Unearthing Zombies

Internet Appendix

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A.1 Bankruptcy System Prior to 2016

Before the passage of the Insolvency and Bankruptcy Code (IBC) in 2016, corporate insolvency in India was characterized by a fragmented system of governing authorities. Specialized restructuring courts were established in 1956 under the Companies Act, which designated the National Company Law Tribunals (NCLTs) to oversee insolvency cases, among other corporate affairs. Because secured creditors at the time did not have the power to foreclose in the event of default, and NCLTs were subject to political pressures to preserve jobs, the system was viewed as management-friendly (Sengupta et al., 2016).

Stemming from prolonged weakness in the industrial sector, the Sick Industrial Companies Act (also known as the Special Provisions Act) was passed in 1985. This created a new adjudicating authority, the Board for Industrial and Financial Reconstruction (BIFR), to resolve financial distress. This process was only available to industrial firms, however, and because the law was passed with job-preserving objectives in mind, the BIFR was also considered to be friendly to management.

Restructuring cases took notoriously long to resolve. The average BIFR case lasted nearly 6 years (Sengupta et al. (2016)). In order to speed up asset sales, legislation in 1993 created specialized Debt Recovery Tribunals that were not required to follow civil procedures to which the NCLTs were bound (Visaria, 2009). The same institutional challenges that plagued the NCLTs (namely a lack of resources) led to delays at the tribunals as well. Banks were also the only creditors allowed to use these tribunals to recover from distressed debtors.

In an attempt to strengthen secured creditor rights, India passed the Securitisation and Reconstruction of Financial Assets and Enforcement of Security Interest (SARFAESI) Act in 2002, empowering banks to foreclose on properties (Vig, 2013). This Act also facilitated the formation of specialized intermediaries, known as Asset Reconstruction Companies, designed to help manage the asset reallocation process. This Act was not successful in generating high recovery rates for banks, however. An RBI report from 2004 cited recovery rates of less than 9% for public sector banks under this regime.

The RBI also exerts significant control over distressed asset resolution procedures, in part because it dictates provisioning requirements for banks. In 2008, the RBI put forward

a set of guidelines to dictate private debt work-outs.[14] Designed for large distressed borrowers, this work-out mechanism facilitated negotiations that would bring debt loads to manageable levels. In exchange for participating in the negotiation process, the RBI relaxed provisioning requirements for banks participating in these work-outs. In 2015, a modified work-out scheme was proposed that encouraged debt-for-equity swaps and granted banks the power to replace management in certain circumstances.

The piece-meal introduction of various insolvency regimes resulted in a web of uncoordinated procedural alternatives. Firms exploited ambiguities and engaged in forum shopping, leading to a significant amount of litigation. In addition, even with several alternatives in place, there was still no process that would allow all creditors to participate in a unified structured bargaining process.

On passage of the IBC, the NCLT continued to remain the adjudicating authority, the BIFR was done away with, and debt recovery tribunals were assigned to handle individual and unincorporated insolvency cases. The private work-out schemes promoted by the RBI were abolished. The powers of foreclosure granted to secured creditors under the SARFAESI Act remained in place, although an automatic stay applied if the firm was referred to the IBC.

A.2 Stressed asset build-up leading up to the bankruptcy reform

Relaxed loan provisioning, allowing banks to postpone loss recognition, formed the basis of the forbearance schemes in India after the 2008 Global Financial Crisis (GFC). Although India was relatively insulated from the GFC, the RBI announced relaxed provisioning norms for restructured loans as a precautionary measure. While this asset quality forbearance was designed to provide temporary relief to illiquid firms, lenders increasingly used them to delay the recognition of troubled assets, causing an increase in zombie lending (Chari et al., 2020). In 2013, RBI began tightening the prudential norms for asset classification and undertook the Asset Quality Review, nudging banks to recognize restructured assets as non-performing. However, the withdrawal of these forbearance schemes had limited impact on reducing zombie lending, which continued nonetheless (Chopra et al., 2020).

The Asset Quality Review pushed lenders to recognize the true capital inadequacy on bank balance sheets. A regulatory structure was also put in place as a stop-gap measure with the aim of outlining an action plan to identify problematic accounts and initiate the

[14] These mechanisms were established in 2001, but it was not until 2008 that the guidelines were clarified.

recovery (or liquidation) of unviable assets. Since an overhaul of the bankruptcy framework was still under progress and alternate methods used to recover stressed assets were inadequate (see Appendix A.1 for details on the debt resolution systems in this period), the so-called 'alphabet soup' regulation was introduced, aimed at structuring credit facilities, aid restructuring of loans, and help in transitioning ownership.[15] Importantly, the lax loan provisioning that made the earlier schemes popular with banks were now made more stringent and hence lender take-up of these new schemes was poor. As a result, the estimated stressed assets increased even after 2013. To address this build-up of stressed assets (by all accounts likely more severe at PSBs) and clean up banks' balance sheets, policymakers considered two choices. Commentators and stakeholders proposed a "bad bank" that would house the stressed assets, but policymakers opposed the idea, arguing that it would create perverse moral hazard incentives for lenders in the future. Instead, both the RBI and the government recommended a bankruptcy code that would provide a centralized marketplace for distressed assets and create a clear pathway for the resolution of unviable assets, while still holding various stakeholders accountable (Patel, 2020).

A.3 Conceptual framework

This section provides a simple framework to motivate our focus on the recognition of zombie borrowers as non-performing. Previous literature hypothesizes that zombie lending can arise due to (i) bank undercapitalization and costly loan provisioning (Peek and Rosengren, 2005), (ii) risk-shifting by distressed banks (Bruche and Llobet, 2013); and (iii) political economy frictions at state-owned banks, either through political connections (Qu, 2018; Dinc, 2005; Khwaja and Mian, 2005; Cole, 2009) or through the "fiscal dominance" channel stipulated in Acharya (2020), in which a constrained government wishes to avoid a costly recapitalization of the banking sector. To elucidate our analysis, we focus on point (i) above. However, a similar logic applies to the remaining cases of zombie lending.

Consider a bank that makes a loan in period t to a given firm for one period. Now suppose in period $(t+1)$, the firm faces an idiosyncratic shock and is unable to repay the loan. The bank is faced with two choices, that is, either to initiate bankruptcy proceedings or roll over (evergreen) the loan. In the former case, the bank first declares the loan non-performing and then takes it through the bankruptcy process to either liquidate

[15] One such mechanism was the was the Strategic Debt Restructuring scheme that allowed for the conversion of debt into equity. An alternate scheme, Sustainable Structuring of Stressed Assets similarly allowed banks to acquire equity in stressed projects. A related scheme was the 5/25 scheme introduced in July 2014 and specifically aimed at the infrastructure sector and allowed banks to fix longer amortization periods (say 25 years) with periodic refinancing (say every 5 years).

or restructure with a payoff given by $r - c(k)$, where r is the recovery rate and $c(k)$ is a capital cost incurred by the lender, which is a function of bank capital (k). The capital cost derives from banking regulations that usually require that banks set aside capital as part of provisioning requirements. For example, in 2016, the provisioning requirement in India was 0.25%-1% for standard loans, 10% for loans classified as non-performing for less than 12 months, and 20%-100% for loans classified as non-performing for more than 12 months. In addition, banks are also required to ensure that capital exceeds certain regulatory thresholds, e.g., a minimum 8% capital ratio. Therefore, if the bank were to choose to pursue bankruptcy (and subsequently liquidate or restructure), the bank would need to first declare the loan non-performing and also provision for it in accordance with capital requirements. For a weakly capitalized bank that is close to the regulatory minimum, such provisioning will imply that the bank needs to raise additional costly capital to meet the regulatory minimum requirement. This explains the dependence of capital costs on bank capitalization in c(k).

After bankruptcy reform, recovery from liquidation or restructuring increases. If this increase is substantial, lenders will be willing to declare even zombie borrowers as non-performing and push them to bankruptcy; the presence of zombie loans has no bearing on the bankruptcy reform's efficacy. However, when the recovery rate r is low or bankruptcy resolution is time-consuming, as is often the case in developing economies (Li and Ponticelli, 2021), provisioning costs $c(k)$ may start to matter. Lenders will then delay the recognition of zombie borrowers as non-performing and dampen the bankruptcy reform's efficacy.

One can therefore think of two distinct parts that determine the effectiveness of the bankruptcy reform, or in general the debt resolution of delinquent borrowers. First is the bad loan recognition step in which lenders recognize zombie borrowers as non-performing. Second is the judicial resolution step in which the non-performing asset is either restructured or liquidated through bankruptcy courts. Our empirical setting allows us to disentangle the two. The IBC improved judicial resolution by improving r. Feb. 12$^{\text{th}}$ streamlined the first stage of the debt resolution process by addressing lender incentives and removing lender discretion over the recognition of delinquent borrowers as non-performing. If we only examined the effects on zombie recognition post the bankruptcy reform, we would end up conflating the effects due to improved recovery and the judicial resolution channel. Our unique setting allows us to hold constant the effects due to improvements in judicial enforcement (captured by the IBC) and focus on lender reluctance to recognize zombie loans as NPAs (captured by Feb. 12$^{\text{th}}$). We are thus able to pinpoint the inefficiency arising from the bad loan recognition channel.

Why is the distinction between bad loan recognition and judicial enforcement important? Indeed, if r were high, bad loan recognition would automatically improve and hence policy should focus on improving r. We argue that the distinction between the two is important because policy needs to take into account the origin of the inefficiency. If most of the inefficiency post-reform arises from the bad loan recognition channel, bank recapitalization is paramount in resolving zombie credit. Further, as previously highlighted, the link between improving debt resolution and zombie lending is not just an India-specific phenomenon. Even advanced countries that have high zombie lending are associated with weak insolvency regimes, suggesting that bankruptcy reform is an appropriate policy response to address zombie lending across countries (Andrews and Petroulakis, 2019; Becker and Ivashina, 2022), underscoring the importance of delineating the two channels in reform efficacy.

A.4 Robustness checks

Here we present results on robustness of our analysis to alternative zombie measures and in different sub-samples.

Modifications to baseline zombie measures: We also show that our results are robust to modifications to the baseline borrower-level zombie measure.

In our baseline measure, we restrict zombie classification to borrowers that see a weakly positive growth in credit exposure in the pre-period. One argument could be that if borrowers capitalize interest payments, this may be reflected as an increase in credit. Alternatively, the loan contracts may simply allow for a moratorium in loan payments for a certain period. To account for these cases, in "Zombie Measure 1", we restrict zombie relationships to borrowers who exhibited relatively high growth in exposures in the quarter after which they are reported as 60-90 days delinquent in the system. Thus, a borrower is zombie if the borrower exhibits growth in real exposures in excess of 4% in the quarter after which it is reported as 60-90 days delinquent in the system and a) the borrower is never rated as AAA or AA between June 2014 and March 2016; and b) the borrower did not start a new relationship with a bank during this period. The first two columns of Table A.6 show that the effect of IBC is only weakly significant using this measure but Feb. 12^{th} continues to have a large, positive impact on NPA recognition of zombies.

In "Zombie Measure 2", we relax the condition that a zombie borrower is never rated AAA or AA during the classification window. Thus, a borrower is zombie if the borrower exhibits weakly positive growth in real exposures in the quarter after which it is reported as 60-90 days delinquent in the system and the borrower forms no new banking relation-

ship between June 2014 and March 2016. Results in columns (3) and (4) of Table A.6 show that the effect of IBC is again only weakly significant but Feb. 12th continues to have a large, positive impact on NPA recognition of zombies.

In "Zombie Measure 3", we relax the condition that a zombie borrower does not form new relationships during the classification window. Thus, a borrower is zombie if the borrower exhibits weakly positive growth in real exposures in the quarter after which it is reported as 60-90 days delinquent in the system and the borrower is never rated AAA or AA between June 2014 and March 2016. Results, using this measure, in columns (5) and (6) of Table A.6 show that the IBC has a modest but significant positive impact on NPA recognition of zombies while Feb. 12th has a much larger impact.

Finally, in "Zombie Measure 4", we use interest coverage ratio (ICR) as a measure of distress. We define a firm as zombie if it had an ICR less than 1 in any year between 2012 and 2015, and exhibits weakly positive growth in real exposures in the quarter after which it is reported as 60-90 days delinquent in the classification window. Since we get the ICR from Prowess, we can use this measure only for firms in CRILC that can be matched to Prowess. Results in columns (7) and (8) of Table A.6 show that the IBC has a modest but significant positive impact on NPA recognition of zombies while Feb. 12th has a much larger impact.

Dynamic zombie classification: Section 2.2 argued for using a static classification of zombie borrowers to ensure that our zombie measure was uncontaminated by the treatment interventions. However, this can bias our findings if we are omitting a large number of bank-borrower relationships which satisfy the "zombie" criterion quarters after March 2016. Depending on how the interventions of interest affect banks' NPA recognition of such borrowers, this has the potential to bias our results in either direction.

We guard against this critique by considering a "dynamic" definition of zombie borrowers where for any quarter t, a borrower is classified as zombie if a) the borrower exhibits weakly positive growth in exposures in quarter t, and was reported 60-90 days delinquent in the CRILC system in quarter *t-1*; b) was not rated AAA or AA in quarters $\{t-1, ..., t-8\}$; c) did not initiate a new lending relationship with another bank in quarters $\{t-1, ..., t-8\}$. While being dynamic in nature, this classification is still cumulative, i.e. borrowers once identified as a zombie continue to remains a zombie until the end of the analysis window.

In aggregate, relative to the dynamic zombie definition, our preferred static definition which "freezes" zombies in March 2016 accounts for over 80 percent of zombie exposures and 50 percent of zombie borrowers in the sample. When considering borrowers with

exposures in excess of INR 0.25 billion which came under the purview of Feb. 12th, we account for over 82 percent of the bank-borrower relationships (by volume – 66 percent by number). Formally, Table A.8 shows the results using this dynamic zombie definition. While IBC now has an insignificant impact on NPA recognition of zombies, the impact of Feb. 12th on zombie recognition remains positive and significant at the 1% level, with magnitudes even larger than those in our baseline static classification results.

Using measures of distress: Here, we show that our results are robust to using simple measures of financial distress that do not involve having to define a zombie as satisfying a set of conditions. We employ three such measures. The first is if a borrower was *restructured*, i.e., it received regulatory forbearance under one of the RBI's restructuring schemes in the period before the passage of the IBC. The second measure simply is if the borrower was ever 60-90 days overdue on a payment during the classification window. The third measure is based on debt serviceability — a firm is distressed if it ever had an ICR less than 1 between 2012 and 2015. The results from using these measures in the baseline specification are presented in Table A.7. The results are largely consistent with Feb. 12th having a large positive impact on NPA recognition of zombies irrespective of the distress measure used. While these measures provide similar results to those using our baseline zombie definition, we prefer to stick with the zombie measure as our primary object because we think it better captures both delinquency and misallocated credit to undeserving firms – hallmarks of a firm being a zombie.

Hazard Rate Models: The baseline analysis uses a linear probability model to examine the probability of a zombie loan being recognized as a non-performing asset (NPA). We show our analysis is robust to using a survival analysis model. We use the following proportional hazards equation:

$$h(t) = h_0(t) \times \exp\big(\gamma_{\text{IBC}}\,\text{IBC} + \beta_{\text{IBC}}\,\text{IBC} \times \text{Zombie}_{ij} + \gamma_{\text{Feb12}^{\text{th}}}\,\text{Feb. 12}^{\text{th}} + \beta_{\text{Feb12}^{\text{th}}}\,\text{Feb. 12}^{\text{th}} \times \text{Zombie}_{ij}\big)$$

In this equation, $h(t)$ is the hazard function, which estimates the rate at which the event of interest (classification as an NPA) occurs at time t. $h_0(t)$ is the baseline hazard rate and is assumed to be parametric. The regression model is implemented as a proportional hazard model with a Weibull distributional assumption.[16] The coefficient of interest, $e^{\beta_{Feb12^{th}}}$, is

[16]We use a parametric hazard model as opposed to the semi-parametric Cox proportional hazard model. The proportional hazard assumption in the Cox proportional hazard model requires that the hazard ratio

the hazard ratio for a zombie in the post-Feb.12th period. $e^{\beta_{IBC}}$ is analogously the hazard ratio for a zombie in the post-IBC period. The hazard rate represents the relative risk of an event occurring at time t — in this case, the classification of the borrower as an NPA — in the exposure (zombie) versus the control group (non-zombie).

The results are presented in Table A.9. The coefficients for the interaction terms of interest are displayed (as opposed to the hazard ratios). Column 1 shows that the coefficient on the interaction term, β_{IBC}, is insignificant. Column 2 shows that $\beta_{Feb12^{th}}$ is 0.382. In hazard ratio terms, this implies that a zombie loan is 1.46 ($e^{\beta_{Feb12^{th}}}$) times more likely to be recognized as an NPA relative to non-zombies. Column 3 examines the impact of IBC and Feb. 12th together. The likelihood of a zombie being recognized as an NPA is greater post-Feb.12th (1.5 times) with muted effects post-IBC. These estimates are consistent with our baseline results in column 3 in Table 2.

Excluding previously restructured assets: The third component of the Feb. 12th circular (Section 1) also eliminated all existing specialized regulatory forbearance schemes. One interpretation of this is that our results on zombie recognition simply reflect reduced forbearance post-Feb. 12th. While at face-value this interpretation seems consistent with our results, conversations with policymakers and the prevailing banking environment suggest otherwise. Instead, the third component of Feb. 12th had implications only for firms that had been receiving forbearance under multiple restructuring schemes since the early 2000s. The changes in the provisioning requirements and modifications to the post-GFC restructuring schemes after Asset Quality Review (AQR) announcement in 2013 meant that these forbearance measures had already been diluted post-AQR, making it less attractive for lenders to provide forbearance lending post-AQR (Chari et al., 2020). As Chari et al. (2020) show, while AQR arrested the build-up of zombie borrowers, it did not reverse the stock of zombie borrowers built up since AQR. Hence, we do not interpret the third component of Feb. 12th as directly affecting the degree of forbearance to borrowers (which had previously already been addressed by AQR), but instead as targeting borrowers that had received repeated credit extensions spanning nearly a decade.

20.8% of the zombie borrowers are restructured borrowers (shown in Table A.3). Empirically, nearly 50% of all restructured borrowers are classified as a zombie, further supporting our zombie classification measure: As we argue, a large proportion of the restructured accounts simply were borrowers that received repeated forbearance since the early 2000s, and our zombie measure manages to capture these accounts. Consistent with this logic, our baseline includes the restructured borrowers. Nonetheless, in columns (1)

of zombies and non-zombies is constant over time, which is not appropriate in our setting.

and (2) of Table A.10, we remove accounts under any restructuring scheme and confirm that our results of the Feb. 12th intervention are large and positive. This ameliorates the concern that our results are driven solely by the removal of restructuring schemes.

Limiting the sample to delinquent borrowers: Our baseline sample includes both healthy and zombie borrowers and one may be concerned that the decline in lending reflects reduced demand by zombie borrowers relative to healthy firms. Hence, in columns (3) and (4) of Table A.10, we restrict the sample to borrowers who have been classified as 60-90 days delinquent at least once in the classification window, i.e., at the threshold of non-performing. This makes our control group more comparable if borrowers delinquent between 60-90 days (but not classified as zombie according to our definition) signify borrowers facing temporary idiosyncratic liquidity shocks. This implies that we are estimating the impact of the two interventions on insolvent borrowers, relative to temporarily illiquid borrowers.

We lose almost half our sample but still identify a positive and significant impact of the regulatory intervention on NPA recognition of zombie borrowers, relative to non-zombie borrowers in an advanced stage of delinquency, but who did not receive credit extensions after being reported 60-90 days delinquent. Intriguingly, upon restricting the control group to delinquent (but non-zombie) borrowers, we see that the bankruptcy reform has no impact on the NPA recognition of zombies. These findings underline the role played by the Feb. 12th intervention in separating borrowers who faced temporary liquidity shocks from insolvent borrowers who continued to receive zombie credit.

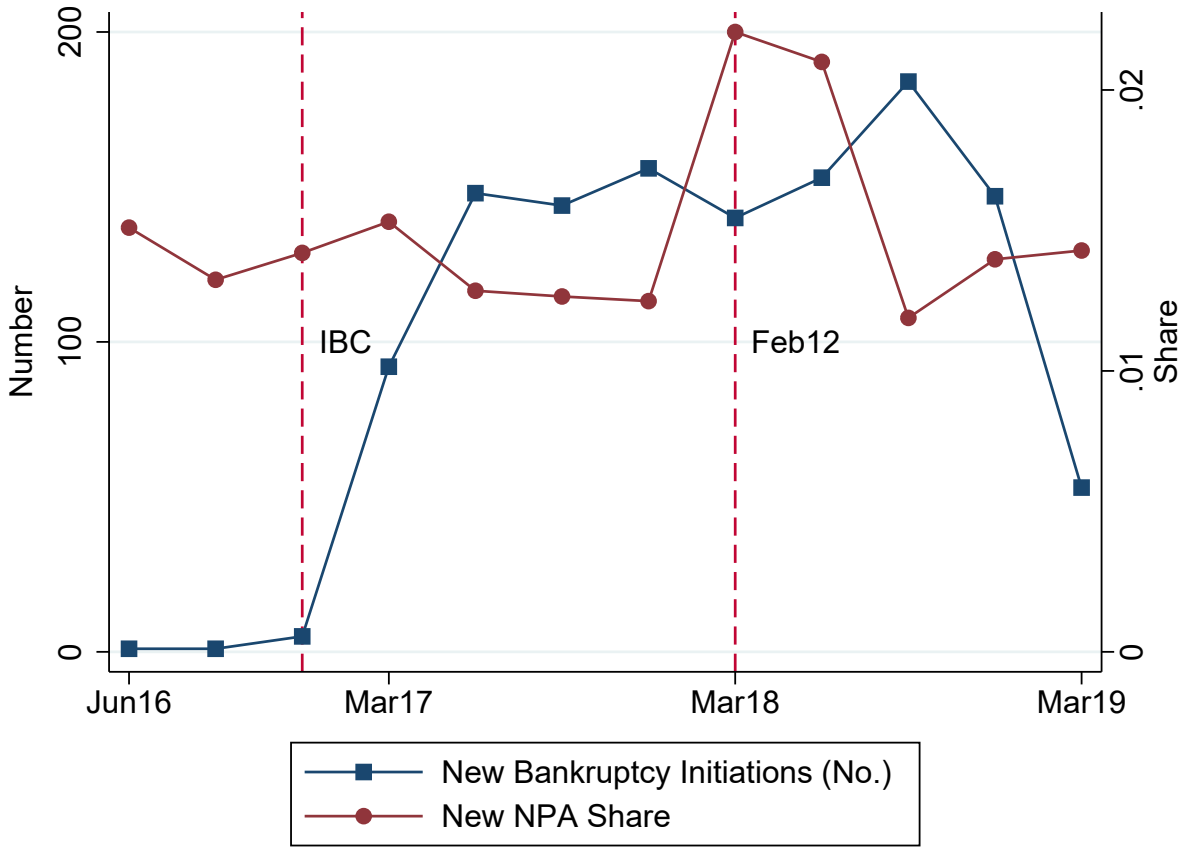
Linking to IBC referrals: While our primary analysis focuses on zombie recognition, Section 1 details how the second component of the Feb. 12th circular streamlined the process once a distressed account was recognized as non-performing. Here, we examine whether lenders started initiating bankruptcy proceedings following the circular. Specifically, we examine the impact on referrals to the National Company Law Tribunal (bankruptcy courts through the IBC) using referral dates in the CRILC database. Results using the specification in equation (1) is present in Table A.11. The dependent variable is a dummy equaling 1 in the quarter in which the borrower gets referred to the bankruptcy court and stays so for the remainder of the sample. Column (1) shows that there is an insignificant increase in zombie referral post-IBC. The impact of post-Feb. 12th on IBC referrals is significant and four times larger. The results are consistent when we jointly estimate the impact of the two interventions [column (3)].

Supreme Court Decision: On April 2nd, 2019, the Supreme Court of India struck down the Feb. 12th circular as being unconstitutional. While our main analysis ends two days before the court decision, here we look at how the decision impacted NPA recognition in the following two quarters – June 2019 and September 2019. We cannot analyze effects beyond this since our CRILC access ends in the quarter ending September 2019

We create a dummy *SC* which takes the value 1 for the two quarters following the court decision. The control period in this analysis is the Feb. 12th period, i.e., March 2018 to March 2019.

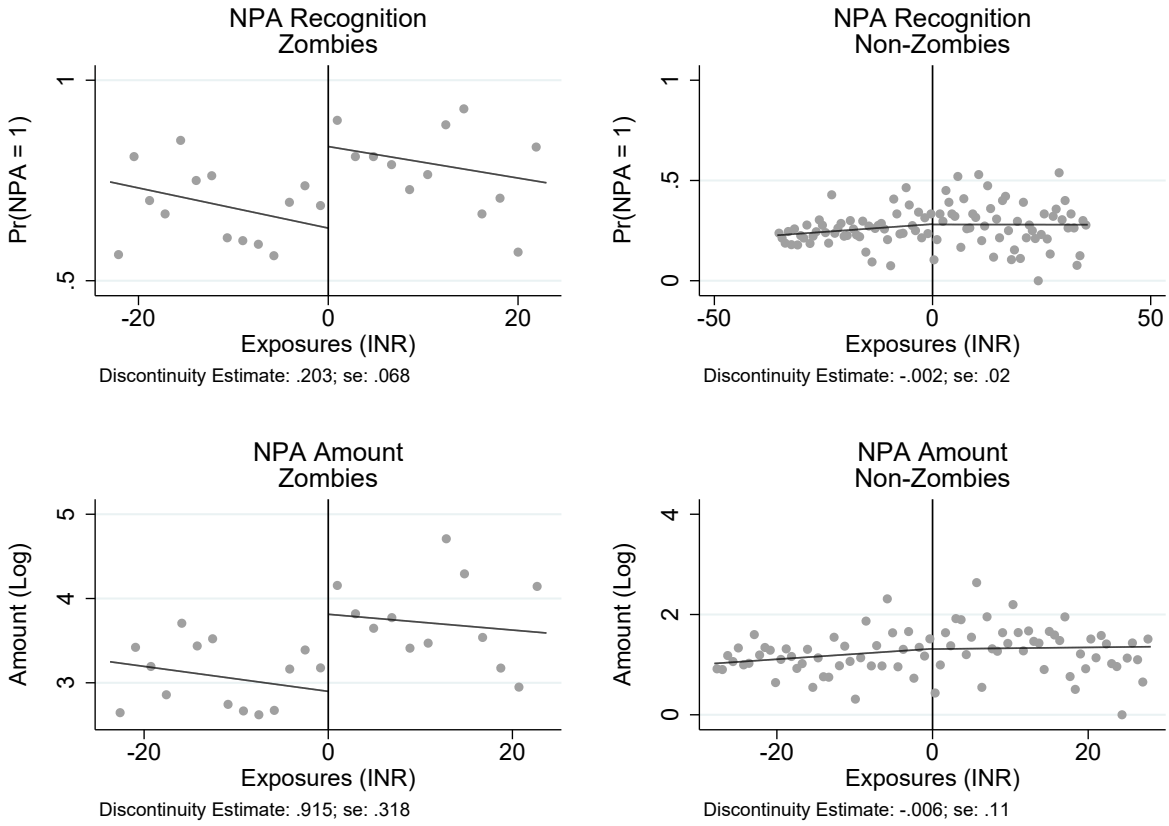
Results using the specification in equation (1) and (3) are shown in Table A.12. We see there is no differential effect of the Supreme Court decision on NPA recognition for all borrowers and large borrowers separately. While this might initially seem surprising, it is possibly explained by the fact that the RBI issued a revised circular two months later on June 7th, 2019. While this revised circular removed the mandatory requirement to initiate bankruptcy proceedings, it did ask banks to report all defaults within 30 days. While less stringent, the new requirement potentially kept banks from rolling back their NPA recognition activities.

Figure A.1
NPA Recognition and Bankruptcy Initiation



Notes: This figure shows the aggregate trends in new bankruptcy initiations and new NPA recognitions for each quarter between June 2016 and March 2019. The left-hand vertical axis depicts the number of new firms referred by banks for the initiation of bankruptcy proceedings. The right-hand vertical axis depicts new NPA recognition by banks. New NPA recognitions are expressed as a share of total non-NPA borrowers in the previous quarter. Vertical broken lines correspond to the timing of the IBC and Feb. 12th circular.

Figure A.2
NPA Recognition of Zombie Borrowers: Regression Discontinuity Analysis



Notes: These figures present regression-discontinuity plots for the NPA recognition of zombie borrowers. The unit of observation is borrower; the sample is restricted to the quarter ending in March 2018. The left-panel restricts the sample to zombie borrowers; the right panel restricts the sample to non-zombie borrowers. The outcome of interest in the top-panel is a dummy equaling 1 if the borrower is classified as non-performing; in the bottom panel, logged exposures of non-performing borrowers. The running variable is defined the difference in outstanding loans from the INR 1 billion threshold. MSERD optimal bandwidths are used in all instances. All specifications include a triangular kernel and a linear polynomial in the running variable, in addition to industry and bank fixed effects.

Table A.1
Variable Definitions

Variable	Definition
Source: CRILC	
Zombie	A bank-borrower pair is designated as a zombie if between June 2014 and March 2016 it has had positive growth in exposures in the quarter after having a payment overdue between 60-90 days; the firm (borrower) does not have a credit rating of AAA or AA even once; and the firm (borrower) has not formed any new banking relationship.
Standard Asset	A loan is classified as 'standard' if a borrower is currently in good standing and has not missed any scheduled payments.
NPA	A loan is classified as an NPA if the borrower has not made any payments towards interest or principal in excess of 90 days.
Banking Relationships	The number of banks with whom a firm has debt outstanding in that year.
Public Sector Bank (PSB)	A dummy variable equaling 1 if the bank is a government-owned bank and 0 otherwise.
Restructured	A loan is classified as restructured if an illiquid borrower, pre-2015 is offered a forbearance scheme, wherein they are offered flexible repayment schedules, additional credit lines, or lower interest rates.
Investment Grade	A dummy variable equaling 1 in a quarter if the firm has an investment grade rating across all banks it transacts with.
Unrated	A dummy variable equaling 1 in a quarter if the firm is not rated by any rating agency.
Large	A dummy variable equaling 1 if the borrower's exposures in the bank in a quarter exceed INR 1 billion.
IBC	A dummy variable equaling 1 for the quarters ending in March, June, September, and December 2017.
Feb. 12^{th}	A dummy variable equaling 1 for all quarters from the one ending in March 2018 onwards.
Bankruptcy Initiation	A dummy variable equaling 1 in the quarter in which the borrower gets referred to the National Company Law Tribunal (NCLT) and stays so for the remainder of the borrower's relationship history in the bank.
Bank $\text{Capital}_{\text{middle}}$	A dummy variable equaling 1 if the bank's average Tier-I capital-to-assets ratio lie in the second tercile, between 2012 and 2015.

Table A.1
Variable Definitions (contd.)

Variable	Definition
Bank $\text{Capital}_{\text{highest}}$	A dummy variable equaling 1 if the bank's average Tier-I capital-to-assets ratio lie in the third (highest) tercile, between 2012 and 2015.
High Zombie Industry	A dummy variable equaling 1 for two-digit industries which had a above median exposure to zombie borrowers in March 2015.
IG	Investment grade (IG) is a dummy equaling 1 in a quarter if the firm has an investment grade rating across all banks it transacts with.
Listed	A dummy variable equaling 1 if the firm is listed for public trading on either of the two national stock exchanges – NSE and BSE.
Young	A dummy variable equaling 1 if the borrower's year of incorporation is 2010 onwards.
$\text{Large}_{\text{Firm}}$	A dummy equaling 1 if the firm's exposures exceed those of the median borrower in the quarter.
Zombie Measure 1	A firm is classified as a zombie if it did not have any new bank relationships between June 2014 and March 2016, was not classified as AAA or AA during any quarter during this period, and during any quarter between June 2014 and March 2016, had quarterly growth in aggregate exposures in excess of 4% in the quarter after it was reported 60-90 days delinquent in the CRILC system.
Zombie Measure 2	A firm is classified as a zombie if it did not have any new bank relationships between June 2014 and March 2016, and during any quarter between June 2014 and March 2016, had weakly positive quarterly growth in exposures in the quarter after it was reported 60-90 days in the CRILC system.
Zombie Measure 3	A firm is classified as a zombie if it was not classified as AAA or AA during any quarter during this period, and during any quarter between June 2014 and March 2016, and during any quarter between June 2014 and March 2016, had weakly positive quarterly growth in exposures in the quarter after it was reported 60-90 days in the CRILC system.
Source: Prowess	
Interest Coverage Ratio (ICR)	Profit before interest and tax scaled by interest expense
Zombie Measure 4	A firm is classified as a zombie if it was reported as having ICR less than 1 in any year between 2012 and 2015, and during any quarter between June 2014 and March 2016, had weakly positive quarterly growth in exposures in the quarter after it was reported 60-90 days in the CRILC system.

Table A.1
Variable Definitions (contd.)

Variable	Definition
CapEx Growth	The symmetric growth rate of capital expenditure defined as $\frac{Y_{it}-Y_{i,t-1}}{0.5\times(Y_{it}+Y_{i,t-1})}$.
Compensation Growth	The symmetric growth rate of wages defined as $\frac{Y_{it}-Y_{i,t-1}}{0.5\times(Y_{it}+Y_{i,t-1})}$.
Cash Ratio	The ratio of cash and bank balances in a year to total assets.
Return on Assets (ROA)	The profit before interest, taxes, depreciation, and amortization in a year scaled by average assets.
Operating Margin	The profit before interest, taxes, depreciation, and amortization in a year scaled by sales in that year.

Notes: This table describes all the variables used in our analysis. First the variables based on the CRILC database are listed and then the variables based on the Prowess database are listed.

Table A.2
Zombie and Non-Zombie Comparison: Firm Characteristics

Sample:	All borrowers (March 2016)		
Dependent Variable:	Healthy	Zombie	Diff of Means
	(1)	(2)	(3)
Assets (INR billion)	18.586	7.035	11.551***
			(1.911)
Sales (INR billion)	8.369	2.123	6.247***
			(0.570)
Return on Assets	0.109	0.043	0.067***
			(0.003)
Operating Margin	0.214	0.147	0.067***
			(0.016)
Fixed Assets Share	0.276	0.332	-0.056***
			(0.010)
Debt Ratio	0.395	0.621	-0.226***
			(0.010)
Current Ratio	1.371	0.987	0.384***
			(0.036)
Interest Coverage Ratio<1	0.198	0.552	-0.353***
			(0.018)
Interest Expense/Average Debt	0.104	0.105	-0.001
			(0.002)
Manufacturing	0.411	0.411	0.000
			(0.018)
Age (Years)	21.974	19.947	2.027***
			(0.555)
Observations	8372	852	9224

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

Notes: This table compares firm characteristics of zombie and healthy (non-zombie) borrowers as of March 2016. The data is from the Prowess database. The first (second) column has the mean value for healthy (zombie) borrowers. The third column has the point estimate and standard error (in parentheses) for a t-test comparing the means of the two groups.

Table A.3
Zombie and Non-Zombie Comparison: Borrowing Characteristics

Sample:	Exposure > 0.25 billion (June 2016- March 2019)		
Dependent Variable:	Healthy	Zombie	Diff of Means
	(1)	(2)	(3)
Exposures (INR Billion)	2.026	1.229	.797***
			(.125)
Exposures > 1 Billion (INR)	0.410	0.339	0.071***
			(0.010)
Standard Asset	.748	0.248	-.501***
			(0.009)
0-30 days payment delinquent	.025	0.033	-0.008**
			(0.001)
30-60 days payment delinquent	0.038	0.095	-0.057***
			(0.004)
60-90 days payment delinquent	0.057	0.271	-0.213***
			(0.006)
NPA	0.132	0.355	-0.223***
			(0.007)
Restructured	0.052	0.208	-0.156***
			(0.005)
Bank Relationships	6.973	5.230	-1.744***
			(0.134)
Public Sector Bank	0.709	0.868	-0.160***
			(0.009)
Investment Grade	0.330	0.096	-0.233***
			(0.009)
Non-Investment Grade	0.180	0.467	-0.287***
			(0.009)
Unrated	0.490	0.436	0.053***
			(0.010)
Observations	14229	3026	17255

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

Notes: This table compares borrowing characteristics of zombie and healthy (non-zombie) borrowers in the quarter of March 2016. The data is from the CRILC database. The sample is restricted to borrowers with exposures in excess of INR 0.25 billion in every quarter between June 2016 and March 2019. The first (second) column has the mean value for healthy (zombie) borrowers. The third column has the point estimate and standard error (in parentheses) for a t-test comparing the means of the two groups.

Table A.4
Transition of Zombie Borrowers Over Time

Sample:	(Zombie – Jun14-Mar16)		(Non-Zombie – Jun14-Mar16)	
Dependent Variable:	Zombie	NPA	Zombie	NPA
	(1)	(2)	(3)	(4)
Jun16-Dec17	.168	.528	.045	.124
Mar18-Mar19	.078	.571	.032	.133

Notes: This table shows the transition of zombie borrowers over time. The unit of observation is borrower. A borrower is classified as a zombie if it witnessed positive loan growth in the quarter after being classified as 60-90 days delinquent, and the borrower was a) not rated AAA or AA once in the past 8 quarters, and b) did not start a new relationship with another bank. For the period between June 2018 and March 2019, we consider the credit ratings and bank relations over the past 4 quarters. NPA indicates if the borrower was classified as non-performing in any quarter during the time period considered.

Table A.5
Transition of Zombie and Non-Zombie Borrowers Over Time

Sample:	Exposure > 0.25 billion (June 2016- March 2019)		
Dependent Variable:	Non-Zombies	Zombies	Difference
	(1)	(2)	(3)
Pr (NPA = 1)	.148	.581	.433***
Pr (Delinquent = 1)	.489	.652	.163***
Pr (60-90 Days Delinquent = 1)	.182	.541	.359***
Pr (Any IG = 1)	.185	.113	-.072***
Pr (Any AAA-AA = 1)	.058	.018	-.040***
Pr (Any NonIG = 1)	.367	.516	.149***

Notes: The above table shows descriptive features about zombie and non-zombie borrowers between June 2016 and March 2019. The unit of observation is the borrower. The sample is restricted to borrowers with exposures in excess of INR 0.25 billion in every quarter between June 2016 and March 2019. Delinquent means missing at least one repayment. IG refers to being rated as either AAA, AA, A or BBB; AAA-AA refers to being rated as either AAA or AA; NonIG refers to being rated as either BB, B, C or D.

Table A.6
Robustness to Alternate Zombie Definitions

Sample:	Exposure > 0.25 billion (June 2016-March 2019)							
	Measure 1		Measure 2		Measure 3		Measure 4	
Dependent Variable	Pr(NPA = 1)	Log (NPA Exp.)	Pr(NPA = 1)	Log (NPA Exp.)	Pr(NPA = 1)	Log (NPA Exp.)	Pr(NPA = 1)	Log (NPA Exp.)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Zombie × IBC	0.019*	0.068	0.015*	0.030	0.023***	0.082**	0.065***	0.311***
	(0.010)	(0.048)	(0.009)	(0.041)	(0.008)	(0.039)	(0.013)	(0.067)
Zombie × Feb. 12th	0.097***	0.433***	0.091***	0.377***	0.090***	0.372***	0.115***	0.566***
	(0.018)	(0.092)	(0.016)	(0.078)	(0.013)	(0.065)	(0.022)	(0.113)
Observations	167319	167319	167319	167319	167319	167319	167319	167319
R^2	0.862	0.850	0.862	0.850	0.862	0.850	0.862	0.851
Bank-Borrower FE	Y	Y	Y	Y	Y	Y	Y	Y
Industry-Time FE	Y	Y	Y	Y	Y	Y	Y	Y
Bank-Time FE	Y	Y	Y	Y	Y	Y	Y	Y

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: This table shows the robustness of the baseline results to alternate definitions of zombie borrowers. The measures used are defined in Table A.1. The unit of observation is the borrower-bank. The outcome of interest in odd-numbered columns is a dummy equaling 1 if the borrower is a non-performing asset; in even-numbered columns, logged NPA exposures. All specifications include borrower-bank, 2-digit industry-quarter and bank-quarter fixed effects, in addition to borrower-specific covariates. The sample is restricted to 12 quarters between June 2016 and March 2019 and borrowers with outstanding loans in excess of INR 0.25 Bn. Standard errors in parentheses, clustered by borrower.

Table A.7
Robustness to Alternate Definitions of Distress

Sample:	Exposure $>$ 0.25 billion (June 2016-March 2019)					
	Restructured Borrower		60-90 Days Delinquent		ICR $<$ 1	
Dependent Variable	Pr (NPA = 1)	Log (NPA Exp.)	Pr (NPA = 1)	Log (NPA Exp.)	Pr (NPA = 1)	Log (NPA Exp.)
	(1)	(2)	(3)	(4)	(5)	(6)
$\mathbb{1}_{Distress} \times$ IBC	0.004	0.012	0.047***	0.196***	0.028***	0.127***
	(0.015)	(0.073)	(0.006)	(0.029)	(0.009)	(0.048)
$\mathbb{1}_{Distress} \times$ Feb. 12th	0.095***	0.481***	0.097***	0.407***	0.050***	0.238***
	(0.024)	(0.128)	(0.011)	(0.056)	(0.015)	(0.074)
Observations	167319	167319	167319	167319	100030	100030
R^2	0.861	0.850	0.862	0.850	0.847	0.839
Bank-Borrower FE	Y	Y	Y	Y	Y	Y
Industry-Time FE	Y	Y	Y	Y	Y	Y
Bank-Time FE	Y	Y	Y	Y	Y	Y

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

Notes: This table shows the robustness of the baseline results to alternate definitions of distressed borrowers. The unit of observation is the borrower-bank. All specifications include borrower-bank, 2-digit industry-quarter and bank-quarter fixed effects, in addition to borrower-specific covariates. *Restructured Borrower* refers to borrowers who have received regulatory forbearance; *60-90 Days Delinquent* refers to borrowers who have been reported as 60-90 days delinquent in at least one quarter prior to March 2016. ICR $<$ 1 refers to firms which have reported an Interest Coverage Ratio less than 1 at least once between 2012 and 2015. The ICR measure is available solely for borrowers which can be linked to the Prowess database. The sample is restricted to 12 quarters between June 2016 and March 2019 and borrowers with outstanding loans in excess of INR 0.25 Bn. Standard errors in parentheses, clustered by borrower.

Table A.8
Robustness to Dynamic Zombie Definition

Sample:	Exposure $>$ 0.25 billion (June 2016-March 2019)	
Dependent Variable:	Pr (NPA = 1)	Log (NPA Exposures)
	(1)	(2)
Zombie $\times$ IBC	0.020	0.060
	(0.016)	(0.074)
Zombie $\times$ Feb. 12^{th}	0.088***	0.421***
	(0.023)	(0.107)
Observations	154511	154511
R^2	0.864	0.853
Bank-Borrower FE	Y	Y
Industry-Time FE	Y	Y
Bank-Time FE	Y	Y

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: This table shows the robustness of the baseline results to a dynamic definition of zombie borrowers. The unit of observation is the borrower-bank. The outcome of interest in column (1) is a dummy equaling 1 if the borrower is classified as non-performing; in column (2), logged NPA exposures. All specifications include borrower-bank, 2-digit industry-quarter and bank-quarter fixed effects, in addition to borrower-specific covariates. The sample is restricted to 12 quarters between June 2016 and March 2019 and borrowers with outstanding loans in excess of INR 0.25 Bn. Zombie is a dummy equaling 1 if the borrower had positive growth in outstanding credit in the quarter after being classified as 60-90 days delinquent, and have in the past 8 quarters not been a) rated AAA or AA in the system, and b) not started a new relationship with a bank. Standard errors in parentheses, clustered by borrower.

Table A.9
Robustness to Using a Proportional Hazard Model

Sample:	Exposure $>$ 0.25 billion (June 2016- March 2019)		
Outcome:	NPA Recognition		
	(1)	(2)	(3)
Zombie $\times$ IBC	-0.106		-0.098
	(0.124)		(0.124)
Zombie $\times$ Feb. 12th		0.382***	0.405***
		(0.143)	(0.149)
Observations	30493	40458	40458

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

Notes: This table shows the robustness of the baseline results using a survival model analysis instead of the baseline linear probability model in columns 1–3 of Table 2. The unit of observation is at the borrower-bank level. The outcome of interest (failure event in the survival model) is the borrower being classified as non-performing by the bank. A parametric survival model with a Weibull distribution is used. Lower-order interaction terms are included but not shown for brevity. The coefficients (log-hazard rate as opposed to the hazard rates) are shown. The sample is restricted to 12 quarters between June 2016 and March 2019 and borrowers with outstanding loans in excess of INR 0.25 Bn. Zombie is a dummy equaling 1 if the borrower had positive growth in outstanding credit in the quarter after being classified as 60-90 days delinquent and have in the past 8 quarters not been a) rated AAA or AA in the system and b) not started a new relationship with a bank. Standard errors in parentheses are clustered at the borrower level.

Table A.10
Robustness to Alternate Samples

Sample:	Exposure > 0.25 billion (June 2016-March 2019)					
	Excluding Rest. Borr		60-90 Days Delinquent		Never NPA Before Mar16	
Dependent Variable	Pr (NPA = 1)	Log (NPA Exp.)	Pr (NPA = 1)	Log (NPA Exp.)	Pr (NPA = 1)	Log (NPA Exp.)
	(1)	(2)	(3)	(4)	(5)	(6)
Zombie × IBC	0.013	0.019	-0.008	-0.055	0.019**	0.053
	(0.008)	(0.038)	(0.010)	(0.045)	(0.009)	(0.041)
Zombie × Feb. 12th	0.058***	0.201***	0.036**	0.159*	0.099***	0.424***
	(0.014)	(0.067)	(0.017)	(0.084)	(0.018)	(0.099)
Observations	140084	140084	96874	96874	128881	128881
R^2	0.873	0.862	0.827	0.818	0.788	0.771
Bank-Borrower FE	Y	Y	Y	Y	Y	Y
Industry-Time FE	Y	Y	Y	Y	Y	Y
Bank-Time FE	Y	Y	Y	Y	Y	Y

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

Notes: This table shows the robustness of the baseline results when we change the sample being employed. The unit of observation is the borrower-bank. The outcome of interest in odd-numbered columns is a dummy equaling 1 if the borrower is classified as non-performing; in even-numbered columns, logged NPA exposures. All specifications include borrower-bank, 2-digit industry-quarter and bank-quarter fixed effects, in addition to borrower-specific covariates. The sample is restricted to 12 quarters between June 2016 and March 2019 and borrowers with outstanding loans in excess of INR 0.25 Bn. Standard errors in parentheses, clustered by borrower.

Table A.11
Bankruptcy Referral of Zombie Borrowers

Sample:	Exposure $>$ 0.25 billion (June 2016-March 2019)		
Dependent Variable:	Pr (Bankruptcy Initiation = 1)		
	(1)	(2)	(3)
Zombie $\times$ IBC	0.007		0.007
	(0.005)		(0.005)
Zombie $\times$ Feb. 12th		0.026***	0.030***
		(0.008)	(0.010)
Observations	106065	167319	167319
R^2	0.458	0.571	0.571
Bank-Borrower FE	Y	Y	Y
Industry-Time FE	Y	Y	Y
Bank-Time FE	Y	Y	Y

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

Notes: This table presents the difference-in-differences estimates of the bankruptcy reform (IBC) and the regulatory intervention (Feb. 12th) on the probability of a borrower being referred to National Company Law Tribunal (NCLT) — defined as an indicator for whether a bankruptcy proceeding has been initiated. The sample is restricted to borrowers with exposures in excess of INR 0.25 billion in every quarter between June 2016 and March 2019. The unit of observation is the borrower-bank-quarter. The dependent variable in all the columns is a dummy equaling 1 in the quarter in which the borrower gets referred to NCLT and stays so for the remainder of the borrower's relationship history in the bank. All specifications include borrower-bank, bank-quarter and industry-quarter fixed effects, in addition to borrower-specific covariates. Standard errors in parentheses and clustered by borrower.

Table A.12
Impact on NPA Recognition of Supreme Court Ruling

Sample:	Exposure $>$ 0.25 billion (March 2018- September 2019)			
Dependent Variable:	Pr (NPA = 1)		Log (NPA Exposures)	
	(1)	(2)	(3)	(4)
Zombie $\times$ SC	0.004	0.002	0.005	-0.004
	(0.009)	(0.009)	(0.040)	(0.035)
Zombie $\times$ Large $\times$ SC		0.010		0.045
		(0.014)		(0.071)
Observations	78488	78488	78488	78488
R^2	0.929	0.929	0.930	0.930
Bank-Borrower FE	Y	Y	Y	Y
Industry-Time FE	Y	Y	Y	Y
Bank-Time FE	Y	Y	Y	Y

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

Notes: This table shows the impact of the Supreme Court ruling in April 2019 which led to the withdrawal of the Feb. 12th circular, to be replaced with a new circular within 2 months of the ruling. The unit of observation is the borrower-bank. The outcome variable in columns (1)-(2) is a dummy equaling 1 if the borrower is classified as non-performing; in columns (3)-(4), the logged volume of outstanding non-performing loans. SC is a dummy that takes the value 1 for quarters following the Supreme Court ruling, i.e., June 2019 onwards. All specifications include borrower-bank, 2-digit industry-quarter and bank-quarter fixed effects, in addition to borrower-specific covariates. The sample is restricted to 7 quarters between March 2018 and September 2019 and borrowers with outstanding loans in excess of INR 0.25 Bn. *Large* is a dummy equaling 1 if the borrower has outstanding loans in the bank exceeding INR 1 billion. Standard errors in parentheses, clustered by borrower.

Table A.13
Heterogeneity by Bank Capital: Robustness to Dynamic Measure of Bank Capital

Sample:	Exposure > 0.25 billion (June 2016 - March 2019)	
Dependent Variable:	Pr (NPA = 1)	Log (NPA Exposures)
	(1)	(2)
Zombie × IBC	0.006	-0.000
	(0.011)	(0.051)
Zombie × Bank Capital$_{middle}$ × IBC	0.003	0.022
	(0.014)	(0.063)
Zombie × Bank Capital$_{highest}$ × IBC	0.025*	0.100
	(0.014)	(0.062)
Zombie × Feb. 12th	0.068***	0.284***
	(0.018)	(0.090)
Zombie × Bank Capital$_{middle}$ × Feb. 12th	-0.007	-0.047
	(0.018)	(0.084)
Zombie × Bank Capital$_{highest}$ × Feb. 12th	0.094***	0.396***
	(0.024)	(0.111)
Observations	167319	167319
R^2	0.862	0.850
Bank-Borrower FE	Y	Y
Industry-Time FE	Y	Y
Bank-Time FE	Y	Y

Standard errors in parentheses. Significant levels: *10%, **5%, and ***1%

Notes: This table shows the differential impact of the bankruptcy reform (IBC) and the regulatory intervention (Feb. 12th) on non-performing asset (NPA) recognition for zombie borrowers across a dynamic measure of bank capital. The sample is restricted to borrowers with exposures in excess of INR 0.25 billion in every quarter between June 2016 and March 2019. The unit of observation is the borrower-bank-quarter. The dependent variable in column (1) is a dummy equaling 1 if the borrower is reported NPA in the bank, in column (2), the logged NPA exposures of the borrower. Bank Capital$_{middle}$ and Bank Capital$_{highest}$ refer to the middle and top terciles of bank capital. *Bank Capital* for a given fiscal year refers to the Tier-I capital of the bank on March 31 of the previous fiscal year. All specifications include borrower-bank, bank-quarter and industry-quarter fixed effects, in addition to borrower-specific covariates. Standard errors in parentheses, clustered by borrower.

Table A.14
Effect on Real Outcomes of Healthy Firms

Panel A: By Credit Rating

Sample:	Non-Zombie Firms				
Dependent Variable:	Capex Growth	Comp Growth	Cash Ratio	ROA	Op. Margin
	(1)	(2)	(3)	(4)	(5)
IG × IBC	0.188***	0.013*	0.001**	-0.001	-0.016
	(0.049)	(0.008)	(0.001)	(0.002)	(0.012)
IG × Feb. 12th	0.185***	0.021***	0.003***	-0.001	-0.013
	(0.038)	(0.007)	(0.001)	(0.002)	(0.013)
Observations	36855	36855	36855	36855	35429
R^2	0.102	0.326	0.536	0.742	0.896
Controls	Y	Y	Y	Y	Y
Firm and Ind-Year FE	Y	Y	Y	Y	Y

Panel B: By Size

Sample:	Non-Zombie Firms				
Dependent Variable:	Capex Growth	Comp Growth	Cash Ratio	ROA	Op. Margin
	(1)	(2)	(3)	(4)	(5)
$\text{Large}_{\text{Firm}}$ × IBC	0.188***	-0.018*	0.007***	-0.001	-0.000
	(0.056)	(0.009)	(0.002)	(0.002)	(0.009)
$\text{Large}_{\text{Firm}}$ × Feb. 12th	0.237***	-0.010	0.010***	-0.001	0.004
	(0.052)	(0.011)	(0.002)	(0.003)	(0.016)
Observations	36378	36378	36378	36378	34976
R^2	0.099	0.322	0.535	0.741	0.895
Controls	Y	Y	Y	Y	Y
Firm and Ind-Year FE	Y	Y	Y	Y	Y

Panel C: By Listing Status

Sample:	Non-Zombie Firms				
Dependent Variable:	Capex Growth	Comp Growth	Cash Ratio	ROA	Op. Margin
	(1)	(2)	(3)	(4)	(5)
Listed × IBC	0.454***	0.045***	-0.000	-0.003*	0.005
	(0.056)	(0.008)	(0.001)	(0.002)	(0.015)
Listed × Feb. 12th	0.114***	0.058***	-0.001	-0.007***	0.009
	(0.043)	(0.008)	(0.001)	(0.002)	(0.018)
Observations	36855	36855	36855	36855	35429
R^2	0.103	0.327	0.536	0.742	0.896
Controls	Y	Y	Y	Y	Y
Firm and Ind-Year FE	Y	Y	Y	Y	Y

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

Notes: This table estimates the impact of the bankruptcy reform (IBC) and the regulatory intervention (Feb. 12th) on firm-level outcomes for healthy, i.e., non-zombie firms, excluding non-performing borrowers and zombie borrowers. The differential impact on investment grade (Panel A), size (Panel B), and listing status (Panel C) is shown. The unit of observation is the firm-year. The dependent variables are growth in capital expenditure (column 1), growth in compensation expenditure (column 2), cash ratio (column 3), return on assets (column 4), and operating margin (column 5). Firm and industry-year fixed effects are included in all specifications, and we control for firm size using log of assets. Standard errors are clustered by firm. All variables are as defined in Table A.1.