Creditor Rights, Threat of Liquidation, and Labor-Capital Choice of Firms*

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Abstract

In 2002, a legal reform introduced in India allowed secured creditors to seize and liquidate the defaulter's assets. We study firms' choice between capital and labor in response to these strengthened creditor rights by exploiting variation in their pre-policy proportion of collateralizable assets. We find that firms increased employment, reduced their capital investments, and substituted secured formal credit with trade credit. These results are consistent with an increased threat of liquidation for firms. We find support for our main results across regions with different pre-policy court-efficiency and across industries with different elasticities of substitution between capital and labor.

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1 Introduction

How do financial market frictions affect employment? The recent financial crisis of 2008-09 led to more than 2.5 million job losses,[1] in the United States alone, and over 20 million worldwide. Since the crisis, there has been significant policy and academic interest in understanding the relationship between financial market frictions and labor market outcomes (ILO (2010), Michaels, Page, and Whited (2018)). There are several strands of literature that allow us to think about the possible channels. The "Law and Finance" literature highlights the importance of the legal institutions protecting creditors and investors for overall financial development and greater access to finance. For example, stronger creditor rights are associated with a greater supply of credit, lower cost of debt, larger capital markets, and greater economic growth (La Porta et al. (1997, 1998), Levine (1998, 1999), Beck, Demirguc-Kunt, and Levine (2005), Qian and Strahan (2007), Djankov, McLiesh, and Shleifer (2007), Visaria (2009), Haselmann, Pistor, and Vig (2010)). A second strand of literature under the rubric of "Finance and Growth" documents the positive link between financial development and economic growth (King and Levine (1993), Jayaratne and Strahan (1996), Rajan and Zingales (1998)), with greater access to finance leading to an increase in both the scale of existing firms and creation of new firms (Black and Strahan (2002)). Taken together, it seems that improving legal institutions encompassing financial transactions would generate more growth and plausibly greater employment. However, there is little direct empirical evidence on how strengthening creditor protection affects employment. This is particularly surprising given that the link between access to finance and a firm's labor-capital choices are not obvious (Garmaise (2008), Giroud and Mueller (2015)).[2]

In this paper, we seek to examine how changes in the financing environment affect firm-level employment decisions. To this end, we investigate how firms altered their labor and capital allocation in response to a plausibly exogenous increase in creditor rights in India brought about by the passage of Securitization and Reconstruction of Financial Assets and Enforcement of Security

[1] https://www.nytimes.com/2009/01/09/business/worldbusiness/09iht-jobs.4.19232394.html

[2] See also Campello, Graham, and Harvey (2010) and Sun and Zhang (2016). Importantly, these labor-capital decisions also impact firm value (Merz and Yashiv (2007), Belo, Lin, and Bazdresch (2014)). However, previous work examining the real effects of strengthening creditor rights on firms have focused exclusively on their capital structure choices, capital investments, and risk taking (Benmelech and Bergman (2011), Roberts and Sufi (2009), Acharya, Amihud, and Litov (2011), Vig (2013), and Gopalan, Mukherjee, and Singh (2016)), with little attention to employment outcomes.

Interests Act (SARFAESI henceforth) of 2002 (Vig (2013)).[3] SARFAESI allowed secured creditors to circumvent the lengthy and inefficient judicial process by giving them the power to seize and liquidate the defaulter's assets.

Theoretically, the ex-ante effects of strengthening creditor rights on firms' input choice are a priori ambiguous. This is because changes in creditor rights can engender very different real outcomes depending on which aspect of creditor protection the law affects.[4] For instance, an improvement in the efficiency of the bankruptcy process, or an expansion in the set of collateralizable assets, or increased judicial efficiency may increase the supply of credit as expected profits of lenders rise and also increase the demand for credit due to a lower cost of capital. This, in turn, can spur investments through increased access to finance (Benmelech and Bergman (2011), Gopalan, Mukherjee, and Singh (2016), Ersahin (2018)). On the one hand, this increase in investments can result in greater demand for labor, through a scale effect if capital and labor are complements (for example, Campello and Larrain (2016)). On the other hand, easing of financial constraints may allow firms to move towards a more capital intensive production process, resulting in a decrease in firm-level employment (Garmaise (2008)), if capital and labor are substitutes, through a substitution effect.

Changes in creditor rights can generate another kind of substitution effect, with diametrically opposite effects on labor and capital. For example, an increase in the rights of banks to directly seize and liquidate collateral may result in sub-optimally "excessive" liquidations of firms with positive continuation value (Aghion, Hart, and Moore (1992), Shleifer and Vishny (1992), Acharya, John, and Sundaram (2005), Assunção, Benmelech, and Silva (2014), Acharya and Thakor (2016)). This increased threat of liquidation, in turn, may increase the effective cost of credit (tighten financial constraints), and can adversely impact their demand for credit and distort their investment decisions. Specifically, in settings under which creditor rights lead to an increase in liquidation bias, firms may find it optimal to substitute labor for capital for at least two reasons. First, since tangible assets are easier to seize and liquidate, firms may choose to replace tangible assets (for instance, fixed assets such as plant and machinery) with intangible assets (labor). Second, capital requires

[3] See also Bhue, Prabhala, and Tantri (2015).

[4] These could include the rights afforded to lenders in bankruptcy, collateral laws, the efficiency of judicial debt recovery, and extra-judicial rights to seize and liquidate collateral. See Besanko and Thakor (1987), Haselmann, Pistor, and Vig (2010), Calomiris, Larrain, Liberti, and Sturgess (2016), Campello and Larrain (2016), and Calomiris, Larrain, Liberti, and Sturgess (2017).

upfront investments and needs to be financed, while labor expenses can at least partially be met ex-post from sales revenue (Garmaise (2008), Benmelech, Bergman, and Seru (2015), Sun and Zhang (2016)). Accordingly, firms trying to reduce their leverage (due to liquidation bias and increased cost of capital) may substitute labor for capital. Thus, the effect of changes in creditor rights on firms' input choices depends on whether the scale or the substitution effect dominates, and is largely an empirical question.

SARFAESI was passed throughout India in 2002, therefore the main empirical challenge in our setting is to construct a valid treatment and control group. To address this issue, we exploit cross-sectional variation in firms' pre-SARFAESI access to collateralizable assets to generate variation in exposure to the law. Specifically, we follow Vig (2013) and employ a difference-in-differences strategy that compares the outcomes of firms with a higher proportion of tangible assets (*treatment group firms*) to those with a lower proportion of tangible assets (*control group firms*). To the extent that tangible assets are more easily securitized,[5] firms with more tangible assets are more likely to be affected by the passage of SARFAESI, as it governs secured lending transactions. Moreover, we control for factory (firm)[6] fixed effects, and industry-year fixed effects in all our tests. The use of firm fixed effects in a difference-in-differences framework essentially implies that our estimates are identified through within-firm variation in outcome variables across our treatment and control samples before and after the passage of SARFAESI. Furthermore, by including industry-year fixed effects, we control for the time-varying differences across industries in a flexible manner.

We start our analysis by examining the impact of SARFAESI on the number of workers employed and fixed capital investments made by firms. Our main results are that as a result of SARFAESI, treated firms differentially increase the total number of employees (by 7.9%-9.1%), and reduce their investment in fixed capital (by 25%), and plant & machinery as compared to control firms. We also find that treated firms differentially increase their expenditure on rented plant and machinery. Since movable assets such as plant and machinery owned by the firms can be seized and liquidated in the event of default, firms move away from investing in capital towards hiring more workers and using rented plant and machinery. This evidence is consistent with a higher threat of liquidation after SARFAESI.

[5] In India, both movable and immovable property can be used as collateral.

[6] For the purposes of this study, we use the terms factories and firms interchangeably.

To strengthen the causal interpretation of our main findings, we examine the heterogeneous effects of SARFAESI across different regions and industries using difference-in-differences-in-differences (DIDID) specifications. Specifically, we look at heterogeneous effects across (i) states with varying levels of pre-SARFAESI judicial efficiency, (ii) industries with different elasticities of substitution between capital and labor, and (iii) states with different labor regimes (pro-worker versus pro-employer)[7]. We find evidence supporting our main results. We find that treated firms differentially hire more workers and invest less in capital in states that had a lower pre-SARFAESI judicial efficiency. This is because secured creditors have greater incentives to avoid the lengthy judicial process and thus more likely to invoke SARFAESI and directly liquidate assets of firms in states that had more inefficient courts.[8] We also find that these differential effects of hiring more workers and investing less in capital is stronger for treated firms in industries with a higher elasticity of substitution between capital and labor. Across states with different labor regulations, we find that treated firms differentially hire more contract workers in pro-worker states, and hire more permanent workers in pro-employer states. However, treated firms do not exhibit any differential capital investment responses across these different labor regulations. This is consistent with the labor regulations in India, as hiring and firing of permanent workers is harder in pro-worker states compared to pro-employer states, but there are no such regulations on the hiring and firing of contract workers.

Finally, we look at the effects of SARFAESI on short-term debt. We find that as a result of SARFAESI, treated firms differentially reduce the amount of secured formal loans in the short-term as compared to control firms. This result is consistent with the evidence presented in Vig (2013). Additionally, we document a novel result with regards to other sources of firm financing. We find that treated firms differentially increase their reliance on trade credit post-SARFAESI compared to control firms. In essence, post-SARFAESI, treated firms substitute away from secured credit towards trade credit (unsecured credit) as compared to control firms. To the extent that trade credit is a costly source of finance (Petersen and Rajan (1994), De and Singh (2013)), this evidence

[7] These labor regulations are explained in detail in Besley and Burgess (2004).

[8] *"For example, a public sector bank (PSB) branch in Jammikunta proceeded with sale of property within 15 days of declaring the asset as NPA. They have also fixed a reserve price without consulting the impugned borrower or without taking into consideration any objections raised by the borrowers..."* - from an article titled "How banks misuse SARFAESI Act provisions for loan recovery" [see http://www.moneylife.in/article/how-banks-misuse-sarfaesi-act-provisions-for-loan-recovery/47625.html, accessed in November 2016].

is consistent with SARFAESI resulting in a higher threat of liquidation that raised the effective cost of secured credit for firms and led them to substitute towards unsecured credit.

Our study contributes to several strands of literature. First, it adds to the growing body of work in the area of "labor and finance" that acknowledges and examines the linkages between firm financing and labor market outcomes. Agrawal and Matsa (2013) find that higher unemployment benefits are associated with an increase in firm leverage. Simintzi, Vig, and Volpin (2014) find that an increase in employment protection is associated with a decrease in leverage possibly because labor protection increases the costs of financial distress. Chava, Danis, and Hsu (2017) find that the passage of right to work laws in the US is associated with lower wages, greater investments and employment, and lower financial leverage.

Conversely, the financial contracting environment can also impact firms' labor input and wage decisions (Benmelech, Bergman, and Seru (2015)). Consistent with this view, Benmelech, Bergman, and Enriquez (2012) find that financial distress with a downward revision in wages while Falato and Liang (2014) and Ersahin, Irani, and Le (2018) find that covenant violations within firms are associated with a drop in employment and investments. Bos, Breza, and Liberman (2018) find that negative credit information reduces both employment and wage earnings of individuals. Brown and Matsa (2016) and Baghai, Silva, Thell, and Vig (2016) find that financially distressed firms face difficulties in both attracting and retaining skilled labor, and Babina (2017) finds that financial distress in firms accelerates the exit of employees who become entrepreneurs. Finally, Chodorow-Reich (2013) and Michaels, Page, and Whited (2018) examine the effect of financing frictions on firm-level employment outside of financial distress. Exploiting the health of firm's relationship lender as a source of exogenous variation in access to credit, Chodorow-Reich (2013) documents that credit-constrained firms experienced higher costs of borrowing and reduced employment during the recent financial crisis. Using a structural model, Michaels, Page, and Whited (2018) show that raising financing costs is associated with a drop in employment, wages, and capital investments. Our paper adds to the scholarship in this area by investigating the ex-ante effects of strengthening creditor rights on firm-level employment, and capital investment. We document the novel finding that a higher cost of capital due to an increased threat of liquidation results in greater employment and lower capital investments.

Second, our study also relates to the large body of work that examines the impact of creditor rights and debt enforcement on corporate policies.[9] The evidence regarding the impact of creditor rights on firm-level outcomes is mixed. On the one hand, strengthening creditor rights can increase the supply of credit and lower the cost of debt (Visaria (2009), Haselmann, Pistor, and Vig (2010)). This, in turn, can enhance the ability of firms to borrow long-term, increase leverage, and consequently the level, quality, and horizon of capital investments (Giannetti (2003), Benmelech and Bergman (2011), and Gopalan, Mukherjee, and Singh (2016)). On the other hand, stronger creditor rights can also decrease the supply of credit to small borrowers (Lilienfeld, Mookherjee, and Visaria (2012)) and increase the threat of liquidation for firms (Acharya, Amihud, and Litov (2011))[10]. As a consequence, this can have an adverse impact on the demand for debt, asset growth, risk-taking, and reduce both the amount and quality of innovation pursued by firms (Acharya and Subramanian (2009), Acharya, Amihud, and Litov (2011), and Vig (2013)). These contrasting effects of creditor rights on firms' demand for debt, in turn, can lead to differing labor-capital choices depending on whether the scale or the substitution effect dominates. Campello and Larrain (2016), for example, find that reforms in Eastern Europe that enlarged the menu of assets that could be posted as collateral, led to an increase in firms' capital investment and employment, via a scale effect. In contrast, our paper provides novel evidence on a new channel through which creditor rights affect real economic activity. Along similar lines, Ersahin (2018) finds that giving lenders greater access to the collateral of firms in financial distress results in an increase in total factor productivity and capital intensity of firms. In our setting, we find that the strengthening of creditor rights led to an increased liquidation bias for treated firms that subsequently hired more workers, and invested less in fixed capital including plant and machinery, via a substitution effect. In essence, SARFAESI had the unanticipated effect of moving firms towards more labor-intensive production process.

Our findings have broader policy implications as developing countries all over the world seek to improve their credit markets through changes in debt enforcement. First, generalizing the results

[9]Broadly, our paper is also related to the literature on real effects of financial frictions (Campello, Graham, and Harvey (2010), Chaney, Sraer, and Thesmar (2012), Hombert and Matray (2015)) and academic work examining the determinants of firms' choice of factors of production (Shapiro (1986), Hall (2004), Acemoglu (2010)).

[10]Gennaioli and Rossi (2010) also show that creditor protection in reorganization improves judicial incentives to resolve financial distress efficiently. This reduces bias of courts towards reorganization of bankrupt firms, thereby increasing the threat of liquidation.

of the paper would imply that policy changes aimed at alleviating financial constraints for firms may not necessarily generate more employment but may even reduce it. Second, to the extent that such policy changes can affect firms' labor hiring and investment decisions, it has implications for both firm value, and economic growth (Merz and Yashiv (2007), Acemoglu and Guerrieri (2008), Belo, Lin, and Bazdresch (2014)).

2 Creditor Rights in India

Historically, regulatory bottlenecks and judicial delays in the recovery of secured assets by creditors were the hallmarks of lender-borrower relationships in India. All loan recovery cases in the event of a default were filed in the civil court system, which had to follow the tedious Code of Civil Procedure Act of 1908. For example, according to the Law Commission of India (1988), approximately 40 percent of the debt recovery cases in 1985 had been pending for more than 8 years. The lengthy judicial process, led to a large depreciation in the value of secured assets held as collateral by the bank.

To fasten the judicial process in debt recovery cases and thereby strengthen creditor rights, the Government of India passed two reforms: (1) The Debt Recovery Tribunal Act of 1993 (DRT Act) and (2) the Securitization and Reconstruction of Financial Assets and Enforcement of Security Interests Act of 2002 (SARFAESI Act).

Debt Recovery Tribunals were specialized courts for loan recovery cases that were set up across India beginning in 1994. To ensure quick recovery on defaulted loans, the tribunals were not required to follow the lengthy Code of Civil Procedure. DRTs set up their own streamlined procedures to expedite the processing of loan default cases. For more detailed discussion on DRTs, see Visaria (2009), Lilienfeld, Mookherjee, and Visaria (2012), and Gopalan, Mukherjee, and Singh (2016).

However, even after the establishment of DRTs, secured creditors could not seize security of a defaulting firm without a court/tribunal order. Before 2002, the lack of any mechanism outside of tribunal proceedings meant that recovery of security interests was effectively stayed. Furthermore, the Industrial Disputes Act of 1947, that governs labor laws in India, also made restructuring and liquidation hard by forcing firms with greater than 100 workers to seek prior government approval

before closing down. This meant that assets of defaulting firms would depreciate significantly, leading to lower values of recovered secured credit for banks and financial institutions.

The SARFAESI Act of 2002 made creditor rights much stronger than the pre-SARFAESI era by allowing secured creditors to seize the assets of a defaulting firm without having to go through the court/tribunal process. Importantly, the law applied to both old and new contracts, and only covered secured loans leaving unsecured loans outside of its purview. Essentially, after 2002 (SARFAESI Act), if a firm defaulted on its payments for more than 6 months, a secured creditor (bank or financial institution) could seize and liquidate their assets by giving a 60-day demand notice. After the 60-day period, banks would advertise a possession (or auction) notice in leading newspapers, essentially to complete the seizure and liquidation of the assets. In figure 1, we show an example of such a possession/auction notice. Secured creditors also had the right to take over the business or the management of assets under SARFAESI.

The SARFAESI Act did provide an avenue for appeal by the debtor. But, an appeal was only possible after the property was seized, and to seek an injunction, the borrower had to deposit 75% of the defaulted amount with a tribunal. Under SARFAESI, the secured creditor had the right to take control of the management of the secured assets and also to sell the secured assets to recover the dues. The Act did not change the priority rights in insolvency, with secured creditors and workmen's dues at the top, followed by government dues, and other preferential claims. Note however, that SARFAESI did not consider the rights of unsecured creditors. Batra (2003), Umarji (2004), and Vig (2013) provide a comprehensive discussion of the SARFAESI Act.

There is evidence that banks used the provisions of the SARFAESI Act aggressively. Figure 2 plots the number of possession/auction notices in leading newspapers before and after SARFAESI. After 2002, we see a big jump in the number of such notices in newspapers. This is suggestive evidence that banks started using SARFAESI provisions to seize and liquidate the assets of firms. There is other supporting evidence that loan recovery by banks improved a lot after SARFAESI. For example, post-SARFAESI, there was a steep decline in the amount of non-performing assets held by banks between 2002-08 (figure 3). Further, since its inception, SARFAESI has been the most successful means of debt recovery by banks in India. As of 2008, 61% of all bank debt recovery was through SARFAESI. This number has since risen and as of 2015, approximately 84% of recovery

made by banks was through SARFAESI.[11]

In summary, post-SARFAESI creditor rights became much stronger relative to the pre-SARFAESI regime, as secured creditors could bypass the lengthy court/tribunal proceedings and seize and liquidate the assets of the defaulting firm to recover their obligations. Many termed SARFAESI as a draconian piece of legislation, with corporate lobby groups arguing that this law would lead to abuse of power by banks as they did not have to seek the court's permission to invoke its provisions.[12] In this paper, we study whether and how firms adjust their capital and labor allocation decisions in response to SARFAESI.

3 Data

Our main source of data for the analysis is the Annual Survey of Industries (ASI), conducted by the Ministry of Statistics and Program Implementation (MoSPI) in India. This unique data set provides information about all industrial units covered under Sections 2(m)(i) and 2(m)(ii) of the Factories Act, 1948, and includes all firms employing 10 or more workers using electricity and 20 or more if the unit does not use electricity. The basic unit of observation in the ASI is an establishment (called a factory in the ASI data). For the purposes of this study, we will use factories and firms interchangeably.

We use the ASI panel data over the period 1999 to 2008. The dataset consists of yearly observations for 30,000-40,000 factories spread all across India. 39.40% of the factories are located in rural areas, while 59.88% are located in urban areas. Factories in the ASI can be categorized into various types of organizations such as individual proprietorship (20.65%), joint family (1.61%), partnership (28.22%), public limited company (18.31%), and private limited company (26.79%).

The ASI frame is divided into census (surveyed every year) and sample (sampled every few years) sectors. In this data set, 34.75% of the firms are from census sector, while around 65.25% are from sample sector. The definition of these two sectors has undergone changes over the years. The

[11] This data is obtained from the reserve Bank of India's annual reports on "TREND AND PROGRESS OF BANKING IN INDIA" published on their website.

[12] See for instance:
http://www.business-standard.com/article/opinion/m-j-antony-creditors-in-a-domineering-role-112081500042_1.html

census sector covers all firms in five industrially backward states (Manipur, Meghalaya, Nagaland, Tripura and Andaman and Nicobar Islands) and large factories. In the ASI, the definition of a large factory to be covered in the census sector has changed from 200 or more employees (1998-2000) to 100 or more employees (2003 onwards). The rest of the firms are covered in sample sector, and a third is randomly selected each year for the survey. The reference year for the ASI is the accounting year from 1st April of the previous year to 31st March of the next year. For example, data from 2004 to 2005 will include the period from 1st April 2004 to 31st March 2005.

We also use a measure of court-efficiency across states in India. Court-efficiency reflects the speed of the judicial system in India. The data on court-efficiency are at the state-year level from annual "Crime in India" Reports, published by India's National Crime Records Bureau. This is an annual publication of the Ministry of Home Affairs that details the trends and patterns in crime throughout India. The report provides detailed information on the duration of all cases brought before the lower-level courts in each state in any given year. The court-efficiency measure used in this paper is based on Amirapu (2015) (Amirapu henceforth). Amirapu (2015) uses the fraction of trials that are disposed of in less than one year in the District/Sessions court. We use the court-efficiency data for the year 2001, one year prior to the passage of the SARFAESI law. The court-efficiency measures for different states is shown in Table A4.

Labor regulation measures used in this paper is based on Besley and Burgess (2004) (BB henceforth). The Industrial Disputes Act (IDA) of 1947, is the core of labor laws in India and covers various aspects such as resolution of industrial disputes by setting up tribunals and labor courts, hiring and firing workers, closure of establishments, strikes and lockouts in the formal sector. Although passed by the federal government, IDA was amended several times by the state governments. These amendments have made some states pro-employer while some pro-worker, resulting in different labor regimes across different states. BB code each state level amendment made to the IDA between 1958 and 1992 as either being pro-worker (+1), neutral (0), or pro-employer (-1). A pro-worker (pro-employment) amendment is one that decreases (increases) a firm's flexibility in hiring and firing of workers while a neutral amendment leaves it unchanged. We follow BB and use the following categorizations: "pro-worker states" - West Bengal, Maharashtra, Orissa, "pro-employer states" - Rajasthan, Karnataka, Kerala, Tamil Nadu, Andhra Pradesh and

Gujarat and "neutral states" - Punjab, Haryana, Himachal Pradesh, Uttarakhand, Uttar Pradesh, Bihar, Assam, Chhattisgarh, Jharkhand, and Madhya Pradesh. IDA regulations are intended primarily for protecting permanent workers. Hence, firms have greater flexibility in hiring and firing contract (or temporary) workers, who are outside the purview of the IDA.

The main variables used in the paper are described in Table 1, and the summary statistics for these variables are shown in Table 2. The summary statistics are divided into four sections i.e. employment, capital, debt and productivity. Employment variables include number of permanent, contract and total workers, and wage per worker for permanent, and contract workers. Capital variables include GVAFC, and GVAPM scaled by pre-policy level of total workers employed by a firm.[13] GVAFC is gross value of additions to fixed capital while GVAPM is gross value of additions to plant and machinery. Debt variables include STtradecredit and STformalcredit. STtradecredit stands for short term trade credit and is defined as working sundry creditors. STformalcredit is short term formal credit and is defined as working overdraft. Control variables include profit/total assets and log(total assets). In establishing a causal relation between the main variables and the law, we also need to take into account that some of the affects might be influenced due to the firm size. To address this issue, we control for size using the aforementioned control variables.

4 Empirical Strategy

We examine the impact of the SARFAESI law on firms by using a difference-in-differences (DID) setup. Because SARFAESI was a national policy enacted in 2002 affecting all firms, we use an asset tangibility measure to define our treatment and control groups following Vig (2013). Asset tangibility is defined as the pre-SARFAESI ratio of fixed assets to total assets (Rajan and Zingales (1995)), and can be thought of as a measure of collateralizable assets before the law change. Fixed assets include land, buildings, plant and machinery, transport equipment, computer equipment, and capital work-in-progress. Total assets are the sum of fixed assets, and current assets that include cash in hand and at bank, sundry debtors, and other current assets. To the extent that fixed assets

[13] In the interest of brevity, we refer to these variables using GVAFC per worker and GVAPM per worker going forward. However, the variables are scaled by pre-policy (and not contemporaneous) level of total workers employed in a firm in all the tables and figures.

(tangible assets) are more likely to be used as collateral for long-term debt and longer duration borrowings are used to finance capital investments (Benmelech, Bergman, and Seru (2015)), a policy that strengthens creditor rights should differentially affect inputs and debt choices of firms with a higher proportion of tangible assets as compared to those with a lower proportion. Hence, we divide our sample into terciles (top 33%, middle 33% and the bottom 33%) based on the pre-SARFAESI average measure of asset tangibility. We define the highest tercile as the treated group and the lowest tercile as the control group. Specifically, the DID regressions estimate the effect of SARFAESI by comparing the average change in firms' outcomes in the highest tercile of asset tangibility to those in the lowest tercile of asset tangibility, before and after the policy.

Formally, we estimate the following regression specification using firm-level data:

$$Y_{ijt} = \nu_i + \delta_{jt} + \beta_0\, Law_t + \beta_1\, Treatment_i + \beta_2\, Law_t \times Treatment_i + \beta_3 X_{ijt} + \epsilon_{ijt} \qquad (1)$$

where i indexes firm, j indexes industry, and t indexes year. Y_{ijt} refers to the *dependent variable* of interest for firm i in industry j in year t, and ν_i and δ_{jt} are firm and 3-digit industry-year fixed effects respectively. The firm fixed effects control for any time-invariant unobserved heterogeneity at the firm level. Law_t is an indicator variable that takes on a value of 1 in years in which the law is in place (2002-2008), and 0 otherwise (1999-2001), and $Treatment_i$ is an indicator variable that takes on a value of 1 if the firm belongs to the treated group (high tangibility group) and 0 if it belongs to the control group (low tangibility group). Note that Law_t will be completely absorbed by industry-year fixed effects, δ_{jt} while $Treatment_i$ will be completely absorbed by firm fixed effects, ν_i. X_{ijt} refers to the *control variables* (profit/total assets and log(total assets)), and ϵ_{ijt} is the error term. Finally, note that the inclusion of firm fixed effects essentially removes the impact of new entrants after 2002, and the regressions therefore only look at the impact of the policy change on firms that existed before 2002 (incumbents). The coefficient on the interaction term $Law_t \times Treatment_i$, β_2 captures the differential impact of the law on *treatment group* relative to the *control group* and hence is the parameter of interest.

The standard DID specification controls for any possible omitted variable bias arising out of pre-treatment time-invariant differences between the treatment and control group as well as aggregate time trends. However, one concern may be that the passage of SARFAESI was correlated with time-varying differences across different industry groups. We address this concern by including

3-digit industry-year fixed effects in our regression specifications. This is a nonparametric way of controlling for time-varying industry-specific shocks. This implies that the regression estimates are identified through within-firm and within-industry variation in our outcome variables of interest around the passage of the law. At the same time industry-year fixed effects also controls for industry specific time trends. We cluster standard errors at the firm level.

The usual caveat for identification in a difference-in-differences setting requires the presence of parallel trends in our outcome variables of interest (labor and capital investments) before the passage of SARFAESI across factories in the treatment and control group. Before formally analyzing the estimates from the difference-in-differences regression specifications, we graphically examine whether the parallel trends assumption holds in our sample. In figures 4 and 5, we visually verify that the treated and control firms have similar trends for the demeaned values of various outcome variables (employment, capital investment, and debt) before 2002. These parallel pre-treatment trends provide support for the use of difference-in-differences (DID) strategy in this context to estimate the causal effect of the policy change. Further, we also use a distributed lag model to formally test for the absence of differential pre-trends in our data. This procedure and the results are discussed in detail in section 5.4.

To further strengthen the causal interpretation of our findings, we look at the heterogeneous effects of SARFAESI across different regions and industries using a difference-in-difference-in-differences (DIDID) specification. Specifically, we examine whether there is cross-sectional heterogeneity in the impact of SARFAESI on firms in the treated and control group located across regions with varying court-efficiency, across different labor regimes, and across industries with differing elasticities of substitution between capital and labor. The formal specifications for these set of tests are discussed in detail in sections 5.1.1, 5.1.2, and 5.1.3.

5 Empirical Evidence

5.1 Employment, and Investment in Capital

We begin by investigating the impact of SARFAESI on our main variables of interest - employment, and investment in capital by firms using our baseline difference-in-differences specification (equation 1). In Table 3, we focus on the impact of SARFAESI on firm-level employment. The employment variables in panel A include natural log of the number of permanent workers (columns 1 and 2), contract workers (columns 3 and 4), and total workers (columns 5 and 6). In panel B, we examine the impact of SARFAESI on wages per worker for permanent (columns 7 and 8), contract (columns 9 and 10, and total workers (columns 11 and 12). Focusing on columns 1 and 2, we find that firms in the treated group hire 6.8%-7.9% more permanent workers than firms in the control group post-SARFAESI as compared to before SARFAESI. In columns 3 and 4, we find similar increases (7.4%-8.2%) in the number of contract workers. These are workers (often temporary in nature) who are hired through outside contractors and are not on the payrolls of the firm. Consistent with the results in columns 1-4, our estimates from columns 5 and 6, confirm that the total number of workers (the sum of permanent and contract) also increase (by 7.9%-9.1%) for firms in the treated group as compared to the control group. In columns 7 through 12, we look at the impact of SARFAESI on the wages of permanent, contract, and total workers. Similar to the results on employment, we find that wages of workers increase substantially for firms in the treated groups relative to the control group. This is consistent with an increase in demand for workers following the passage of SARFAESI.

In table 4, we look at the impact of SARFAESI on capital investment by firms. We use two proxies for capital investments made by firms, the ratio of GVAFC (gross value of additions to fixed capital) to total workers, and the ratio of GVAPM (gross value of additions to plant and machinery) to total workers. Finally, we also look at the expenditures by firms on rental plant, machinery, and fixed capital. In columns 1 and 2, we find that SARFAESI led to a significant reduction in GVAFC/total workers for treated firms relative to control firms. The coefficient estimate of -0.0769 in column 2 translates into an average reduction of INR 13 million (approximately 25% in percentage terms) in new investments to fixed capital by treated firms following the passage of

SARFAESI.[14] Columns 3 and 4 confirm these results for the ratio of GVAPM to total workers. We interpret the results in tables 3 and 4, as a response to SARFAESI by firms in the treated group that hire more workers and reduce their fixed capital investment relative to the control group. This is consistent with firms in the treated group differentially experiencing a higher threat of liquidation post-SARFAESI, thereby substituting away from factors of production that can be seized by banks (tangible fixed assets) towards labor. Furthermore, in columns 5 and 6, we find that treated firms differentially spend more on rental plant, machinery, and fixed capital. This is again consistent with the other results because in the event of default, banks are unable to seize rental machinery, and plants as opposed to those owned by the firm.

These results are also visually clear in figure 4, where we plot the demeaned values of (a) GVAFC by total workers, (b) GVAPM by total workers, and (c) log [total workers]. Before 2002, the demeaned trends of both GVAFC by total workers, and GVAPM by total workers for the treated and control firms are parallel, with the trends for treated firms starting above those for the control firms. After 2002, we see a sharp decline in the trends for treated firms, whereas no such changes are seen in the trends for the control firms. The demeaned trends for log [total workers] are also parallel for the treated and control firms before SARFAESI (2002), and post-2002 we see an increase in the employment trends for the treated firms whereas the trends for control firms do not show any change. In essence, both the regression analysis and the graphs show that consistent with the substitution effect, after SARFAESI, the firms with the highest threat of liquidation reduce investment in capital and hire more workers.

Although our difference-in-differences results show an increase in employment and a decline in capital investment, there may still be residual concerns that other contemporaneous policy changes may confound the results. Two major events that affected Indian firms during our sample period are the de-reservation of products under the Small Scale Industry promotion scheme in India (Martin et al. (2017)), and competition from Chinese firms (Autor et al. (2013), Khandelwal et al. (2013)). To the extent that both these events affected various 3-digit industries differently, the use of 3-digit industry-year fixed effects in all our regression specifications controls for these events. Indeed,

[14]Note from Table 3, that the average treated firm in our sample employs 164 workers. So the coefficient estimate of -0.0794 translates into -0.0769×164 decrease in annual additions to fixed capital. The value of GVAFC for the average treated firm pre-SARFAESI is approximately INR 51 million. Thus, INR 13 million represent a $\frac{13*100}{51} = 25\%$ reduction in fixed capital investments.

the use of 3-digit industry-year fixed effects ensure that our analysis controls for all time-varying changes at the industry level. Nonetheless, as a robustness check, in Appendix Table A1, we remove the firms in 3-digit industries affected by the Small Scale Industry de-reservation and re-estimate our main specifications. We find that our results are robust to removing these 3-digit industries.

Additionally, for robustness we also repeat our analysis using alternate classifications to identify treatment and control firms. Here, we use two different measures in defining the treatment group. First, we use the ratio of land and buildings to total assets as a measure of collateralizable assets. This is based on the fact that land is often used as a collateral for loans in India.[15] Based on this definition, we define the treatment group as firms in the highest tercile and the control group as firms in the lowest tercile of the ratio of land and buildings to total assets (before SARFAESI). Our second measure is simply based on the amount of outstanding loans before the passage of SARFAESI. For the sake of consistency, we again define the treatment and control groups as the highest and lowest tercile of this measure. In table A2, we use our first measure - ratio of land and buildings to total assets. In column 1, we confirm that treated firms hire more workers, and invest less in fixed capital, and plant and machinery (columns 2 and 3). We report results from using our second measure (amount of outstanding loans) in table A3. We again find that treated firms increase the number of workers (column 1) and reduce their capital investments (columns 2 and 3).

We provide further credence to our main results by showing heterogeneous treatment effects across regions and industries next. The main rationale behind these triple difference specifications is to check whether our results on higher employment and lower capital investment hold in regions and industries where we expect them to hold.

We provide further credence to our main results by showing heterogeneous treatment effects across regions and industries next.

5.1.1 Heterogeneity across states with different court-efficiency

In our main results, we show that in response to SARFAESI, treated firms invested less in capital, and increased the number of workers. These effects should be stronger in regions where the

[15] Calomiris, Larrain, Liberti, and Sturgess (2016) note that there "is a disproportionate reliance on real estate collateral in developing countries."

threat of liquidation after SARFAESI was higher. In relative terms, after SARFAESI, banks had a higher incentive to liquidate defaulting firms in states where resolution of disputes in courts took longer (thus lower court-efficiency) before SARFAESI, than in states that had speedier resolution of disputes (high court-efficiency). Thus, the law change should have had a larger effect in states that were used to slower legal procedures (thus had lower court-efficiency) before the passage of SARFAESI in 2002. In states where the courts were already efficient (in a relative sense) before 2002, SARFAESI should have had a smaller effect. Based on this intuition, we run triple-differences (DIDID) regression specifications, where we look at the differential effect on our main outcomes of interest - employment and capital investment, between firms in the treated and control groups located across states with high (above median) and low (below median) court-efficiency, after the passage of SARFAESI compared to the pre-SARFAESI era. We use the fraction of cases disposed off in less than one year in the Districts/Sessions court before 2002 to proxy for pre-SARFAESI court-efficiency (Amirapu (2015)).

Specifically, to examine the differential response of firms, we estimate the following difference-in-difference-differences (DIDID) specification:

$$\begin{aligned} Y_{ijst} = \nu_i + \delta_{jt} + \beta_0 \text{ Law}_\text{t} + \beta_1 \text{ Treatment}_\text{i} + \beta_2 \text{ Court-efficiency}_\text{s} + \beta_3 \text{ Law}_\text{t} \text{ X Treatment}_\text{i} \\ + \beta_4 \text{ Law}_\text{t} \text{ X Court-efficiency}_\text{s} + \beta_5 \text{ Court-efficiency}_\text{s} \text{ X Treatment}_\text{i} + \\ \beta_6 \text{ Court-efficiency}_\text{s} \text{ X Law}_\text{t} \text{ X Treatment}_\text{i} + \beta_7 X_{ijt} + \epsilon_{ijst} \end{aligned} \tag{2}$$

where i indexes firm, t indexes time, j indexes industries, and s indexes state. Y_{isjt} refers to the *outcome variable* of interest for firm i, in year t, in state s, and in industry j; ν_i and δ_{jt} are firm and industry-year fixed-effects respectively; $\text{court-efficiency}_\text{s}$ is an indicator variable that takes on a value of zero if a state is considered to be highly efficient (if the Amirapu court-efficiency measure is above the median) and one if it is less efficient (if the Amirapu court-efficiency measure is below the median). The rest of the terms are similar to equation (3). The coefficient on the triple interaction terms, β_6 captures the DIDID effect, and is the parameter of interest. These DIDID regressions require weaker assumptions for identification and consequently are a strict test for our initial findings that treated firms differentially hire more workers and invest less in capital compared to control firms after SARFAESI relative to before the law change.

In table 5, columns 1 and 2, we find that treated firms differentially hire more workers than

control firms in states with low court-efficiency compared to states with high court-efficiency after the policy relative to before SARFAESI. In columns 3 through 6, we find that treated firms differentially invest lesser in fixed capital, and plant and machinery (as compared to control firms) in low court-efficiency states relative to high court-efficiency states after SARFAESI compared to before SARFAESI.

These results provide strong support to our main results because we find that in areas where SARFAESI had a bigger bite, treated firms hired more workers, and invested lesser in capital.

5.1.2 Heterogeneity across states with different labor law regimes

Labor regulations in India differ by states and apply differently across types of laborers. We use Besley and Burgess (2004) codes to classify states as pro-worker, pro-employer, and neutral. In pro-worker states, hiring and firing of permanent workers is the hardest, followed by neutral, and pro-employer states. However, there are no such regulations on the hiring and firing of contract workers. If post-SARFAESI, firms in the treated group hire more workers than the control group, we would expect to see a differential response by these firms located across labor regimes in the hiring of different kinds of workers (permanent or contract workers). We would thus expect to see treated firms in pro-employer states differentially hire permanent workers, and treated firms in pro-worker states differentially hire contract workers relative to control firms in response to SARFAESI.

Thus, we run DIDID regression specifications and look at the difference in outcomes (employment, and capital investment) for firms in the treated group located across different labor regimes (pro-worker, neutral, and pro-employer) compared to firms in the control group before and after the passage of SARFAESI.

Formally, we estimate the following regression specification:

$$\begin{aligned} Y_{ijst} = \nu_i + \delta_{jt} + \beta_0 \text{ Law}_\text{t} + \beta_1 \text{ Treatment}_\text{i} + \beta_2 \text{ Pro-worker}_\text{s} + \beta_3 \text{ Pro-employer}_\text{s} \\ + \beta_4 \text{ Law}_\text{t} \text{ X Treatment}_\text{i} + \beta_5 \text{ Pro-worker}_\text{s} \text{ X Treatment}_\text{i} + \beta_6 \text{ Pro-employer}_\text{s} \text{ X Treatment}_\text{i} + \\ \beta_7 \text{ Pro-worker}_\text{s} \text{ X Law}_\text{t} + \beta_8 \text{ Pro-employer}_\text{s} \text{ X Law}_\text{t} + \beta_9 \text{ Pro-worker}_\text{s} \text{ X Law}_\text{t} \text{ X Treatment}_\text{i} \\ + \beta_{10} \text{ Pro-employer}_\text{s} \text{ X Law}_\text{t} \text{ X Treatment}_\text{i} + \beta_{11} X_{ijt} + \epsilon_{ijst} \end{aligned} \tag{3}$$

where i indexes firm, t indexes time, j indexes industries, and s indexes state. Y_{isjt} refers to the *outcome variable* of interest for firm i, in year t, in state s, and in industry j; ν_i and δ_{jt} are firm and industry-year fixed-effects respectively; Law, and $Treatment$ are defined similar to the DID specification above. We use labor regulation measures from Besley and Burgess (2004) - who code each state-level amendment made to the Industrial Disputes Act between 1958 and 1992 as being pro-worker (+1), neutral (0), or pro-employer (-1). Based on this cumulative score, a state is then assigned to one of the three groups pro-worker, pro-employer, or neutral. Hiring and firing of permanent workers is easier in pro-employer states, followed by neutral states, and pro-worker states. The Industrial Disputes Act, however, does not apply to contract workers (i.e. temporary workers). Based on the BB measure we define *Pro-worker* as an indicator variable that takes on a value of one if a state is pro-worker and zero otherwise. *Pro-employer* is an indicator variable that takes on a value of one if a state is pro-employer and zero otherwise. X_{ijt} refers to the *control variables* (e.g., profit/total assets and log(total assets)), and ϵ_{ijst} represents the error term. The omitted category in this regression is firms in neutral states. The main parameters of interest are the coefficients on the triple interaction terms, β_9 and β_{10} capture the DIDID effects on the treated firms located in the *Pro-worker* and *Pro-employer* states respectively with respect to the firms located in the neutral states.

In table 6, columns 1 and 2, we find that as a result of SARFAESI, treated firms differentially hire more permanent workers than control firms in *pro-employer* states as compared to pro-worker states. In columns 3 and 4, we look at the differential response for firms (in treated and control groups) located across labor regimes in the hiring of contract workers. We find that treated firms in *pro-worker* states differentially hire more contract workers relative to pro-employer states.[16] Intuitively, these results make sense because hiring and firing of permanent workers is easier in pro-employer states than in pro-worker states. However, these rules do not apply to contract workers. In columns 5 and 6 we find some weak evidence that treated firms differentially hire more workers (permanent + contract) than control firms in pro-employer states as compared to pro-worker states.

Next, we look at the differential effect on investment across labor regimes for firms in the treated and control group in table 7. We find no evidence of differential effects on investment. This result

[16]These results are similar to Chaurey (2015), who finds that in response to demand shocks, firms in pro-worker states differentially hire more contract workers.

also makes sense because apart from the difficulties in hiring and firing of permanent workers, these states do not differ along other margins that would differentially affect investment behavior of firms in the treated and control groups.

Our DIDID results showing heterogeneous effects of SARFAESI across regions with varying court-efficiency and labor regulations strengthen our main findings. We give further evidence for our main results by focusing on heterogeneity across industries.

5.1.3 Elasticity of substitution

Our baseline results show that SARFAESI caused firms in the treated group to hire more workers and invest less in capital as compared to the control group. These effects should be differentially larger in industries where the elasticity of substitution between labor and capital is higher. For this analysis, we use measures of elasticity of substitution for 22 manufacturing industries (at the 2-digit level) for India from Goldar, Pradhan, and Sharma (2013). We divide industries into terciles and compare the effects on the treated firms before and after SARFAESI in the highest tercile (industries with the highest elasticity of substitution) to the lowest tercile relative to the same changes in the control firms. Our regression specification is the same as equations 2 and 3:

$$\begin{aligned} Y_{ijt} = \nu_i + \delta_{jt} + \beta_0 \text{ Law}_\text{t} + \beta_1 \text{ Treatment}_\text{i} + \beta_2 \text{ High Substitution}_\text{i} + \beta_3 \text{ Law}_\text{t} \text{ X Treatment}_\text{i} \\ + \beta_4 \text{ Law}_\text{t} \text{ X High Substitution}_\text{i} + \beta_5 \text{ High Substitution}_\text{i} \text{ X Treatment}_\text{i} + \\ \beta_6 \text{ High Substitution}_\text{i} \text{ X Law}_\text{t} \text{ X Treatment}_\text{i} + \beta_7 X_{ijt} + \epsilon_{ijt} \end{aligned} \tag{4}$$

where i indexes firm, t indexes time, and j indexes industries Y_{ijt} refers to the *outcome variable* of interest for firm i, in year t, in state s, and in industry j; ν_i and δ_{jt} are firm and industry-year fixed-effects respectively; *High Substitution*$_i$ is an indicator variable that takes on a value of one (zero) if a firm i is in an industry j in the highest (lowest) tercile of ease of substitution. The rest of the terms are similar to equation (3). The coefficient on the triple interaction terms, β_6 captures the DIDID effect and is the main parameter of interest.

In table 8, columns 1 and 2, we find that firms in the treated group (when compared to the control group), in industries with high elasticity of substitution between capital and labor relative

to industries with low elasticity of substitution differentially hire more workers after SARFAESI as compared to before SARFAESI. These firms in the treated group also invest less in fixed capital and plant and machinery (columns 3-6). Taken together, we find that the treatment effect of SARFAESI on employment and capital investment, is higher in industries with higher elasticity of substitution as compared to industries with low elasticity of substitution between capital and labor.

5.2 Debt

Thus far, we have discussed how the SARFAESI-induced increased threat of liquidation for firms with higher share of collateralizable assets led them to increase employment and reduce their capital investment. We now discuss other results to support our claims.

We consider whether the passage of SARFAESI in 2002, differentially affected firms in the treated and control groups with respect to the amount and source of short-term debt. A strengthening of creditor rights (SARFAESI) could have two opposing effects on the amount of secured debt demanded by firms. Since the value of collateral increased post-SARFAESI, secured creditors should have been willing to lend more. However, as discussed earlier, if firms experience a higher threat of liquidation after SARFAESI, they should take on less secured debt and move towards unsecured/informal sources of debt. Both of these effects should be larger for firms with a higher fraction of collateralizable assets (treatment group). Note that in the ASI data set, we do not have good information on long-term debt, therefore we only focus on short-term debt variables for this analysis.

In Table 9, we look at the impact of SARFAESI on short-term debt variables. In columns 1 through 4, we look at the effect on short-term formal credit. This includes over draft, cash credit, and other short-term loans from banks and financial institutions. In column 1 (without controls), and 2 (with controls), we find that SARFAESI led to a decline in short-term formal credit for firms in the treated group by 22.5%-31.6% as compared to firms in the control group. We also confirm this result by focusing on the ratio of short-term formal credit to total assets in columns 3 and 4.

Next, we focus on the effects of SARFAESI on short-term trade credit (amount owed to sundry creditors) in columns 5 through 8. Short-term trade credit is generally unsecured loans that firms

owe to sundry creditors/suppliers. We find a statistically significant increase in trade credit by 11.6%-20.3% in columns 5 and 6. Columns 7 and 8 show similar results for the ratio of short-term trade credit to total assets. These results show that as a result of SARFAESI, firms in the treated group differentially accessed more short-term trade credit than firms in the control group. These results are also visually clear in figure 5, where we plot the demeaned values of (a) log of formal credit, and (b) log of trade credit.

Taken together, we find that SARFAESI led to a reduction in formal secured debt and an increase in unsecured trade credit by firms in the treated group relative to those in the control group. These results are consistent with Vig (2013)[17], and provide evidence that the passage of SARFAESI led to an increase in the threat of liquidation faced by firms and induced them to substitute away from formal credit towards unsecured trade credit. A higher threat of liquidation for existing plants must have followed from a number of firm closures following the policy. We look at the proportion of firms that remained open following SARFAESI in the next table.

5.3 Firm closures

In Table 10, we examine the impact of SARFAESI on the proportion of firms that close down or become non-operational. In columns 1 and 2, we find that firms in the treated group were 0.36% more likely to close down (or become non-operational) compared to firms in the control group. This effect is economically significant given that the average rate of closures in our sample pre-SARFAESI is 0.7%. This suggests that the firms in the treated group (with a higher proportion of collateralizable assets) were more severely impacted by the law and a significant fraction of them were liquidated (closed down) or became non-operational. These results strengthen our interpretation that SARFAESI increased the threat of liquidation for firms with a higher share of collateralizable assets.

[17]Vig (2013) uses the Center for Monitoring the Indian Economy (CMIE) data set and shows that the SARFAESI reform led to a reduction in secured debt for firms with a higher proportion of tangible assets.

5.4 Dynamic Effects

Any result from a difference-in-differences test is subject to the caveat that the result may be driven by pre-existing trend differentials between the treatment and control group. While, figures 4 and 5 visually show that our treated and control sample were trending similarly prior to the passage of SARFAESI, we also use a distributed lag model to formally test for the existence of pre-existing trend and also investigate the dynamic evolution of debt, employment and investment measures during the pre-SARFAESI and post-SARFAESI years in our sample period. Specifically, we estimate the following distributed lag model:

$$Y_{ijt} = \nu_i + \delta_{jt} + \alpha_0\, Treatment_i + \sum_{t=1999}^{2008} \beta_t\, I_t \times Treatment_i + \sum_{n=1999}^{2008} \theta_t I_t + \alpha_1 X_{ijt} + \epsilon_{ijt} \qquad (5)$$

Following Agarwal and Qian (2014), the results can be interpreted as an event study. I_t is a dummy variable that identifies the year t. The coefficient β_{2002} measures the immediate DID effect of SARFAESI on the dependent variable. The *marginal* coefficients β_{2003},..., β_{2008} measure the *additional* marginal responses one year,..., six years after the implementation of the SARFAESI law respectively. All these coefficients are relative to the year 2001, which therefore is omitted. Similarly, coefficients β_{1999}, β_{2000}, β_{2001} capture the difference of trends for each of the dependent variable between the treatment group and the control group in each of the three pre-treatment years. In line with Agarwal and Qian (2014) and Agarwal, Chunlin, and Souleles (2007), we then plot the cumulative coefficients $b_s = \sum_{t=2002}^{s, s\in[2003,2008]}$, that gives the total change in outcome variables as of year s. For example, for year 2004, we cumulate the coefficients for the years 2002, 2003 and 2004 ($b_{2004} = \beta_{2002} + \beta_{2003} + \beta_{2004}$) and so on.

Figures 6 and 7 graph the entire paths of cumulative coefficients b_s, s = 1999, 2000,..., 2007, 2008, and the dotted lines depict the corresponding 95 percent confidence intervals. Reassuringly, we note from figures 6 and 7, that before 2002 (year of passage of SARFAESI), there was no statistically significant difference between the treated and the control firms. This confirms the parallel pre-treatment trends assumption needed for our DID estimates. Post-2002, we see a statistically significant difference between the treated and control firms. Specifically, consistent with our baseline results, we find that trade credit, and total number of workers increase after the passage of

SARFAESI, whereas formal credit, GVAPM/total workers, and GVAFC/total workers significantly decline.

6 Conclusion

It is now generally accepted that strengthening creditor rights has a first-order impact on access to finance both through demand and supply-side factors. However, whether and how such legal changes associated with alleviating/tightening financial constraints affects employment is less understood. A change in the legal system that reduces the cost of financing would in turn reduce (increase) the cost of capital and is likely to have a scale effect leading the firm to undertake new projects. However, whether this would lead to an increase/ decrease in employment would depend on the degree of substitutability between capital and labor. If labor and capital are substitutes, then this could lead to less labor (lower employment). Likewise, a legal change that increases the cost of capital could lead to an increase in employment if the substitution effect dominates. In this paper, we focus on a law change in India that strengthened creditor rights to shed light on these issues.

In our context, the passage of SARFAESI Act in 2002, allowed secured creditor rights to seize and liquidate the assets of defaulting firms. This, in turn, increased the threat of liquidation for firms thereby increasing their effective cost of financing. Consistent with this idea, we find that firms decided to move away from secured financing to a more costly way of raising debt. Since secured financing is extensively used for finance capital projects (property, plant, equipment, etc.), the law increased the cost of capital for the borrowers. Our paper having documented a reduction in capital (following an increase in the cost of capital) shows an increase in employment within firms. Generalizing the findings in this paper would imply that expanding access to finance does not necessarily create more employment, but it can even reduce it (if the substitution effect dominates the scale effect).

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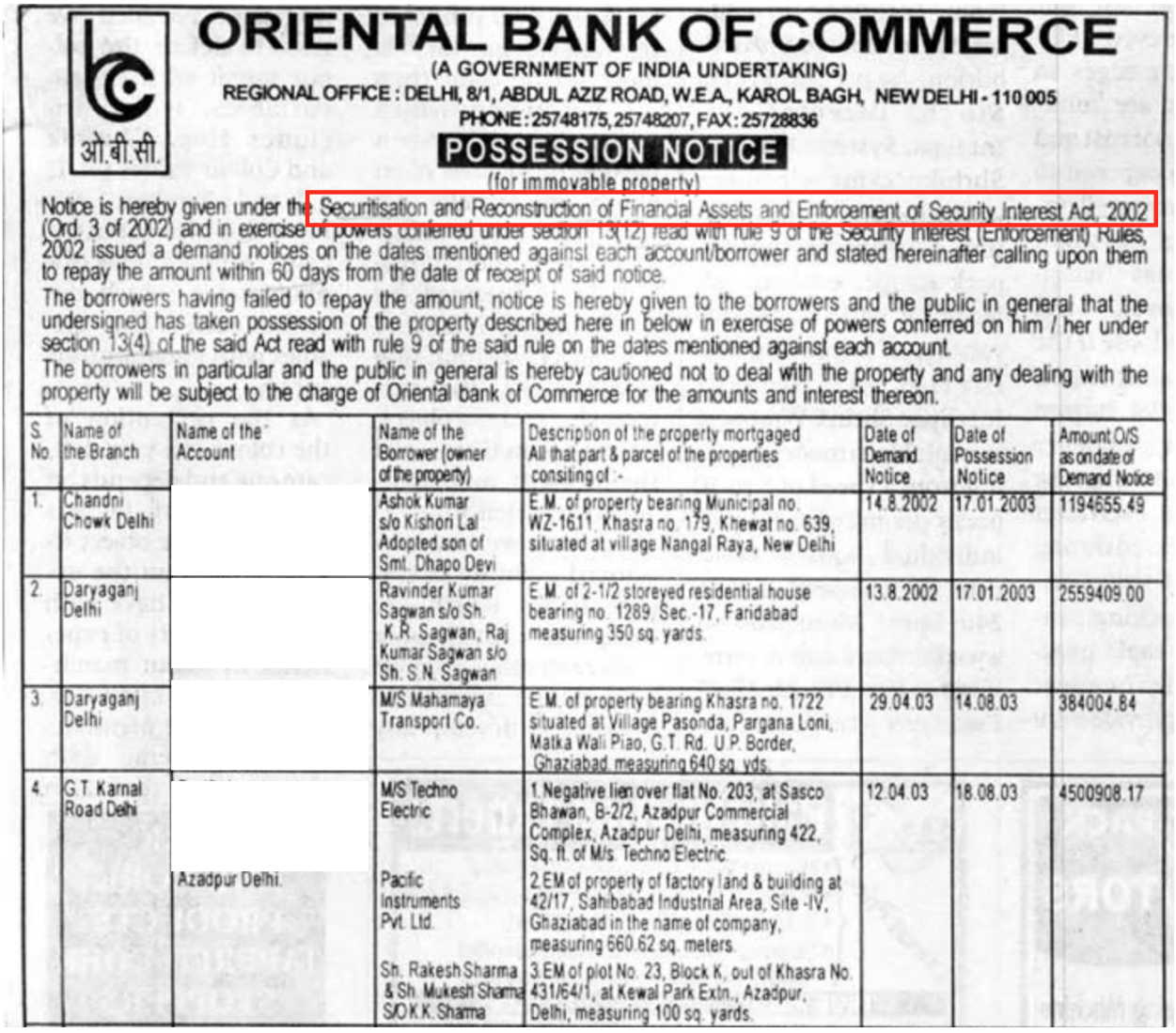
Figure 1: **Example of Auction Notice**
The figure shows a screenshot of an auction/possession notice issued by Oriental bank of Commerce under the Securitisation and Reconstruction of Financial Assets and Enforcement of Security Interest Act, 2002 (SARFAESI) upon the failure of repayment by the respective borrowers. SARFAESI has been highlighted in the box for reference. Source: watchoutinvestors.com.



ORIENTAL BANK OF COMMERCE

(A GOVERNMENT OF INDIA UNDERTAKING)

REGIONAL OFFICE : DELHI, 8/1, ABDUL AZIZ ROAD, W.E.A., KAROL BAGH, NEW DELHI - 110 005

PHONE : 25748175, 25748207, FAX : 25728836

POSSESSION NOTICE

(for immovable property)

Notice is hereby given under the Securitisation and Reconstruction of Financial Assets and Enforcement of Security Interest Act, 2002 (Ord. 3 of 2002) and in exercise of powers conferred under section 13(12) read with rule 9 of the Security Interest (Enforcement) Rules, 2002 issued a demand notices on the dates mentioned against each account/borrower and stated hereinafter calling upon them to repay the amount within 60 days from the date of receipt of said notice.

The borrowers having failed to repay the amount, notice is hereby given to the borrowers and the public in general that the undersigned has taken possession of the property described here in below in exercise of powers conferred on him / her under section 13(4) of the said Act read with rule 9 of the said rule on the dates mentioned against each account.

The borrowers in particular and the public in general is hereby cautioned not to deal with the property and any dealing with the property will be subject to the charge of Oriental bank of Commerce for the amounts and interest thereon.

S. No.	Name of the Branch	Name of the Account	Name of the Borrower (owner of the property)	Description of the property mortgaged All that part & parcel of the properties consiting of :-	Date of Demand Notice	Date of Possession Notice	Amount O/S as on date of Demand Notice
1.	Chandni Chowk Delhi		Ashok Kumar s/o Kishori Lal Adopted son of Smt. Dhapo Devi	E.M. of property bearing Municipal no. WZ-1611, Khasra no. 179, Khewat no. 639, situated at village Nangal Raya, New Delhi	14.8.2002	17.01.2003	1194655.49
2.	Daryaganj Delhi		Ravinder Kumar Sagwan s/o Sh. K.R. Sagwan, Raj Kumar Sagwan s/o Sh. S.N. Sagwan	E.M. of 2-1/2 storeyed residential house bearing no. 1289, Sec.-17, Faridabad measuring 350 sq. yards.	13.8.2002	17.01.2003	2559409.00
3.	Daryaganj Delhi		M/S Mahamaya Transport Co.	E.M. of property bearing Khasra no. 1722 situated at Village Pasonda, Pargana Loni, Matka Wali Piao, G.T. Rd. U.P. Border, Ghaziabad measuring 640 sq. yds.	29.04.03	14.08.03	384004.84
4.	G.T. Karnal Road Delhi	Azadpur Delhi.	M/S Techno Electric Pacific Instruments Pvt. Ltd. Sh. Rakesh Sharma & Sh. Mukesh Sharma S/O K.K. Sharma	1. Negative lien over flat No. 203, at Sasco Bhawan, B-2/2, Azadpur Commercial Complex, Azadpur Delhi, measuring 422, Sq. ft. of M/s. Techno Electric. 2. EM of property of factory land & building at 42/17, Sahibabad Industrial Area, Site -IV, Ghaziabad in the name of company, measuring 660.62 sq. meters. 3. EM of plot No. 23, Block K, out of Khasra No. 431/64/1, at Kewal Park Extn., Azadpur, Delhi, measuring 100 sq. yards.	12.04.03	18.08.03	4500908.17

Figure 2: **Time series trend of Auction/Possession notices**
The figure shows a time series trend of auction notices issued by secured creditors such as banks, institutional lenders,etc. under the SARFAESI Act, 2002. As it can be observed, the notices show an increasing trend upon the enactment of the SARFAESI Act. Source: watchoutinvestors.com.

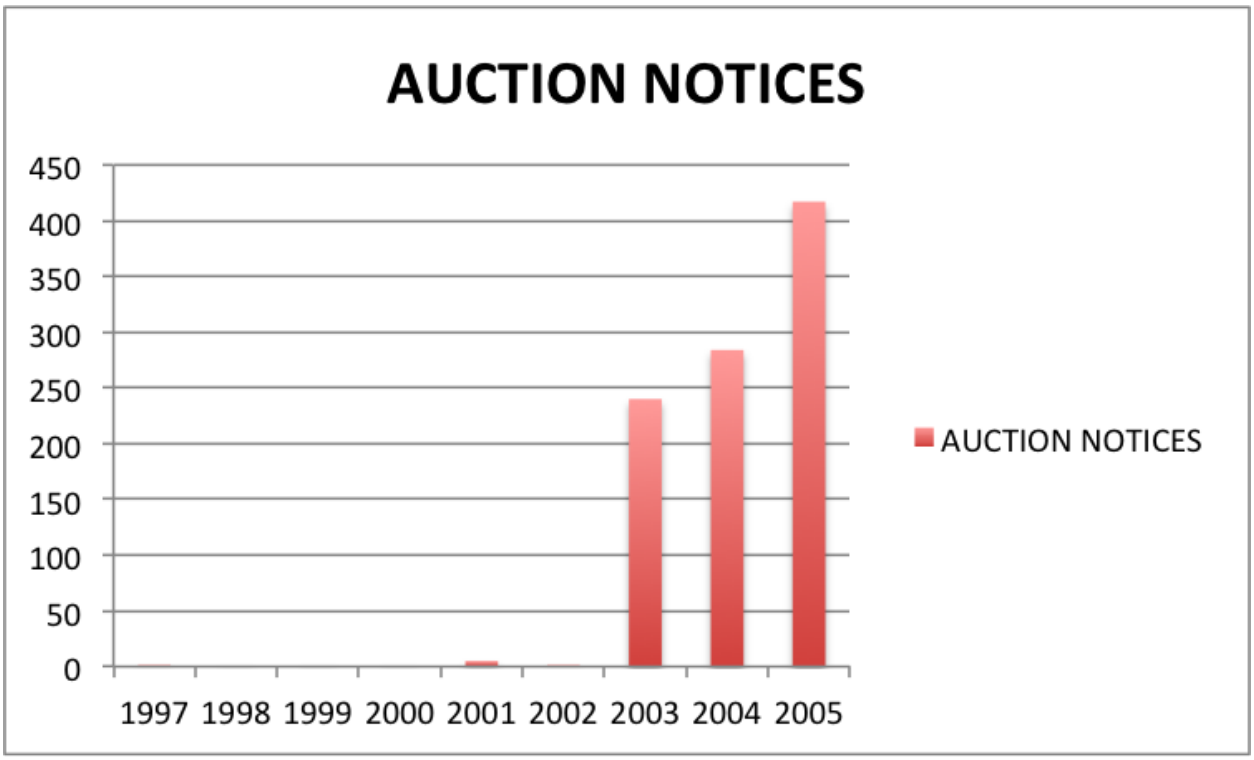


Figure 3: **Time series trend of Non-Performing Assets (NPAs)**
The figure shows a time series trend of Non-Performing Assets (NPAs) as declared by public sector banks. A Non-Performing Asset (NPA) is a loan or advance for which the principal or interest payment remained overdue for a period of 90 days. On the y-axis, we plot NPAs of public sector banks. Source: Trends and Progress Report, Reserve Bank of India.

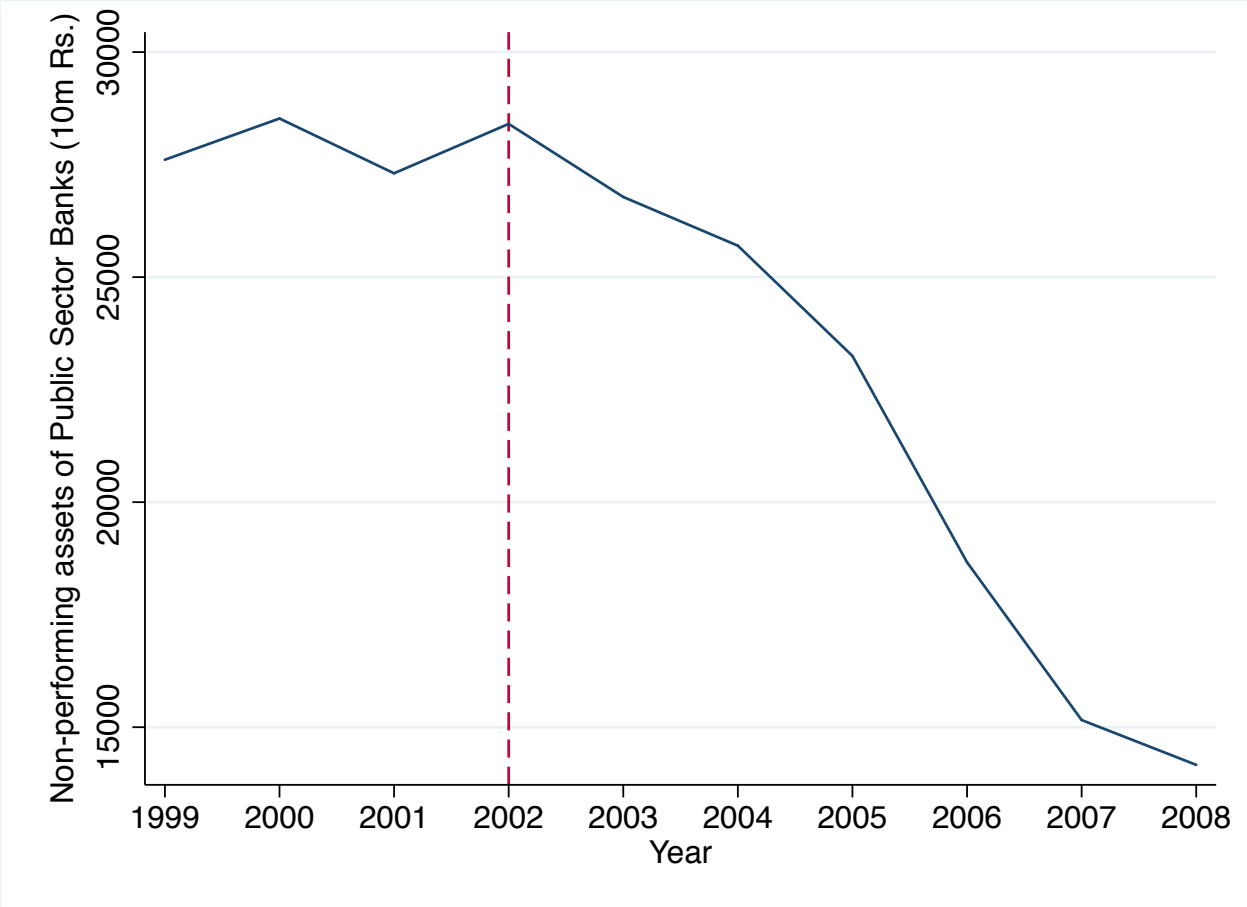
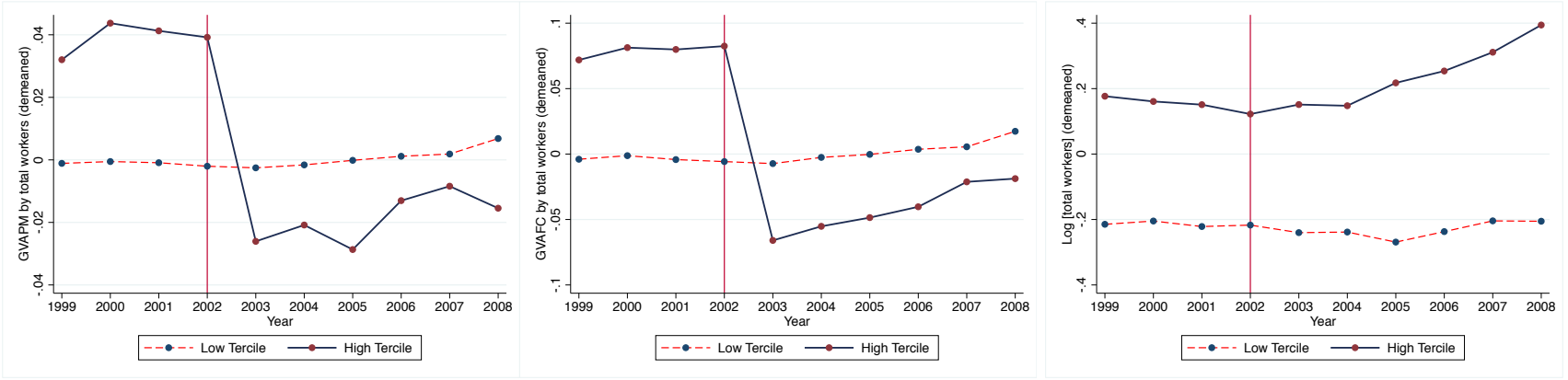


Figure 4: **Plots of demeaned values of capital investment and employment variables**

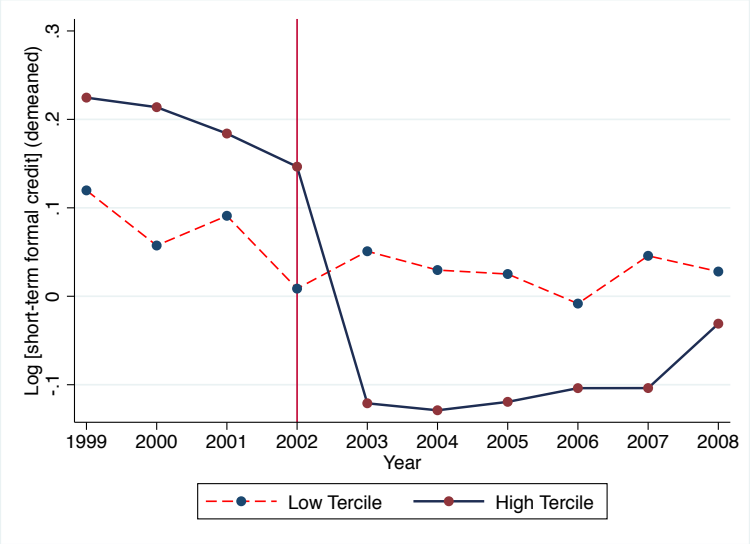
The figure shows a time series trend of demeaned values of capital investment and employment variables for both the high tangibility and low tangibility groups i.e. treated and control groups. Capital investment variables include *GVAFC/Pre-Policy Total workers* and *GVAPM/Pre-Policy Total workers*. Employment variable includes log of total workers. Tangibility is defined as the ratio of net fixed assets to total assets. Source: ASI database.



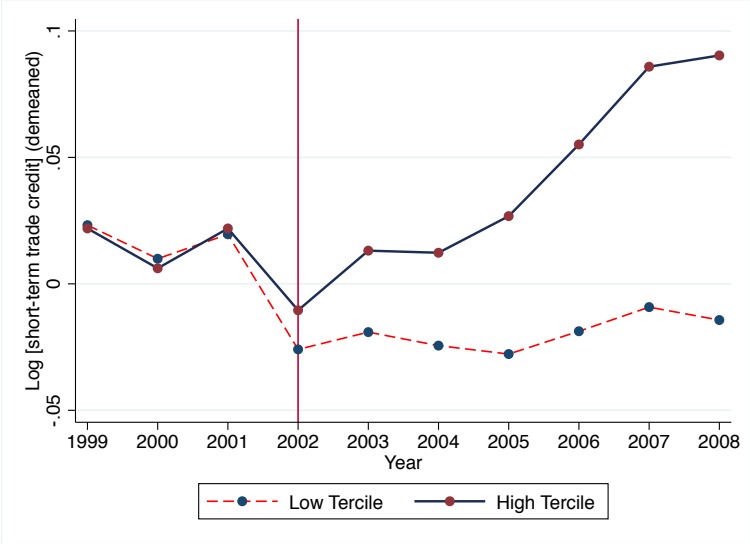
(a) GVAPM by total workers (b) GVAFC by total workers (c) Log [total workers]

Figure 5: **Plots of demeaned values of debt variables**

The figure shows a time series trend of demeaned values of debt variables for both the high tangibility and low tangibility groups i.e. treated and control groups. Debt variables include log of short-term formal credit and log of short-term trade credit. Tangibility is defined as the ratio of net fixed assets to total assets. Source: ASI database.



(a) Log [formal credit]



(b) Log [trade credit]

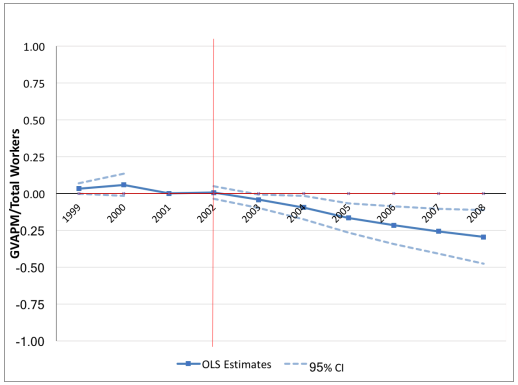
Figure 6: **Dynamic results of capital investment and employment variables**

The graphs plot the cumulative coefficient estimates from the OLS estimation of the dynamic version of the difference-in-differences regression:

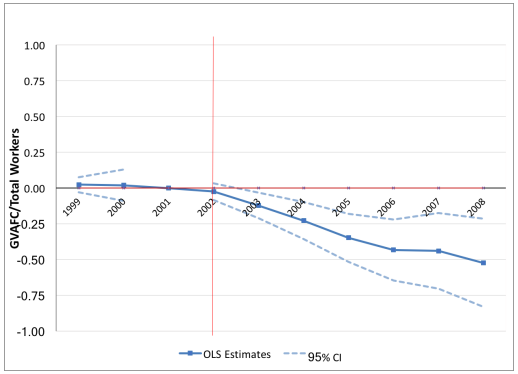
$$Y_{ijt} = \nu_i + \delta_{jt} + \alpha_0\ Treatment_i + \sum_{t=1999}^{2008} \beta_t\ I_t \times Treatment_i + \sum_{t=1999}^{2008} \theta_t I_t + \alpha_1 X_{ijt} + \epsilon_{ijt}$$

where y_{ijt} is the dependent variable. I_t is a dummy variable that identifies the year t. The coefficient β_{2002} measures the immediate DID effect of SARFAESI on the dependent variable. The *marginal* coefficients β_{2003},..., β_{2008} measure the *additional* marginal responses one year,..., six years after the implementation of the SARFAESI law respectively.

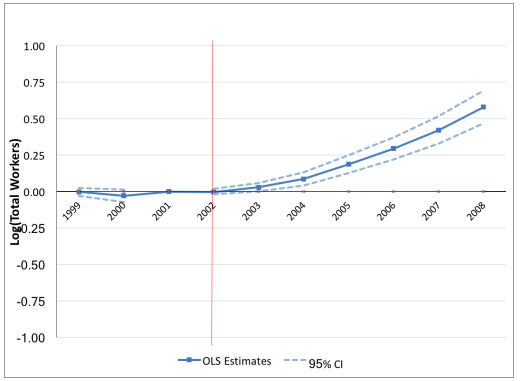
The figure plots the entire paths of cumulative coefficients $b_s = \sum_{t=2002}^{s, s\in[2003,2008]}$, that gives the total change in outcome variables as of year s, along with their corresponding 95 percent confidence intervals. Capital investment variables include *GVAFC/Pre-Policy Total workers* and *GVAPM/Pre-Policy Total workers*. Employment variable include log of total workers. Source: ASI database.



(a) GVAPM by total workers



(b) GVAFC by total workers



(c) Log[total workers]

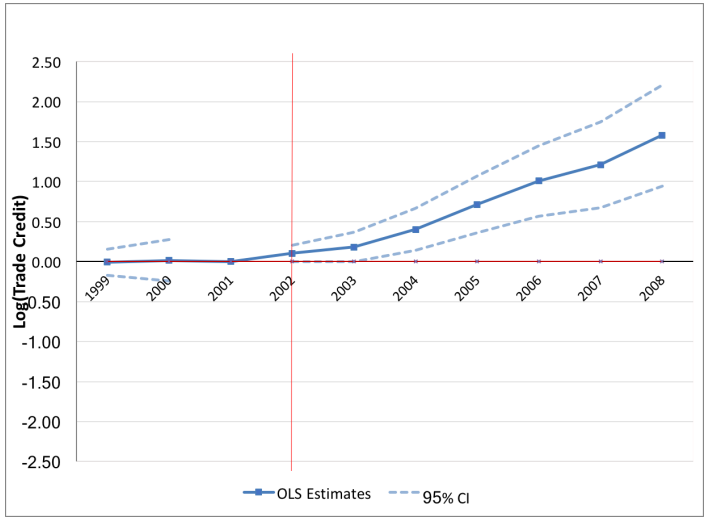
Figure 7: **Dynamic results of debt variables**

The graphs plots the cumulative coefficient estimates from the OLS estimation of the dynamic version of the difference-in-differences regression:

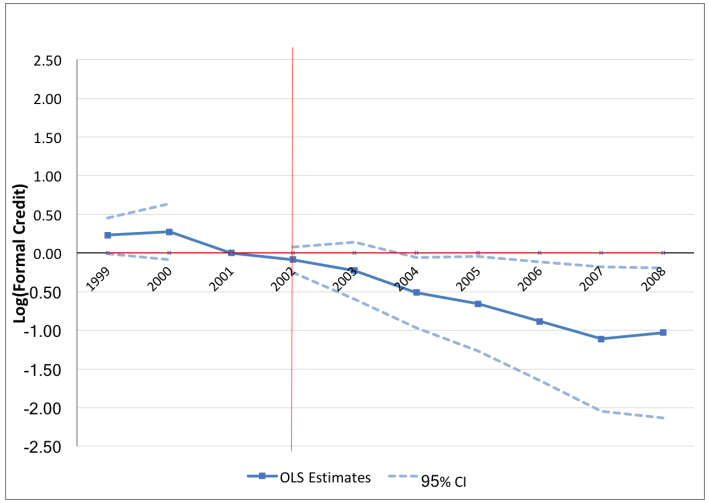
$$Y_{ijt} = \nu_i + \delta_{jt} + \alpha_0\ Treatment_i + \sum_{n=1999}^{2008} \beta_n\ I_n \times Treatment_i + \sum_{n=1999}^{2008} \theta_n I_n + \alpha_1 X_{ijt} + \epsilon_{ijt}$$

where y_{ijt} is the dependent variable. I_n is a dummy variable that identifies the year n. The coefficient β_{2002} measures the immediate DID effect of SARFAESI on the dependent variable. The *marginal* coefficients β_{2003},..., β_{2008} measure the *additional* marginal responses one year,..., six years after the implementation of the SARFAESI law respectively.

The figure plots the entire paths of cumulative coefficients b_s that explains the dynamic evolution of the variable pre-law and post-law period in our sample years where s = 1999, 2000,.., 2007, 2008, along with their corresponding 95 percent confidence intervals. Debt variables include log of short-term trade credit and log of short-term formal credit. Source: ASI database.



(a) trade credit



(b) formal credit

TABLE 1: Variable Description

The description of variables used in the study is presented below.

Variable	Description
	Panel A: Annual Survey of Industries[18]
Permanent workers	count; workers on the factory payroll.
Contract workers	count; workers hired through contractors.
Total workers	count; sum of workers on the factory payroll and workers hired through contractors.
Wages per worker (Permanent)	in INR; yearly average wage paid to a permanent worker.
Wages per worker (Contract)	in INR; yearly average wage paid to a contract worker.
GVAFC	in INR million; Gross value additions to the total fixed assets, this includes assets equipment, transport and land.
GVAFC per worker	in INR million; GVAFC/Pre-Policy Total workers
GVAPM	in INR million; Gross value additions to plant and machinery.
GVAPM per worker	in INR million; and GVAPM/Pre-Policy Total workers
STtradecredit	in INR million; borrowing from sundry creditors.
STformalcredit	in INR million; Overdraft, cash credit, other short term loans from banks and other financial institutions.
Total assets	in INR million; sum of fixed assets (includes land, building, plant and machinery, transport equipment, computer equipment including software and capital work-in-progress) and current assets (includes cash in hand and at bank, sundry debtors and other current assets).
Close	dummy; is a dummy variable that indicates one if the factory is in closed condition and zero if not closed.

[18]Variables are constructed using the definition from ASI tabulation scheme.

TABLE 2: **Descriptive Statistics**

This table reports the descriptive statistics of the various variables considered in the analysis. Permanent workers, contract workers and total workers are reported in levels. Wage per worker is reported in INR. GVAFC, GVAPM, STtradecredit, STformalcredit are reported in INR million. The data spans the period 1999-2008 and consists of all factories/firms in the ASI data.

	Observations	Mean	Standard Deviation
Employment variables			
Permanent workers	212,080	100.06	501.09
Contract workers	212,080	35.34	510.70
Total workers	212,080	135.40	748.12
Wage per worker - Permanent	212,080	38,217.64	40,743.91
Wage per worker - Contract	212,080	8,387.54	18,294.56
Capital variables			
GVAFC	212,080	30	676
GVAFC per worker	212,080	0.08	2.82
GVAPM	212,080	17.90	567
GVAPM per worker	212,080	0.04	1.93
Debt variables			
STtradecredit	212,080	22.90	74.10
STtradecredit/total assets	206,931	0.20	0.22
STformalcredit	212,080	17.70	63.30
STformalcredit/total assets	206,931	0.11	0.16
Firm closure variable			
Close pre-SARFAESI	76,448	0.08%	0.03
Close post-SARFAESI	277,976	8.32%	0.09
Court-efficiency variable			
Amirapu Ratio	32	0.21	0.23

TABLE 3: Impact of SARFAESI on Employment

This table reports the estimates from a panel regression model examining the impact of the implementation of SARFAESI law on the types of workers at a given establishment. Specifically, we estimate the following panel regression model:

$$Y_{ijt} = \nu_i + \delta_{jt} + \beta_0\ Law_t + \beta_1\ Treatment_i + \beta_2\ Law_t \times Treatment_i + \beta_3 X_{ijt} + \epsilon_{ijt}$$

where Y_{ijt} refers to the log of *permanent* workers employed in firm i in industry j in year t in columns (1) and (2), *contract* workers in columns (3) and (4) and *total workers* in columns (5) and (6); log of wages of *permanent* workers employed in firm i in year t in columns (7) and (8), *contract* workers in columns (9) and (10) and *total* workers in columns (11) and (12). The data spans the period 1999-2008 and consists of all factories/firms in the ASI data. Firm-clustered robust standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Log(Number of Workers)						
	Permanent		Contract		Total	
	(1)	(2)	(3)	(4)	(5)	(6)
Law X Treatment	0.0687***	0.0796***	0.0746***	0.0820***	0.0798***	0.0917***
	(0.0110)	(0.0108)	(0.0187)	(0.0190)	(0.00843)	(0.00796)
N	212,080	206,926	212,080	206,926	212,080	206,926
R^2	0.923	0.927	0.802	0.803	0.947	0.953
Panel B: Log(Wage per worker)						
	Permanent		Contract		Total	
	(7)	(8)	(9)	(10)	(11)	(12)
Law X Treatment	0.0599**	0.0701***	0.137***	0.149***	0.0403***	0.0443***
	(0.0243)	(0.0246)	(0.0502)	(0.0510)	(0.00513)	(0.00513)
N	212,080	206,926	212,080	206,926	212,080	206,926
R^2	0.816	0.818	0.774	0.775	0.898	0.900
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes	No	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes	Yes

TABLE 4: Impact of SARFAESI on Capital Investments

This table reports the estimates from a panel regression model examining the impact of the implementation of SARFAESI on capital investments at a given establishment. Specifically, we estimate the following panel regression model:

$$Y_{ijt} = \nu_i + \delta_{jt} + \beta_0\ Law_t + \beta_1\ Treatment_i + \beta_2\ Law_t \times Treatment_i + \beta_3 X_{ijt} + \epsilon_{ijt}$$

where Y_{ijt} refers to the levels of *GVAFC/Pre-Policy Total workers* in firm i in industry j in year t in columns (1) and (2), *GVAPM/Pre-Policy Total workers* in columns (3) and (4), log of of *rental expenditures on plant and machinery, and fixed capital* in firm i in year t in columns (5) and (6). The data spans the period 1999-2008 and consists of all factories/firms in the ASI data. Firm-clustered robust standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	GVAFC/total workers		GVAPM/total workers		Log(rentPMFC)	
	(1)	(2)	(3)	(4)	(5)	(6)
Law X Treatment	-0.0808***	-0.0769***	-0.0505***	-0.0490***	0.1370**	0.1841***
	(0.0172)	(0.0176)	(0.0112)	(0.0114)	(0.0674)	(0.0667)
N	212,080	206,926	212,080	206,926	212,080	206,926
R^2	0.892	0.892	0.343	0.344	0.166	0.150
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes	No	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes	Yes

TABLE 5: **Impact of SARFAESI: Triple interaction with court-efficiency**

This table reports the estimates from a panel regression model examining the impact of the implementation of SARFAESI on firms along with the interaction of court-efficiency. Specifically, we estimate the following panel regression model:

$$Y_{ijst} = \nu_i + \delta_j t + \beta_0 \text{ Law}_\text{t} + \beta_1 \text{ Treatment}_\text{i} + \beta_2 \text{ Court-efficiency}_\text{s} + \beta_3 \text{ Law}_\text{t} \text{ X Treatment}_\text{i} + \beta_4 \text{ Law}_\text{t} \text{ X Court-efficiency}_\text{s} + \beta_5 \text{ Court-efficiency}_\text{s} \text{ X Treatment}_\text{i} + \beta_6 \text{ Court-efficiency}_\text{s} \text{ X Law}_\text{t} \text{ X Treatment}_\text{i} + \beta_7 X_{ijt} + \epsilon_{ijst}$$

where Y_{ijst} refers to the log of the number of *total* workers employed in firm i in industry j in state s in year t in columns (1) and (2), levels of *GVAFC/Pre-Policy Total workers* in columns (3) and (4), levels of *GVAPM/Pre-Policy Total workers* in columns (5) and (6). The data spans the period 1999-2008 and consists of all factories/firms in the ASI data. Firm-clustered robust standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Total Workers		GVAFC/Total workers		GVAPM/Total workers	
	(1)	(2)	(3)	(4)	(5)	(6)
Law X Treatment	0.0588***	0.0774***	-0.0354**	-0.0294	-0.0275**	-0.0247**
	(0.0122)	(0.0116)	(0.0177)	(0.0182)	(0.0130)	(0.0123)
Law X Court efficiency	-0.0387***	-0.0295***	0.00159	0.00330	0.00168	0.00233
	(0.0115)	(0.0109)	(0.00640)	(0.00666)	(0.00350)	(0.00366)
Court efficiency X Treatment	0.0625	0.0829	1.274	1.286	0.781	0.788
	(0.0725)	(0.0678)	(1.110)	(1.124)	(0.723)	(0.733)
Court efficiency X Law X Treatment	0.0455***	0.0307**	-0.107**	-0.110***	-0.0542**	-0.0556**
	(0.0166)	(0.0156)	(0.0439)	(0.0442)	(0.0238)	(0.0244)
N	204,671	199,637	204,671	199,637	204,671	199,637
R^2	0.948	0.953	0.875	0.875	0.333	0.333
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes	No	Yes

TABLE 6: Impact of SARFAESI: Triple interaction with State Labor laws

This table reports the estimates from a panel regression model examining the impact of the implementation of SARFAESI on **employment variables** of firms along with the interaction of state-laws. Specifically, we estimate the following panel regression model:

$$Y_{ijst} = \nu_i + \delta_j t + \beta_0 \text{ Law}_\text{t} + \beta_1 \text{ Treatment}_\text{i} + \beta_2 \text{ Pro-worker}_\text{s} + \beta_3 \text{ Pro-employer}_\text{s}$$
$$+\beta_4 \text{ Law}_\text{t} \text{ X Treatment}_\text{i} + \beta_5 \text{ Pro-worker}_\text{s} \text{ X Treatment}_\text{i} + \beta_6 \text{ Pro-employer}_\text{s} \text{ X Treatment}_\text{i} +$$
$$\beta_7 \text{ Pro-worker}_\text{s} \text{ X Law}_\text{t} + \beta_8 \text{ Pro-employer}_\text{s} \text{ X Law}_\text{t} + \beta_9 \text{ Pro-worker}_\text{s} \text{ X Law}_\text{t} \text{ X Treatment}_\text{i}$$
$$+\beta_{10} \text{ Pro-employer}_\text{s} \text{ X Law}_\text{t} \text{ X Treatment}_\text{i} + \beta_{11} X_{ijt} + \epsilon_{ijst}$$

where Y_{ijst} refers to the log of *permanent* workers employed in firm i in industry j in state s in year t in columns (1) and (2), *contract* workers in columns (3) and (4) and *total workers* in columns (5) and (6). The data spans the period 1999-2008 and consists of all factories/firms in the ASI data. Firm-clustered robust standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Permanent Worker		Contract Worker		Total Worker	
	(1)	(2)	(3)	(4)	(5)	(6)
Law X Treatment	0.0531***	0.0744***	0.0169	0.0285	0.0642***	0.0880***
	(0.0172)	(0.0168)	(0.0345)	(0.0346)	(0.0142)	(0.0134)
Proworker X Treatment	-0.0640	-0.0367	-0.370**	-0.383**	-0.163**	-0.139**
	(0.0529)	(0.0506)	(0.155)	(0.157)	(0.0660)	(0.0650)
Proemployer X Treatment	-0.0896*	-0.0372	0.0612	0.0358	-0.0372	-0.0168
	(0.0488)	(0.0457)	(0.0847)	(0.0869)	(0.0355)	(0.0341)
Proworker X Law	-0.0310*	-0.0243	-0.0225	-0.0164	-0.0563***	-0.0465***
	(0.0176)	(0.0173)	(0.0336)	(0.0339)	(0.0145)	(0.0138)
Proemployer X Law	-0.0783***	-0.0677***	-0.00350	0.00981	-0.0544***	-0.0388***
	(0.0179)	(0.0179)	(0.0294)	(0.0304)	(0.0136)	(0.0131)
Proworker X Law X Treatment	0.00465	-0.00686	0.144***	0.134**	0.0367	0.0214
	(0.0269)	(0.0260)	(0.0545)	(0.0546)	(0.0230)	(0.0216)
Proemployer X Law X Treatment	0.0946***	0.0813***	-0.00281	-0.0127	0.0373*	0.0201
	(0.0244)	(0.0242)	(0.0439)	(0.0446)	(0.0191)	(0.0182)
N	194,002	188,897	194,002	188,897	194,002	188,897
R^2	0.926	0.930	0.803	0.804	0.948	0.954
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes	No	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes	Yes

TABLE 7: **Impact of SARFAESI: Triple interaction with State Labor laws**

This table reports the estimates from a panel regression model examining the impact of the implementation of SARFAESI on **capital variables** firms along with the interaction of state-laws. Specifically, we estimate the following panel regression model:

$$Y_{ijst} = \nu_i + \delta_j t + \beta_0 \text{ Law}_\text{t} + \beta_1 \text{ Treatment}_\text{i} + \beta_2 \text{ Pro-worker}_\text{s} + \beta_3 \text{ Pro-employer}_\text{s}$$
$$+\beta_4 \text{ Law}_\text{t} \text{ X Treatment}_\text{i} + \beta_5 \text{ Pro-worker}_\text{s} \text{ X Treatment}_\text{i} + \beta_6 \text{ Pro-employer}_\text{s} \text{ X Treatment}_\text{i} +$$
$$\beta_7 \text{ Pro-worker}_\text{s} \text{ X Law}_\text{t} + \beta_8 \text{ Pro-employer}_\text{s} \text{ X Law}_\text{t} + \beta_9 \text{ Pro-worker}_\text{s} \text{ X Law}_\text{t} \text{ X Treatment}_\text{i}$$
$$+\beta_{10} \text{ Pro-employer}_\text{s} \text{ X Law}_\text{t} \text{ X Treatment}_\text{i} + \beta_{11} X_{ijt} + \epsilon_{ijst}$$

where Y_{ijst} refers to the levels of *GVAFC/Pre-Policy Total workers* in firm i in industry j in state s in year t in columns (1) and (2), *GVAPM/Pre-Policy Total workers* in columns (3) and (4). The data spans the period 1999-2008 and consists of all factories/firms in the ASI data. Firm-clustered robust standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	GVAFC/total workers		GVAPM/total workers	
	(1)	(2)	(3)	(4)
	(0.0498)	(0.0498)	(0.0332)	(0.0332)
Proworker X Treatment	0.0493	0.0586	0.0256	0.0371
	(0.0884)	(0.0879)	(0.0866)	(0.0842)
Proemployer X Treatment	0.0672	0.0736	0.0822	0.0965*
	(0.0582)	(0.0590)	(0.0508)	(0.0515)
Proworker X Law	0.00428	0.00723**	0.00563***	0.00844***
	(0.00312)	(0.00337)	(0.00206)	(0.00273)
Proemployer X Law	0.0137***	0.0157***	0.00727*	0.00906**
	(0.00502)	(0.00542)	(0.00387)	(0.00443)
Proworker X Law X Treatment	-0.0324	-0.0357	-0.0257	-0.0288
	(0.0894)	(0.0895)	(0.0659)	(0.0661)
Proemployer X Law X Treatment	0.00935	0.00536	-0.0125	-0.0146
	(0.0690)	(0.0694)	(0.0370)	(0.0374)
N	194,002	188,897	194,002	188,897
R^2	0.887	0.887	0.447	0.448
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes
Industry-year FE	Yes	Yes	Yes	Yes

TABLE 8: **Impact of SARFAESI: Triple interaction with Elasticity of Substitution**

This table reports the estimates from a panel regression model examining the impact of the implementation of SARFAESI on firms along with the interaction of industry analysis. Specifically, we estimate the following panel regression model:

$$Y_{ijst} = \nu_i + \delta_j t + \beta_0 \text{ Law}_\text{t} + \beta_1 \text{ Treatment}_\text{i} + \beta_2 \text{ High Substitution}_\text{i} + \beta_3 \text{ Law}_\text{t} \text{ X Treatment}_\text{i} + \beta_4 \text{ Law}_\text{t} \text{ X High Substitution}_\text{i} + \beta_5 \text{ High Substitution}_\text{i} \text{ X Treatment}_\text{i} + \beta_6 \text{ High Substitution}_\text{i} \text{ X Law}_\text{t} \text{ X Treatment}_\text{i} + \beta_7 X_{ijt} + \epsilon_{ijst}$$

where Y_{ijst} refers to the log of the number of *total* workers employed in firm i in industry j in state s in year t in columns (1) and (2), levels of *GVAFC/Pre-Policy Total workers* in columns (3) and (4), levels of *GVAPM/Pre-Policy Total workers* in columns (5) and (6). The data spans the period 1999-2008 and consists of all factories/firms in the ASI data. Firm-clustered robust standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Total Workers		GVAFC/Total workers		GVAPM/Total workers	
	(1)	(2)	(3)	(4)	(5)	(6)
Law X Treatment	0.0684***	0.0821***	0.0157	0.0217	0.0457	0.0492
	(0.0221)	(0.0207)	(0.0406)	(0.0408)	(0.0419)	(0.0420)
Law X Goldar	-0.0361**	-0.0199	-0.00170	0.00428	-0.00130	0.00196
	(0.0168)	(0.0158)	(0.00449)	(0.00468)	(0.00215)	(0.00228)
Treatment X Goldar	-0.0765	-0.0792	0.177***	0.175***	0.157***	0.156***
	(0.0580)	(0.0522)	(0.0479)	(0.0480)	(0.0401)	(0.0404)
Law X Goldar X Treatment	0.0461*	0.0463*	-0.157***	-0.158***	-0.159***	-0.160***
	(0.0261)	(0.0245)	(0.0581)	(0.0585)	(0.0497)	(0.0500)
N	102,625	100,732	102,625	100,732	102,625	100,732
R^2	0.946	0.953	0.644	0.644	0.329	0.330
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes	No	Yes

TABLE 9: **Impact of SARFAESI on Debt**

This table reports the estimates from a panel regression model examining the impact of the implementation of SARFAESI law on the various measures of short term debt at a given establishment. Specifically, we estimate the following panel regression model:

$$Y_{ijt} = \nu_i + \delta_{jt} + \beta_0\ Law_t + \beta_1\ Treatment_i + \beta_2\ Law_t \times Treatment_i + \beta_3 X_{ijt} + \epsilon_{ijt}$$

where Y_{ijt} refers to the log of *ST formal credit* in firm i in industry j in year t in columns (1) and (2), levels of *ST formal credit by total assets* in columns (3) and (4), log of *ST trade credit* in columns (5) and (6), levels of *ST Trade Credit by total assets* in columns (7) and (8). The data spans the period 1999-2008 and consists of all factories/firms in the ASI sample data. Firm-clustered robust standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Log(STformalcredit)		STformalcredit/total assets		Log(STtradecredit)		STtradecredit/total assets	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Law X Treatment	-0.316***	-0.225***	-0.00457**	-0.00323*	0.116**	0.203***	0.0202***	0.0211***
	(0.0829)	(0.0813)	(0.00197)	(0.00196)	(0.0511)	(0.0467)	(0.00248)	(0.00248)
N	212,080	206,926	206,931	206,926	212,080	206,926	206,931	206,926
R^2	0.786	0.796	0.761	0.763	0.851	0.867	0.793	0.794
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Industry-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

TABLE 10: **Impact of SARFAESI on Firm closure**

This table reports the estimates from a panel regression model examining the impact of the implementation of SARFAESI law on the proportion of firms that remained open (operational). Specifically, we estimate the following panel regression model:

$$Y_{ijt} = \nu_i + \delta_j + \beta_0\ Law_t + \beta_1\ Treatment_i + \beta_2\ Law_t \times Treatment_i + \beta_3 X_{ijt} + \epsilon_{ijt}$$

where Y_{ijt} refers to the number of *firm closures* in industry j in year t in columns (1) and (2). The data spans the period 1999-2008 and consists of all factories/firms in the ASI data. Firm-clustered robust standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Open	
	(1)	(2)
Law X Treatment	-0.00359***	-0.00331***
	(0.00115)	(0.00117)
N	212,080	206,926
R^2	0.009	0.011
Firm FE	Yes	Yes
Year FE	Yes	Yes
Controls	No	Yes
Industry FE	Yes	Yes

Appendix A

This Appendix reports results of robustness tests that are briefly described in the text. Additional details are available from the authors upon request.

TABLE A1: De-reservation Test: Using only industries that were not affected by the SSI de-reservation policy

This table reports the estimates from a panel regression model examining the impact of the implementation of SARFAESI law on labor and capital investments at a given establishment. For these tests, we drop all firms in industries that ever produced a product that were de-reserved under the SSI de-reservation policy, and reestimate the following baseline panel regression model:

$$Y_{ijt} = \nu_i + \delta_{jt} + \beta_0\ Law_t + \beta_1\ Treatment_i + \beta_2\ Law_t \times Treatment_i + \beta_3 X_{ijt} + \epsilon_{ijt}$$

where Y_{ijt} refers to the log of the number of *total workers* in firm i in industry j in year t in column (1), levels of *GVAFC/total workers* in column (2), and *GVAPM/total workers* in column (3). The data spans the period 1999-2008 and consists of all factories/firms in the ASI data. Firm-clustered robust standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Total workers	GVAFC/total worker	GVAPM/total worker
	(1)	(2)	(3)
Law X Treatment	0.0722**	-0.0815**	-0.0590***
	(0.0152)	(0.0411)	(0.0220)
N	98,319	98,319	98,319
R^2	0.959	0.890	0.467
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes

TABLE A2: Robustness Tests: Using just land and buildings only in defining treatment/control groups

This table reports the estimates from a panel regression model examining the impact of the implementation of SARFAESI law on labor and capital investments at a given establishment. For these tests, we consider fixed assets in the definition of treatment/control as inclusive of land and buildings only. Specifically, we estimate the following panel regression model:

$$Y_{ijt} = \nu_i + \delta_{jt} + \beta_0\ Law_t + \beta_1\ Treatment_i + \beta_2\ Law_t \times Treatment_i + \beta_3 X_{ijt} + \epsilon_{ijt}$$

where Y_{ijt} refers to the log of the number of *total workers* in firm i in industry j in year t in column (1), levels of *GVAFC/total workers* in column (2), and *GVAPM/total workers* in column (3). The data spans the period 1999-2008 and consists of all factories/firms in the ASI data. Firm-clustered robust standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Total workers	GVAFC/total worker	GVAPM/total worker
	(1)	(2)	(3)
Law X Treatment	0.0198**	-0.0294*	-0.0161*
	(0.00806)	(0.0159)	(0.00847)
N	212,308	212,308	212,308
R^2	0.944	0.863	0.330
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes

TABLE A3: Robustness Tests: Using outstanding loans for defining treatment/control groups

This table reports the estimates from a panel regression model examining the impact of the implementation of SARFAESI law on labor and capital investments at a given establishment. For this test, we define treatment/control groups based on outstanding loans. Specifically, we estimate the following panel regression model:

$$Y_{ijt} = \nu_i + \delta_{jt} + \beta_0\ Law_t + \beta_1\ Treatment_i + \beta_2\ Law_t \times Treatment_i + \beta_3 X_{ijt} + \epsilon_{ijt}$$

where Y_{ijt} refers to the log of the number of *total workers* in firm i in industry j in year t in column (1), levels of *GVAFC/total workers* in column (2), and *GVAPM/total workers* in column (3). The data spans the period 1999-2008 and consists of all factories/firms in the ASI data. Firm-clustered robust standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Total workers	GVAFC/total worker	GVAPM/total worker
	(1)	(2)	(3)
Law X Treatment	0.113***	-0.0643***	-0.0536***
	(0.00856)	(0.0205)	(0.0127)
N	199,692	199,692	199,692
R^2	0.953	0.843	0.353
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry-year FE	Yes	Yes	Yes

TABLE A4: Court-efficiency Statistics

This table reports the details of courts and periods of trials conducted by district/session judges during the year 2001 which is one year prior to the passage of the SARFAESI law. We calculate court-efficiency as the fraction of trials that are disposed of in less than one year in the District/Sessions court as calculated by Amirapu (2015). Source: "Crime in India" Reports published by India's National Crime Records Bureau.

State/UT	District/Session Judge			
	Duration of Trial			
	Less than 6 months	6-12 months	Total	Court Efficiency
Andhra Pradesh	92	261	3316	0.106
Arunachal Pradesh	1	3	58	0.069
Assam	389	434	1629	0.505
Bihar	102	214	2648	0.119
Chhattisgarh	151	147	656	0.454
Goa	0	3	121	0.025
Gujarat	22	109	1234	0.106
Haryana	15	67	671	0.122
Himachal Pradesh	9	60	286	0.241
Jammu & Kashmir	24	42	739	0.089
Jharkhand	5	28	873	0.038
Karnataka	101	219	3229	0.099
Kerala	32	146	846	0.210
Madhya Pradesh	481	471	2576	0.370
Maharashtra	42	88	1747	0.074
Manipur	6	10	52	0.308
Meghalaya	1	6	68	0.103
Mizoram	316	274	677	0.871
Nagaland	2	0	2	1.000
Orissa	40	250	1159	0.250
Punjab	15	182	820	0.240
Rajasthan	646	949	4949	0.322
Sikkim	0	2	9	0.222
Tamilnadu	205	356	3333	0.168
Tripura	68	67	290	0.466
Uttar Pradesh	12	153	6740	0.024
Uttaranchal	14	40	779	0.069
West Bengal	103	152	2264	0.113

TABLE A5: **Elasticity of substitution**

This table reports the details of the elasticity of substitution in manufacturing industries in India for the highest (treated) and lowest (control) terciles. Source: Goldar, Pradhan, and Sharma (2013).

2-digit Industry code	Industry Description
	Panel A: Industries in the highest tercile of elasticity of substitution measures
24	Manufacture of chemicals and chemical products
25	Manufacture of rubber and plastic products
26	Manufacture of other non-metallic mineral products
29	Manufacture of machinery and equipment
30	Manufacture of office, accounting and computing machinery
34	Manufacture of motor vehicles, trailers and semi-trailers
	Panel B: Industries in the lowest tercile of elasticity of substitution measures
16	Manufacture of tobacco products
18	Manufacture of wearing apparel; dressing and dyeing of fur
19	Tanning and dressing of leather; manufacture of luggage, handbags, addler, harness and footwear
27	Manufacture of basic metals
32	Manufacture of radio, television and communication equipment and apparatus
33	Manufacture of medical, precision, and optical instruments, watches and clocks
35	Manufacture of other transport equipment
36	Manufacture of furniture; manufacturing n.e.c. (n.e.c - not elsewhere classified; includes goods such as jewellery and related articles, musical instruments, sports goods, games and toys, etc.)