The Unholy Trinity: Regulatory Forbearance, Stressed Banks and Zombie Firms

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*The views expressed are personal and not the official view of CAFRAL.

Outline

Regulatory Forbearance & Financial Stability

- Rationale: For viable but solvent firms experiencing temporary liquidity problems to continue operations.
- Dueling incentives of forbearance:

  A risk management tool for temporarily problematic loans of viable firms

  vs.

  Can be used to avoid a "non-performing" classification $\rightarrow$ inefficient allocation of resources & pose eventual problems for lenders.

- What are the implications of these incentives to appropriately provision for & manage credit risk in loan portfolios?

Regulatory Forbearance & Financial Stability

- Stealth recapitalization schemes → negative impact on bank lending (Acharya et al. (2018), Carpinelli and Crosignani (2017)) → Japanese lost decade (Caballero et al. (2008)).
- Forbearance extended over long time-periods may lead to misallocation of credit → evergreening of NPAs, supporting zombie firms.
- Regulatory arbitrage windows (capital provisioning) may fail to channel available liquidity efficiently → especially if the banking sector is weakly capitalized.

Asset Quality Forbearance in India

- Before and after 2008 classification of standard assets changes. Introduction of new category of "Restructured Assets."

Asset Category	Npa Duration	Provisioning Rate
Standard		0.25%-1%*
Sub-Standard	<1 year	15%
Doubtful	Up to one year	25%
	One to three years	40%
	More than three years	100%
Loss		100%

Did Forbearance Provide a License for Regulatory Arbitrage?

A Forensic Approach to Examine the Impact of Forbearance

Banks:

- Correlation of bank & firm distress measures

Firms:

- Allocation of credit

1. Low-solvency vs low-liquidity firms.
2. Zombie firms and....
   spillovers to healthy firms.
3. Real effects on capex and labor expenditure

Is there a reversal once retraction begins?

Summary of Findings

1. Post-Forbearance Credit Misallocation: Credit from stressed banks to low-solvency, low-liquidity firms increases significantly; rise in zombie credit between 2008-2016.

2. At the Margin: Compared to good banks, stressed banks lending:
   7% higher to low-solvency firms,
   5% higher to low-liquidity firms and,
   2% higher zombie credit.

3. Negative Spillovers: Healthy firms in the zombie-dominated industries or borrowing from zombie-heavy banks witness a decline in credit from stressed banks post 2008.

4. Distortions in Real Sector: Low-solvency firms borrow more but do not increase capex rather increase wages as a proportion of total expenses.

5. Persistence: Larger effects during 2009-2013 but muted effects during the retraction phase (2014-2016). Why?

Key takeaways: Implications of credit misallocation

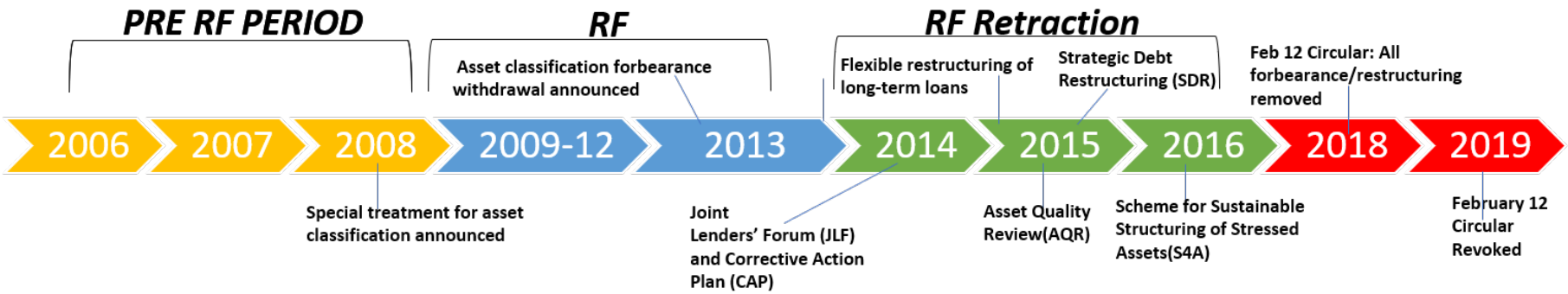
1. Stressed banks lose out on their better clients.
2. Forbearance, possibly, persistently changes industry structure with stressed banks in sticky matches with weak firms.
3. Retracting forbearance and cleaning up bank balance sheets may be harder than previously envisaged.

Existing Literature

- Acharya et al. (2018) $\rightarrow$ post-ECB's OMT announcement, banks extended subsidized loans to impaired borrowers.
- Peek and Rosengren (2005) $\rightarrow$ misallocation of credit in Japan by marginal banks to avoid losses on balance sheets. Blattner et al.(2019) $\rightarrow$ Europe. Flanagan & Puranandam (2019) $\rightarrow$ India.
- Gropp et al. (2017) $\rightarrow$ impact of recapitalization of distressed banks through TARP in the USA; frictions to creative destruction processes predict weak recovery (see Caballero et al. (2008)).
- McGowan et al. (2018) $\rightarrow$ connection between zombie firms, bank health, and spillovers to productive firms.

Timeline of Policy Announcements

Announcement Date	Content of Announcement
27-Aug-08	Special Regulatory Treatment Announced allowing forbearance
30-May-13	Announcement of withdrawal of Forbearance beginning April 1, 2015
26-Feb-14	Framework for Revitalising Distressed Assets in the Economy – Guidelines on Joint Lenders' Forum (JLF) and Corrective Action Plan (CAP)
15-Jul-14	Flexible Structuring of Long Term Project Loans to Infrastructure and Core Industries
1-Apr-15	Asset Quality Review Started
8-Jun-15	Strategic Debt Restructuring Scheme for conversion of debt to equity
13-Jun-16	Scheme for Sustainable Structuring of Stressed Assets
12-Feb-18	Resolution of stressed assets – Revised Framework



Outline

Data

1. **Borrower-level**: Sample of non-financial borrowers from Prowess CMIE between 2006-2016.
   - Variables from standalone financial statements; Identity-Industry Classification.
   - Lead Bankers: Assign total borrowings to **lead bankers** only since break-up of loan volumes from different banks is not available. Use **Syndicate names** for matching part of the paper.
2. **Bank-level:** Publicly available BSR data (RBI website) aggregated at the bank-level. Time Period: 2006-2018.
   - Capture gross advances, restructured advances and NPAs for Public- & Private-sector banks

Data

- Banks in 2016: Public sector (27), private sector (21) & foreign banks (49).
- Market Share: Public sector (70%), Private (23%) & foreign (7%).

Measures

1. **Low-Solvency Firm:** Above median debt-equity ratio in year t.

2. **Low-Liquidity Firm:** Below median cash ratio in year t.

3. **Zombie Credit Firm:** Average interest rate $<$ Prime Lending Rate (PLR) of safest bank in India (following Caballero et al. (2008)).

   Alternative Measures: Refine subsidized credit+ $ICR < 2$ condition,

   Speculative Credit Definition of IMF: $ICR < 4.1$ & Net debt to assets ratio > 0.25.

4. **Stressed Bank:** Bank belongs to Top two terciles of NPA ratio in 2007.

   Alternative Measures: Capital to Risk Weighted Assets Ratio (CRAR), Bank ownership- public vs private, geographic distance to regulator.

5. **Forbearance:** Post forbearance dummy is 1 if year $>=$ 2009 (special regulatory treatment announced in August, 2008). Post withdrawal dummy is 1 if year $>=$ 2014 (withdrawal announced in May, 2013).

   Alternative Measures: Provisioning rate on restructured loans as a 'continuous' measure of forbearance.

Confusion Matrices

		Healthy Banks			Stressed Banks			
		$\textbf{Liquidity}_{j,t}$			$\textbf{Liquidity}_{j,t}$			
		High	Low	Overall		High	Low	Overall
$\textbf{Solvency}_{j,t}$	High	38%	16%	54%	High	30%	14%	44%
	Low	18%	28%	46%	Low	18%	38%	56%
	Overall	56%	44%	100%	Overall	48%	52%	100%

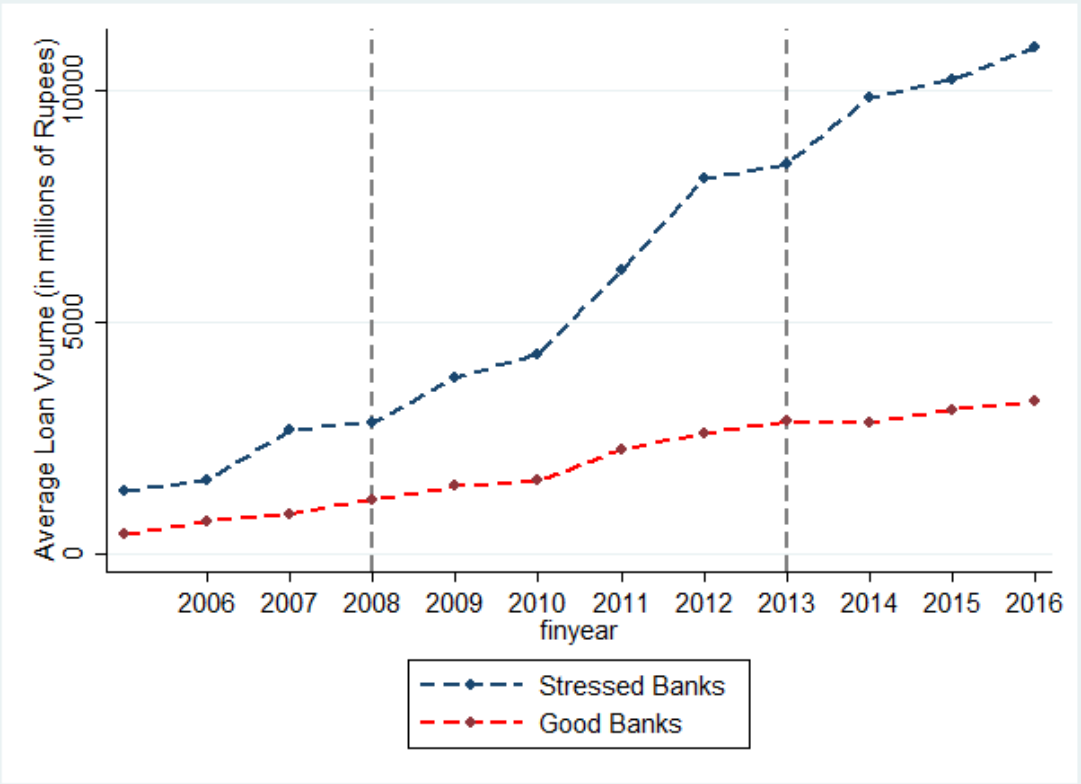
Outline

Table 1: Results I: Correlation of Bank & Firm Distress Measures

Measure	$\frac{RA}{DA}$	$\frac{NPA}{GA}$	$\frac{DA}{GA}$
% Borrowers (Debt-Equity Ratio > Q4)	0.722***	0.0362***	0.144***
% Borrowers (Debt-Equity Ratio > Q2)	0.695***	-0.00164	0.0769***
% Borrowers (Debt-Equity Ratio > 2)	1.303***	0.0408***	0.212***
% Borrowers (Cash Ratio < Q1)	0.384**	0.0310*	0.0946***
% Borrowers (Cash Ratio <Q2)	0.387***	0.00935	0.0407*
% Borrowers (Cash Ratio <1)	0.973***	0.0776***	0.219***

There is strong positive correlation between the distress ratios of banks & the proportion of borrowers in bank's portfolio with low-solvency (high leverage) and low-liquidity (cash) measures.

Stressed Bank Lending



- The average loan volume of stressed banks witnessed a steep rise after 2008 compared to healthy banks.
- Where did this credit go? Check the claim that objective was to help low-liquidity but viable firms only.

Empirical Framework: Where did the Credit go?

The baseline specification we use is:

$$Log(Debt_{j,t+1}) = \alpha_t + \gamma_j + \beta_1 * Stressed\,Bank_b * Low\,Quality^F_{j,t} + \zeta_k \sum_{k=1}^{2} Stressed\,Bank_b * RF^k_t + \eta_k \sum_{k=1}^{2} Low\,Quality^F_{j,t} * RF^k_t + \delta_k \sum_{k=1}^{2} Stressed\,Bank_b * Low\,Quality^F_{j,t} * RF^k_t + \epsilon_{j,t+1} \quad (1)$$

where:

- $Log(Debt_{j,t+1})$ is the Log of debt in period $t+1$ for a given firm j borrowing from lead bank b.
- For $k = 1$, RF^1_t: 'regulatory forbearance increasing' episode, For $k = 2$, RF^2_t: 'regulatory forbearance retraction' episode.
- $Low\,Quality^F \in \{Low\,Solvency_{j,t}, Low\,Liquidity_{j,t}\}$
- α_t and γ_j control for year (t) and firm (j) fixed effects.

Results II: Credit to Low-Solvency & Low-Liquidity Firms

Dependent Variable: Log Debt$_{j,t+1}$	Solvency		Liquidity	
	(1)	(2)	(3)	(4)
Stressed Bank$_b$ * Low Solvency$_{j,t}$ * Forbearance$_t^{\text{Post 2008}}$	0.359***	0.384***		
	(0.125)	(0.123)		
Stressed Bank$_b$ * Low Solvency$_{j,t}$ * Forbearance$_t^{\text{Post 2013}}$	0.0661	0.0603		
	(0.0899)	(0.0893)		
Stressed Bank$_b$ * Low Liquidity$_{j,t}$ * Forbearance$_t^{\text{Post 2008}}$			0.310***	0.306***
			(0.0939)	(0.0928)
Stressed Bank$_b$ * Low Liquidity$_{j,t}$ * Forbearance$_t^{\text{Post 2013}}$			-0.0304	-0.0182
			(0.0884)	(0.0883)
No. of Observations	21827	21827	24080	24080
R^2	0.931	0.933	0.927	0.928
Borrower FE	Y	Y	Y	Y
Year FE	N	Y	N	Y
Bank FE	N	Y	N	Y

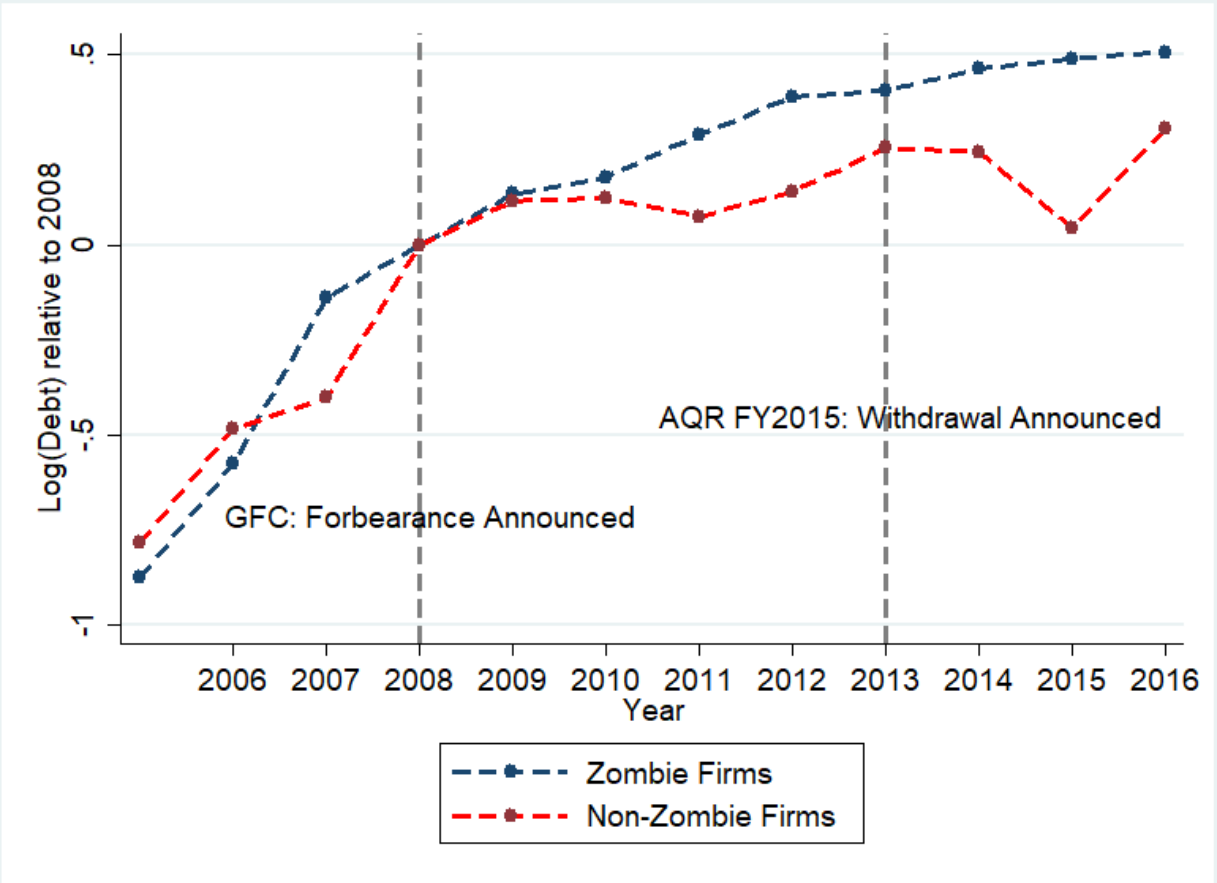
Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The total number of firm-year observations in the full sample are 39,227.

- Stressed Banks lend 7% higher to low-solvency firms & 4% higher to low-liquidity firms compared to healthy banks based on a margins calculation.
- No signs of trend reversal after forbearance removal was announced.

Results III: Zombie Firms & Distortions in Credit Allocation

Rise of Zombie Credit



- Post 2008, evidence of crowding-out of loans away from healthy firms to zombie like-firms. No noticeable reversal observed after 2013.

Empirical Framework

I. Zombie Credit:

$$Log(Debt_{j,t+1}) = \alpha_t + \gamma_j + \beta_1 * Stressed\ Bank_b * Zombie\ Firm_{j,t} + \zeta_k \sum_{k=1}^{2} Stressed\ Bank_b * RF_t^k + \eta_k \sum_{k=1}^{2} Zombie\ Firm_{j,t} * RF_t^k + \delta_k \sum_{k=1}^{2} Stressed\ Bank_b * Zombie\ Firm_{j,t} * RF_t^k + \epsilon_{j,t+1} \quad (2)$$

II. Spillovers:

$$Log(Debt_{j,t+1}) = \alpha_t + \gamma_j + \beta_1 * Industry\ Frac\ Zombie_{h,t} * Non - Zombie_{j,t} + \zeta_k \sum_{k=1}^{2} Industry\ Frac\ Zombie_{h,t} * RF_t^k + \eta_k \sum_{k=1}^{2} Non - Zombie_{j,t} * RF_t^k + \delta_k \sum_{k=1}^{2} Industry(Bank)\ Frac\ Zombie_{h,t} * Non - Zombie_{j,t} * RF_t^k + \epsilon_{j,t+1} \quad (3)$$

where additionally, from (1):

- $Industry\ Frac\ Zombie_{h,t}$ is the fraction of firms that receive zombie credit in the industry h & in year t.
- $Bank\ Frac\ Zombie_{h,t}$ is the fraction of firms that receive zombie credit attached to bank b & in year t.

Results III: Zombie Credit

Dependent Variable: Log Debt$_{j,t+1}$	Direct Effects: Zombie Firms		Spillover Effects: Non-Zombie Firms			
			Within Bank$_b$		Within Industry$_i$	
	(1)	(2)	(3)	(4)	(5)	(6)
Stressed Bank$_b$ * Zombie$_{j,t}$ * Forbearance$_t^{\text{Post 2008}}$	0.312***	0.323***				
	(0.105)	(0.103)				
Stressed Bank$_b$ * Zombie$_{j,t}$ * Forbearance$_t^{\text{Post 2013}}$	0.0173	0.0211				
	(0.0907)	(0.0906)				
Forbearance$_t^{\text{Post 2008}}$ * NonZombie$_t$ * Bank Frac Zombie$_{b,t}$			-1.086**	-1.062**		
			(0.438)	(0.448)		
Forbearance$_t^{\text{Post 2013}}$ * NonZombie$_t$ * Bank Frac Zombie$_{b,t}$			-0.351	-0.362		
			(0.441)	(0.450)		
Forbearance$_t^{\text{Post 2008}}$ * NonZombie$_t$ * Industry Frac Zombie$_{h,t}$					-0.693**	-0.896***
					(0.279)	(0.312)
Forbearance$_t^{\text{Post 2013}}$ * NonZombie$_t$ * Industry Frac Zombie$_{h,t}$					0.136	0.0341
					(0.251)	(0.290)
No. of Obs.	24126	24126	24126	24126	24126	24126
R-sq.	0.930	0.931	0.930	0.934	0.930	0.933
Borrower FE	Y	Y	Y	Y	Y	Y
Year FE	N	Y	N	N	N	N
Bank FE	N	Y	N	N	N	N
Industry X Yr	N	N	N	N	N	Y
Bank X Yr	N	N	N	Y	N	N

- A significant rise in Zombie credit & crowding-out of credit access from stressed banks to healthy firms that are in a zombie dominated industry...or attached to zombie credit heavy stressed bank.

Results III: Zombie Spillovers to Healthy Firms

	Full Sample		Subsample: Stressed Banks=1		Subsample: Healthy Banks=1	
	BankFrac	IndustryFrac	BankFrac	IndustryFrac	BankFrac	IndustryFrac
coefficient	-1.062**	-0.896***	-1.062**	-0.896***	-1.062**	-0.896***
p25	.42	.33	.47	.37	.34	.32
p75	.58	.63	.59	.63	.48	.60
p25 effect (coeff×p25 value)	-.44	-.29	-.49	-.331	-.36	-.28
p75 effect (coeff×p75 value)	-.61	-.56	-.62	-.56	-.50	-.53

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The total number of firm-year observations in the full sample are 39,227.

- **Bank Congestion Channel:** (61%-44%=17%) additional contraction in lending to healthy firms as bank congestion rises from p25 to p75.
- Sub-samples of stressed and healthy lead banks suggest contractions of an additional 13% and 14% as bank congestion rises from p25 to p75.
- **Industry Congestion Channel:** (56%-29%=27%) additional contraction in lending to healthy firms as industry congestion rises from p25 to p75.
- Sub-samples of stressed and healthy lead banks suggest lending contractions of 23% and 25%, respectively as industry congestion rises from p25 to p75.

Results IV: Real Effects

Panel A: Low-Solvency Firms

Dependent Variable :	$\text{Capex}_{j,t+1} = \frac{\Delta\text{GFA}_{j,t+1}}{\text{Total Assets}_{j,t+1}}$		$\text{Emp}_{j,t+1} = \frac{\text{Wages}_{j,t+1}}{\text{Total Expenses}_{j,t+1}}$	
	(1)	(2)	(3)	(4)
$\text{Stressed Bank}_b * \text{Low Solvency}_{j,t} * \text{RF}_t^{\text{Post 2008}}$	-0.0171*	-0.0173*	0.0163**	0.0162**
	(0.00932)	(0.00931)	(0.00705)	(0.00704)
$\text{Stressed Bank}_b * \text{Low Solvency}_{j,t} * \text{RF}_t^{\text{Post 2013}}$	0.00820	0.00790	-0.0116*	-0.0111*
	(0.00619)	(0.00620)	(0.00666)	(0.00667)
No. of Observations	22144	22144	24678	24678
R^2	0.453	0.456	0.862	0.863

Panel B: Low-Liquidity Firms

	(5)	(6)	(7)	(8)
$\text{Stressed Bank}_b * \text{Low Liquidity}_{j,t} * \text{RF}_t^{\text{Post 2008}}$	-0.0105	-0.00973	0.00302	0.00279
	(0.00804)	(0.00803)	(0.00605)	(0.00604)
$\text{Stressed Bank}_b * \text{Low Liquidity}_{j,t} * \text{RF}_t^{\text{Post 2013}}$	-0.00489	-0.00458	0.00323	0.00361
	(0.00625)	(0.00620)	(0.00598)	(0.00598)
No. of Observations	24136	24136	27002	27002
R^2	0.436	0.439	0.850	0.851
Borrower FE	Y	Y	Y	Y
Year FE	N	Y	N	Y
Bank FE	N	Y	N	Y

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.
The total number of firm-year observations in the full sample are 39,227.

- The 'intended' beneficiaries- no real effects.
- The 'unintended' beneficiaries- decline in capex & increase in wages.

Robustness of Results & Alternative Tests

1. Public-Sector Banks as a channel of misallocation
   - **Zombie lending:** Public-sector banks relatively engage in zombie lending more than the private sector banks.
   - Suggestive evidence of migration of healthy firms to private banks & non-bank lenders.
2. Foreign banks as a placebo test.
3. Bond market substitution
4. Alternative measures of zombie firms
5. CRAR & distance to regulator as a measure of bank health: Banks with lower CRAR and geographically closer to RBI engage in relatively higher zombie lending.
6. Provisioning on restructured loans as a measure of forbearance: Lower rates associated with more zombie lending by stressed banks.

Outline

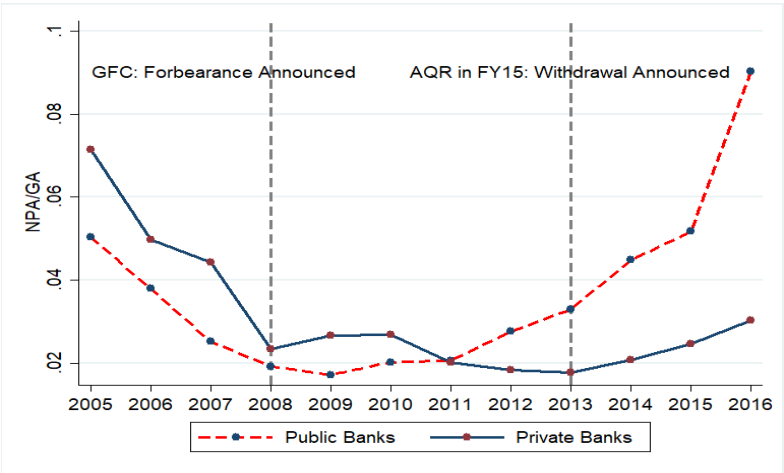
Conclusion

- We provide evidence that the regulatory forbearance measures enacted by the Reserve Bank of India post-GFC effectively handed over a license for banks to engage in regulatory arbitrage.
- We find that the forbearance measures provided banks with an incentive to hide true asset quality, & the build-up of stressed assets in the system is a by-product of accounting subterfuge.
- Using both bank & firm-level data, we examine the externalities and costs generated by regulatory forbearance.
- Overall, the results emphasize the possibly persistent negative effects of prolonged phases of forbearance.
- It appears that the process of creative destruction is hindered as low-quality firms on life support of new credit continue to survive at the expense of healthy firms.

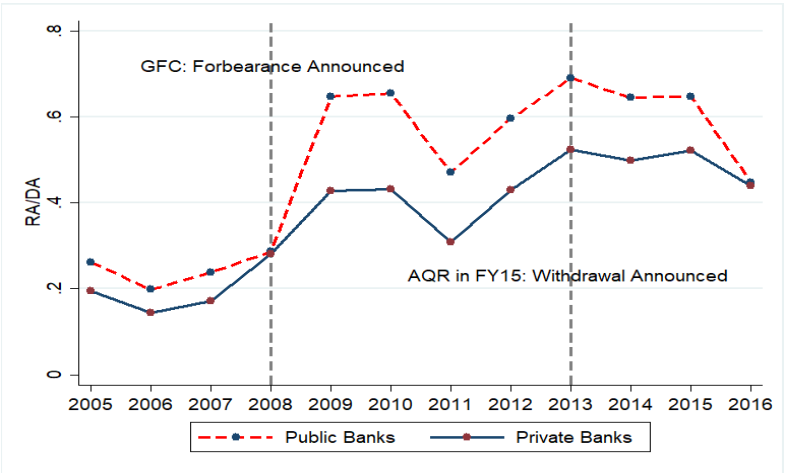
Thank You!

Outline

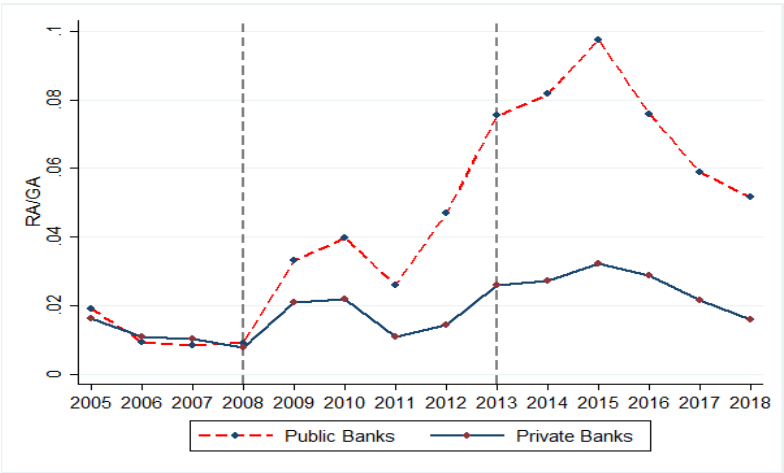
Public-Private Sector Banks: Asset Quality



Panel a) Non-performing loans ratio

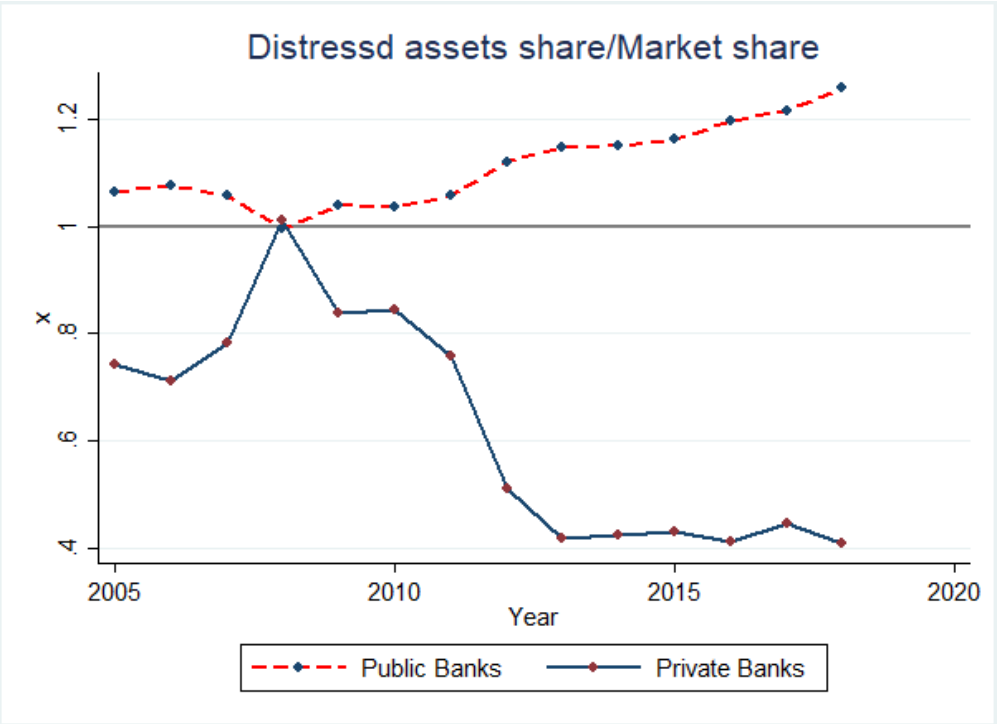


Panel b) Hidden loans ratio



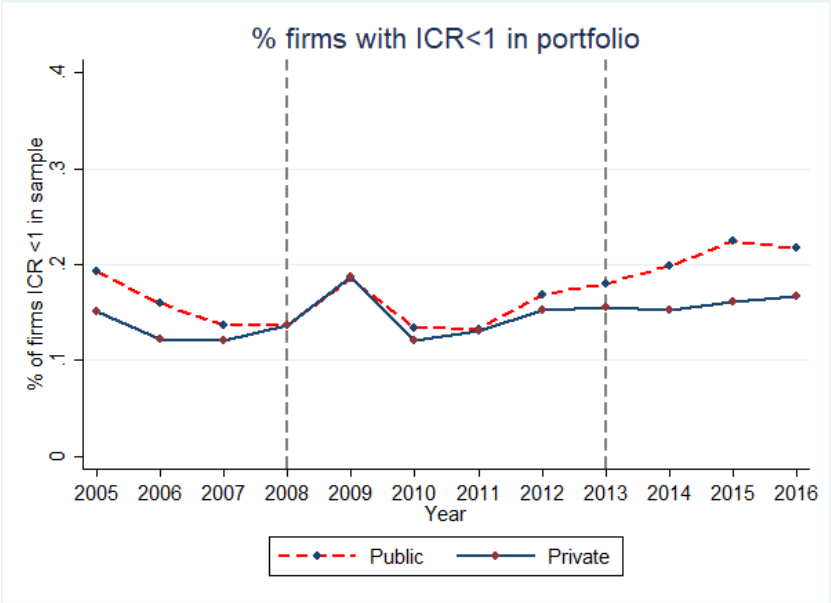
Panel c) Restructured loans ratio

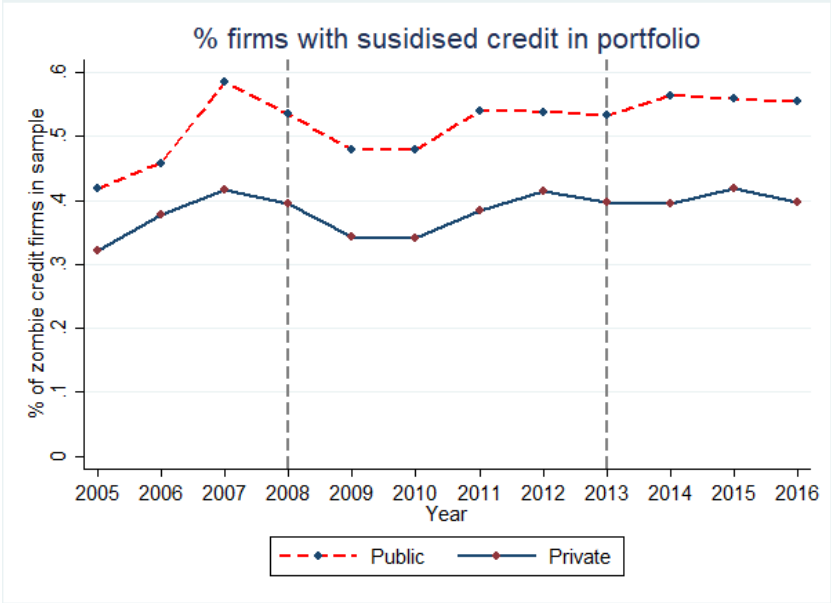
Public-Private Sector Banks: Asset Quality & Market Shares



- Share in stressed assets vs market share ratio goes down for private banks and goes up for public sector banks.

Public-Private Sector Banks: Portfolio Composition





- Since 2008, a rise in firms with poor ICR ratio.
- PSBs consistently lend more to low-quality firms compared to PVBs.

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