Response To Higher Capital Requirements: Evidence From A Natural Experiment**

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Recent debate on higher capital requirements for banks

Banks could increase their capital ratios by raising new capital or by shrinking assets

- Bank shareholders have incentives to shrink assets (Admati, DeMarzo, Hellwig, and Pfleiderer, 2015)
- Asset-shrinking has potential social costs (e.g. Hanson, Kashyap, and Stein, 2011)

Challenges in estimating the effect of an increase in capital requirements:

- Find exogenous variation in capital requirements
- Disentangle credit supply and credit demand

The effects of bank capital requirements on lending:

- Shocks to bank capital (Peek and Rosengren, 1997)
- Changes in dynamic provisioning requirements (Jiménez, Ongena, Peydró and Saurina, 2012)
- Variation in firm-bank specific risk weights (Fraisse, Lé and Thesmar, 2015)

Our contribution:

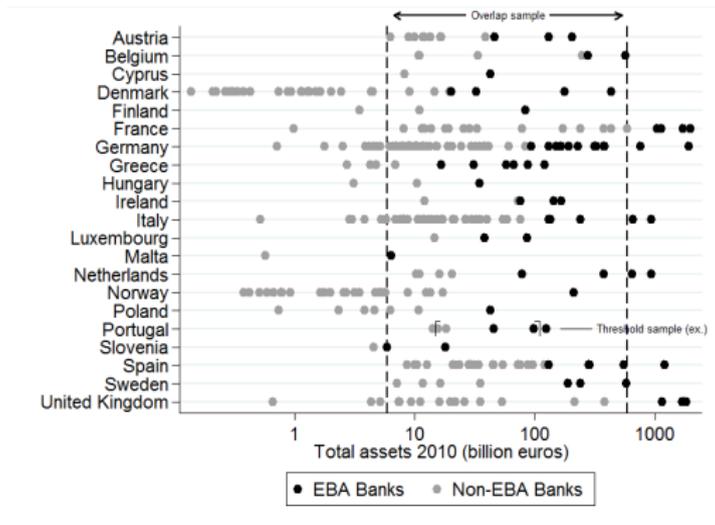
- Novel identification of the effect of capital requirements
- We investigate the adjustment measures on both the asset- and liability side
- We study the effect on credit supply and the transmission to firm level outcomes

- **Question 1:** How do banks respond to higher capital requirements?

$$\text{Regulatory Capital Ratio} = \frac{\text{Bank Capital}}{\text{Risk-Weighted Assets}}$$

- **Question 2:** What are the effects of higher capital requirements on credit supply and the associated real effects at the firm level?
- We use the 2011 EBA capital exercise as a natural experiment

- The 2011 EBA capital exercise in the EU calls for an increase in banks' Core Tier 1 ratio from 5% to 9%
  - To be implemented by the national supervisory authorities
- The EBA capital exercise came unexpected
- Bank selection rule:
  - Banks have been included in the exercise "in descending order of market shares by total assets as of 2010 to cover at least 50% **of each national banking sector**"
  - We take advantage of the **country-specific selection threshold**



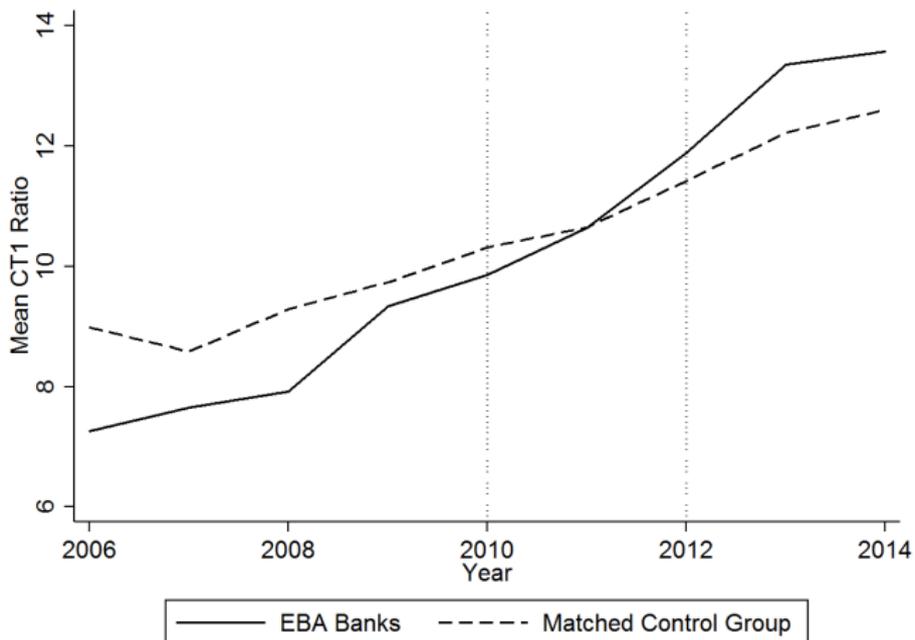
- Difference-in-differences matching approach
- Selection on observables (total assets)
- We exploit the **country-specific selection threshold**
- Overlap between EBA and Non-EBA banks

## Alternative Matching Strategies

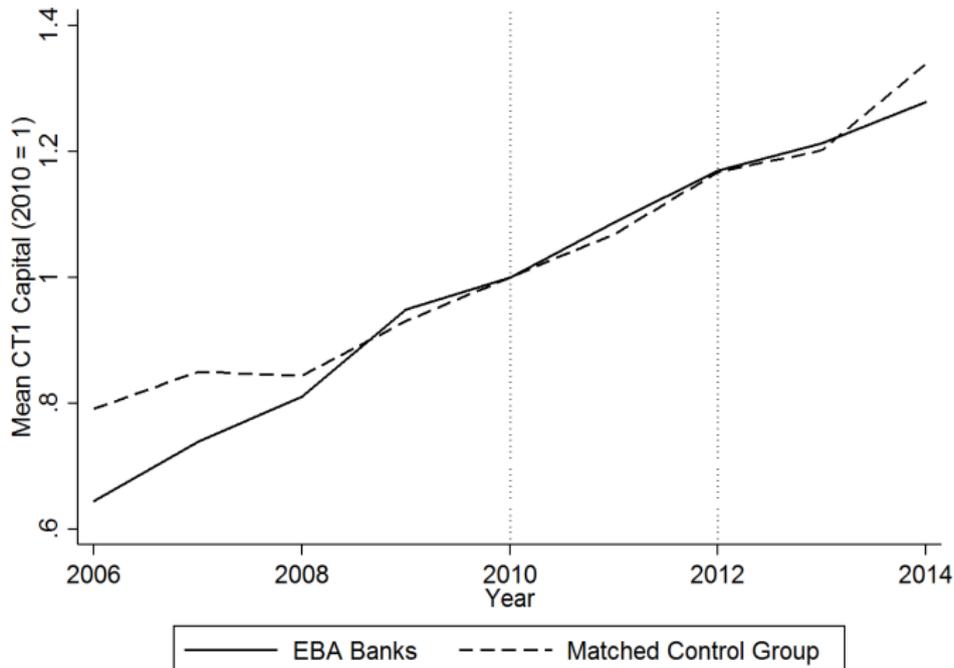
Matching Strategy	Baseline	Overlap	Within Country	Within Region
Sample Used	Baseline	Overlap	Threshold	Threshold
<i>Matching covariates</i>				
Total Assets	✓	✓	✓	✓
CT1 Capital Ratio	✓		✓	✓
Total Deposits / TA	✓		✓	✓
Customer Loans / TA	✓		✓	✓
Net Int. Inc. / Op. Rev.	✓		✓	✓
Net Income / TA	✓		✓	✓
Country			✓	
Region				✓

- Bank-level part: SNL Financial bank balance sheet data
  - Exclude subsidiaries, acquisitions, capital injections, Greek & Cypriot banks
  - Final sample: 48 EBA banks and 145 non-EBA banks
- Loan-level part: Dealscan syndicated loan data
- Firm-level part: Amadeus firm data
  - Merged with Dealscan data

## EBA banks increased their CT1 ratios

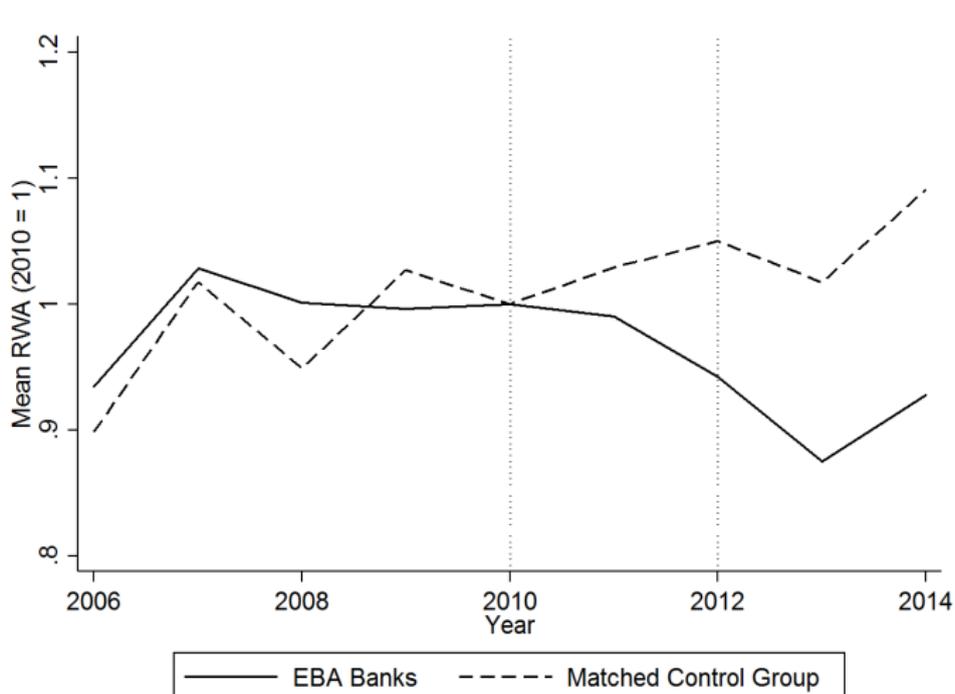


## EBA banks did not raise their capital ratio by increasing CT1 Capital ...



# Results: Risk-Weighted Assets

... but primarily by reducing their risk-weighted assets.



## Results: Baseline Matching

Dependent Variable	$\Delta$ CT1 Ratio	$\Delta$ Log CT1 Capital	$\Delta$ Log RWA
EBA Banks: Before - After	3.02***	0.19***	-0.10***
Control Group: Before - After	1.79***	0.17***	0.03
Matching Estimator (ATT)	1.85***	0.02	-0.16***
Number of observations	48	48	48

- $\Delta Y = Y_{2012/2013} - Y_{2009/2010}$
- Alternative matching strategies yield robust results.
- Placebo test: changes in CT1 Ratios between 2009-2010

## Results: Risk Reduction vs. Asset Shrinking

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Dependent Variable	$\Delta(\text{RWA}/\text{TA})$	$\Delta\text{Log TA}$	$\Delta\text{Log Cust. Loans}$
EBA Banks: Before - After	-5.94**	0.03	0.01
Control Group: Before - After	-4.12**	0.10***	0.08**
Matching Estimator (ATT)	-0.57	-0.14***	-0.12***
Number of observations	48	48	48

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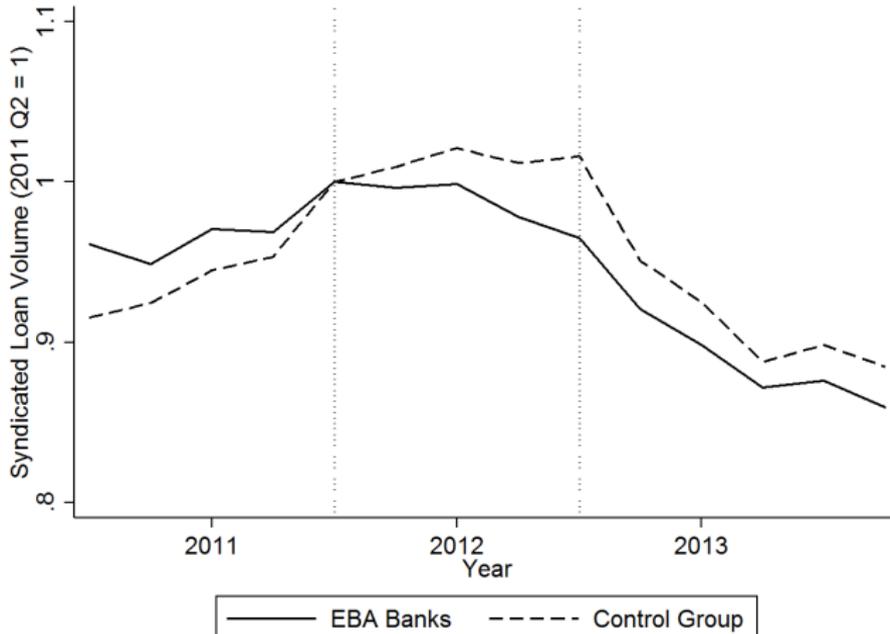
The increase in capital requirement for EBA banks may have been correlated with credit demand

To examine this we use syndicated loan-level data (Dealscan)

We employ a modified version of the Khwaja and Mian (2008) estimator

- Compare  $\Delta LoanExposure$  of EBA and Non-EBA banks to the same firm cluster (country  $\times$  industry) before and after the capital exercise
- Country-Industry FE control for firm-cluster specific shocks

## EBA banks reduced credit supply



$$\Delta \text{Loan Exposure}_{bij} = \beta \cdot \text{EBA Bank}_{bi} + \gamma \cdot X_{bi} + \eta_i + \eta_j + \epsilon_{bij}$$

	(1)	(2)	(3)	(4)	(5)
EBA Bank	-0.14** (0.06)	-0.25** (0.10)	-0.26*** (0.10)	-0.27*** (0.10)	-0.27*** (0.09)
Bank Country FE	YES	YES	YES	YES	YES
Bank Characteristics		YES	YES	YES	YES
Borrower Country FE			YES	YES	
SIC FE				YES	
Borrower Country x SIC FE					YES
Treatment Banks	45	45	45	45	45
Control Group Banks	44	44	44	44	44
Adjusted $R^2$	0.03	0.03	0.06	0.08	0.29
Observations	2,254	2,254	2,254	2,254	2,254

A reduction in credit supply by EBA banks may not have any real effects, if other banks are able to pick up the slack

We calculate the EBA borrowing share prior to the capital exercise:

$$\text{EBA Borrowing Share}_j = \frac{\sum_{i[\text{EBABanks}]} \frac{1}{5} \sum_{t=2010Q2}^{2011Q2} \text{OutstandingLoans}_{ijt}}{\sum_{i[\text{AllBanks}]} \frac{1}{5} \sum_{t=2010Q2}^{2011Q2} \text{OutstandingLoans}_{ijt}}$$

We estimate:

$$\Delta Y_j = \beta \cdot \text{EBA Borrowing Share}_j + \gamma \cdot X_j + \epsilon_j$$

where  $Y_j$  is the change in ...

- ... log total assets
- ... log fixed assets
- ... log number of employees
- ... log sales

## Results: Real Effects

$$\Delta Y_j = \beta \cdot \text{EBA Borrowing Share}_j + \gamma \cdot X_j + \epsilon_j$$

	$\Delta \text{Log}$ Total Assets	$\Delta \text{Log}$ Fixed Assets	$\Delta \text{Log}$ Employees	$\Delta \text{Log}$ Sales
EBA Borrowing Share	-0.11*** (0.03)	-0.11*** (0.03)	-0.03 (0.02)	-0.08** (0.03)
Firm-Level Controls	YES	YES	YES	YES
Borrower Country FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Number of Firms	1,655	1,655	1,655	1,655

Results are driven by non-listed firms.

- The EBA capital exercise was an effective policy instrument to improve the capitalization of the largest European banks
- However, banks did not raise their capital ratios by increasing their core tier 1 capital, but by reducing credit supply
- The reduction in credit supply had significant real effects on firm growth, investment and sales
- The paper suggests that capital regulation targeting the capital ratio has significant negative real effects