Bank quality, judicial efficiency and borrower runs: loan repayment delays in Italy[1]

Fabio Schiantarelli, Boston College and IZA, Massimiliano Stacchini, Bank of Italy
and Philip E. Strahan, Boston College and NBER

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[1] This presentation was prepared for the meeting. The views expressed are those of the authors and do not necessarily reflect the views of the BIS, the IFC or the central banks and other institutions represented at the meeting.
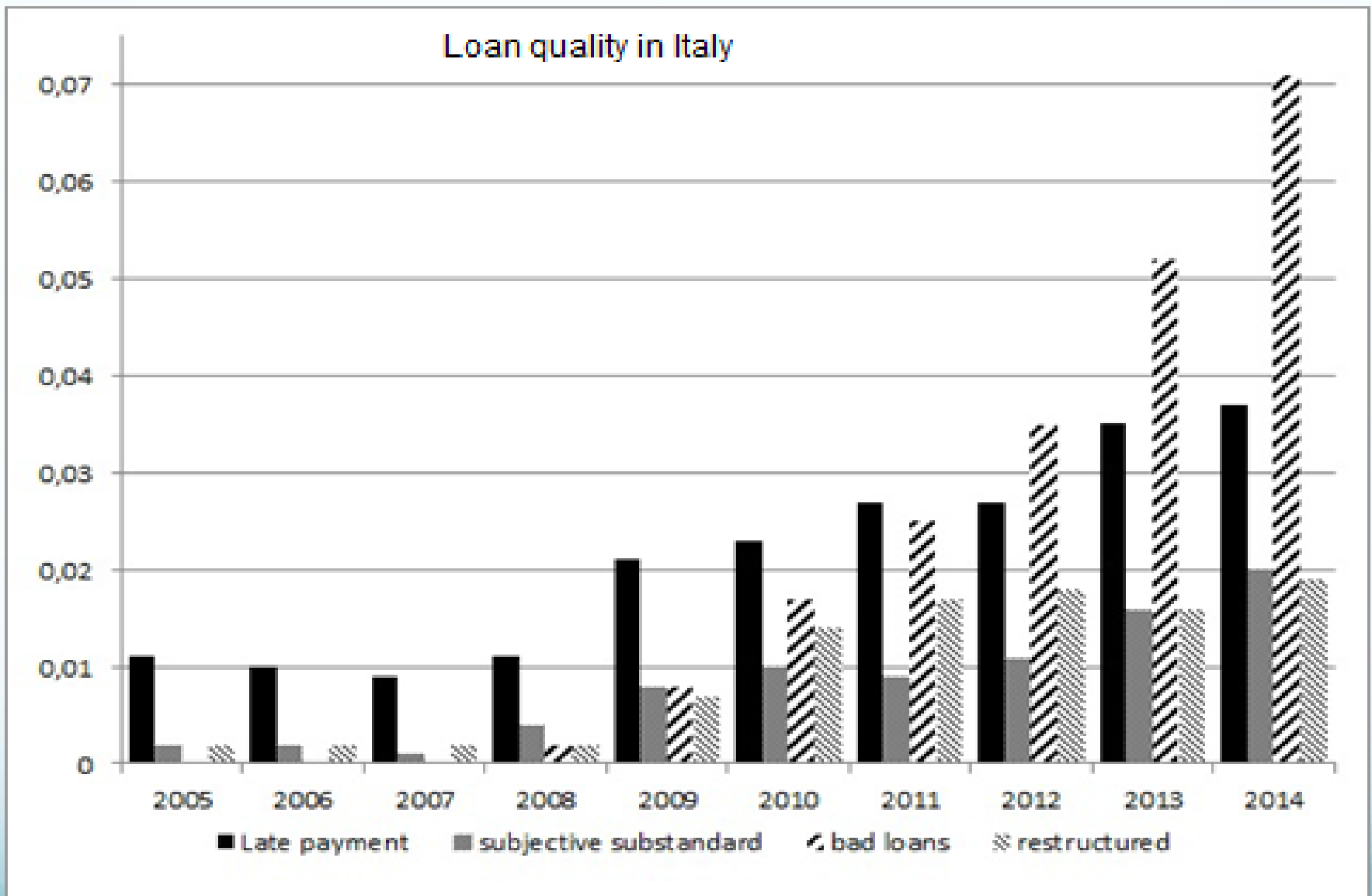
Bank Quality, Judicial Efficiency and Borrower Runs:
Loan Repayment Delays in Italy

Fabio Schiantarelli, Boston College & IZA
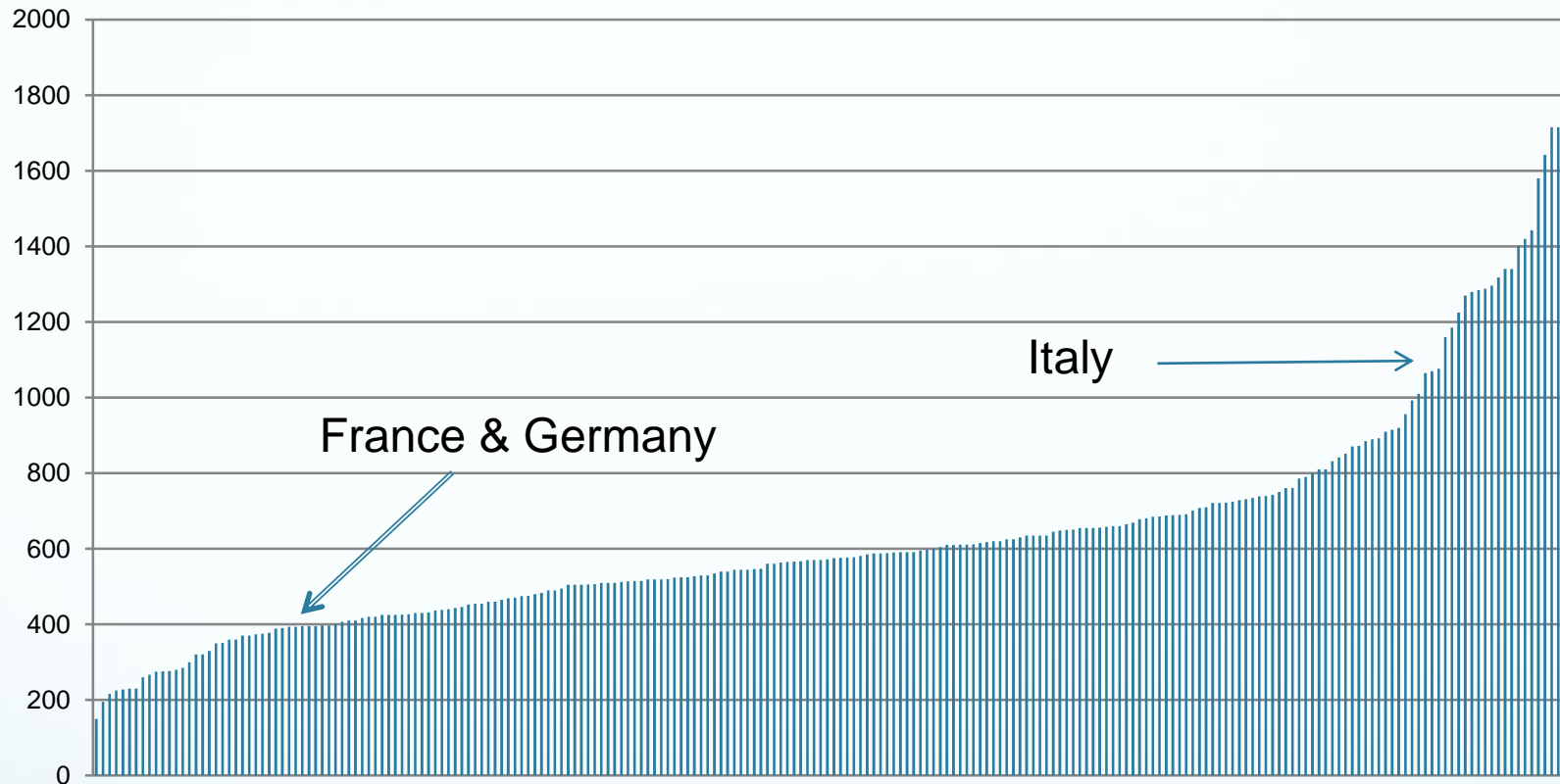
Massimiliano Stacchini, Bank of Italy

Philip E. Strahan, Boston College and NBER

Loan quality in Italy

The recession has left a legacy of non-performing loans on Italian banks' balance sheets.

World Bank Development Indicator: Time to Enforce a Contract

"The snail's pace of Italy's courts throws sand into the wheels of the economy in myriad ways. Banks struggle to resolve bad loans because bringing deadbeat debtors to court takes far the longest in Europe (WSJ, 2014)."

Legislative reforms in 2015 and 2016

"One factor that until now has played a role in the growth of the stock of non-performing loans has been the slowness of insolvency and recovery procedures.

The legislative reforms introduced last summer and those approved at the beginning of this month serve to speed them up.

With the out-of-court assignment of property pledged by firms as collateral, recovery times could shrink to a matter of months from the previous estimate of more than three years, already reduced by last summer's reforms."

I. Visco (The Governor's Concluding Remarks, 2016)

What makes Banks Fragile?

- Standard story: <u>Liquidity Risk</u>

    - Depositor runs a la Diamond and Dybvig (1983)
    - Interbank market "freeze" (Iyer et al, 2013)
    - Lines of credit (Kashyap, Rajan and Stein, 2001;
      Gatev and Strahan, 2006)

Liquidity risk in the financial Crises
    - Gorton & Metrick (2010)
    - Ivashina & Scharfstein (2011)
    - Ippolito, Peydro, Paolo and Sette (2014)

Our question: Can Bank Fragility Stem from Provision of <u>Credit</u>?

Theory says 'yes';

   Borrower may fail to repay lender if

  - lender is perceived to be weak, i.e. unlikely to lend in the future

  - lender's enforcement capacity is limited.

Bond and Rai (JDE, 2009)

Trautmann and Vlahu (JBF, 2013)

Carrasco and Salgado (JFE, 2014)

Little empirical support for this idea

Main Results

- New channel through which credit risk might enhance bank fragility.

- Borrowers <u>delay their loan repayments (default) selectively</u>: probability increases in banks weakened by past bad loans.
  - Effect is stronger for large borrowers

- Selective default is evident only where <u>legal enforcement is weak</u>.
  - We exploit local variation in enforcement across Italy

- Effect reflect <u>borrower</u> choice NOT <u>lender</u> choice

Why Italy?

- Massive increases in <u>borrower distress</u> during the "Seven years' War".

  - Manufacturing lost 17 percent of its productive capacity.

  - Net job destruction reached almost one million

- <u>Data</u>: Detailed information on outcomes at the loan-level

- <u>Multiple lending</u>: Firms very often borrow from more than one bank in Italy

- <u>Enforcement</u>

  Varies widely across Italy

Length of Property Execution Proceedings (# of days)

■	(1633,3688]
▨	(1201,1633]
▧	(860,1201]
□	[323,860]
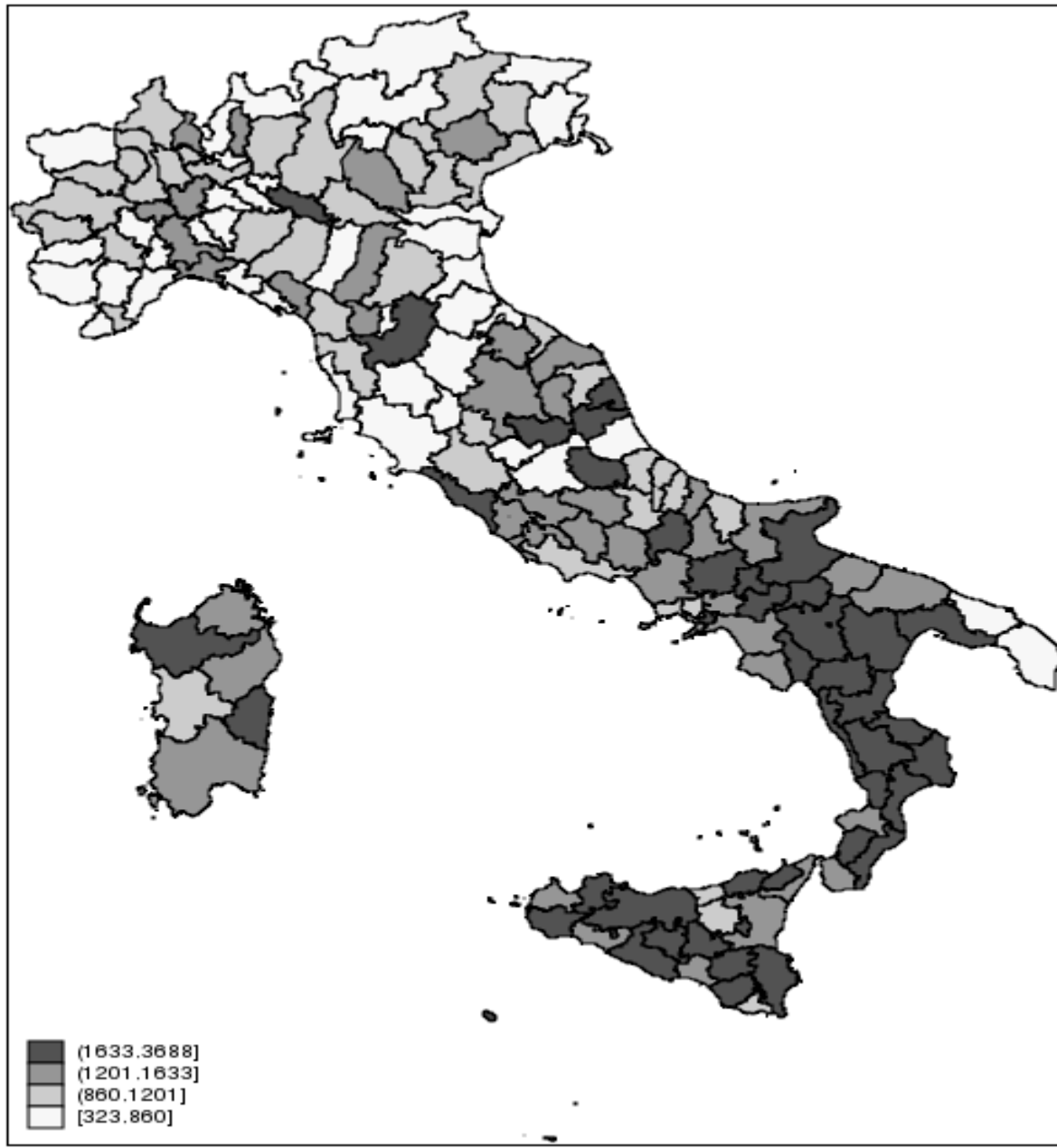
Identification: two challenges

- Weak borrowers may be matched to weak banks
  - Firm-time (multiplicative) effects fully remove any variation in borrower health

- Want to focus on borrower's choice to default
  - Dependent variable leaves out bank decision on loan classification

Identification (Empirical Model)

- We want to focus on <u>selective default</u>, so we look within <u>borrower-quarter</u>

$$y_{i,b,t} = \sum_{k=1}^{K} \alpha_k x_{b,t-1} + \theta_{i,t} + \delta_b + \varepsilon_{i,b,t}$$

- $y_{i,b,t}$ = 1 if loan payment is late or overdrawn with the bank;
  = 0 if performing

Identification (Model, cont'd)

- Control for borrower fundamental with firm-time fixed effects (a la Khwaja and Mian, 2008)

- Control for bank effects

- Focus on the effect of time-varying measure of bank health ($X_{b,t-1}$)
  - With firm-year effects, regression driven by firm choice as to <u>which bank not to pay</u>.

- And, we introduce interactions to look at firm characteristics, relationships, and legal enforcement

Identification: Where is variation coming from?

- Firm pays all its banks

  No, removed by firm*time effect

- Firm defaults on all banks

  No, removed by firm*time effect

- Firm that defaults on one bank but pays the other

  Yes, fixed effect will not perfectly explain these observations

  Variation driven by differences in bank characteristics
  This is what we mean by 'Selective Default'

Data

Sample: About 32,000 firms, from 2008 to 2013.

Source: Balance Sheet Register,

99% unlisted; firms account for more than 75% of total net revenues of Italian incorporated firms

Median firm has 50 employees

Match to:

- loan level data from Credit Register, Bank of Italy

- bank level data from Supervisory Reports, Bank of Italy

Solvency: Capital/assets, Bad loans/assets, Loss on sovereign bonds/assets,

Profitability: Profits/Equity

Liquidity: (Retail deposits and bonds with households)/assets;

(Cash and bonds)/assets

Size: Log Assets

Baseline Regression
DepVar: Delay

	Without Profits	With Profits
Capital/assets	0.021	0.037
Bad loans/assets	0.114**	0.099**
Sovereign losses/assets	0.002*	0.003
Profits	-	0.001
Deposits/assets	0.002	0.002
(Cash+bonds)/assets	-0.006	-0.012
Log of Assets	-0.001	-0.001
Share from Bank	0.012***	0.014***
Bank Effects	Y	Y
Firm-Time Effects	Y	Y
Observations	2,656,566	1,066,184
Cluster	By Bank	By Bank

Economic Impact

- Increase of bad loans/assets from 25th to 75th Percentile = 0.05

- Estimated effect on default = 0.05 x 0.114 = <u>0.5%</u>

- <u>Large</u> relative to mean default rate of 3% (~16 percent increase from the mean)

Bank weakness matters more for large firms
Dep.var.: Delay

	Smallest	Medium	Large	Largest
Capital/assets	0.034	0.017	0.037	0.056
Bad loans/assets	0.076*	0.041	0.108***	0.138**
Sovereign losses/assets	0.002	0.004	0.003	0.004
Profits/assets	-0.003	0.009	-0.006	0.002
Deposits/assets	0.003	0.005	0.001	0.002
(Cash+bonds)/assets	-0.012	-0.022**	-0.007	-0.010
Log of Assets	-0.002	-0.002	-0.001	-0.001
Share from Bank	0.007***	0.008***	0.013***	0.025***

Bank-Firm/Type Effects	Y
Firm-Time Effects	Y
Observations	1,065,889
Cluster	Bank
P-value for F-test of Coefficient Equality	0.020

Do results reflect legal inefficiency?

- Interact <u>Bank characteristics</u> with <u>Log of Days to Execute Property Disputes</u>
  - How long to repossess collateral?
  - Large variation across Italy

- Match by location of lender's head office
  - → Direct effect taken out by bank fixed effects

- Use 2007 data on legal efficiency (pre-determined)
  - → no mechanical relationship with losses in our sample

YES: Interaction with 2007 Legal Efficiency

|	Without Profits	With Profits
Capital/assets	-0.398	-0.533
Capital/assets * Log Efficiency	0.060	0.082
Bad loans/assets	-1.301***	-1.063***
Bad loan * Log Efficiency	0.196***	0.162***
Sovereign losses/assets	0.004	-0.001
Sovereign Loss * Log Efficiency	-0.001	0.001
Profits/assets	-	0.017
Profit * Log Efficiency	-	-0.001
Deposits/assets	-0.057	-0.075*
Deposits * Log Efficiency	0.010	0.012*
(Cash+bonds)/assets	0.172*	0.069
Cash+bonds * Log Efficiency	-0.025*	-0.011
Log of Assets (Billions €)	-0.011	-0.013
Log assets * Log Efficiency	0.002	0.002
Share from Bank	-0.002	-0.005
Share * Log Efficiency	0.002	0.003
Bank Effects	Y	Y
Firm-Time Effects	Y	Y
Observations	2,656,566	1,066,184
Cluster	Bank	Bank

Magnitude of Bad Loans on Late Payment, by Legal Efficiency
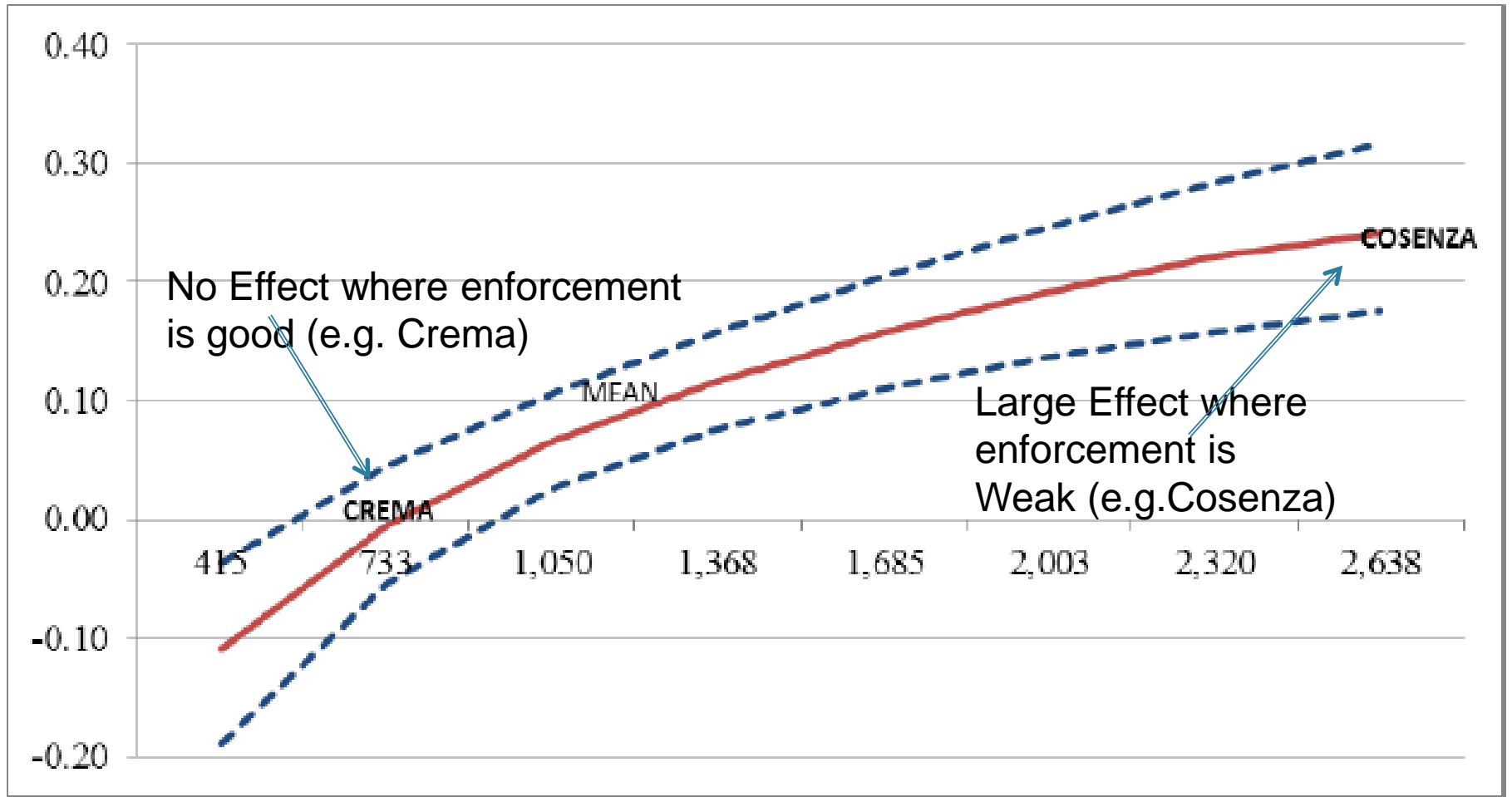
Selective v. Strategic Default

	Without Profits	With Profits
Safe Firms (Strategic)		
Bad loans/assets	-0.873***	-0.576***
Bad loan * Log Efficiency	0.124***	0.082***
N	502,356	202,475
Vulnerable Firms (Selective)		
Bad loans/assets	-1.177***	-1.062***
Bad loan * Log Efficiency	0.177***	0.159***
N	1,597,259	641,802
Risky Firms (Selective)		
Bad loans/assets	-2.089***	-1.521***
Bad loan * Log Efficiency	0.322***	0.244***
N	556,951	221,907
Bank Characteristics X Inefficiency	Y	Y
Bank Effects	Y	Y
Firm-Time Effects	Y	Y
Cluster	Bank	Bank

Magnitude of Bad loans on Late Payment, by Legal Efficiency & Borrower Risk Type (Z- score)
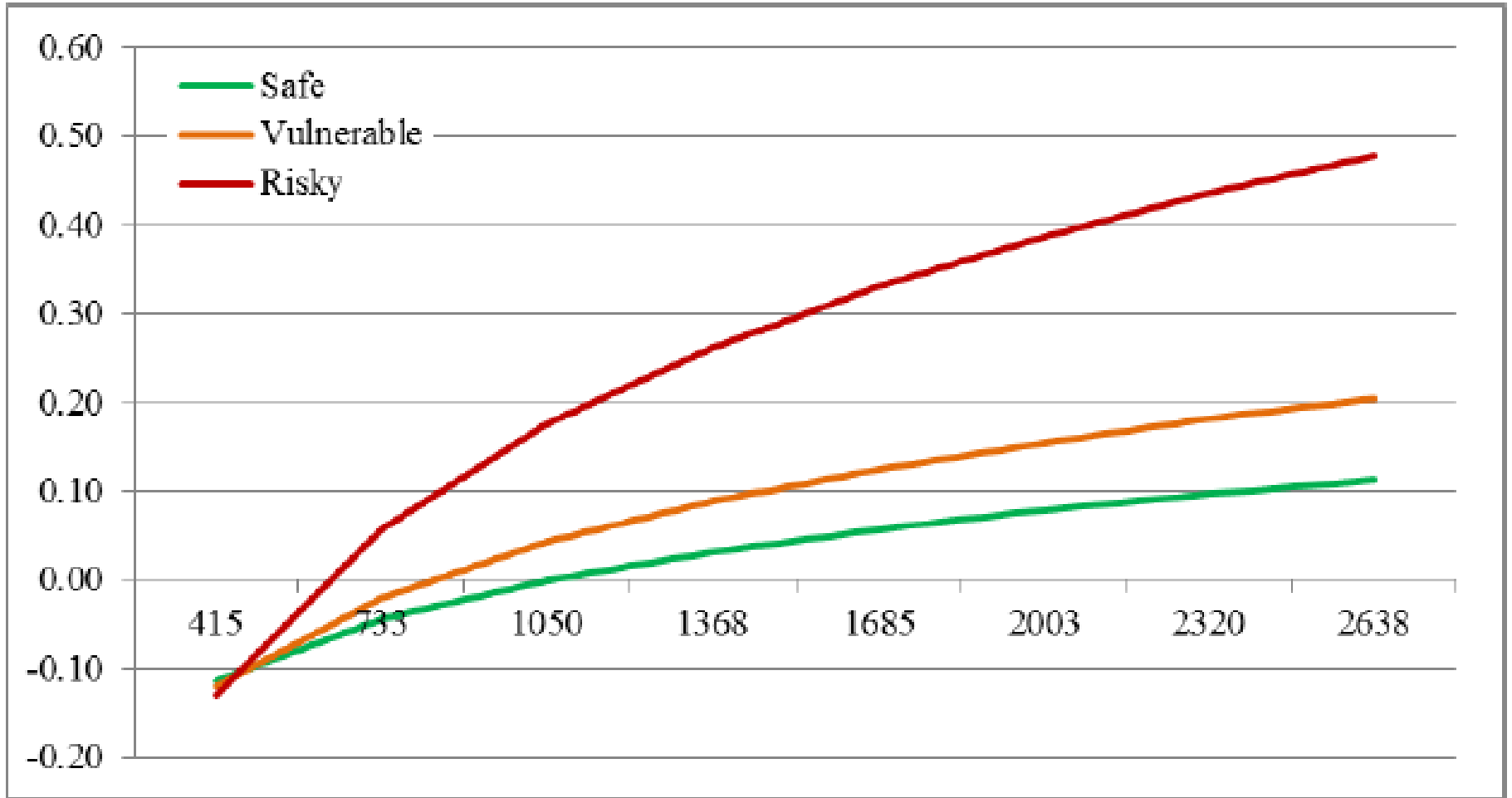
Robustness Checks

- Use First Late Payment only
  - Because distressed banks may be slower to write off bad loans
  - (Once a loan goes into arrears, we drop all subsequent observations)

- Use Term Loans only
  - Because distressed banks might cut lines more aggressively, leading to defaults

- Control for other Loan Terms
  - maturity, price, real collateral, receivables

- Results are robust to region (North v. South)

- Results similar with bank * firm fixed effect

Final remarks

- Banks can face 'borrower runs'
  - Another dimension of bank fragility, related to credit provision rather than to liquidity provision

- Borrowers selectively default against weak banks

- This only emerges where <u>Legal Enforcement</u> is weak

- Our results point to Legal Enforcement as an additional component required to reduce fragility stemming from credit risk.

- Better enforcement might limit the use of mechanisms (i.e., lender of last resort facilities, deposit insurance) that might generate moral hazard costs.

- Controversial possibility: can too much transparency can be destructive?

Thanks !

Summary Statistics

	2008	2009	2010	2011	2012	2013
Loan Defaults						
Late Payments, all	1.90	3.00	3.10	3.20	4.20	5.90
Late Payments, term loans	1.30	2.10	2.20	2.30	3.10	4.20

	Mean	Q25	Q75
Bank Characterstics			
Capital/assets (solvency)	0.14	0.08	0.17
Bad loans/assets (solvency)	0.03	0.01	0.06
Sovereign losses/assets (solvency)	-0.08	-0.20	0.03
Profits/assets	0.02	0.01	0.04
Deposits/assets (funding liquidity)	0.60	0.41	0.86
(Cash+bonds)/assets (asset market liquidity)	0.16	0.06	0.25
Assets (Billions €)	36.00	0.14	2.60

Firm characteristics

	mean	p25	p50	p75
leverage	52	28	57	77
age	25	13	23	33
total assets	62,298	7,905	14,720	32,556
empl	153	24	49	106

And for risky firms (split by z-score)

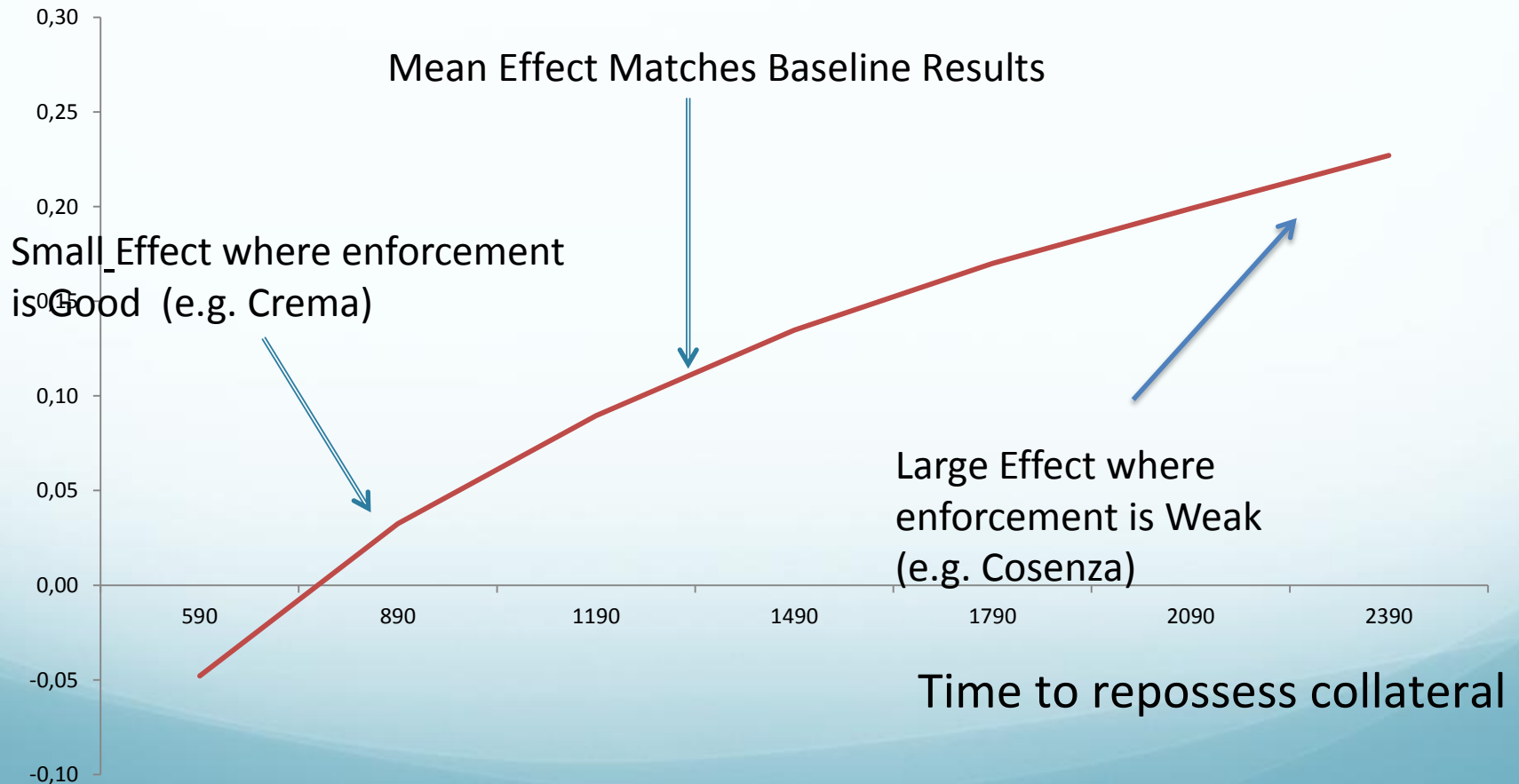|	Safe	Vulnerable	Risky
Capital/assets	-0.012	-0.008	0.134**
Bad loans/assets	0.021	0.096**	0.227***
Sovereign losses/assets	0.001	0.003**	0.003
Deposits/assets	-0.001	0.004	-0.001
(Cash+bonds)/assets	-0.004	-0.001	0.006
Log of Assets (Billions €)	-0.001	-0.001*	-0.001
Share from Bank	0.005***	0.012***	0.032***
Bank-Firm/Type Effects	Y	Y	Y
Firm-Time Effects	Y	Y	Y
Observations	502,356	1,597,259	556,934
Cluster	Bank	Bank	Bank

Main results
Selective Default Stronger where Legal Enforcement is Weak

∂ Prob (borrower delays loan repayment)

∂ Bank's accumulated bad loans

Mean Effect Matches Baseline Results

Small Effect where enforcement is Good (e.g. Crema)

Large Effect where enforcement is Weak (e.g. Cosenza)

Time to repossess collateral

Bank Relationships in Italy

- Most firms have at least 2 relationships (our data)

- Typical number of banks in Italy is highest in EU (Ongena & Smith, 2000)

- But not correlated with <u>Legal Enforcement</u> variation within Italy

Do relationships mitigate selective default?

- Introduce interactions between bank's share with bank-level characteristics

NO: Interaction with share

|	Without Profits	With Profits
Capital/assets	0.034	0.050
Capital/assets * Share	-0.094	-0.095
Bad loans/assets	0.114***	0.102***
Bad loan * Share	-0.002	-0.020
Sovereign losses/assets	0.002	0.003
Sovereign Loss * Share	0.002	0.002
Profits/assets	-	0.006
Profit * Share		-0.039
Deposits/assets	0.004	0.005
Deposits * Share	-0.015	-0.016
(Cash+bonds)/assets	-0.008	-0.014
(Cash+bonds) * Share	0.020	0.021
Log of Assets (Billions €)	-0.001	-0.001
Log assets * Share	-0.001*	-0.002**
Share from Bank	0.038***	0.047***
Bank Effects	Y	Y
Firm-Time Effects	Y	Y
Observations	2,656,566	1,066,184
Cluster	Bank	Bank

First Delayed Repayment

	2008	2009	2010	2011	2012	2013
First Delay	1.1	1.5	1.3	1.1	1.7	1.9

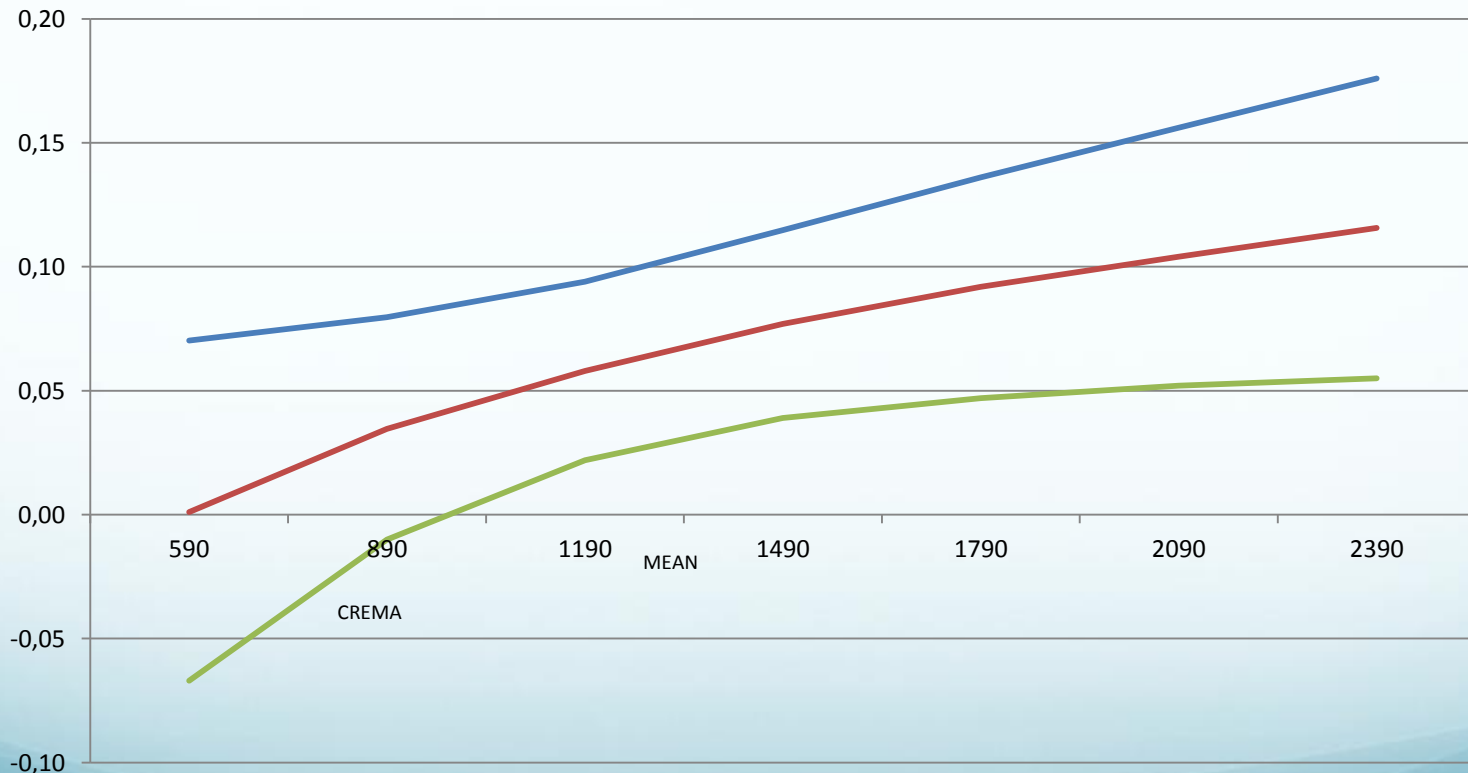$\dfrac{\partial\, p\ (\text{firm delay})}{\partial\ \text{lenders' past bad loans}}$
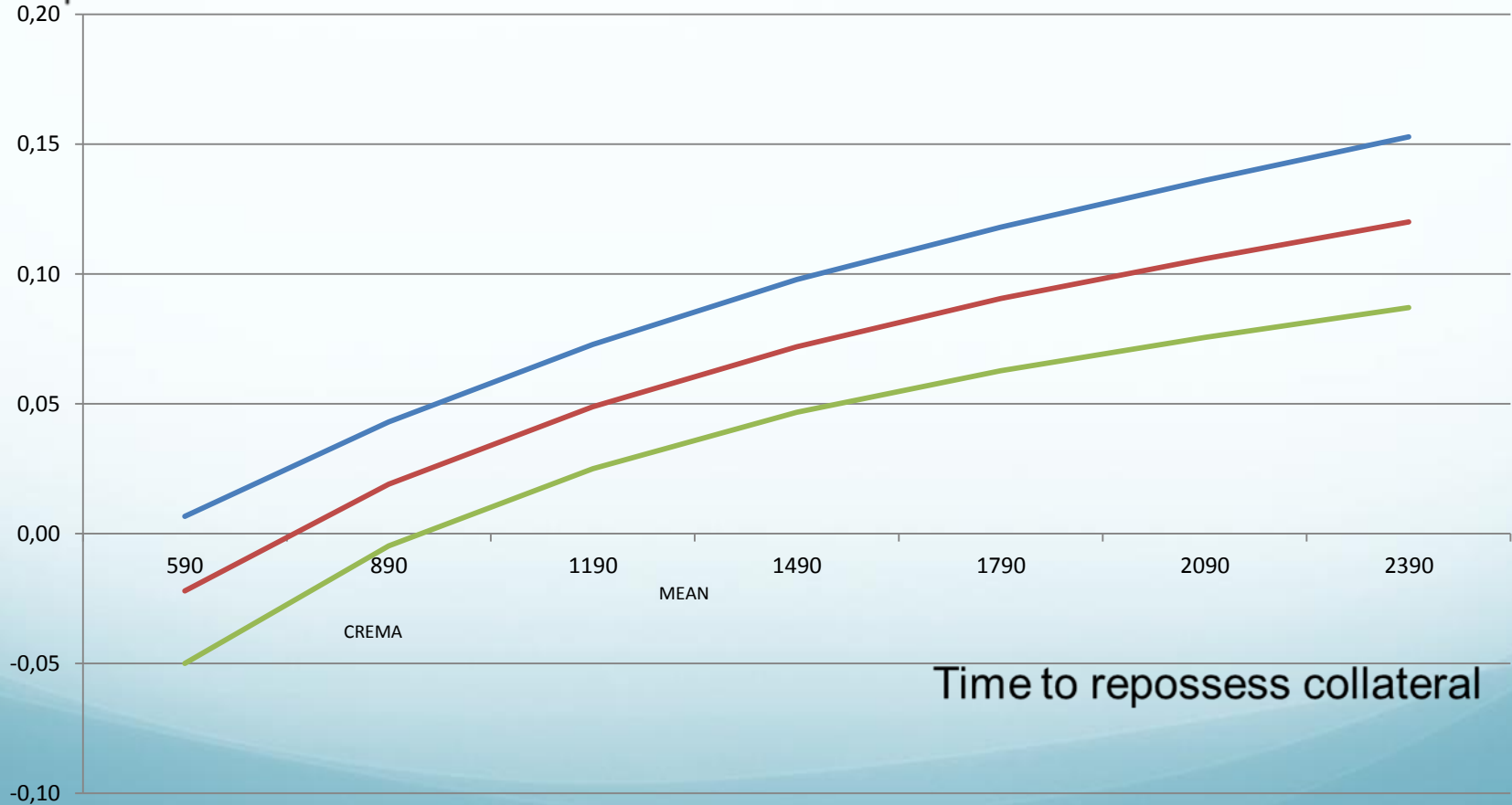
Time to repossess collateral

Term Loans Only

	2008	2009	2010	2011	2012	2013
Delay Term loans	1.3	2.1	2.2	2.3	3.1	4.2

$$\frac{\partial\ p\ (\text{firm delay})}{\partial\ \text{lenders' past bad loans}}$$

Time to repossess collateral

Loan Transition Matrix

	Loan State at time 12/2014			
	Perf-orming	Past Due / overdrawn	Substandard / Restructured	Bad Loans
Loan State at 12/2013 Performing	92.39%	1.04%	5.67%	0.90%
Past Due / overdrawn	**27.49%**	**13.70%**	**46.91%**	**11.90%**
Substandard / Restructured	3.97%	0.22%	71.86%	23.94%
Bad Loans	0.10%	0.01%	0.27%	99.62%