Unearthing Zombies: Regulatory Intervention to Aid Bankruptcy Reform

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Motivation

- Lenders face perverse incentives to delay the recognition of bad borrowers
  - Weak creditor rights hinder asset recovery
  - Under-capitalized banks unwilling to recognize losses to avoid provisioning costs
- Non-recognition of bad assets can promote “zombie” lending
  - Lending to insolvent borrowers kept afloat solely by bank credit (Caballero et al. 2008)
  - Zombie lending reduces firm entry and investment, both within and across sectors (Caballero et al. 2008)
  - Limited research however on policies to arrest zombie lending
- This paper: set in a context with both weak creditor rights and under-capitalized banks
  - Strengthening of creditor rights is insufficient to limit zombie lending
  - Uncoventional regulatory policy eliminating lender discretion in recognizing bad assets arrests zombie lending and facilitates a reallocation of credit to healthy borrowers

Research Questions

- Can rule-based regulatory interventions compel lenders to recognize zombie borrowers as non-performing assets?
  - Contrast the role of regulatory guidelines introduced by the RBI vis-a-vis reforms to bankruptcy code
  - Guidelines made it harder for banks to delay the recognition of bad assets
  - Guidelines eliminated lender discretion in initiating bankrupcty proceedings for large bad assets
- Mechanisms: are bankruptcy reforms less effective amongst under-capitalized banks?
  - Under-capitalized banks face zombie lending incentives in an effort to avoid recognition of losses
- Downstream effects:
  - Does the regulatory intervention lead to reallocation of credit towards healthy borrowers?

Contributions

- Zombie lending:
  - Large literature documenting the negative effects of zombie lending
  - Limited work on how to arrest zombie lending
  - This paper: shows that regulatory interventions eliminating lender discretion can limit zombie lending
- Creditor rights and bank lending
  - Alecnar and Ponticelli (2016): Law is not enough, need efficient courts
  - This paper: law is not enough in an environment with under-capitalized banks – need a credible regulator

Legislative Intervention

- Passage of Insolvency and Bankruptcy Code (IBC)
  - Effective since December 2016
  - Streamlined the bankruptcy process
  - Time-bound resolution of bankruptcy cases

Regulatory Intervention – Feb12 Circular

- Unanticipated intervention by RBI on February 12, 2018
  - Mandated immediate compliance from lenders
- Advances default recognition by lenders
  - NPA norms unchanged
  - Lenders need to create resolution plan if a borrower defaults even by 1 day
- Eliminates lender discretion in initiation of bankruptcy cases
  - Borrowers refered to IBC if resolution plan not "implemented" within 180 days of first instance of default
  - Provision applies with immediate effect for borrowers with exposures in excess of Rs. 20bn
  - Information intervention: similar provisions will be introduced for borrowers with exposures between Rs. 1 and 20bn
- Eliminates regulatory forebearance
  - Restructured borrowers downgraded to NPA
  - Large restructured borrowers: upgradation from NPA only if investment grade rating provided by 2 credit rating agencies

Conceptual Framework: Regulatory Intervention vs Bankruptcy Reform

- Under IBC: onus on lenders to initiate bankruptcy proceedings against delinquent borrowers
  - To initiate bankruptcy proceedings, banks need to first recognize borrowers as NPA
  - NPA recognition has immediate provisioning costs for lenders
- Bank's tradeoff for recognizing a delinquent borrower of size B
  - Provision .15*B today and receive $\frac{h*B}{1+\delta}$ in the future
  - Disincentive for under-capitalized banks to initiate bankruptcy proceedings against large delinquent borrowers
- Feb12 circular: Eliminates lender discretion in bankruptcy proceedings for large borrowers
  - Initiating of bankruptcy proceedings based on whether borrowers above a pre-determined size threshold are in default for over 180 days

Data

- Borrower-level data from CRILC
  - Quarterly borrower-bank panel for all borrowers with aggregate exposures exceeding Rs. 50 million
  - 20 quarters of data since quarter ending June 2014
- Key variables reported:
  - Outstanding debt (exposures) for borrower-bank combination
  - Asset quality
  - External credit rating
  - Industry of operation
- Non performing assets: No repayment in excess of 90 days
- Special mention accounts (SMA):
  - SMA2: No repayment for 60-90 days; all other lenders informed of a borrower's SMA2 status through CRILC

Detecting Zombie Lending

- Qualifying zombie relationships:
  - Caballero et al. (2008): firms receiving subsidized credit
  - Acharya et al. (2017): firms receiving credit at rates lower than AAA rated firms
- Major drawback of CRILC data:
  - No information on interest rates
- This paper: borrower has a zombie relationship with a bank if between June 2014 and March 2016:
  - At least 1 SMA2 report by any bank in CRILC
  - Positive growth in exposures *post* SMA2 reporting
  - Never rated AAA or AA
  - No new banking relationship
- Verify CRILC-based zombie measure using firm-level data from Prowess for matched sub-sample
- Test sensitivity of results with alternate zombie classifications

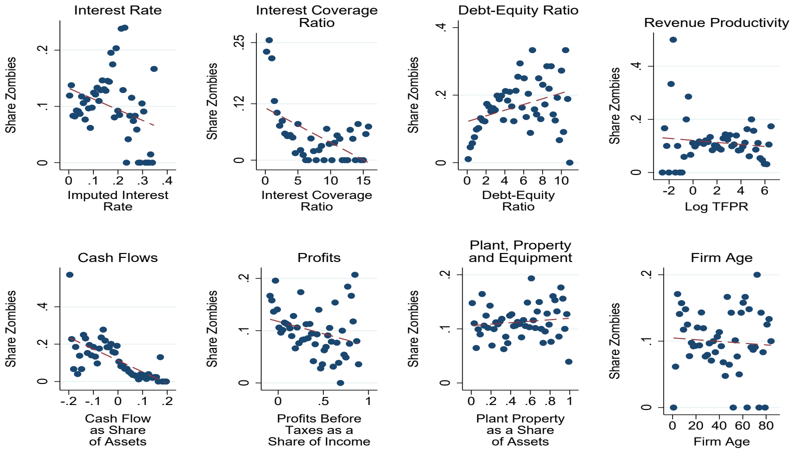
Zombie and Non-Zombie Borrowers: Pre-Treatment Summary Characteristics

Table 1: Comparison of Zombie and Non-Zombie Borrowers in the CRILC System: June 2014-March 2015

	(1) Zombie Borrowers	(2) Non-Zombie Borrowers
Exposures (Rs. Billion)	0.56	0.49
Quarterly Exposure Growth	0.03	0.01
Average Banking Relations	3.69	3.51
Industries	0.47	0.45
Public Sector Bank	0.82	0.62
Ever NPA	0.07	0.07
Ever SMA0/1	0.33	0.11
Always Standard	0.26	0.79
Always Investment Grade	0.11	0.17
Always Unrated	0.44	0.58
Non-Investment Grade at Least Once	0.45	0.25

Notes: The unit of observation is borrower-bank. The sample is restricted to the first 4 quarters of the CRILC reporting period, between June 2014 and March 2015. Industries include the manufacturing and infrastructure sectors. A borrower-bank relationship is considered to be a zombie relationship if the borrower between June 2014 and March 2016 has a) never been rated AAA or AA in this period; b) not initiated any new relationship with another lender and c) experienced positive growth in exposures in the quarter immediately succeeding a SMA2 reporting. The comparison is based on a total of 74,315 borrower-bank relationships. Out of these, 14 percent, or 10,487 borrower bank relationships can be considered as zombie relationships as per our definition of zombie borrowers.

Pre-Treatment Financial Characteristics of Zombie Borrowers



Empirical Strategy: Difference-in-Difference Specification

- Average treatment effect for ex-ante zombie borrowers

$$Y_{ijbt} = \alpha_{ib} + \gamma_{jt} + \beta_1 Post_t * Zombie_{ijb} + \eta \mathbf{X}_{ijbt} + \epsilon_{ijbt} \quad (1)$$

- Outcome of interest:
  - Probability of borrower i, operating in industry j, borrowing from bank b is NPA in time t
  - Logged NPA exposures of borrower i in bank b and time t
- Bankruptcy reform (IBC): $Post = 1$ for $Dec16 > t \leq Dec17$
- Regulatory intervention (Feb12): $Post = 1$ for $t > Dec17$
- α and γ: borrower-bank and 2-digit industry-time FE
- Restrict sample to 12 quarters between June 2016 and March 2019
- Cluster by borrower-bank

Regulatory Intervention vs Bankruptcy Reform for Zombie Borrowers

Table 2: Baseline Results

	(1)	(2)	(3)	(4)	(5)	(6)
		Pr(NPA = 1)			NPA Exposures (Log)	
$\mathbb{1}_{Zombie} * \mathbb{1}_{Post\ Feb12}$	.032***		.038***	.172***		.201***
	(.007)		(.009)	(.036)		(.042)
$\mathbb{1}_{Zombie} * \mathbb{1}_{Post\ IBC}$		.015**	.012*		.063**	.051*
		(.006)	(.006)		(.030)	(.030)
Observations	130822	83309	130822	130822	83309	130822
R^2	.86	.89	.86	.85	.88	.85
Dep Var Mean	.15	.15	.15	19.28	19.28	19.28
Borrower-Bank FE	Y	Y	Y	Y	Y	Y
Industry Time FE	Y	Y	Y	Y	Y	Y

Establishing Exogneity: Variation in Applicability of Regulatory Intervention Across Exposure Threshold

- Identify differential impact of Feb12 circular for "large" borrowers
  - Validates the identification strategy as Feb12 circular targeted towards larger borrowers
- Triple difference specification to identify differential effect of IBC and Feb12 circular across borrowers with exposures in excess of Rs. 1bn
  - Expect Feb12 circular to have a significantly larger effect for large borrowers
  - Expect no such effect for IBC

Differential Effect of Regulatory Intervention and Bankruptcy Reform for Large Zombie Borrowers

Table 3: Differential Effects by Exposure Size

	(1)	(2)	(3)	(4)	(5)	(6)
	Pr(NPA = 1)			NPA Exposures (Log)		
$\mathbb{1}_{Zombie} * \mathbb{1}_{Post\ Feb12}$	.005		.014	-.046		-.031
	(.009)		(.010)	(.035)		(.042)
$\mathbb{1}_{Exp>1Bn} * \mathbb{1}_{Post\ Feb12}$	.015***		.018**	.180***		.226***
	(.006)		(.007)	(.027)		(.033)
$\mathbb{1}_{Zombie} * \mathbb{1}_{Exp>1Bn} * \mathbb{1}_{Post\ Feb12}$	.056***		.051***	.451***		.478***
	(.013)		(.016)	(.066)		(.077)
$\mathbb{1}_{Zombie} * \mathbb{1}_{Post\ IBC}$		.017**	.016**		.030	.028
		(.008)	(.008)		(.031)	(.031)
$\mathbb{1}_{Exp>1Bn} * \mathbb{1}_{Post\ IBC}$		.002	.005		.064***	.072***
		(.005)	(.005)		(.022)	(.022)
$\mathbb{1}_{Zombie} * \mathbb{1}_{Exp>1Bn} * \mathbb{1}_{Post\ IBC}$		-.005	-.009		.066	.047
		(.011)	(.011)		(.053)	(.053)
Observations	130822	83309	130822	130822	83309	130822
R^2	.86	.89	.86	.85	.88	.85
Dep Var Mean	.15	.15	.15	19.28	19.28	19.28
Borrower-Bank FE	Y	Y	Y	Y	Y	Y
Industry Time FE	Y	Y	Y	Y	Y	Y

Mechanisms: Differential Effects of Regulatory Intervention and Bankruptcy Reform for Under-capitalized Banks

- Is the legislative intervention less effective due to bank under-capitalization?
- Identity differential effect of IBC and Feb12 circular across banks closest to regulatory threshold
  - Classify banks falling in the lowest quartile of capital-assets ratio as those closest to regulatory threshold
  - Capital measured using tier I capital (shareholder capital)
  - Banks' tier I capital to assets ratio based on average tier I capital assets ratio between 2012-2015
- Point of caution: under-capitalized banks are typically public sector banks – under-capitalization might be correlated with other factors

Differential Effect of Regulatory Intervention and Bankruptcy Reform Across Banks Closest to Regulatory Threshold

Table 4: Differential Effects Across Banks Closest to Regulatory Threshold

	(1)	(2)	(3)	(4)	(5)	(6)
	Pr(NPA = 1)			Log(NPA Exposures)		
$\mathbb{1}_{Zombie} * \mathbb{1}_{Post\ Feb12}$	.033***		.049***	.167***		.240***
	(.009)		(.011)	(.047)		(.055)
$\mathbb{1}_{Zombie} * \mathbb{1}_{Low\ Capital} * \mathbb{1}_{Post\ Feb12}$	-.003		-.025	.011		-.087
	(.013)		(.016)	(.068)		(.079)
$\mathbb{1}_{Zombie} * \mathbb{1}_{Post\ IBC}$		.032***	.028***		.144***	.127***
		(.008)	(.008)		(.038)	(.038)
$\mathbb{1}_{Zombie} * \mathbb{1}_{Low\ Capital} * \mathbb{1}_{Post\ IBC}$		-.041***	-.038***		-.185***	-.172***
		(.011)	(.011)		(.053)	(.053)
Observations	130822	83309	130822	130822	83309	130822
R^2	.86	.89	.86	.85	.88	.85
Dep Var Mean	.15	.15	.15	19.28	19.28	19.28
Borrower-Bank FE	Y	Y	Y	Y	Y	Y
Industry Time FE	Y	Y	Y	Y	Y	Y

Regulatory Intervention and Bankruptcy Reform on Zombie Borrowers: Summary of Results

- Regulatory intervention increases the recognition of zombie borrowers as NPA
  - Impact of regulatory intervention significantly higher than bankruptcy reform
  - Regulatory intervention: significantly higher impact on recognition of large zombie borrowers as NPA
  - Bankruptcy reform: muted impact on NPA recogntion of zombie borrowers in weakly capitalized banks
  - Entrenched factors possibly continue to hinder NPA recognition in weakly capitalized banks post Feb12 circular
- Results highlight the complementary role of regulatory interventions in aiding bankruptcy reform
- Results robust to alternate classification of zombies
- Results not driven solely via restructured borrowers

Downstream Effects of Regulatory Interventions on Credit Disbursement

- Does the enhanced recognition of non-performing assets lead to higher credit disbursement by lenders?
- Possible channels driving credit reallocation
  - Reduction in zombie lending
  - Reduction in strategic defaults
  - Lenders anticipate recovery of bad assets in the future
- However:
  - Banks face higher provisioning burden due to NPA recogntion, reducing their ability engage in new lending
  - GE effect: improvement in creditor rights can increase the cost of borrowing (Lilienfield-Toal et. al. (2012))
- Downstream effect of regulatory intervention on credit reallocation is an empirical question

Downstream Effects of Regulatory Interventions on Credit: Primary Hypotheses of Interest

- Do lenders increase credit to healthy borrowers?
  - Measure borrower health based on external credit rating of borrowers - borrowers rated AAA-BBB are "creditworthy"
- Do banks lend more to "large" borrowers for whom creditor rights are strengthened?
  - Test for differential effects across borrowers with exposures in excess of Rs. 1Bn
- Does the increase in credit occur along the intensive or extensive margin?

Downstream Effects of Regulatory Interventions on Credit: Empirical Specification

$$
\begin{aligned}
Y_{ijbt} = \alpha_{ib} + \gamma_{jt} + \beta_1 IG_{ijbt} * Post_t + \beta_2 Large_{ijbt} * Post_t \\
+ \beta_3 IG_{ijbt} * Large_{ijbt} * Post_t + \eta \mathbf{X}_{ijbt} + \epsilon_{ijbt} \quad (2)
\end{aligned}
$$

- Outcomes of interest:
  - Logged exposures
  - Dummy equaling 1 if a borrower starts a new banking relationship
- *IG*: Dummy equaling 1 if borrower is rated AAA-BBB
- β_1: Differential impact of Feb12 circular on small healthy borrowers
- β_2: Differential impact of Feb12 circular for non-creditworthy large borrowers
- β_3: Differential impact of Feb12 circular for large healthy borrowers

Impact of Regulatory Intervention on Credit Disbursement

Table 5: Reallocation to Healthy Borrowers

	(1)	(2)	(3)	(4)
	Exposures (Log)		Pr(New Bank Relation = 1)	
$\mathbb{1}_{Exp>1Bn} * \mathbb{1}_{Post\ Feb12}$		.020		-.009***
		(.015)		(.003)
$\mathbb{1}_{Post\ Feb12} * \mathbb{1}_{Investment\ Grade}$	.048***	.021***	-.007***	-.007***
	(.007)	(.006)	(.001)	(.001)
$\mathbb{1}_{Exp>1Bn} * \mathbb{1}_{Post\ Feb12} * \mathbb{1}_{Investment\ Grade}$		.067***		.013***
		(.018)		(.004)
Observations	983413	983413	983413	983413
R^2	.91	.92	.27	.27
Dep Var Mean	99.29	99.29	.15	.15
Borrower-Bank FE	Y	Y	Y	Y
Industry Time FE	Y	Y	Y	Y

Downstream Effects of Regulatory Interventions on Credit: Additional Hypotheses of Interest

- Does credit disbursement increase differentially in banks with relative higher exposure to zombie borrowers?
  - If zombie lending has reduced, these banks can reallocate credit from zombies to non-zombies
  - Identify differential effects of regulatory intervention across banks with ex-ante high share of zombie borrowers
- Which sectors witness an expansion in credit?
  - Creative destruction: if credit issued to borrowers in sectors with high ex-ante share of zombies
  - Sectoral reallocation: if credit issued to borrowers in sectors with low ex-ante share of zombies
  - Identify differential effects of regulatory intervention across industries with ex-ante high share of zombie borrowers

Regulatory Intervention and Credit Disbursement: Sources of Credit and Sectoral Reallocation

Table 6: Differential Effects Across Zombie Banks and Industries

	(1)	(2)	(3)	(4)
	Exposures (Log)		Pr(New Bank Relation = 1)	
$\mathbb{1}_{Investment\ Grade} * \mathbb{1}_{Post\ Feb12}$	.031***	.044***	.006***	-.011***
	(.009)	(.014)	(.002)	(.003)
$\mathbb{1}_{Zombie\ Bank} * \mathbb{1}_{Investment\ Grade} * \mathbb{1}_{Post\ Feb12}$	.054***		-.029***	
	(.015)		(.003)	
$\mathbb{1}_{Zombie\ Industry} * \mathbb{1}_{Investment\ Grade} * \mathbb{1}_{Post\ Feb12}$		.014		.006*
		(.015)		(.003)
Observations	823422	823019	823422	823019
R^2	.90	.90	.27	.27
Dep Var Mean	98.41	98.41	.15	.15
Firm FE	Y	Y	Y	Y
Industry Time FE	Y	Y	Y	Y
Bank FE	Y	Y	Y	Y

Downstream Effects of Regulatory Interventions on Credit Disbursement: Summary of Results

- Lenders expand credit to large borrowers post regulatory intervention
  - Credit increase concentrated towards investment grade borrowers
- No withdrawal of lending from sectors with ex-ante high share of zombie borrowers
  - Partial support for findings of Caballero et al. (2008) that zombie firms hurt healthy non-zombie firms in the same sector
- Increase in credit primarily along the intensive margin

Conclusion and Future Research

- Regulatory interventions can aid in the elimination of zombie borrowers from the banking system
  - Bankruptcy reform is necessary but not sufficient to eliminate zombie relationships: need a credible regulator in an environment with large delinquent borrowers in under-capitalized banks
- Lenders respond to improved creditor rights by expanding credit to healthier borrowers
- Future research:
  - Do under-capitalized banks proxy for other factors such as rent-seeking/corruption?
  - Identify impact of higher credit disbursement by banks on firm-level outcomes