

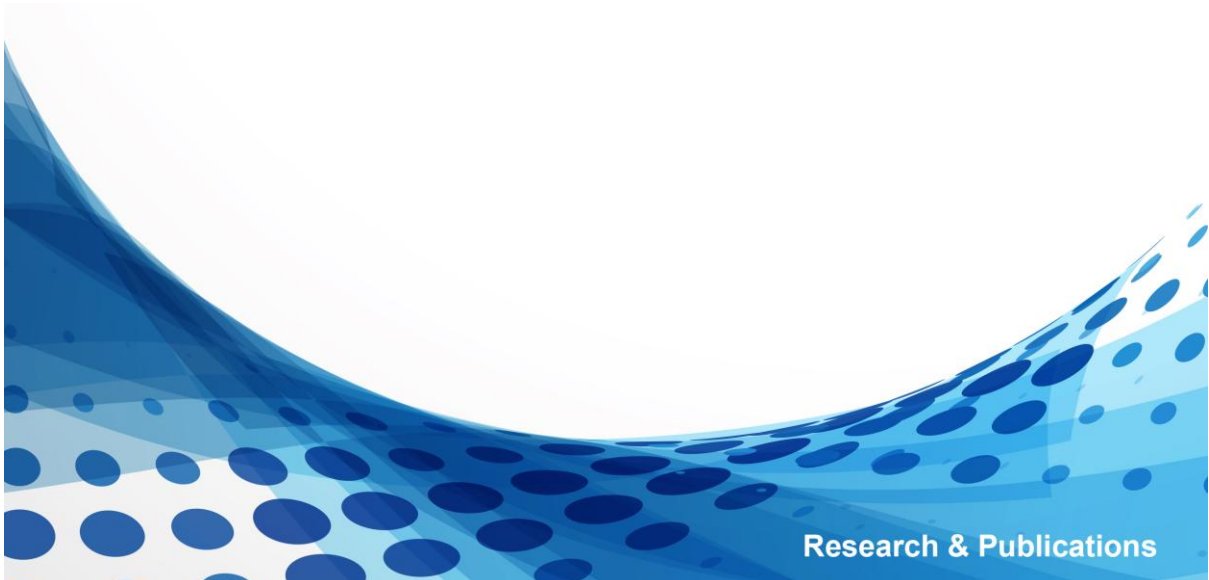


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Creditor Rights, State-Owned Banks, and Investment Efficiency: Evidence from SARFAESI Act

Vishal Vaibhav



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Creditor Rights, State-Owned Banks, and Investment Efficiency: Evidence from SARFAESI Act

Vishal Vaibhav

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Abstract

I examine whether firms borrowing exclusively from government-owned banks respond differently to SARFAESI Act and how it affects the investment efficiency. I find that firms borrowing exclusively from government-owned banks experience a significant increase in investment inefficiency following the reform. I also find the increase in inefficiency is concentrated among firms with high levels of tangible assets, suggesting that collateral enforcement is the primary mechanism driving the results.

Keywords: *Investment Inefficiency, Tangible Assets, Creditor Rights*

1 Introduction

The allocation of capital within firms is a key determinant of long-term growth of a firm. Financial intermediaries play a critical role in shaping this allocation by disciplining firms and influencing investment decisions through both monitoring and enforcement mechanisms [Diamond \(1984\)](#), [Townsend \(1979\)](#). The effectiveness of this disciplining role depends on the institutional environment and the incentives of lenders. In many emerging economies government-owned banks (GOBs from now on) occupy a dominant position in credit markets and operate under objectives that extend beyond profit maximization. These banks are often tasked with achieving social and developmental goals like expanding access to credit and supporting politically connected sectors. Such objectives may enhance financial inclusion but they can also distort credit allocation and weaken the efficiency of firm-level

investment decisions.

GOBs may exhibit forbearance toward distressed borrowers in order to preserve employment or support politically connected firms. The employees of GOBs can be investigated by vigilance agencies like CBI or CVC . This heightened regulatory scrutiny and the risk of ex-post investigations may induce overly conservative behavior, leading to stricter enforcement and premature liquidation. As emphasized by [Kariya \(2021\)](#), these competing incentives imply that the effect of borrowing from GOBs on firm outcomes is theoretically ambiguous and ultimately an empirical question I answer in this paper.

This ambiguity becomes particularly salient in the context of creditor rights reforms. A large body of theoretical work predicts that strengthening creditor rights increases liquidation value and enhances lenders' ability to enforce contracts, thereby improving investment efficiency. [Vig \(2013\)](#) finds that stronger creditor rights can increase the risk of inefficient liquidation due to the concavity of creditor payoffs. As creditors do not participate in the upside of risky projects as they have fixed returns so they may prefer liquidation even when continuation of the project yields higher total surplus. Anticipating this the firms which are prone to liquidation may adjust their financial and investment decisions in ways that reduce efficiency.

The Indian banking sector provides a particularly useful setting to study these issues because government-owned banks have historically dominated the lending business. Following the nationalization of major banks, GOBs became the primary providers of formal credit to Indian firms, especially in sectors considered strategically important for economic development. Although financial liberalization in the 1990s increased the role of private banks, GOBs continued to account for the majority of commercial lending during the sample period. As a result, a substantial proportion of firms remained dependent on public sector credit, making the institutional characteristics of GOBs highly consequential for corporate financing and investment decisions.

This paper studies how the interaction between creditor rights and bank ownership affects firm-level investment efficiency in India. I exploit the enactment of the Securitisation and Reconstruction

of Financial Assets and Enforcement of Security Interest (SARFAESI) Act in 2002 as a quasi-natural experiment that significantly strengthened creditor enforcement. The reform allowed secured lenders to seize and liquidate collateral without court intervention which increased the liquidation value of debt and the bargaining power of creditors. Prior research has shown that this reform led to substantial changes in firms' financing decisions, particularly among firms with high tangible assets which are more exposed to collateral-based enforcement.

The SARFAESI Act represents one of the most significant changes to India's creditor rights framework during the post-liberalization period. Prior to the reform, the debt recovery process in India was characterized by substantial judicial delays and weak enforcement capacity, which limited creditors' ability to recover distressed loans. By enabling out-of-court enforcement of collateral, the Act fundamentally altered the balance of power between lenders and borrowers. Consequently, the reform provides an ideal setting to study how firms adjust their investment behavior in response to changes in liquidation risk and creditor power.

I distinguish between firms that borrow exclusively from GOBs and those that maintain relationships with private banks. This distinction captures variation in exposure to the institutional features of state-owned banking. Firms with exclusive relationships with GOBs are more likely to be affected by the incentives and constraints specific to these institutions, whereas firms with mixed banking relationships are subject to the discipline of private lenders, who may have stronger incentives to enforce contracts.

I examine whether these differences in banking relationships shape the effect of strengthened creditor rights on firms' investment efficiency. Specifically, I employ a difference-in-differences framework that compares changes in investment inefficiency between firms exclusively borrowing from GOBs and other firms before and after the SARFAESI Act. Investment inefficiency is measured following [Biddle et al. \(2009\)](#) as deviations of actual investment from expected investment based on firm fundamentals and growth opportunities.

This paper contributes to the literature in several ways. First, it contributes to the growing liter-

ature on creditor rights by highlighting the importance of lender heterogeneity in shaping the effects of legal reforms. While existing studies primarily focus on the impact of creditor rights on financing and investment outcomes, I show that these effects depend crucially on the ownership structure of financial intermediaries. Second, the paper contributes to the literature on government-owned banks by examining how state ownership influences the transmission of institutional reforms to firm-level investment efficiency.

The remainder of the paper is organized as follows. Section 2 reviews the related literature. Section 3 describes the background of the SARFAESI Act, Section 4 discusses the data sources and methodology. Section 5 outlines the identification strategy. Section 6 presents the results, section 7 discusses the robustness , and Section 8 concludes.

2 Review of Literature and Hypothesis Development

2.1 Creditor Rights and Corporate Outcomes

The relationship between creditor rights and corporate behavior has been an important topic in corporate finance for many years. Traditional financial theories suggest that legal systems play a major role in lending decisions and firms' financing choices. In situations where contracts cannot cover every possible outcome, lenders depend on legal protections to recover their money if borrowers fail to repay. Because of this stronger creditor rights give lenders more confidence and increase the value they can recover during default. This makes it easier for firms to obtain external financing. Many international studies show that countries with stronger creditor protection usually have larger credit markets and more developed financial systems.

Most early studies mainly looked at how creditor protection affects the supply of credit. For example, [Djankov et al. \(2007\)](#) find that countries with stronger creditor rights have higher levels of private credit compared to GDP. [Qian & Strahan \(2007\)](#) show that better legal protection for creditors reduces borrowing costs and allows firms to borrow for longer periods. [Haselmann et al. \(2010\)](#) study legal reforms in transition economies and find that banks increase lending when contract enforcement improves.

Vig (2013) provides one of the most influential empirical examinations of this mechanism by studying the SARFAESI Act in India. The SARFAESI Act, enacted in 2002, significantly strengthened the rights of secured creditors by allowing banks and financial institutions to seize and liquidate collateral without judicial intervention. Prior to the reform, debt recovery in India was characterized by lengthy court procedures and low recovery rates. The Act increased both the liquidation value of debt and the bargaining power of creditors. Firms with high levels of tangible assets significantly reduced their reliance on secured debt after the reform. Because tangible assets are easier to seize and liquidate, these firms faced greater exposure to the strengthened enforcement regime.

Subsequent studies have extended these ideas and examined broader implications of creditor rights reforms for corporate outcomes. Acharya & Subramanian (2009) argue that bankruptcy regimes influence innovation and entrepreneurial activity by shaping firms' tolerance for failure. Creditor-friendly systems may discourage risky but innovative investments because managers become more concerned about liquidation. Favara et al. (2017) show that legal reforms affecting creditor rights significantly influence firms' investment policies and risk-taking behavior.

2.2 Investment Efficiency and Financial Frictions

Investment efficiency is one of the central concepts in corporate finance because it captures how effectively firms allocate capital toward value-maximizing opportunities. In frictionless markets firms are expected to invest whenever projects possess positive net present value and avoid investments that destroy shareholder value. In the presence of agency conflicts and institutional frictions, firms may deviate from optimal investment behavior. Such deviations give rise to investment inefficiency, which can take the form of either overinvestment or underinvestment.

The theoretical foundations of investment inefficiency can be traced to agency models of the firm. Jensen (1986) argues that managers with access to excess free cash flow may overinvest in low-return projects to maximize private benefits such as empire building or managerial compensation. Myers (1977) develops the debt overhang hypothesis and shows that highly leveraged firms may underin-

vest because the benefits of new investment accrue primarily to creditors rather than shareholders. These theories establish that financing frictions and governance problems can distort firms' investment choices.

Another influential strand of literature studies how information environments affect investment efficiency. [Biddle et al. \(2009\)](#) provides one of the most widely used empirical frameworks for measuring investment efficiency. The paper estimates expected investment as a function of firm sales growth and defines investment inefficiency as deviations from predicted investment levels. Larger residuals indicate greater misallocation of capital and therefore lower investment efficiency. He shows that higher financial reporting quality improves investment efficiency by reducing information asymmetries between firms and capital providers. I use this model of Biddle to measure investment inefficiency.

[Richardson \(2006\)](#) examines the determinants of investment inefficiency and shows that agency conflicts and excess free cash flow are important drivers of overinvestment. Firms with weak governance mechanisms and abundant internal resources are more likely to invest in projects with negative expected returns. Subsequent studies extend this framework and examine how governance structures affects firms' investment behavior. In the Indian context, [Srinivasan & Thampy \(2017\)](#) find that firms borrowing exclusively from GOBs exhibit lower investment-cash flow sensitivity and greater responsiveness of investment to Tobin's Q.

2.3 Hypothesis Development

The first hypothesis of the paper examines whether the strengthening of creditor rights through the SARFAESI Act affected investment efficiency differently for firms borrowing exclusively from GOBs. GOBs may continue lending to inefficient firms because of political or developmental considerations, thereby reducing the disciplining effect typically associated with stronger creditor rights. Alternatively, the fear of regulatory scrutiny may induce inefficient enforcement behavior.

Hypothesis 1: Firms borrowing exclusively from GOBs experience a greater increase in

investment inefficiency following the SARFAESI Act relative to firms borrowing from private lenders and GOBs.

Creditor rights matter more for firms with high levels of collateralizable assets because creditor enforcement becomes more effective when lenders can seize collateral. Thus firms with greater asset tangibility face higher liquidation risk under stronger creditor rights regimes. I examine this in my second hypothesis.

Hypothesis 2: The increase in investment inefficiency following the SARFAESI Act is more pronounced for high tangibility firms borrowing exclusively from government-owned banks.

3 Background of the SARFAESI Act

The Securitisation and Reconstruction of Financial Assets and Enforcement of Security Interest (SARFAESI) Act which was enacted in 2002 is one of the most significant creditor rights reforms in post-liberalization India. The Act fundamentally transformed the institutional framework governing debt recovery and secured lending. It granted creditors the power to enforce security interests without requiring judicial intervention. Prior to the enactment of SARFAESI the Indian financial system was characterized by weak debt enforcement and low recovery rates. The functioning of credit markets was severely constrained. The reform was introduced in response to growing concerns regarding rising non-performing assets (NPAs) and the inability of lenders to recover distressed loans effectively.

Historically, the Indian legal framework governing insolvency and debt recovery was highly debtor-friendly. Although lenders formally possessed claims over collateral, enforcement of these claims required lengthy proceedings through civil courts and debt recovery tribunals. Before the 1990s, creditors seeking recovery from defaulting borrowers had to rely on ordinary civil courts. Cases in these courts frequently remained unresolved for several years. This prolonged judicial process significantly reduced the effective value of collateral because assets depreciated over time while disputes remained pending. As noted by [Vig \(2013\)](#), liquidation and rehabilitation proceedings in India often took between ten and fifteen years to conclude.

The inefficiency of debt enforcement became particularly problematic during the post-liberalization period of the 1990s. India experienced rapid credit expansion and increasing integration with global financial markets. GOBs accumulated large volumes of non-performing assets. It raised concerns regarding the stability and efficiency of the banking system. Policymakers increasingly viewed weak creditor rights as a major impediment to financial development and economic growth. The inability of lenders to recover secured loans discouraged credit expansion and increased the cost of borrowing. In this context, reforms aimed at strengthening creditor enforcement emerged as an important policy priority.

An early attempt to address these issues came through the establishment of Debt Recovery Tribunals (DRTs) under the Recovery of Debts Due to Banks and Financial Institutions Act of 1993. These tribunals were intended to provide specialized forums for debt recovery and to bypass some of the procedural rigidities associated with civil courts. The tribunals were granted flexibility to establish their own procedures and were expected to accelerate loan recovery. DRTs improved enforcement relative to the earlier system but they did not fully resolve the underlying problems because creditors still required formal legal approval before taking possession of collateral. Thus recovery remained slow and inefficient.

The SARFAESI Act was introduced as a more comprehensive reform to strengthen secured creditor rights and improve the efficiency of debt recovery mechanisms. The reform was motivated by recommendations of several committees and policy discussions during the late 1990s and early 2000s. A high-powered committee headed by T.R. Andhyarujina was established to examine reforms required for strengthening the legal framework governing secured transactions and debt enforcement. The committee emphasized the need to empower banks and financial institutions to recover secured loans without relying on prolonged court proceedings.

The SARFAESI Act fundamentally changed the balance of power between borrowers and lenders by granting secured creditors the authority to directly seize and liquidate collateral in cases of default. Under the Act banks and financial institutions could enforce security interests without intervention from courts or tribunals once a borrower defaulted on a secured loan for more than six months. Cred-

itors were only required to provide borrowers with a sixty-day notice demanding repayment before initiating enforcement proceedings. If the borrower failed to comply, lenders could take possession of the secured assets and liquidate assets to recover dues. One of the most important features of the SARFAESI Act was that it applied retroactively to both existing and new loan contracts.

The Act also shifted the burden of legal action toward borrowers. Before the reform, creditors bore the burden of initiating lengthy legal proceedings to recover debt. After SARFAESI borrowers seeking to challenge enforcement actions could only appeal after collateral had been seized. Borrowers were required to deposit a substantial proportion of the disputed amount before appeals could proceed. It made litigation significantly more costly. The reform effectively transformed India from a relatively debtor-friendly regime into a more creditor oriented system.

4 Data Sources and Methodology

4.1 Data Sources and Sample Construction

I use firm-level panel data obtained from the CMIE Prowess database, one of the most comprehensive databases on Indian firms. Prowess contains detailed financial information for both listed and unlisted firms, including balance sheet variables, income statement items, ownership characteristics, and banking relationships. The database has been widely used in studies examining corporate finance and banking relationships in India, including [Baghai & Becker \(2018\)](#) , [Naaraayanan & Nielsen \(2021\)](#) and [Vig \(2013\)](#). An important advantage of the Prowess database for the purposes of this study is that it provides detailed information on firms' banking relationships, which allows identification of whether firms borrow exclusively from government-owned banks or maintain relationships with private sector lenders.

The sample period extends from 1998 to 2007. This period is particularly appropriate because it captures both the pre-reform and post-reform phases surrounding the enactment of the SARFAESI Act in 2002. Following [Vig \(2013\)](#), the post-reform period is defined as beginning in 2002, when the SARFAESI Act came into force . Although the Act was formally implemented in June 2002, dis-

cussions surrounding the legislation had begun earlier in the parliamentary process. Since firms and financial institutions may respond to anticipated reforms, the post-reform period captures the broader change in enforcement expectations generated by the Act.

The sample excludes financial firms because their balance sheet structures, regulatory frameworks, and investment decisions differ substantially from those of non-financial firms. In addition, observations with negative sales or negative net worth are removed because such firms may reflect severe distress conditions that could bias the measurement of investment efficiency. Following the approach in [Kariya \(2021\)](#), zombie firms are also excluded from the sample. Zombie firms are firms that continue borrowing despite weak fundamentals and persistent inability to service debt obligations. Such firms may receive continued support from lenders for reasons unrelated to efficient capital allocation and therefore may distort the analysis of investment efficiency. I define a firm as zombie if the interest coverage ratio is less than one.

The treatment classification follows the methodology used in [Kariya \(2021\)](#). Firms are categorized as government-owned bank (GOB) firms if they maintain exclusive borrowing relationships with government-owned banks. Government-owned banks include nationalized banks and State Bank of India along with its associates. Firms that borrow from private banks, foreign banks, or maintain mixed banking relationships constitute the control group. I also winsorize all continuous variables at 1 and 99 percent levels.

The definitions of the variables are presented in Table 1. The summary statistics for the variables used in the analysis are presented in Table 2. The mean value of investment inefficiency is approximately 0.0, with substantial variation across firms. Other key variables include firm size, profitability, leverage, tangibility, age, and cash flow from operations. The correlation matrix indicates meaningful relationships among these variables and is presented in Table 3.

4.2 Measuring Investment Efficiency

The primary dependent variable in this study is investment inefficiency. Following [Biddle et al. \(2009\)](#), investment inefficiency is measured as the deviation of actual investment from predicted investment based on firms' growth opportunities proxied by sales growth. To estimate expected investment, the following baseline model is estimated at the industry-year level:

$$Investment_{i,j,t} = \alpha + \beta SalesGrowth_{i,j,t-1} + \epsilon_{i,j,t} \quad (1)$$

where $Investment_{i,j,t}$ represents firm investment which is measured as the capital expenditure resulting from cash outflow due to investment in fixed assets, which is adjusted with cash inflow by selling the fixed assets and is scaled by the lagged value of total assets. $SalesGrowth_{i,j,t-1}$ proxies for firm growth opportunities. Sales growth is commonly used in the literature because firms experiencing stronger growth opportunities are expected to undertake higher levels of investment. i indexes firm and j indexes industry which I measure using 2 digit NIC code. I run this cross sectional regressions only in those industry-year which has atleast 12 firms.

The residual term $\epsilon_{i,j,t}$ captures deviations from predicted investment and therefore reflects investment inefficiency. Following [Biddle et al. \(2009\)](#), the absolute value of the residual is used as the measure of inefficiency:

$$Investment\ Inefficiency_{i,j,t} = |\epsilon_{i,j,t}| \quad (2)$$

Larger residuals indicate greater deviations from optimal investment and therefore lower investment efficiency.

5 Identification Strategy

The SARFAESI Act strengthened the rights of secured creditors by enabling banks and financial institutions to seize and liquidate collateral without requiring lengthy judicial intervention. The extent

to which this stronger enforcement translated into actual creditor intervention depended on the ownership structure of lenders. GOBs differ from private lenders because they pursue objectives beyond profit maximization and may therefore respond differently to financial distress. Thus firms borrowing exclusively from GOB may face different liquidation incentives relative to firms borrowing from private lenders.

To identify the impact of the reform I use a difference-in-differences framework that compares investment inefficiency between treated and control firms before and after the SARFAESI Act. Treated firms are defined as firms maintaining exclusive borrowing relationships with GOBs, while firms borrowing from private banks or maintaining mixed banking relationships constitute the control group.

The baseline empirical specification is given by:

$$Inefficiency_{i,j,t} = \alpha + \beta_1(Post_t \times Treat_i) + \gamma X_{ij,t} + \mu_i + \lambda_t + \epsilon_{i,j,t} \quad (3)$$

where $Inefficiency_{i,j,t}$ represents the investment inefficiency of firm i in year t , measured following equations 1 and 2. $Post_t$ is an indicator variable equal to one for years after 2002 and zero otherwise. $Treat_i$ is a dummy variable equal to one for firms borrowing exclusively from GOBs. The interaction term $Post_t \times Treat_i$ captures the differential effect of the SARFAESI reform on treated firms relative to the control group. Firm-level controls include size, profitability, age, leverage, tangibility, and cash flow from operations. I use one year lag value of all the controls in the specification. The specification additionally includes firm fixed effects and year or industry-year fixed effects to control for unobserved heterogeneity and common macroeconomic shocks. Standard errors are clustered at the firm level.

To examine whether the effect of the SARFAESI Act is concentrated among firms with greater collateralizable assets, I estimate an additional heterogeneity specification based on asset tangibility. I classify firms into high tangibility and low tangibility groups based on the median level of tangibility in the sample. High tangibility firms are expected to face stronger effects of the SARFAESI Act because creditor enforcement becomes more effective when lenders can seize and liquidate physical collateral. If the increase in investment inefficiency is driven by stronger collateral enforcement, the

effect should be concentrated among firms with high asset tangibility borrowing exclusively from GOBs.

To test this mechanism, I estimate the following triple-difference specification:

$$Inefficiency_{i,j,t} = \alpha + \beta_1(Post_t \times Treat_i) + \beta_2(Post_t \times HighTan_i) + \beta_3(Treat_i \times HighTan_i) + \beta_4(Post_t \times Treat_i \times HighTan_i) + \gamma X_{i,j,t} + \mu_i + \lambda_t + \epsilon_{i,j,t} \quad (4)$$

I expect the coefficient of the triple interaction term $Post_t \times Treat_i \times HighTan_i$ to be positive and significant.

6 Results

6.1 Baseline Results

Table 4 presents the baseline difference-in-differences estimates examining the effect of the SARFAESI Act on investment inefficiency for firms borrowing exclusively from government-owned banks. The dependent variable throughout the table is investment inefficiency measured following [Biddle et al. \(2009\)](#) as the absolute value of the residual from the expected investment model.

Across all specifications, the coefficient on $Post_t \times Treat_i$ is positive and statistically significant which means that that firms borrowing exclusively from government-owned banks experience higher investment inefficiency following the reform. In Column (1), which includes firm and year fixed effects, the coefficient on the interaction term is 0.010 and statistically significant at the 5 percent level. The positive coefficient suggests that the strengthening of creditor rights through the SARFAESI Act increased deviations between actual and optimal investment for GOB firms relative to non-GOB firms. The economic magnitude of the result is substantial. The mean value of investment inefficiency in the sample is approximately 0.07. Therefore, the estimated coefficient of 0.010 implies an increase of nearly 14.2 percent relative to the sample mean.

This indicates that firms borrowing exclusively from government-owned banks became approximately 14 percent more inefficient in their investment decisions after the enactment of the SARFAESI Act. The result is consistent with the argument that political and social objectives associated with GOBs weaken the disciplining role of creditor rights. The results remain robust across alternative specifications. In columns 3, 4, 5 and 6 I use the Industry-Year fixed effects and the results are similar. I use 2 digit industry levels to identify an industry.

6.2 Results in Manufacturing Firms

To ensure that the baseline findings are not driven by sectoral composition or differences across industries, I re-estimate the baseline specification using only manufacturing firms. Manufacturing firms constitute a useful subsample because they typically possess higher levels of tangible assets and depend more heavily on external financing. The results for manufacturing firms are presented in Table 5. Similar to the baseline results, the coefficient on $Post_t \times Treat_i$ is positive across all specifications and is statistically significant in most cases.

6.3 Parallel Trends and Event-Study Analysis

A key identifying assumption underlying the difference-in-differences framework is the parallel trends assumption. Specifically, in the absence of the SARFAESI Act, investment inefficiency for firms borrowing exclusively from government-owned banks and the control firms would have followed similar trends over time. To examine the validity of this assumption, I estimate an event-study specification that traces the dynamic evolution of investment inefficiency around the implementation of the reform.

Figure 1 presents the event-study coefficients using 1998 as the base year. The figure plots the coefficients on the interaction between event time indicators and the treatment dummy, along with 95 percent confidence intervals.

6.4 Heterogeneity Analysis: Role of Asset Tangibility

Table 6 presents the heterogeneity analysis examining whether the effect of the SARFAESI Act on investment inefficiency is stronger for firms with high levels of tangible assets. The motivation for

this analysis comes directly from the collateral enforcement mechanism underlying the SARFAESI Act. Since the reform strengthened the ability of lenders to seize and liquidate collateral, firms with greater collateralizable assets are expected to be more exposed to creditor intervention following the reform.

To test this mechanism, I estimate a triple-interaction specification involving the post-reform period, the treatment indicator for firms borrowing exclusively from government-owned banks, and an indicator variable for high tangibility firms. The coefficient of interest is the interaction term $Post_t \times Treat_i \times HighTan_i$, which captures the additional effect of the SARFAESI Act on investment inefficiency for high tangibility firms borrowing exclusively from government-owned banks.

Across all specifications, the coefficient on the triple interaction term is positive and statistically significant. In Column (1), the coefficient on $Post_t \times Treat_i \times HighTan_i$ is 0.0173 and statistically significant at the 5 percent level. The magnitude remains stable across alternative specifications, ranging between 0.015 and 0.018. This finding provides strong evidence that the increase in investment inefficiency following the SARFAESI Act is concentrated among firms with greater levels of collateralizable assets.

7 Robustness Checks

7.1 Propensity Score Matching

A potential concern with the baseline estimates is that treated firms may differ systematically from control firms along several observable dimensions. For instance firms borrowing from GOBs may be smaller or less profitable relative to firms borrowing from private lenders. If such differences are correlated with investment inefficiency the baseline estimates may partly reflect selection effects rather than the causal impact of the SARFAESI Act.

To address this concern I employ a propensity score matching (PSM) approach to construct a more comparable sample of treated and control firms. The matching procedure pairs firms borrowing exclusively from GOBs with observationally similar firms from the control group based on pre-treatment firm characteristics. Specifically, firms are matched on variables including size, profitability, leverage, tangibility, age, and cash flow from operations.

Table 7 presents the covariate balance statistics before and after matching. Prior to matching treated firms differ significantly from control firms across several characteristics. In particular, treated firms are smaller in size, less profitable, younger, and possess greater asset tangibility. After propensity score matching, the differences between treated and control firms decline substantially. The p-values for most covariates become statistically insignificant, indicating improved balance between the two groups.

Table 8 presents the regression results using the matched sample. The coefficient on the interaction term $Post_t \times Treat_i$ remains positive across all specifications and continues to be statistically significant in most cases. In Column (1), the coefficient is 0.0094 and significant at the 5 percent level. The magnitude is very similar to the baseline estimate reported earlier, suggesting that the main findings are not driven by systematic observable differences between treated and control firms.

7.2 Placebo Test

To further validate the identification strategy and ensure that the baseline results are not driven by spurious trends or pre-existing differences between treated and control firms, I conduct a placebo test using only the pre-SARFAESI period. Specifically, I restrict the sample to the years 1995 to 2001 and artificially classify the post-treatment period as the years after 1998. Since the actual SARFAESI Act was enacted only in 2002, there should be no significant treatment effect during this earlier period if the baseline estimates truly capture the causal impact of the reform.

The placebo specification follows the same difference-in-differences framework used in the baseline analysis:

$$Inefficiency_{i,j,t} = \alpha + \beta_1(Post_t \times Treat_i) + \gamma X_{i,j,t} + \mu_i + \lambda_t + \epsilon_{i,j,t} \quad (5)$$

where the placebo post-period is defined as the years after 1998. The interaction term $Post_t \times Treat_i$ therefore captures whether firms borrowing exclusively from GOBs exhibit differential changes in investment inefficiency during a period when no actual creditor rights reform occurred.

The results of the placebo regressions are presented in Table 9. Across all specifications barring 2, the coefficient on the interaction term is statistically insignificant. More importantly there is no systematic positive effect comparable to the post-SARFAESI estimates. This absence of consistent placebo effects suggests that firms borrowing exclusively from GOBs were not already experiencing diverging trends in investment inefficiency before the enactment of the reform.

8 Conclusion

I use the SARFAESI Act of 2002 as a natural experiment to examine whether firms that borrowed only from government-owned banks (GOBs) changed their investment behavior differently after the reform compared to firms borrowing from private lenders and GOBs. The SARFAESI Act brought an important change to India's financial system because it gave secured creditors the power to seize and sell collateral without going through long court procedures. This strengthened creditor rights and increased the bargaining power of lenders.

Most previous studies focus on the positive outcomes of stronger creditor rights such as better loan recovery and improved financial discipline among borrowers. Some research points out that stronger creditor protection may also increase the risk of liquidation and influence firms' financing and investment decisions in unintended ways. This issue is especially important in India where government-owned banks play a dominant role in lending and often operate with goals that go beyond simple profit maximization.

The findings of this paper suggest that lender ownership matters significantly for understanding the consequences of creditor rights reforms. I find that firms borrowing exclusively from GOBs experienced a significant increase in investment inefficiency following the SARFAESI Act relative to other firms. The results are economically meaningful. The baseline estimates imply that investment inefficiency increased by approximately 14 percent relative to the sample mean for treated firms.

I also provide evidence on the mechanism underlying these results. The heterogeneity analysis shows that the increase in investment inefficiency is concentrated among firms with high levels of

tangible assets. These firms possess more collateralizable assets and are therefore more exposed to creditor intervention under stronger enforcement regimes. The positive and significant triple interaction term suggests that the effects of the SARFAESI Act operate primarily through the collateral enforcement channel. In other words creditor rights matter most when enforcement is feasible.

These findings are consistent with the broader creditor rights literature particularly the argument developed by [Vig \(2013\)](#) that stronger creditor rights can create liquidation bias. Because creditors do not fully participate in the upside gains from continuation, they may prefer liquidation even when continuation generates greater economic value. Firms anticipating this stronger creditor intervention may alter their investment behavior in inefficient ways. The results of this paper suggest that these distortions become more severe when firms rely on GOBs.

One possible explanation is that GOBs may not discipline firms in the same way as private lenders. Public sector banks often pursue social or developmental objectives in addition to profit maximization. Such objectives may weaken efficient monitoring and encourage continuation of inefficient firms. Bureaucratic constraints and fear of investigations by agencies such as the CBI or CVC may induce overly cautious behavior among managers of GOBs. These competing incentives may result in inefficient enforcement decisions and distort firms' investment choices after the reform.

The results remain robust across several alternative specifications and robustness checks. Restricting the sample to manufacturing firms produces similar findings which indicates that the results are not driven by sectoral composition. Propensity score matching also yields comparable estimates suggesting that the findings are not explained by observable differences between treated and control firms. In addition placebo tests using only the pre-reform period show no evidence of differential pre-trends.

Future research can extend this analysis in several directions. One possible extension would be to examine how the later Insolvency and Bankruptcy Code (IBC) interacted with GOBs and whether the effects documented in this paper persisted under the new insolvency framework. Another direction would be to use loan-level or project-level data to better understand how creditor intervention

influences specific investment decisions.

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Table 1: Variable Definitions

Variable	Definition
Investment Inefficiency	Absolute value of the residual obtained from the expected investment model estimated following equation 1 and 2
Investment	Cash outflow from purchase of fixed assets adjusted for cash inflow from sale of fixed assets, scaled by lagged total assets.
Assets	Natural logarithm of total assets.
ROA	Return on assets measured as net income scaled by total assets.
Age	Natural logarithm of one plus firm age.
Tangibility	Ratio of net fixed assets to total assets.
CFO	Cash flow from operating activities scaled by total assets.
Leverage	Ratio of total debt to total assets.
Post	Indicator variable equal to one for years after 2002 and zero otherwise.
Treat	Indicator variable equal to one for firms borrowing exclusively from government-owned banks and zero otherwise.
HighTangibility	Indicator variable equal to one for firms with above median tangibility and zero otherwise.

Table 2: Descriptive Statistics

	N	Mean	SD	Min	Median	Max
Investment Inefficiency	8424	0.07	0.07	0.00	0.04	0.57
Assets	8424	6.37	1.62	3.15	6.21	11.49
Roa	8424	0.06	0.05	-0.01	0.04	0.28
Age	8424	2.99	0.72	1.39	2.94	4.56
Leverage	8424	0.30	0.17	0.00	0.29	0.72
Tangibility	8424	0.34	0.18	0.01	0.33	0.78
CFO	8424	0.08	0.10	-0.25	0.08	0.36

Table 3: Pairwise Correlations Among Key Variables

	Investment Inefficiency	Assets	Roa	Age	Leverage	Tangibility	CFO
Investment Inefficiency	1						
Assets	-0.044***	1					
Roa	0.093***	0.094***	1				
Age	-0.086***	0.279***	-0.020***	1			
Leverage	0.063***	0.100***	-0.306***	0.098***	1		
Tangibility	0.081***	0.044***	-0.056***	-0.123***	0.300***	1	
CFO	0.050***	0.133***	0.329***	0.098***	-0.042***	0.279***	1

Table 4: Regression Results

Dependent Variable:	Investment Inefficiency					
Model:	(1)	(2)	(3)	(4)	(5)	(6)
<i>Variables</i>						
Post \times Treat	0.010** (0.004)	0.009** (0.004)	0.006* (0.004)	0.007** (0.004)	0.008** (0.004)	0.008* (0.004)
Assets		-0.031*** (0.005)		-0.002*** (0.001)		-0.029*** (0.006)
Roa		0.157*** (0.037)		0.153*** (0.025)		0.139*** (0.038)
Age		0.005 (0.013)		-0.007*** (0.001)		0.008 (0.013)
Leverage		-0.037** (0.015)		0.026*** (0.006)		-0.050*** (0.016)
Tangibility		-0.121*** (0.021)		0.016*** (0.006)		-0.114*** (0.020)
CFO		0.007 (0.013)		0.011 (0.011)		-0.004 (0.013)
Treat			-0.001 (0.003)	-0.002 (0.003)		
<i>Fixed Effects</i>						
Firm	Yes	Yes			Yes	Yes
Year	Yes	Yes				
Industry-Year			Yes	Yes	Yes	Yes
<i>Fit Statistics</i>						
Observations	7,982	7,465	8,424	7,915	7,982	7,465
R ²	0.336	0.376	0.128	0.150	0.381	0.419
Within R ²	0.001	0.052	0.001	0.023	0.001	0.049

Standard errors clustered at the firm level.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

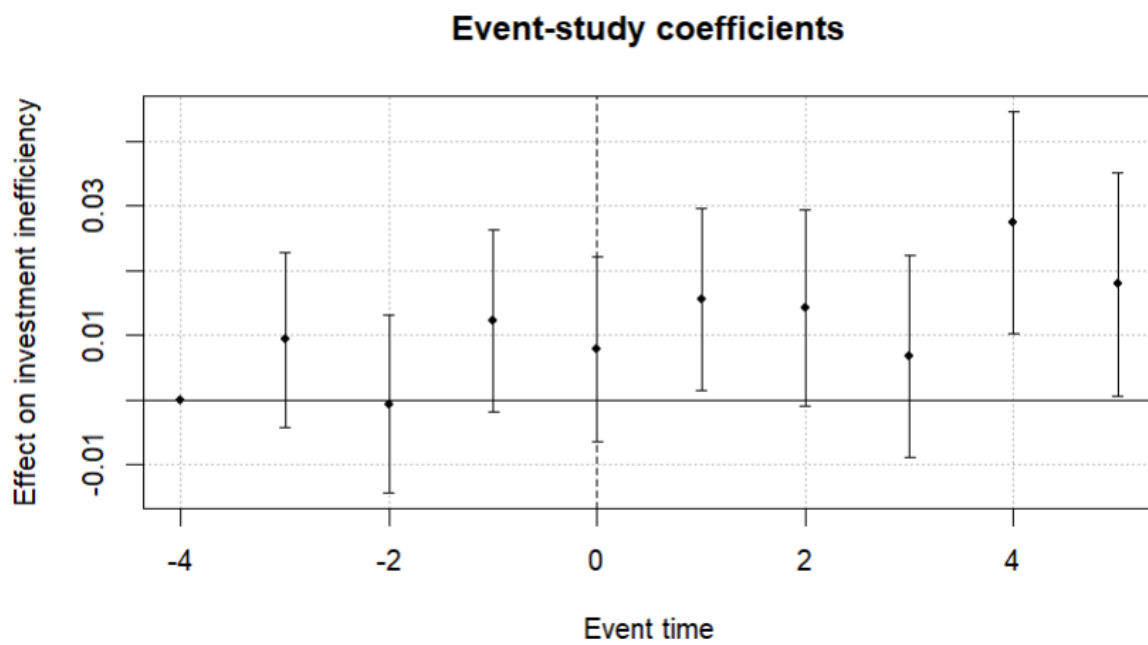


Figure 1: Event-Study Coefficients

Table 5: Regression Results in Manufacturing Firms

Dependent Variable:	Investment Inefficiency					
Model:	(1)	(2)	(3)	(4)	(5)	(6)
<i>Variables</i>						
Post × Treat	0.009** (0.005)	0.009* (0.005)	0.006 (0.004)	0.007 (0.004)	0.008* (0.005)	0.008* (0.005)
Assets		-0.031*** (0.007)		-0.002** (0.001)		-0.030*** (0.007)
Roa		0.140*** (0.041)		0.134*** (0.029)		0.130*** (0.044)
Age		0.008 (0.016)		-0.008*** (0.002)		0.010 (0.016)
Leverage		-0.027 (0.018)		0.024*** (0.007)		-0.039** (0.018)
Tangibility		-0.129*** (0.024)		0.005 (0.007)		-0.121*** (0.024)
CFO		0.014 (0.015)		0.019 (0.013)		0.002 (0.015)
Treat			0.001 (0.003)	-0.001 (0.003)		
<i>Fixed Effects</i>						
Firm	Yes	Yes			Yes	Yes
Year	Yes	Yes				
Industry-Year			Yes	Yes	Yes	Yes
<i>Fit Statistics</i>						
Observations	6,034	5,687	6,304	5,964	6,034	5,687
R ²	0.322	0.362	0.128	0.147	0.363	0.402
Within R ²	0.001	0.051	0.001	0.019	0.001	0.049

Standard errors clustered at the firm level.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 6: Heterogeneity Results

Dependent Variable:	Investment Inefficiency			
Model:	(1)	(2)	(3)	(4)
<i>Variables</i>				
hitan	0.006 (0.006)	0.021*** (0.006)	0.005 (0.006)	0.020*** (0.006)
Post × Treat	-0.000 (0.005)	-0.002 (0.006)	-0.001 (0.005)	-0.002 (0.006)
Post × hitan	-0.001 (0.005)	-0.003 (0.005)	-0.002 (0.005)	-0.003 (0.005)
Treat × hitan	-0.010 (0.010)	-0.012 (0.010)	-0.008 (0.010)	-0.010 (0.010)
Post × Treat × hitan	0.017** (0.008)	0.018** (0.008)	0.016** (0.008)	0.016* (0.008)
Assets		-0.032*** (0.005)		-0.030*** (0.006)
Roa		0.160*** (0.037)		0.143*** (0.038)
Age		0.008 (0.013)		0.012 (0.013)
Leverage		-0.041*** (0.015)		-0.054*** (0.015)
Tangibility		-0.143*** (0.021)		-0.134*** (0.021)
CFO		0.006 (0.013)		-0.005 (0.013)
<i>Fixed Effects</i>				
Firm	Yes	Yes	Yes	Yes
Year	Yes	Yes		
Industry-Year			Yes	Yes
<i>Fit Statistics</i>				
Observations	7,982	7,465	7,982	7,465
R ²	0.337	0.381	0.382	0.423
Within R ²	0.003	0.059	0.002	0.055

Standard errors clustered at the firm level.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 7: Covariate Balance Before and After Matching

Variable	Before Matching				After Matching			
	Mean Treated	Mean Control	Diff	p-value	Mean Treated	Mean Control	Diff	p-value
Assets	5.944	6.776	-0.832***	0.000	5.973	6.209	-0.237***	0.008
Roa	0.054	0.062	-0.008***	0.006	0.055	0.057	-0.001	0.653
Age	2.892	2.996	-0.105***	0.008	2.896	2.912	-0.016	0.702
Leverage	0.298	0.293	0.005	0.582	0.295	0.301	-0.006	0.568
Tangibility	0.379	0.348	0.031***	0.003	0.379	0.364	0.016	0.163
CFO	0.081	0.082	-0.001	0.874	0.082	0.081	0.002	0.777

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 8: Regression Results after Propensity Score Matching

Dependent Variable:	Investment Inefficiency					
Model:	(1)	(2)	(3)	(4)	(5)	(6)
<i>Variables</i>						
Post × Treat	0.009** (0.005)	0.011** (0.005)	0.007 (0.004)	0.007* (0.004)	0.009* (0.005)	0.010** (0.005)
Assets		-0.023*** (0.007)		-0.003*** (0.001)		-0.023*** (0.007)
Roa		0.187*** (0.050)		0.196*** (0.036)		0.170*** (0.051)
Age		-0.008 (0.016)		-0.006*** (0.002)		-0.001 (0.017)
Leverage		-0.058*** (0.021)		0.024*** (0.009)		-0.079*** (0.021)
Tangibility		-0.101*** (0.024)		0.025*** (0.008)		-0.095*** (0.024)
CFO		-0.001 (0.017)		0.013 (0.016)		-0.017 (0.017)
Treat			-0.003 (0.003)	-0.003 (0.003)		
<i>Fixed Effects</i>						
Firm	Yes	Yes			Yes	Yes
Year	Yes	Yes				
Industry-Year			Yes	Yes	Yes	Yes
<i>Fit Statistics</i>						
Observations	4,373	4,252	4,476	4,356	4,373	4,252
R ²	0.292	0.326	0.131	0.157	0.347	0.383
Within R ²	0.001	0.049	0.001	0.028	0.001	0.050

Standard errors clustered at the firm level.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 9: Placebo Regression Results

Dependent Variable:	Investment Inefficiency					
Model:	(1)	(2)	(3)	(4)	(5)	(6)
<i>Variables</i>						
Post × Treat	-0.005 (0.007)	-0.011* (0.007)	-0.004 (0.007)	-0.003 (0.006)	-0.005 (0.007)	-0.011 (0.007)
Assets		-0.061*** (0.013)		-0.002* (0.001)		-0.059*** (0.012)
Roa		0.125** (0.059)		0.149*** (0.041)		0.126** (0.059)
Age		0.014 (0.025)		-0.007*** (0.002)		0.019 (0.026)
Leverage		-0.158** (0.063)		0.022** (0.009)		-0.158*** (0.063)
Tangibility		-0.133*** (0.030)		0.002 (0.009)		-0.123*** (0.029)
CFO		-0.030 (0.019)		0.013 (0.017)		-0.040** (0.020)
Treat			0.002 (0.006)	0.001 (0.006)		
<i>Fixed Effects</i>						
Firm	Yes	Yes			Yes	Yes
Year	Yes	Yes				
Industry-Year			Yes	Yes	Yes	Yes
<i>Fit Statistics</i>						
Observations	3,167	3,066	3,550	3,413	3,167	3,066
R ²	0.446	0.515	0.129	0.148	0.484	0.549
Within R ²	0.000	0.104	0.000	0.019	0.000	0.100

Standard errors clustered at the firm level.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.