Creditor Rights and Credit Cycles*

Martin Kornejew† Shohini Kundu‡ Karsten Müller §

Preliminary Draft

August 20, 2025

Please do not cite nor circulate

Abstract

Do creditor rights amplify or mitigate the macroeconomic risks of credit cycles? Using a panel of 39 countries from 1978 to 2020, we find that an expansion in business credit predicts larger output losses, rising non-performing loans, an erosion of bank capital, and continued credit growth to risky firms in economies with weak creditor rights. Evidence from staggered legal reforms across U.S. states confirms that strong creditors lend less to highly levered firms with faltering growth prospects. Together, these results emphasize the benefits of creditor rights for resource reallocation after ill-fated credit booms.

*We thank Viral Acharya, Vladimir Asriyan, Olivier Darmouni, Edie Hotchkiss, Simone Lenzu, Yueran Ma, Bruno Pellegrino, Noémie Pinardon-Touati, Olivier Wang, and seminar participants at Columbia Business School for their insightful comments. We are grateful to Aurelio Gurrea-Martinez for sharing his creditor rights index. We thank Arnav Mishra for excellent research assistance. All errors are our own. Martin Kornejew gratefully acknowledges financial support from the Open Society Foundations.

†Bocconi University, Department of Finance; martin.kornejew@unibocconi.it

‡University of California, Los Angeles, Anderson School of Management; shohini.kundu@anderson.ucla.edu

§National University of Singapore, Business School; kmueller@nus.edu.sg

1 Introduction

Credit booms and busts are a salient feature of modern macroeconomic fluctuations. Rapid, debt-fueled expansions often precede financial crises and severe recessions (e.g., Kindleberger, 1978; Minsky, 1977; Reinhart and Rogoff, 2011; Schularick and Taylor, 2012; Greenwood et al., 2022; Müller and Verner, 2023). Recent literature has pointed to the macroeconomic benefits of bankruptcy institutions in salvaging the value of defaulting firms (Jordà et al., 2022; Kornejew et al., 2024). This raises a fundamental question: Does the distribution of value between shareholders and creditors matter? In this paper, we test competing hypotheses on how legal protection of creditor interests shapes the macroeconomic aftermath of credit expansions.

Strong creditor protection undergirds credit markets by reducing borrower moral hazard (e.g., La Porta et al., 1998; Djankov et al., 2007; Benmelech and Bergman, 2011). However, excessive creditor power may also hamper efficient debt restructuring by inducing a bias towards liquidation of firms (Vig, 2013; Kornejew, 2025), and suppress productive risk-taking by increasing the perceived cost of failure (e.g., Acharya and Subramanian, 2009; Acharya et al., 2011). While these studies focus on steady-state effects, we study the link between creditor rights and business cycles.

Do legal creditor protections amplify or dampen the macroeconomic aftermath of credit cycles? Studies focusing on household debt have illustrated how liquidation bias of strong creditors can exacerbate fire sales and aggregate demand externalities, deepening economic downturns (Mian et al., 2015; Auclert and Mitman, 2023). While similar mechanisms may be operational for business debt, the liquidation of businesses can also free up factors of production that could be deployed more productively elsewhere.[1]

We document that stronger creditor rights are systematically associated with smaller output losses following business credit expansions. Under a weak creditor rights regime, creditors face a dual challenge as capital buffers shrink: they have strong incentives to evergreen or engage in zombie lending due to low recovery prospects in bankruptcy, while simultaneously heavily discounting new lending opportunities because of rampant borrower moral hazard. This dynamic slows the macroeconomic rebalancing process after credit booms and ultimately thwarts economic growth. Notwithstanding, we also find evidence that credit booms may grow larger under strong creditor rights regimes, suggesting a potential trade-off for policymakers.

[1] Stronger creditor rights might also curb risk taking of borrowers during the boom, but with ambiguous implications for economic efficiency (cf. Acharya et al., 2011).

We proceed in four steps. First, we develop hypotheses about creditor rights' potential cyclical ramifications, building on literature that has examined creditor rights or credit cycles. The emerging conceptual framework and empirical predictions guide our subsequent analysis.

Second, we compile a novel cross-country annual panel dataset of creditor rights in corporate bankruptcy—spanning 39 countries from 1978 through 2020—by combining separate indices by Djankov et al. (2007) and Gurrea-Martinez (2025). We merge standard macroeconomic data including corporate and household credit among other variables. Equipped with this data, we establish several macroeconomic facts about credit cycles under different legal regimes. We document that boom-bust episodes in business credit markets are associated with significantly worse macroeconomic outcomes in countries with weak creditor rights. In contrast, countries with stronger creditor protection experience milder contractions after credit booms. The estimated magnitudes are quantitatively significant: Where creditor protection is weakest, a 10 percentage points increase in the business debt-to-GDP ratio over three years predicts cumulative real GDP losses of around 15 percentage points over five years. By contrast, the trajectory of real GDP remains effectively unscathed in economies with the strongest creditor protections.

This pattern is robust to controls of economic development, financial depth, and the overall efficiency of bankruptcy procedures. Efficient bankruptcy regimes manage to protect and accommodate the interests of both creditors and debtors (Gurrea-Martinez, 2025). However, we show empirically that debtor protection does not exhibit similar correlations with macroeconomic outcomes. This points specifically to the role of creditor enforcement, above and beyond the influence of general bankruptcy efficiency or sophistication of legal institutions.

Third, we explore the mechanisms behind these predictive patterns. In countries with weak creditors, credit booms are followed by increasing non-performing loans and an erosion of the book and market value of bank equity, while we find no such pattern where creditors are strong. In addition, we find differences in the riskiness of credit allocation. Using cross-country data on the share of corporate bond issues classified as high yield from Kirti (2025), we find risky credit falls sharply after credit booms in strong-enforcement regimes but remains flat in countries with weaker rights.

To identify a causal effect of creditor rights on the allocation of credit, we exploit the staggered adoption of antirecharacterization laws across U.S. states between 1997 and 2005. These laws strengthened creditors' ability to enforce claims on assets in special-purpose vehicles (SPVs), shielding them from the automatic stay of bankruptcy procedures. Using a difference-

in-differences design, panel regressions, placebo tests, and hand-collected data on firm subsidiaries to measure the use of SPVs, we find that risky firms curb debt growth when subject to stronger creditor rights. Importantly, this effect is concentrated among risky firms with *low* Tobin's Q, i.e. those with dubious growth prospects; risky firms with high Tobin's Q even experience a moderate increase in debt. The heterogeneity indicates an allocation of credit from firms with limited investment opportunities to those with plenty, consistent with the idea that stronger creditor rights result in a weaker incentive to "evergreen" and lower credit constraints.

In the fourth and final step, we examine the size and frequency of business credit booms under varying creditor rights regimes. We find that credit booms tend to be larger under strong creditor protection, with business credit responding more strongly to innovations in aggregate total factor productivity. This is consistent with stronger creditors' greater willingness to lend to riskier firms, given their enhanced control in the event of default. Combined with our earlier findings, this evidence confirms that creditor rights make credit booms more likely, but at the same time might at least in part mitigate their potentially negative output losses.

Our findings shed light not only on the cyclical implications of creditor rights but also on the fundamental nature of credit boom-bust episodes. The heterogeneity we observe points to obstacles to credit reallocation as a key factor behind sluggish growth after credit cycles.

Our perspective differs from, and complements, the prominent narrative that emphasizes financial crises and a decline in the *quantity* of credit (e.g., Kindleberger, 1978; Minsky, 1977; Reinhart and Rogoff, 2011; Schularick and Taylor, 2012; Greenwood et al., 2022). It also reinforces research that highlights the importance of credit allocation during the boom itself (Mian et al., 2015; Müller and Verner, 2023).

These conclusions have potential policy implications. Generally, measures that stimulate credit reallocation after a boom can accelerate economic rebalancing and recovery. In the short run, our findings suggest that temporary credit guarantees for new loans to firms with little debt could incentivize banks to lend beyond their existing base of legacy borrowers. Additionally, expedited bankruptcy procedures may shift the balance in favor of liquidating nonperforming loans rather than evergreening them. In the long run, our findings suggest that developing corporate bond markets could limit the role of relationship lending, which may be prone to evergreening and zombie lending. Furthermore, legal reforms that strengthen creditor rights may speed up credit reallocation after booms, though they may also contribute to making those booms larger. Our empirical analysis thus cannot assess the welfare implications

of stronger creditor rights, and we leave such a study for future work.

Other related Literature In addition to the aforementioned literature at the intersection of law, macro-finance, and corporate credit, we contribute to the literature on financial frictions and misallocation. Studies have shown that financial frictions can lead to inefficient resource allocation (e.g., Midrigan and Xu, 2014; Gopinath et al., 2017). Arguably, those risks are most prominent during episodes of rapid credit expansions. Our results indicate that stronger creditor protection not only mitigates financial frictions that may cause misallocation in the first place, but in addition help to rectify them should they be revealed ex post. This argument has been made most forcefully by Becker and Ivashina (2022), who argue that weak insolvency regimes are a root cause of "zombie lending," i.e. continued lending to unviable, unproductive firms.

Relative to recent prior papers that studied the influence of bankruptcy regimes on credit cycle outcomes (Jordà et al., 2022; Kornejew et al., 2024), we show that the distribution of value between creditors and debtors matters beyond the value lost due to bankruptcy deadweight. Different from these papers, we show that bankruptcy regimes also matter for the materialization of credit risk in the form of non-performing loans and eroding bank capitalization, study the importance of credit allocation, and provide causal evidence on the role of creditor rights from a natural experiment.

2 Conceptual Framework and Testable Predictions

This section develops a theoretical framework examining the relationship between creditor rights and business cycle fluctuations. The literature highlights two competing hypotheses. Section 2.1 explores the *amplification view*, which posits that stronger creditor rights exacerbate business cycle fluctuations by expanding credit supply during booms and accelerating liquidation during downturns. Section 2.2 examines the *dampening view*, which argues that strong creditor protection moderates economic volatility by inducing ex-ante borrower discipline, protecting balance sheet health, and an improved allocation of capital. Section 2.3 synthesizes these theoretical perspectives into testable empirical predictions that guide our subsequent analysis.

2.1 The Amplification View

The amplification view holds that creditor rights exhibit asymmetric effects across different phases of the business cycle. The core mechanism begins with how stronger creditor rights improve the outside option of creditors in renegotiation, as shown in models by Hart and Moore (1998) and Holmstrom and Tirole (1997); Holmström and Tirole (1998). This improvement in creditors' bargaining position raises the ex-ante pledgeability of cash flows, thereby expanding credit supply. However, because liquidation values move procyclically, this same mechanism that boosts credit during good times also exacerbates asset sales when resale prices are low, potentially deepening the downturn (Shleifer and Vishny, 1992).

This amplification occurs through two interconnected channels. First, higher pledgeability creates tighter links between borrowing and collateral values or net worth, as emphasized in the financial accelerator frameworks of Kiyotaki and Moore (1997) and Bernanke et al. (1999). When collateral values rise, borrowers can pledge more of their returns to creditors, fueling credit expansion. But when these values fall, the same tight linkage forces sharp contractions in borrowing capacity. Second, stronger creditor rights alter the resolution of financial distress by tilting outcomes toward liquidation rather than reorganization (Aghion et al., 1992). While this may improve recovery rates during normal times, it becomes problematic during widespread distress when fire sale dynamics can emerge.

While the prospect of higher recovery values encourages banks to expand credit supply during the boom, Diamond and Rajan (2001) show how creditor control rights can destabilize banks when collateral values subsequently fall. Drozd and Serrano-Padial (2018) demonstrate how stronger enforcement can accelerate liquidation during downturns, creating feedback loops that depress asset prices further. Diamond and Rajan (2011) show that higher expected liquidation values can increase each creditor's private incentive to withdraw funds from banks during potential crises, potentially triggering the very fire sales that creditor rights were meant to protect against.

A rich body of empirical work supports these theoretical mechanisms. Cross-country studies consistently show that stronger creditor rights expand credit supply, with creditor protections associated with both deeper credit markets (La Porta et al., 1998) and more favorable loan terms (Qian and Strahan, 2007; Bae and Goyal, 2009; Haselmann et al., 2010). Pence (2006) and Dagher and Sun (2016) use differences in foreclosure procedures across U.S. states as a natural experiment, showing that nonjudicial foreclosure—which strengthens creditor rights by bypassing court approval—leads to both larger mortgage loans and lower interest rates. Because

credit supply is highly procyclical—during booms, credit risk is high (Greenwood and Hanson, 2013; Kirti, 2025) but credit spreads are low (Krishnamurthy and Muir, 2017; Mian et al., 2017)—strong creditors can act as an amplifying factor. Houston et al. (2010) provide some indirect evidence by showing that stronger creditor rights correlate with higher bank riskiness and an increased probability of banking crises.

The amplifying effects of strong creditor rights become particularly pronounced during downturns. While stronger creditor rights facilitate faster insolvency resolution and higher recovery values, this occurs partly through increased liquidation rather than reorganization (Davydenko and Franks, 2008; Djankov et al., 2008; Rodano et al., 2016). The costs of this liquidation bias became evident during the 2007-08 financial crisis: Mian et al. (2015) found that U.S. states with nonjudicial foreclosure experienced not only more foreclosures but also larger house price drops and deeper output losses. The negative spillovers extend beyond the distressed firms themselves: Bernstein et al. (2019a) show that liquidation can lead to an inefficient allocation of assets in bankruptcy, and Bernstein et al. (2019b) document harmful spillover effects on nearby firms. The implication is that, while strong creditor rights may protect individual lenders, they can make economy-wide downturns more severe by leading to excessive liquidation of borrowers.

In summary, the *amplification view* sees creditor rights as a source of volatility or tail risk. In booms, stronger creditor rights increase banks' willingness to supply credit by raising expected recovery values, especially for lower-quality borrowers due to adverse selection. In busts, stronger rights enable creditors to liquidate borrowers more quickly, which triggers sharper declines in asset prices and real activity.

2.2 The Dampening View

The dampening view argues that stronger creditor rights stabilize the financial system and real economy by disciplining borrowers' ex-ante, making balance sheets more resilient, and improving the allocation of capital. While this perspective recognizes that stronger creditor rights increase credit supply, it emphasizes that they can ultimately make the conditions leading to business cycle downturns less likely ex-ante, and further help resolve problems when they arise ex-post.

When borrowers know that creditors can more effectively seize control and liquidate assets in default, they face stronger incentives to avoid the actions that lead to distress. Holmstrom and Tirole (1997); Holmström and Tirole (1998) show that stronger enforcement increases the

share of project returns that can be credibly pledged to investors, making shirking less attractive and reducing moral hazard. Similarly, in Hart and Moore (1998), creditor control rights strengthen repayment incentives by raising the cost of diversion. The threat of losing control thus has a disciplining effect on firms' risk-taking behavior (Aghion et al., 1992; Shleifer and Vishny, 1992).

This ex-ante discipline operates through multiple channels. Borrowers anticipating potential liquidation, especially during downturns when collateral values are depressed, become more conservative in their project selection and financing choices (Shleifer and Vishny, 1992). The enforceable collateral constraints emphasized by Kiyotaki and Moore (1997) limit borrowing to the value of seizable assets, naturally steering leverage toward more sustainable levels. The result is a financial system where excessive risk-taking becomes self-limiting, as the very possibility of effective creditor enforcement deters the accumulation of debt that might later require resolution.

Beyond these ex-ante effects, stronger creditor rights can stabilize the financial system by protecting balance sheets when shocks occur. Empirical evidence shows that strong creditor protections lead to higher recovery values, reduced strategic default, and lower loan losses (Davydenko and Franks, 2008; Rodano et al., 2016; Ghent and Kudlyak, 2011; Tantri, 2020; Heitz and Narayanamoorthy, 2021). As a result, strong creditors tend to have strong balance sheets, which creates buffers that can absorb negative shocks without forcing sharp contractions in credit supply. In theoretical frameworks such as He and Krishnamurthy (2013) and Brunnermeier and Sannikov (2014), such balance sheet strength is crucial to stabilize the economy, because well-capitalized banks can continue lending even during downturns. The dampening effect extends to borrower balance sheets as well: firms that face stronger disciplinary incentives during booms are more likely to maintain higher net worth during the bust, which would stabilize the economy in financial accelerator models (Bernanke et al., 1999).

Stronger creditor rights can also improve the allocation of capital, particularly during periods of distress. The control rights framework of Aghion et al. (1992) shows how transferring control to creditors can improve the allocation of underperforming assets by moving them to more productive users. This reallocation mechanism becomes critical during downturns, when the ability to cut off funding to insolvent firms can prevent the emergence of "zombie lending"—lending to fundamentally unviable, unproductive businesses. Empirical evidence suggests that zombie lending can significantly drag down economic growth (Hoshi and Kashyap, 2004; Peek and Rosengren, 2005; Caballero et al., 2008; Giannetti and Simonov, 2013;

Schivardi et al., 2021; Acharya et al., 2024), particularly when bankruptcy systems function poorly (Jordà et al., 2022; Kornejew et al., 2024). Becker and Ivashina (2022) provide compelling evidence for this mechanism, showing that more efficient insolvency proceedings—themselves a function of stronger creditor rights—are correlated with fewer zombie firms following the 2007-08 Global Financial Crisis.

In closing, the dampening view holds that stronger creditor rights can mitigate business cycle fluctuations for two reasons: (i) they tilt the ex-ante and ex-post allocation of credit away from risky, unviable firms, and (ii) they protect bank and borrower balance sheets during the downturn. From a macroeconomic perspective, these arguments view the early resolution of distress induced by stronger creditor rights as mitigating rather than amplifying cyclical fluctuations.

2.3 Empirical Predictions

The two competing views of stronger creditor rights as amplifiers or dampeners of credit and business cycles above generate distinct empirical predictions. While both mechanisms likely operate in practice, we can test which effect is more useful for describing equilibrium relationships in the data.

Boom dynamics Under the amplification view, stronger creditor rights should increase both the probability and severity of credit booms, because the prospect of higher recovery rates encourages lenders to extend credit more aggressively in response to positive shocks. Conversely, the dampening view predicts that strong creditor protections reduce the intensity of booms by deterring excessive borrowing through ex-ante disciplinary effects.

Depth of recessions The amplification hypothesis implies that countries with stronger creditor rights should experience deeper and more persistent recessions following credit booms, as aggressive liquidation strategies and fire sale externalities amplify the initial downturn. The dampening view suggests the opposite: stronger creditor rights should mitigate the severity of recessions by preserving the net worth of banks and borrowers.

Bank health During downturns following a credit boom, the amplification view predicts that stronger creditor rights are correlated with larger increases in non-performing loan ratios and sharper declines in bank equity values, reflecting the destabilizing effects of widespread

liquidation. Under the dampening view, enhanced creditor protections should insulate banks from losses and an erosion of capital.[2]

Credit allocation The amplification view suggests that stronger creditor rights exacerbate adverse selection during booms, channeling a disproportionate amount of credit toward riskier borrowers. By contrast, the dampening view implies that enhanced creditor protections reduce evergreening incentives, leading to more conservative lending standards and lower credit growth to firms with poor fundamentals.[3]

In sum, the amplification and dampening views of creditor rights and credit cycles provide us with several testable predictions. We begin by testing these in cross-country panel data and then turn to an identification strategy based on a natural experiment in the United States.

3 Data Sources and Description

3.0.1 Cross-Country Data

We assemble a cross-country panel dataset of macroeconomic information at annual frequency from several different sources.

Country panel data on creditor rights We obtain data on creditor rights from Djankov et al. (2007), based on La Porta et al. (1998), as well as a new dataset on creditor set compiled by Gurrea-Martinez (2025). Djankov et al. (2007) measure four important legal features that define rights for creditors when corporate borrowers are in financial distress across 133 countries over the time period 1978-2003. Gurrea-Martinez (2025) measures a large range of features of corporate bankruptcy laws in 53 countries over the time period 2000 to 2023. We focus on his index of legal protections for secured creditors, which is conceptually closest to creditor rights coded by Djankov et al. (2007). Figure 1 visualizes both indices in a scatter plot for the cross section of the year 2004. Despite some discrepancies, the two indices exhibit a strong positive correlation.

For econometric analysis, we standardize both indices via percentile rank transformations in order to splice them into a composite index $L_{i,t} \in [0, 1]$. That is, we use the empirical

[2] We acknowledge that banking sector outcomes may partly reflect the overall severity of economic downturns rather than independent effects on financial stability.

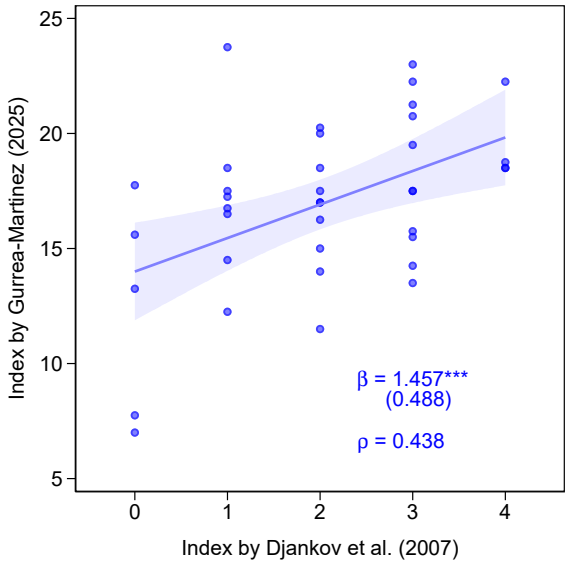
[3] Higher bank and borrower net worth under strong creditor rights could theoretically enable greater risk-bearing capacity, though the disciplinary effects should dominate in practice.

cumulative distribution function of each index to map corresponding index values to the unit interval. For overlapping coverage during 2000-2004, we prioritize information from Djankov et al. (2007):

$$L_{i,t} = \begin{cases} \frac{1}{n^D} \sum_j^{n^D} \mathbb{1}(L_j^D \leq L_{i,t}^D) & \text{if} \quad t < 2005 \\ \frac{1}{n^G} \sum_j^{n^G} \mathbb{1}(L_j^G \leq L_{i,t}^G) & \text{if} \quad t \geq 2005 \end{cases} \tag{1}$$

where L^D, L^G, n^D and n^G denote indices of Djankov et al. (2007) or Gurrea-Martinez (2025) and their respective sample sizes. That is, the strongest (weakest) creditor rights regimes score value of $L_{i,t}$ close to one (zero). Appendix Figure A.1 visualizes $L_{i,t}$ for our baseline sample, i.e., country-year observations with coverage on other macroeconomic variables, notably aggregate firm debt.

Figure 1: Correlation Between Creditor Rights Indices



Notes: This figure plots a scatter plot showing the correlation between the creditor rights index by Djankov et al. (2007) and the index for secured creditor rights from Gurrea-Martinez (2025). Each dot represents a country in 2004. The line shows the linear fit with its 95% confidence interval shaded. Coefficient and standard error are printed in the lower right corner.

Data on aggregate firm debt We use data from the Bank for International Settlement (BIS) on the total debt of non-financial firms in a given country and year. These data covers 43 advanced and emerging economies between 1980 and 2020. From the same source, we also obtain household credit to control for concurrent dynamics in mortgage and consumer credit markets. To explore the sectoral allocation of credit, we use bank lending statistics compiled by Müller and Verner (2023), which provide information on the volume of bank debt outstanding

in a given economic sector in a specific country and year. These data cover 120 countries between 1940 and 2014.

Other data We compile macroeconomic panel data on GDP, consumer prices, investment from the IMF's WEO database. We tmerge the bankruptcy efficiency measure from Kornejew et al. (2024) and the financial crises chronology from Baron et al. (2021). Data on the share of newly issued bond debt with a junk rating ("high yield share") is taken from Kirti (2025). We hand-collect data on the ratio of non-performing loans (in arrears by 90 days or more) from the national central banks, and sometimes from the IMF's Financial Soundness Indicators. Data on aggregate total factor productivity data is from the Penn World Tables. Annual bankruptcy filings are hand-collected from publications of national statistical offices and partly from CEIC.

3.0.2 U.S. Microeconomic Data

We obtain data on the quarterly financial statements of publicly listed U.S. firms, their states of incorporation, stock prices, and rating information from the *Compustat* North America Fundamentals database. These data are well-suited for our identification strategy revolving around Special Purpose Vehicles (SPVs), as listed firms are larger firms that commonly deploy sophisticated corporate structures. We also hand-collect information on firms' subsidiaries from Exhibits 21 of 10-K filings published by the Securities and Exchange Commission following Feng et al. (2009). Our sample covers the ten years between the first quarter of 1995 and the fourth quarter of 2004. We exclude financial firms (SIC code 6) and firms operating in public administration (SIC code 9).

4 Creditor Rights and the Aftermath of Credit Booms

This section presents cross-country panel evidence on how the aftermath of credit booms plays out under strong vs. weak creditor rights. We present the baseline result before identifying the underlying mechanism.

4.1 Methodology

To shed light on how creditor rights moderate macroeconomic risks of credit cycles, we build on the existing literature linking credit booms to future economic slowdowns (e.g., Mian et al.,

2017; Jordà et al., 2022; Müller and Verner, 2023). Specifically, we estimate state-dependent local projections for $h \in \{1, 2, ..., 5\}$ that predict GDP dynamics following firm credit expansions, and test for differences across legal regimes:

$$\Delta_h \log(y_{i,t+h}) = \alpha_{i,h} + \beta_{1,h}\Delta_3 c_{i,t} + \beta_{2,h}\Big(\Delta_3 c_{i,t} \times L_{i,t}\Big) + \beta_{3,h} L_{i,t} + \boldsymbol{\gamma}_h \boldsymbol{x}_{i,t} + e_{i,t} \tag{2}$$

where $y_{i,t}$ is real GDP in country i and year t, $c_{i,t}$ is the business debt-to-GDP ratio and $L_{i,t}$ is the composite creditor rights index defined in Equation (1). The vector of controls $\boldsymbol{x}$ includes the contemporaneous value and five lags of annual real GDP growth and the annual change in the household debt-to-GDP ratio. We add various institutional controls in robustness checks described below. α_h captures horizon-specific country fixed effects. The coefficients of interest, denoted by $\beta_{2,h}$, capture how predicted GDP growth varies across different creditor rights regimes.

4.2 Main Results

Figure 2 visualizes our estimates, revealing a striking heterogeneity: firm credit booms predict considerably worse real GDP growth under legal regimes with weak creditor rights. Where creditor protection is weakest ($L_{i,t} = 0$), a 10 percentage points increase in the business debt-to-GDP ratio over three years predicts cumulative real GDP losses of around 15 percentage points over five years. By contrast, real GDP trajectories remain effectively unscathed in economies with the strongest creditor protections ($L_{i,t} = 1$). Horizon-specific differences captured by $\hat{\beta}_{2,h}$ are statistically highly significant. Table A.1 exhibits estimates of all coefficients and other regression statistics for each horizon.

These conclusions are remarkably robust across a range of alternative specifications. A key concern with our baseline results is the possibility that legal institutions governing creditor rights are endogenous to broader patterns of institutional quality that co-determine financial development and macroeconomic volatility. To address this, we conduct a sequence of robustness checks.

First, we split our sample into advanced and emerging economies using the median value of GDP per capita in real USD and re-estimate local projections within each subsample. Results visualized in Appendix Figure A.2 show a remarkable stability across both groups of countries characterized by wildly different institutional contexts.

Second, we test more directly whether the effect we find for creditor rights is confounded

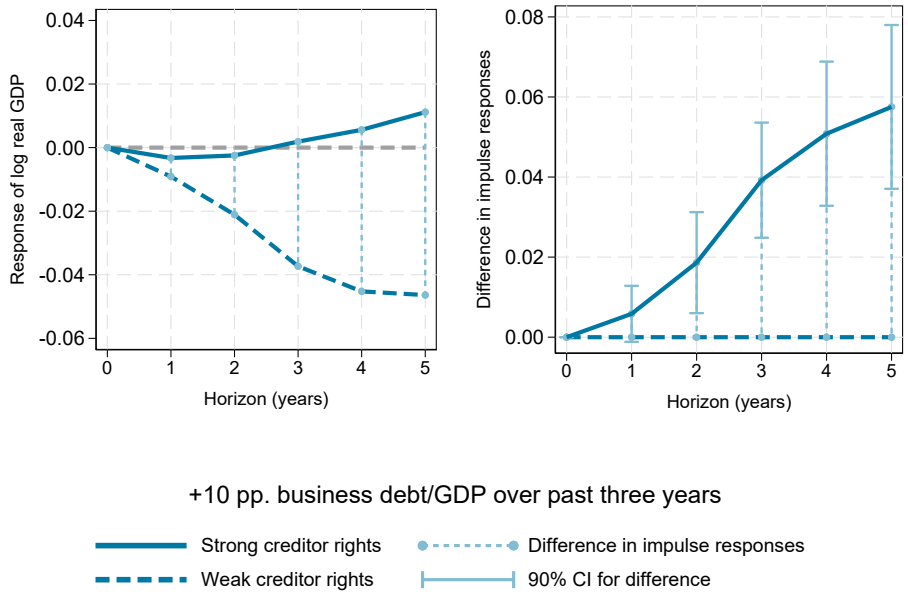
by economic and financial development. When we add the level of GDP per capita in real USD as well as its interaction with the three-year change in business credit-to-GDP ratios to our baseline specification, our conclusions remain unchanged, see Appendix Figure A.3b. Similarly, we obtain comparable results in terms of direction, magnitude and statistical precision when we control for financial development via the level of business credit-to-GDP ratios at $t-4$ as well as its interaction with the change in business credit-to-GDP ratios from $t-3$ to t, see Appendix Figure A.3c.

Third, we test whether creditor rights are merely proxying bankruptcy efficiency, which has been shown to mitigate the macroeconomic fallout from credit booms (Jordà et al., 2022; Kornejew et al., 2024). To this end, we add the measure of bankruptcy efficiency used by (Kornejew et al., 2024) as well as its interaction with the three year change in business credit-to-GDP ratios to our baseline specification and re-estimate the local projections. Results visualized in Appendix Figure A.3a confirm that creditor rights moderate the macroeconomic repercussions of business credit booms above and beyond overall efficiency in bankruptcy proceedings. In a similar vein, we run a placebo test using the index of debtor rights constructed by (Gurrea-Martinez, 2025). Efficient bankruptcy regimes manage to protect and accommodate interests of both creditors and debtors. We show in Appendix Figure A.4 that conditional on total rights, debtor protection does not exhibit similar correlations with macroeconomic outcomes. If anything, stronger debtor protection predicts weaker future GDP outcomes. This points specifically to the role of creditor enforcement, above and beyond the influence of general bankruptcy efficiency or sophistication of legal institutions.

Finally, we find our results to be stable across time and consistent across both original indices by Djankov et al. (2007) and Gurrea-Martinez (2025).

At face value, this evidence is inconsistent with hypotheses emphasizing creditor liquidation bias and fire sale externalities. Could differential trajectories following business credit booms be explained by ex ante differences in the nature of the booms? It is plausible that weak creditor protections increase the need for tangible collateral and hence strengthen the link between credit booms and real estate—a mix that has been found to be toxic to macroeconomic stability (Müller and Verner, 2023). However, when we control for the real estate intensity of the preceding boom, our main estimates remain virtually unchanged, see Appendix Figure A.7a. Similarly, our baseline conclusions cannot be explained by the quality of credit allocation during the boom as proxied by the share of debt issued by risky firms as measured by Kirti (2025), see Appendix Figure A.7b.

Figure 2: Creditor Rights and Real GDP after Business Credit Booms



Notes: This figure visualizes estimates from the local projection equation (2) for a 10 percentage points increase in the business debt-to-GDP ratio over the preceding three years. The right panel plots the impulse response in real GDP for economies with the strongest creditor rights ($0.1 \times (\hat{\beta}_{1,h} + \hat{\beta}_{2,h})$) as the solid line and for economies with the weakest creditor rights ($0.1 \times \hat{\beta}_{1,h}$) as dashed. The left panel plots the difference between those impulse responses ($\hat{\beta}_{2,h} \times 0.1$) with corresponding 90% confidence intervals based on Driscoll-Kraay standard errors.

4.3 The Role of Credit Reallocation

In this section, we investigate the role of a differential allocation of credit in explaining the dynamics of downturns following a credit expansion. There are two classes of hypotheses that could explain the baseline result presented in the previous section: (i) strong creditor rights help avoid a credit crunch, and (ii) strong creditor rights improve the quality of credit following an ill-fated boom. To test for the empirical relevance of these predictions, we re-estimate state-dependent local projections of Equation (2) for alternative dependent variables.

In the first step, we test for the dynamics of aggregate credit. Figure 3a plots the cumulative growth in real aggregate debt predicted following a business credit expansion across different creditor rights regimes. We find no statistical difference between the speed of aggregate deleveraging that could possibly explain the notable difference in output dynamics. Irrespective of the legal protection granted to creditors, businesses shed about 2 percentage points more debt than they would have done absent a +10 percentage points boom in business debt-to-GDP rations over the previous three years.

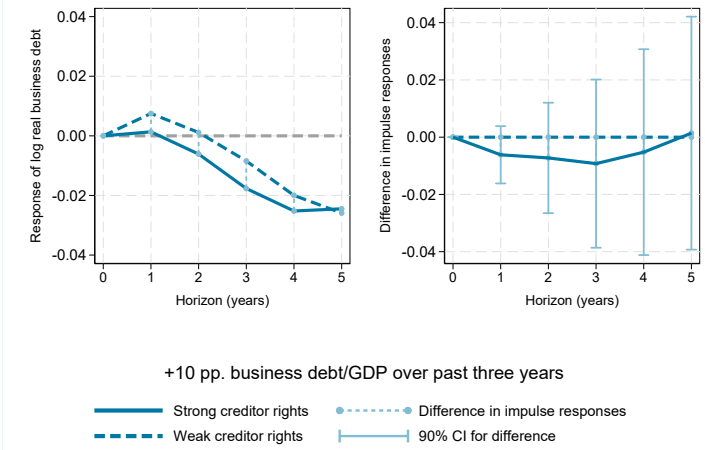
Instead, we find strong evidence in favor of a role of creditor rights in the reallocation

of credit in terms of credit risk. Figure 4 visualizes local projection estimates showing that economies with legal regimes featuring strong creditor rights see significantly lower growth of credit to low quality firms in the aftermath of credit booms.

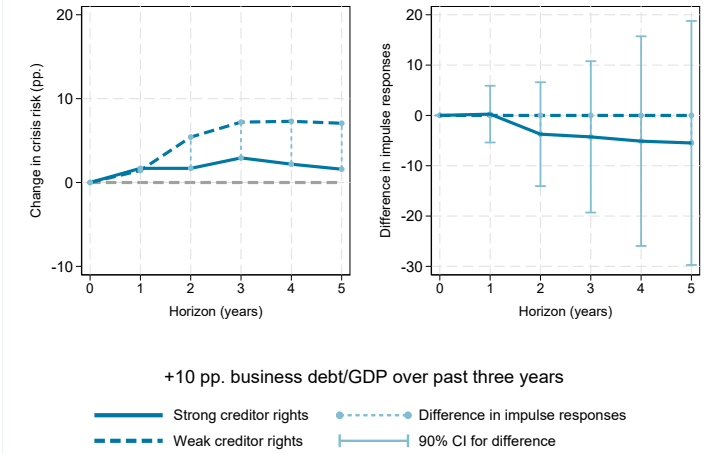
The macroeconomic evidence presented thus far is consistent with the dampening view of creditor rights and credit cycles, which could at least partly operate through a differential allocation of credit. However, our cross-country analysis faces the limitation that unobserved country characteristics correlated with statutory creditor protections explain at least part of these results. To address such concerns, the next section uses a natural experiment in the form of the staggered adoption of legal reforms across U.S. states to establish a causal link between strong creditor rights and credit allocation.

Figure 3: Creditor Rights and Deleveraging after Business Credit Booms

(a) Log Real Business Debt



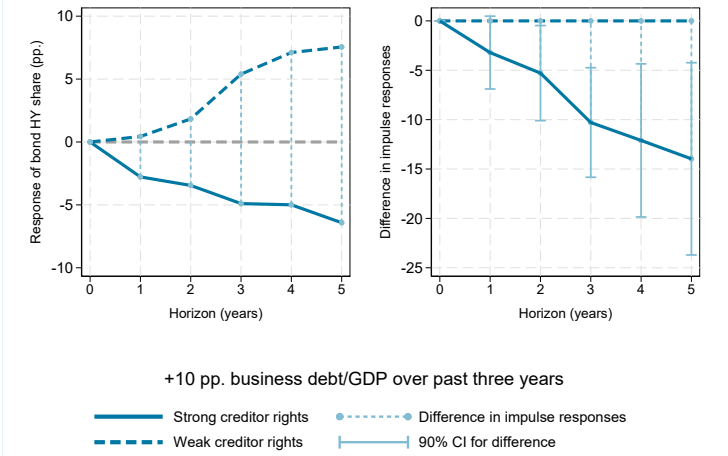
(b) Financial Crisis Risk



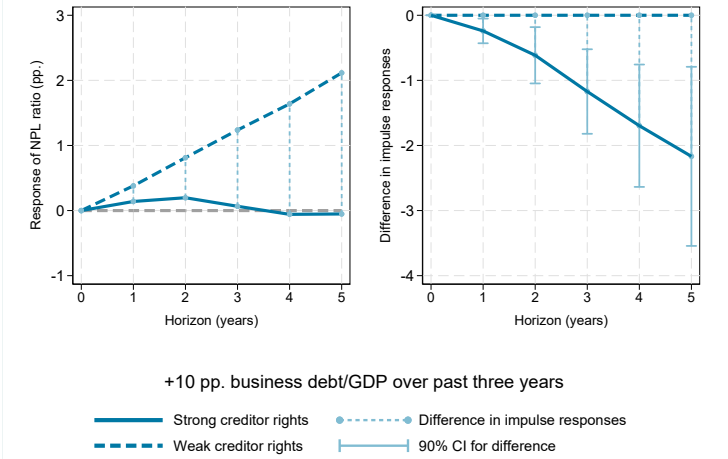
Notes: This figure shows impulse response estimates from local projections for advanced economies following a 10 percentage point increase in the business debt-to-GDP ratio over three years. Panel (a) shows predicted cumulative changes in log real business debt. Panel (b) shows predicted cumulative changes in the probability of financial crisis. Each local projection controls for the contemporaneous value as well as five lags of the dependent variable, real GDP growth and changes in the household debt-to-GDP ratio. Within each panel, the right graph plots the impulse response for a 10 percentage points increase in the business debt-to-GDP ratio over three years under strong creditor rights ($L_{i,t} = 1$) as the solid line and under weak creditor rights ($L_{i,t} = 0$) in dashed. The left graphs plot the difference between those impulse responses, with corresponding 90% confidence intervals based on Driscoll-Kraay standard errors.

Figure 4: Creditor Rights and Credit Quality after Business Credit Booms

(a) Credit Allocation to Risky Firms



(b) Nonperforming Loans



Notes: This figure shows impulse response estimates from local projections for advanced economies following a 10 percentage point increase in the business debt-to-GDP ratio over three years. Panel (a) presents the impulse response of the share of annual corporate bond issuance rated "high yield" from Kirti (2025). Panel (b) presents the impulse response of the share of non-performing loans measured by the IMF Financial Soundness Indicators augmented by hand-collected data published by national central banks. Each local projection controls for the contemporaneous value as well as five lags of the dependent variable, real GDP growth and changes in the household debt-to-GDP ratio. Within each panel, the right graph plots the impulse response for a 10 percentage points increase in the business debt-to-GDP ratio over three years under strong creditor rights ($L_{i,t} = 1$) as the solid line and under weak creditor rights ($L_{i,t} = 0$) in dashed. The left graphs plot the difference between those impulse responses, with corresponding 90% confidence intervals based on Driscoll-Kraay standard errors.

5 Causal Evidence from Legal Reforms across U.S. States

This section provides causal evidence on the effect of creditor rights on firm debt issuance that is consistent with the idea that strong creditors can mitigate lending to unviable firms with limited growth prospects during economic downturns.

5.1 Identification strategy

We follow a large literature and exploit variation in creditor rights within the U.S. generated by the staggered state-level adoption of *antirecharacterization laws* (e.g., Li et al., 2016; Mann, 2018; Chu, 2020; Ersahin, 2020; Favara et al., 2021; Tut, 2021). Antirecharacterization laws bolster the rights of secured creditors in bankruptcy—in particular, investors into asset-backed securities. In the absence of such laws, U.S. judges can *recharacterize* assets that the borrower had set aside for the creditor in special purpose vehicles (SPV), and put the collateral under bankruptcy's automatic stay.[4] Such discretionary judicial interventions often thwarted creditor access to SPV collateral—until antirecharacterization laws entitled creditors to access SPV collateral reliably. Nine U.S. states adopted antirecharacterization laws between 1997 and 2005.[5] A given corporate borrower and its debt contracts became subject to stronger creditor rights once its state of incorporation adopted antirecharacterization laws.[6]

The case *Reaves Brokerage Company, Inc. v. Sunbelt Fruit & Vegetable Company, Inc.* adjudicated 2003 in Texas upended the influence of state-level antirecharacterization laws. The court innovated by pre-empting the Texan antirecharacterization statute using a federal law. The court case became a heavily cited precedent, creating substantial uncertainty surrounding the power of state-level antirecharacterization statues (Li et al., 2016).[7] Accordingly, we code firm

[4] While the borrower sold assets to the SPV in which the creditor obtained a security interest, judges could reinterpret the sale as a loan, removing the "bankruptcy remote" status of the SPV assets and rendering the lender a creditor of the bankrupt borrower rather than of the SPV. For background on the use of corporate SPV and recharacterization inside and outside of bankruptcy, see Feng et al. (2009), Gorton and Souleles (2007) and Kettering (2008). Notably, Feng et al. (2009) reports that 59% of public firms use at least one SPV in 2004.

[5] Texas and Louisiana introduced them in 1997, followed by Alabama and Ohio in 2001, Delaware and North Carolina in 2002, South Dakota in 2003, Virginia in 2004, and Nevada in 2005.

[6] For SPV-based borrowing, a firm sponsors a SPV which in turn issues asset-backed securities to purchase designated collateral from the firm. Thereby, the SPV assumes debt and the sponsoring firm obtains cash. Alternatively, the SPV may purchase new assets which are then leased to the sponsoring firm. Because sponsoring firms typically retain the SPV's equity stake, those subsidiaries are consolidated in the firm's balance sheet. To establish bankruptcy remoteness, the transaction has to legally qualify as a "true sale". Therefore, collateral and debt may be fully off-balance sheet. Nevertheless, the firm may list the collateral fully or partially on its balance sheet because accounting standards look beyond legal form and consider questions of control and risk. That is, whenever the sponsor retains (at least 50% of) the SPV's equity, the sponsor would have to consolidate the SPV. After FIN 46, also smaller equity stakes as well as non-equity exposures such as guarantees suffice to mandate consolidation. In 2009, FIN46 and its update FIN46 were codified in GAAP as ASC 810.

[7] In addition, on January 17, 2003, the U.S. Financial Accounting Standards Board (FASB) issued a new interpre-

level treatment following the existing literature: a firm faces "strong creditor rights" as soon as its state of incorporation adopts antirecharacterization laws. All firms are untreated from the start of 2003 to reflect the influence of the landmark Texas court case of 2003.[8]

5.2 Event Study

In a first step, we exploit the timing of antirecharacterization law reforms as a natural experiment to study the impact of creditor rights on the aftermath of the U.S. *Dotcom* bubble. This episode is known for its stock market bubble, but it also involved a sizable credit boom: From 1996 to 2000, the U.S. corporate debt-to-GDP ratio increased by five percentage points—the same magnitude as during the four years leading up to the Great Financial Crisis. We compare credit allocation patterns in the aftermath of the boom between states with different creditor rights, i.e., between states with and without antirecharacterization laws. Delaware adopted antirecharacterization laws in January 2002, i.e, right after the boom. Hence, Delaware firms were exposed to the credit boom under similar creditor rights as firms in states that never adopted antirecharacterization laws. Any difference emerging after January 2002 then cannot be attributed to creditor rights' impact on the nature of the boom, but rather a differential reaction of credit markets during a credit cycle downturn. In the subsequent analysis, we thus analyze the sample to firms that are incorporated in Delaware—the treatment group—or states that never adopted antirecharacterization laws or only after 2003—the control group.[9]

In general, stronger creditor rights affect credit reallocation after the boom in two ways: On the one hand, they mitigate moral hazard and thereby expand supply of credit to risky firms. On the other hand, they dampen incentives to evergreen loans to risky firms as bankruptcy is

tation of the Accounting Research Bulletin No. 51 "Consolidated Financial Statements". This new interpretation No. 46 (FIN 46) was a reaction to the Enron scandal in which undisclosed SPVs, also referred to as variable interest entities (VIE) allowed Enron to hide substantial liabilities that would ultimately lead to the company's demise and wipe out shareholder claims. This was possible because before FIN 46, VIEs did not need to be disclosed and consolidated unless the sponsor held at least a 50% voting stake. Tightening requirements, FIN 46 mandated consolidation whenever the sponsor was the so-called primary beneficiary, defined as follows (FASB's Summary of Interpretation No. 46): "The primary beneficiary of a variable interest entity is the party that absorbs a majority of the entity's expected losses, receives a majority of its expected residual returns, or both, as a result of holding variable interests, which are the ownership, contractual, or other pecuniary interests in an entity." The FIN 46 received additional clarification on December 13, 2003, resulting in FIN 46(R). Notably, FIN 46(R) established that the new accounting rules would apply only to VIEs sponsored after December 31, 2003.

[8] The timing of the Texan court case upending the influence of antirecharacterization laws was plausibly exogenous to any economic developments and conditions (Li et al., 2016). By contrast, the adoption of antirecharacterization laws was influenced by lobbying efforts of the securitization industry as well as banks (Kettering, 2008). Hence, economic conditions and of those sectors may be endogenous to the adoption of the laws. It is therefore important to control for general credit supply effects.

[9] Half of all U.S. public firms are incorporated in Delaware, so the treatment group is sizable enough to generate statistical power. It removes states Alabama, Louisiana, North Carolina, Ohio, South Dakota and Texas, as they adopted antirecharacterization laws before 2003.

less of a threat the borrower can use to muscle the creditor into debt forbearance. Which effect dominates depends on the firm's investment opportunities: The positive credit supply effect is stronger (weaker) for firms with ample (few) investment opportunities. Hence, we focus our analysis on the sample of risky firms and allow the effect to depend on the profitability of the firm's investment opportunities.

We measure a firm's investment using Tobin's Q—the market value of firm payouts relative to the book value of assets. As is customary, we combine financial statement and stock market data from Compustat to compute Q:

$$Q_{f,q} = \frac{\text{book value of debt}_{f,q} + \text{market value of equity}_{f,q}}{\text{book value of assets}_{f,q}}. \tag{3}$$

Intangible capital increases $Q_{f,q}$. Within industry, higher intangible capital may very well reflect higher firm quality. But technologies differ across industries, and a firm in an intangible intensive industry is not necessarily of higher quality than firms in other industries. Across time, the intangible capital intensity has grown especially in some industries. In addition, aggregate market valuation have been impacted cyclical forces. To limit measurement errors related to these factors, we purge $Q_{f,q}$ off 2 digit SIC industry-quarter fixed effects.

We run then the following local projection event study, which measures firms' cumulative real debt growth for quarterly horizons $h \in \{-8, -7, ..., 8\}$ around the first quarter of 2002 for four disjoint subsamples of firms to characterize credit allocation patterns: (i) firms that are financially distressed and of low quality, (ii) firms that are financially distressed and of high quality, (iii) firms that are financially solid and of low quality, as well as (iv) firms that are financially solid and of high quality. Financial distress is defined as a credit rating falling into the weakest tercile of the sample distribution (rating below BB-). Low quality firms are defined to have Tobin's Q falling into the weakest tercile of the sample distribution (adjusted Q below 1.39).

$$\Delta_h \log(\text{real debt}_{f,2001q4+h}) = \beta_h \mathbb{1}(\text{Delaware})_f + \boldsymbol{\gamma}_h \boldsymbol{x}_{f,2001q4} + \epsilon_{f,2001q4+h} \tag{4}$$

The binary variable $\mathbb{1}(\text{Delaware})_f$ indicates which firms, indexed by f, are incorporated in Delaware. Thus, the main coefficient β_h captures the debt growth differential of Delaware firms, conditional on the firm characteristics $\boldsymbol{x}_{f,2001q4}$ at the end of 2001, including 2 digit SIC industry fixed effects, debt to asset ratio, liquid assets to total asset ratio, real annual sales growth, Tobin's Q and rating fixed effects.

Figure 5 illustrates our estimates. The figure shows treatment and control state trajectories of corporate debt growth before and after Delaware's reform in the aftermath of the Dotcom boom, distinguishing between risky and safe firms with low and high Tobin's Q. The evidence highlights a divergence emerging post-reform: risky, low-Q firms subject to the reform substantially curb their debt growth relative to risky, low-Q firms in states without reform. Importantly, we find no such difference for risky high-Q firms, safe low-Q firms or safe high-Q firms. If anything, treated risky high-Q firms seem to experience an increase in debt growth.

Delaware plays a prominent role in U.S. corporate governance. A key concern is whether other dynamics affecting Delaware firms, rather than the antirecharacterization laws themselves, could confound our results. To do this, we compare Delaware firms with a high concentration of SPV firms to those with a low concentration. Since SPVs are difficult to track, we follow the approach of Feng et al. (2009) to proxy their presence. We manually examine the Exhibit 21 filings of public U.S. firms from 2001, which are part of their 10-K submissions to the Securities and Exchange Commission. In these filings, we count the number of subsidiaries structured as limited liability companies or partnerships—the most common legal forms for SPVs. We confirm that effects within Delaware are driven by SPV-heavy firms, see Appendix Figure A.10.

5.3 Panel Regressions

We pool all state-level reforms into a panel regression framework, allowing us to estimate the average effect of antirecharacterization laws on firm borrowing across time and jurisdictions. To avoid a mechanical effect of debt growth on risk ratings, we lag firm-level risk by one period.

$$\Delta \log(\text{debt}_{f,q}) = \gamma_f + \tau_t + \beta_{R(f,q-1),Q(f,q-1),L(f,q-1)} + \epsilon_{f,q} \tag{5}$$

where $\Delta \log(\text{debt}_{f,q})$ is the firm's real growth in long term debt and the fixed effects of interest $\beta_{\cdot}$ are indexed by $R(\cdot), Q(\cdot), L(\cdot)$ variables marking firms with high vs. low risk, terciles of Tobin's Q and exposure to high vs. low creditor rights, e.g., antirecharacterization laws.

Figure 6 presents the panel regression results visualized across different firm types, revealing stark differences in how antirecharacterization laws affect credit allocation, depending on firm risk and investment opportunities. The estimates show statistically significant effects exclusively among risky firms, as expected for bankruptcy-related reforms. For risky firms, the

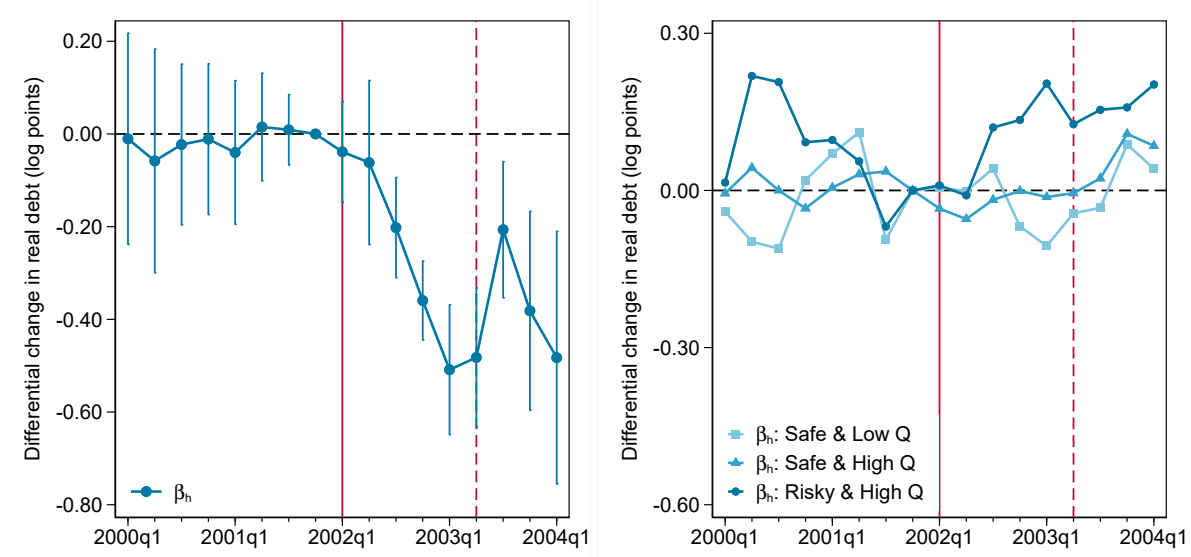
pattern indicates reallocation of credit based on investment quality: firms with low Tobin's Q (bottom tercile) experience substantial reductions in debt growth, more than 10 percentage points, while firms with high Q (top tercile) see modest increases of roughly 5-10 percentage points. This reallocation pattern is entirely absent among safe firms, where debt growth remains essentially unchanged across all investment opportunity levels regardless of creditor protection strength. The results are consistent with credit flowing away from risky firms with limited investment opportunities toward risky firms with abundant growth prospects, suggesting that stronger creditor rights eliminate inefficient lending to low-quality risky borrowers while potentially expanding access for high-quality risky firms where moral hazard concerns are more relevant.

Table 1 presents a range of additional specifications enriching the panel regression of Equation (5) with firm-level controls and fixed effects. For ease of exposition, we group the middle and high tercile groups of Tobin's Q. Across all models, the negative effect for risky firms with low Tobin's Q proves highly robust, consistently indicating a sharp contraction in debt growth once stronger creditor rights are in place. Appendix Table A.2 presents estimates from alternative panel regressions that vary measurement choices (z score instead of rating), sample (excluding Delaware) and dependent variable (capital expenditure instead of debt), all for the richest set of fixed effects. Our conclusions remain robust across all those specifications.

Figure 5: Creditor Rights and Credit Allocation after the Dotcom Boom

(a) Sample: Risky firms with low Q

(b) Other subsamples

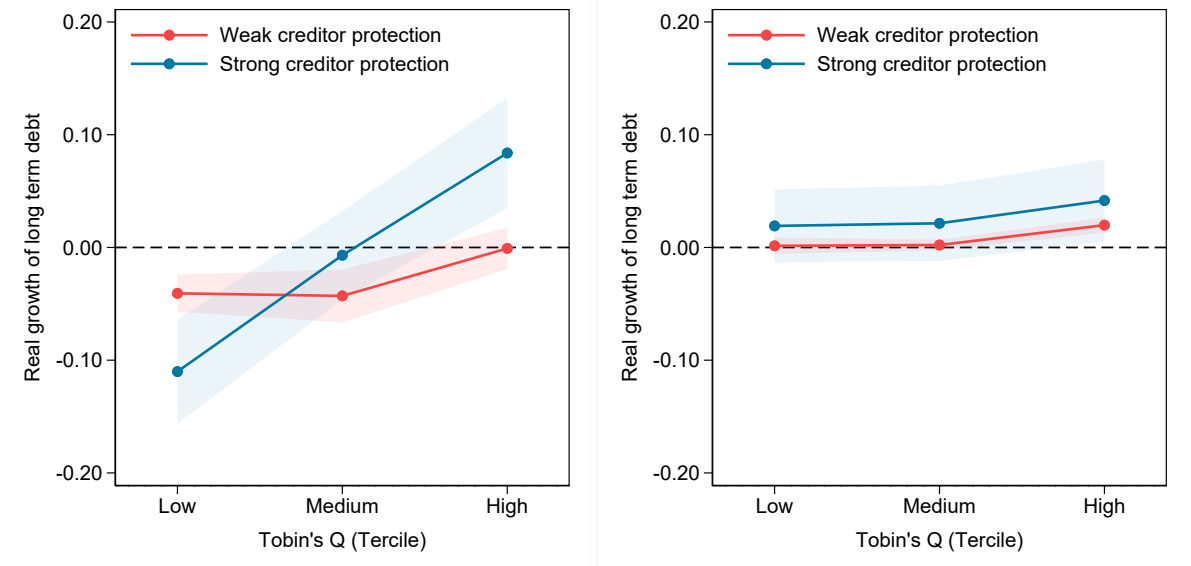


Notes: The figure plots estimates of coefficient β_h from Equation (4) obtained for different subsamples. The left panel plots point estimates and 95% confidence intervals for firms that are financially distressed and of low quality, i.e., those with a credit rating as well as Tobin's Q falling into the respective weakest tercile of the sample distribution. The right panel plots point estimates for firms that are financially distressed and of high quality, firms that are financially solid and of low quality, as well as firms that are financially solid and of high quality.

Figure 6: Antirecharacterization Laws and Debt Growth Across Firms

(a) Risky Firms

(b) Safe Firms



Notes: This figure visualizes estimates for $\beta_{R(f,q-1),Q(f,q-1),L(f,q-1)}$ from Equation (5). The left panel shows point estimates of future debt growth for risky firms ($R(f,q-1)=1$). The right panel shows point estimates of future debt growth for safe firms ($R(f,q-1)=0$). Shaded areas mark 95% confidence intervals based on standard errors clustered at the level of U.S. states.

Table 1: Antirecharacterization Laws and Debt Growth Across Firms, Various Specifications

	(1)	(2)	(3)	(4)	(5)	(6)
Low Q × High risk × Strong creditors	-0.113***	-0.113***	-0.121**	-0.146***	-0.110***	-0.149***
	(0.039)	(0.038)	(0.045)	(0.041)	(0.039)	(0.049)
Low Q × High risk	-0.002	-0.004	-0.002	0.030**	-0.005	0.029**
	(0.011)	(0.011)	(0.012)	(0.013)	(0.011)	(0.013)
Low Q × Strong creditors	-0.002	-0.005	0.002	0.002	0.019	0.036
	(0.003)	(0.003)	(0.007)	(0.003)	(0.022)	(0.031)
High risk × Strong creditors	0.026	0.020	0.026	0.119***	0.020	0.112**
	(0.018)	(0.017)	(0.022)	(0.043)	(0.017)	(0.046)
Low Q	-0.003	0.004	0.002	-0.005		
	(0.004)	(0.004)	(0.003)	(0.004)		
High risk	-0.038***	-0.065***	-0.067***		-0.065***	
	(0.010)	(0.012)	(0.013)		(0.012)	
Strong creditors	0.020	0.025		0.003	0.016	
	(0.018)	(0.019)		(0.020)	(0.018)	
Firm Controls		✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓
Quarter FE	✓	✓	✓	✓	✓	✓
Quarter × State FE			✓			✓
Quarter × High Risk FE				✓		✓
Quarter × Low Q FE					✓	✓
R^2	0.06	0.06	0.09	0.06	0.06	0.09
Observations	36093	36050	35780	36050	36049	35779

Notes: This table present estimates from regressions following Equation (5) adding firm controls and fixed effects. Column (1) presents the baseline. Column (2) adds the log real total assets and the firm's liquidity ratio as controls. Column (3) adds quarter-state fixed effects. Column (4) adds quarter-specific fixed effects for firms rated below BB-. Column (5) adds quarter-specific fixed effects for firms with Tobin's Q in the lowest tercile. Column (6) shows the full specification. Standard errors are shown in parentheses and clustered at the level of U.S. states. $***p < 0.01$, $**, p < 0.05$, $*, p < 0.10$.

6 Creditor Rights and the Incidence of Credit Booms

Lastly, we explore whether legal creditor protections are associated with the frequency and magnitude of credit expansions. The discussion in Section 2 predicts such patterns where strong creditor rights have an amplifying role.

We begin by comparing the distribution of three-year changes in business debt-to-GDP ratios across countries with strong versus weak creditor rights in Figure 7. The distributions reveal that countries with strong creditor protection exhibit a slightly higher frequency of extreme credit expansions, with the right tail extending further than in weak creditor rights regimes. A linear probability model confirms a statistically significant relationship between the strength of creditor rights and the likelihood of experiencing large credit booms (defined as increases exceeding 10 percentage points over three years). However, this relationship becomes statistically insignificant when we control for bankruptcy efficiency, suggesting that the link between creditor rights and boom frequency may at least partly be confounded by broader institutional quality differences across countries.

Next, we compare the size of a typical business credit boom across legal regimes, controlling for past macro-financial dynamics. To this end, we estimate the following state-dependent local projections for $h \in \{1, 2, ..., 6\}$:

$$\begin{aligned}\Delta_h c_{i,t+h} = \alpha_{i,h} + \beta_{1,h} \mathbb{1}(\Delta_3 c_{i,t+4} > 0.05) \\ + \beta_{2,h} \Big(\mathbb{1}(\Delta_3 c_{i,t+4} > 0.05) \times L_{i,t} \Big) + \beta_{3,h} L_{i,t} + \boldsymbol{\gamma}_h \boldsymbol{x}_{i,t} + e_{i,t}\end{aligned} \tag{6}$$

where $c_{i,t}$ is the business debt-to-GDP in country i and year t and $L_{i,t}$ is the composite creditor rights index defined in Equation (1). The vector of controls $\boldsymbol{x}$ includes the contemporaneous value and five lags of annual real GDP growth, the annual change in the business debt-to-GDP ratio and the annual change in the household debt-to-GDP ratio.

Figure 8 visualizes estimates of $\beta_{1,h}$ and $\beta_{2,h}$: when credit booms do occur, they tend to be substantially larger in countries with strong creditor rights. Under strong creditor protection, business debt-to-GDP rises by approximately 18 percentage points over six years following the initiation of a credit boom, compared to only 9 percentage points in weak creditor rights countries. The difference between regimes grows over time, reaching a peak differential of about 10 percentage points by year 6. These findings suggest that while strong creditor rights may not necessarily increase the frequency of credit booms, they do amplify their magnitude once initiated.

Further, we investigate whether productivity improvements generate different credit responses across legal regimes by examining impulse responses to positive total factor productivity shocks via the following local projections for $h \in \{1, 2, ..., 5\}$:

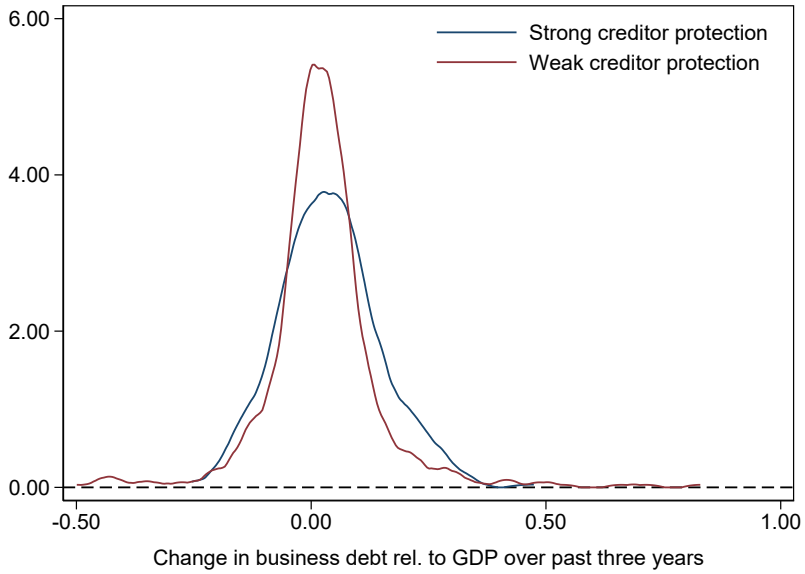
$$\Delta_h c_{i,t-1+h} = \alpha_{i,h} + \beta_{1,h} \Delta A_{i,t} + \beta_{2,h} \Big(\Delta A_{i,t} \times L_{i,t} \Big) + \beta_{3,h} L_{i,t} + \boldsymbol{\gamma}_h \boldsymbol{x}_{i,t} + e_{i,t} \tag{7}$$

where $c_{i,t}$ is the business debt-to-GDP in country i and year t, $A_{i,t}$ is the natural logarithm of aggregate total factor productivity and $L_{i,t}$ is the composite creditor rights index defined in Equation (1). The vector of controls $\boldsymbol{x}$ includes five lags of annual TFP growth, real GDP growth, the annual change in the business debt-to-GDP ratio and the annual change in the household debt-to-GDP ratio.

Figure 9 visualizes the results. A 5 percentage point time series innovation in TFP predicts a substantially larger credit expansion in strong creditor rights countries, with business debt-to-GDP rising by approximately 4.5 percentage points over the 5-year horizon. In contrast, weak creditor rights countries actually experience a decline in credit of about 3 percentage points following a productivity shock of the same magnitude. The differential response between regimes peaks around year 3 at approximately 8 percentage points and is statistically significant. This striking pattern suggests that strong creditor protections enable the financial system to effectively channel credit toward productive opportunities, while weak creditor rights may actually constrain credit allocation even when fundamental productivity improvements occur.

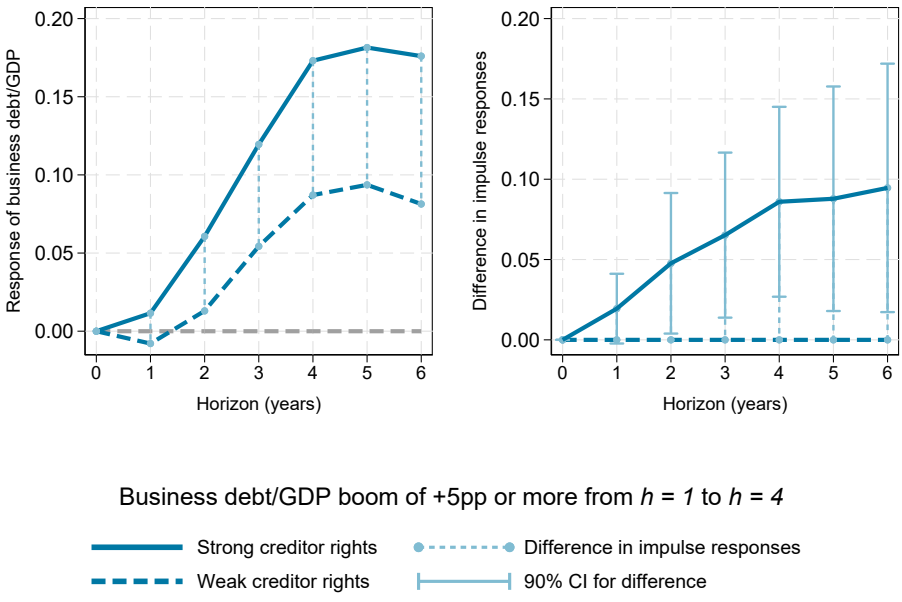
Appendix Figure A.11 explores additional dimensions of how credit boom characteristics vary across legal regimes. Panel A.11a shows that during credit expansions, countries with strong creditor rights experience virtually no change in their real estate debt share of total credit. In contrast, countries with weak creditor rights experience up to 2 percentage points higher real estate debt share relative to countries with strong creditor rights. Panel A.11b demonstrates that strong creditor rights countries see larger increases in high-yield bond issuance during boom periods, suggesting greater risk-taking in capital markets in the short horizon. Panel A.11c reveals that consistent with increased risk-taking, countries with strong creditor protections experience increases in bankruptcy filings during boom periods. This finding suggests that stronger creditor protection prompts bankruptcies early on, reducing the need for more bankruptcies in the future. Together, these findings suggest that strong creditor rights facilitate larger but potentially more sustainable credit expansions, characterized by both increased risk-taking and better risk management.

Figure 7: Credit Cyclicality and Creditor Rights



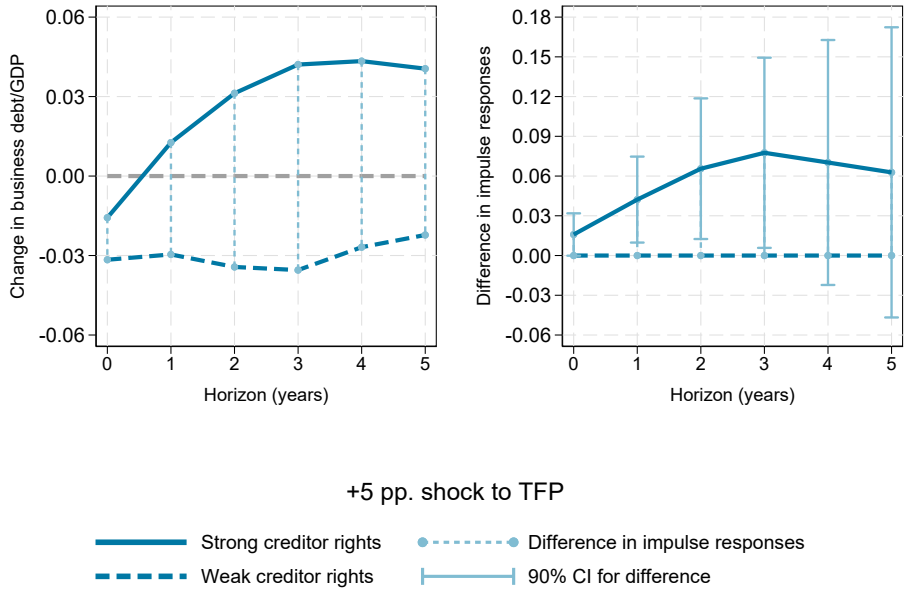
Notes: This figure shows the kernel density plot for the three year change in the business debt-to-GDP ratio in the country-year sample with strong (weak) creditor rights, $L_{i,t} = 1$ ($L_{i,t} = 0$). A linear probability model for events in which the three year change in the business debt-to-GDP ratio exceeds +10 pp. reveals a significant statistical link to the regime of creditor rights. However, standard errors of the estimate increase substantially once controls for bankruptcy efficiency are included.

Figure 8: Creditor Rights and Credit Booms



Notes: This figure visualizes estimates from the local projection equation (6). The right panel plots the trajectory of business credit-to-GDP under strong creditor rights ($\hat{\beta}_{1,h} + \hat{\beta}_{2,h}$) as the solid line and under weak creditor rights ($\hat{\beta}_{1,h}$) in dashed. The left panel plots the difference between those impulse responses, $\hat{\beta}_{2,h}$, with corresponding 90% confidence intervals based on Driscoll-Kraay standard errors.

Figure 9: TFP Shocks and Credit Booms, by Legal Regime



Notes: This figure visualizes estimates from the local projection equation (7) for an annual 5 percentage points increase in total factor productivity. The right panel plots the impulse response in business credit-to-GDP under strong creditor rights ($0.1 \times (\hat{\beta}_{1,h} + \hat{\beta}_{2,h})$) as the solid line and under weak creditor rights ($0.1 \times \hat{\beta}_{1,h}$) in dashed. The left panel plots the difference between those impulse responses, $\hat{\beta}_{2,h} \times 0.1$, with corresponding 90% confidence intervals based on Driscoll-Kraay standard errors.

7 Conclusion

A stricter legal protection of creditors could amplify or dampen business and credit cycles. Our central finding is that, where creditors rights are strong, credit booms are associated with stable future output growth. Put differently, the recessions routinely following credit expansions are concentrated in countries with weak creditor rights. We document evidence for two key mechanisms. First, strong creditors can liquidate unviable firms with questionable growth prospects as soon as an economic downturn materializes. Second, strong creditor rights protect the balance sheets of banks (both by increasing recovery values and through a faster liquidation of unviable firms) and borrowers (by discouraging excessive ex-ante risk-taking). Our takeaway is thus that stronger creditor rights—which in principle could amplify credit supply-driven booms and excessive liquidations during downturns—in fact tend to dampen macro-financial linkages.

Despite this overall optimistic conclusion about strong creditors, our results cannot speak on equilibrium welfare implications. The reason is that stronger creditor protections are associated with larger and more frequent credit booms, which is precisely what one would expect if they encourage higher credit supply. To the extent that such booms may foreshadow macroeconomic instability, it also means economies with stronger creditor rights require stricter supervision and efficient bankruptcy procedures to allow for a swift resolution of defaults when they invariably begin to rise. As a result, the broader institutional environment likely plays an important mediating role for any potential benefit of stronger creditor rights, and their overall welfare implications are difficult to assess based on our empirical analysis.

Despite these limitations, our findings carry some potential implications for policymakers. When focusing on equilibrium relations, the evidence we present rejects the idea that creditor rights amplify business and credit cycles. It also highlights the benefits of expedited bankruptcy procedures in accelerating a reallocation of credit following a credit boom, at least in part because unresolved legacy debt incentivizes "evergreening" by creditors. Reforms that expand creditor rights are therefore best viewed as part of a broader institutional package—one that recognizes their power to cushion busts while potentially mitigating some of the risks that come with larger booms.

References

Acharya, Viral V., and Krishnamurthy V. Subramanian. 2009. "Bankruptcy codes and innovation." Review of Financial Studies, 22: 4949–4988.

Acharya, Viral V., Matteo Crosignani, Tim Eisert, and Christian Eufinger. 2024. "Zombie Credit and (Dis-)Inflation: Evidence from Europe." Journal of Finance, 79(3): 1883–1929.

Acharya, Viral V., Yakov Amihud, and Lubomir Litov. 2011. "Creditor rights and corporate risk-taking." Journal of Financial Economics, 102(1): 150–166.

Aghion, Philippe, Oliver D. Hart, and John Moore. 1992. "The Economics of Bankruptcy Reform." Journal of Law, Economics, and Organization, 8(3): 523–546.

Auclert, Adrien, and Kurt Mitman. 2023. "Consumer bankruptcy as aggregate demand management." Stanford, mimeo.

Bae, Kee-Hong, and Vidhan K. Goyal. 2009. "Creditor Rights, Enforcement, and Bank Loans." Journal of Finance, 64(2): 823–860.

Baron, Matthew, Emil Verner, and Wei Xiong. 2021. "Banking crises without panics." Quarterly Journal of Economics, 136(1): 51–113.

Becker, Bo, and Victoria Ivashina. 2022. "Weak Corporate Insolvency Rules: The Missing Driver of Zombie Lending." AEA Papers and Proceedings, 112: 516–20.

Benmelech, Efraim, and Nittai Bergman. 2011. "Vintage capital and creditor protection." Journal of Financial Economics, 99(2): 308–332.

Ben Zeev, Nadav, Valerie Ramey, and Sarah Zubairy. 2023. "Do government spending multipliers depend on the sign of the shock?" AEA Papers and Proceedings, 113: 382–87.

Bernanke, Ben S., Mark Gertler, and Simon Gilchrist. 1999. "The Financial Accelerator in a Quantitative Business Cycle Framework." In Handbook of Macroeconomics. Vol. 1, , ed. John B. Taylor and Michael Woodford, Chapter 21, 1341–1393. Elsevier.

Bernstein, Shai, Emanuele Colonelli, and Benjamin Iverson. 2019a. "Asset Allocation in Bankruptcy." The Journal of Finance, 74(1): 5–53.

Bernstein, Shai, Emanuele Colonnelli, Xavier Giroud, and Benjamin Iverson. 2019b. "Bankruptcy Spillovers." Journal of Financial Economics, 133(3): 608–633. JFE Special Issue on Labor and Finance.

Brunnermeier, Markus K., and Yuliy Sannikov. 2014. "A Macroeconomic Model with a Financial Sector." American Economic Review, 104(2): 379–421.

Caballero, Ricardo J., Takeo Hoshi, and Anil K. Kashyap. 2008. "Zombie Lending and Depressed Restructuring in Japan." American Economic Review, 98(5): 1943–77.

Chu, Yongqiang. 2020. "Collateral, ease of repossession, and leases: Evidence from antirecharacterization laws." Management Science, 66(7): 2951–2974.

Dagher, Jihad, and Yangfan Sun. 2016. "Borrower Protection and the Supply of Credit: Evidence From Foreclosure Laws." Journal of Financial Economics, 121(1): 195–209.

Davydenko, Sergei A., and Julian R. Franks. 2008. "Do Bankruptcy Codes Matter? A Study of Defaults in France, Germany, and the U.K." Journal of Finance, 63(2): 565–608.

Diamond, Douglas W, and Raghuram G Rajan. 2001. "Liquidity risk, liquidity creation, and financial fragility: A theory of banking." Journal of political Economy, 109(2): 287–327.

Diamond, Douglas W, and Raghuram G Rajan. 2011. "Fear of fire sales, illiquidity seeking, and credit freezes." The Quarterly Journal of Economics, 126(2): 557–591.

Djankov, Simeon, Caralee McLiesh, and Andrei Shleifer. 2007. "Private credit in 129 countries." Journal of Financial Economics, 84(2): 299–329.

Djankov, Simeon, Oliver Hart, Caralee McLiesh, and Andrei Shleifer. 2008. "Debt Enforcement Around the World." Journal of Political Economy, 116(6): 1105–1149.

Drozd, Lukasz A, and Ricardo Serrano-Padial. 2018. "Financial contracting with enforcement externalities." Journal of Economic Theory, 178: 153–189.

Ersahin, Nuri. 2020. "Creditor rights, technology adoption, and productivity: Plant-level evidence." Review of Financial Studies, 33(12): 5784–5820.

Favara, Giovanni, Janet Gao, and Mariassunta Giannetti. 2021. "Uncertainty, access to debt, and firm precautionary behavior." Journal of Financial Economics, 141(2): 436–453.

Feng, Mei, Jeffrey Gramlich, and Sanjay Gupta. 2009. "Special purpose vehicles: Empirical evidence on determinants and earnings management." Accounting Review, 84(6): 1833–1876.

Ghent, Andra C., and Marianna Kudlyak. 2011. "Recourse and Residential Mortgage Default: Evidence from U.S. States." Review of Financial Studies, 24(9): 3139–3186.

Giannetti, Mariassunta, and Andrei Simonov. 2013. "On the Real Effects of Bank Bailouts: Micro Evidence from Japan." American Economic Journal: Macroeconomics, 5(1): 135–167.

Gopinath, Gita, Şebnem Kalemli-Özcan, Loukas Karabarbounis, and Carolina Villegas-Sanchez. 2017. "Capital allocation and productivity in South Europe." The Quarterly Journal of Economics, 132(4): 1915–1967.

Gorton, Gary, and Nicholas Souleles. 2007. "Special purpose vehicles and securitization." In The Risks of Financial Institutions. University of Chicago Press.

Greenwood, Robin, and Samuel G. Hanson. 2013. "Issuer Quality and Corporate Bond Returns." Review of Financial Studies, 26(6): 1483–1525.

Greenwood, Robin, Samuel Hanson, Andrei Shleifer, and Jakob Sørensen. 2022. "Predictable financial crises." Journal of Finance, 77(2): 863–921.

Gurrea-Martinez, Aurelio. 2025. "The myth of debtor-friendly or creditor-friendly insolvency systems: Evidence from a new global insolvency index." SMU Yong Pung How School of Law Research Paper.

Hart, Oliver, and John Moore. 1998. "Default and renegotiation: A dynamic model of debt." The Quarterly journal of economics, 113(1): 1–41.

Haselmann, Rainer F. H., Katharina Pistor, and Vikrant Vig. 2010. "How Law Affects Lending." Review of Financial Studies, 23(2): 549–580.

Heitz, Arie R., and Ganesh E. Narayanamoorthy. 2021. "Creditor Rights and Bank Loan Losses." Journal of Financial and Quantitative Analysis, 56(8): 2803–2841.

He, Zhiguo, and Arvind Krishnamurthy. 2013. "Intermediary Asset Pricing." American Economic Review, 103(2): 732–70.

Holmstrom, Bengt, and Jean Tirole. 1997. "Financial intermediation, loanable funds, and the real sector." the Quarterly Journal of economics, 112(3): 663–691.

Holmström, Bengt, and Jean Tirole. 1998. "Private and public supply of liquidity." Journal of political Economy, 106(1): 1–40.

Hoshi, Takeo, and Anil K. Kashyap. 2004. "Japan's Financial Crisis and Economic Stagnation." Journal of Economic Perspectives, 18(1): 3–26.

Houston, Joel F., Chen Lin, Ping Lin, and Yue Ma. 2010. "Creditor Rights, Information Sharing, and Bank Risk Taking." Journal of Financial Economics, 96(3): 485–512.

Jordà, Òscar, Martin Kornejew, Moritz Schularick, and Alan M Taylor. 2022. "Zombies at large? Corporate debt overhang and the macroeconomy." The Review of Financial Studies, 35(10): 4561–4586.

Kettering, Kenneth. 2008. "True sales of receivables: A purpose analysis." American Bankruptcy Institute Law Review, 16: 511–562.

Kindleberger, Charles P. 1978. "Manias, Panics and Crashes, Londres et Basingstoke."

Kirti, Divya. 2025. "Lending standards and output growth." Journal of Financial Stability, 76: 101351.

Kiyotaki, Nobuhiro, and John Moore. 1997. "Credit cycles." Journal of political economy, 105(2): 211–248.

Kornejew, Martin. 2025. "Market creditor protection, finance and investment." Mimeo.

Kornejew, Martin, Chen Lian, Yueran Ma, Pablo Ottonello, and Diego Perez. 2024. "Bankruptcy resolution and credit cycles." In NBER Macroeconomics Annual 2024, volume 39. , ed. John Leahy, Martin Eichenbaum and Valerie Ramey. University of Chicago Press.

Krishnamurthy, Arvind, and Todd Muir. 2017. "Credit Spreads and Business Cycle Fluctuations." Journal of Political Economy, 125(3): 715–770.

La Porta, Rafael, Florencio Lopez-de Silanes, Andrei Shleifer, and Robert W. Vishny. 1998. "Law and Finance." Journal of Political Economy, 106(6): 1113–1155.

Li, Shaojin, Toni Whited, and Yufeng Wu. 2016. "Collateral, taxes, and leverage." Review of Financial Studies, 29(6): 1453–1500.

Mann, William. 2018. "Creditor rights and innovation: Evidence from patent collateral." Journal of Financial Economics, 130(1): 25–47.

Mian, Atif, Amir Sufi, and Erik Verner. 2017. "Household Debt and Business Cycles Worldwide." The Quarterly Journal of Economics, 132(4): 1755–1817.

Mian, Atif, Amir Sufi, and Francesco Trebbi. 2015. "Foreclosures, House Prices, and the Real Economy." Journal of Finance, 70(6): 2587–2634.

Midrigan, Virgiliu, and Daniel Yi Xu. 2014. "Finance and misallocation: Evidence from plant-level data." American economic review, 104(2): 422–458.

Minsky, Hyman P. 1977. "The financial instability hypothesis: An interpretation of Keynes and an alternative to "standard" theory." Challenge, 20(1): 20–27.

Müller, Karsten, and Emil Verner. 2023. "Credit allocation and macroeconomic fluctuations." Review of Economic Studies, rdad112.

Peek, Joe, and Eric S. Rosengren. 2005. "Unnatural Selection: Perverse Incentives and the Misallocation of Credit in Japan." American Economic Review, 95(4): 1144–1166.

Pence, Karen M. 2006. "Foreclosing on Opportunity: State Laws and Mortgage Credit." Review of Economics and Statistics, 88(1): 177–182.

Qian, Jun, and Philip E. Strahan. 2007. "How Laws and Institutions Shape Financial Contracts: The Case of Bank Loans." Journal of Finance, 62(6): 2803–2834.

Reinhart, Carmen M, and Kenneth S Rogoff. 2011. "From financial crash to debt crisis." American economic review, 101(5): 1676–1706.

Rodano, Giacomo, Nicolas Serrano-Velarde, and Emanuele Tarantino. 2016. "Bankruptcy Law and Bank Financing." Journal of Financial Economics, 120(2): 363–382.

Schivardi, Fabiano, Enrico Sette, and Guido Tabellini. 2021. "Credit Misallocation During the European Financial Crisis." The Economic Journal, 132(641): 391–423.

Schularick, Moritz, and Alan M Taylor. 2012. "Credit booms gone bust: monetary policy, leverage cycles, and financial crises, 1870–2008." American Economic Review, 102(2): 1029–1061.

Shleifer, Andrei, and Robert W Vishny. 1992. "Liquidation values and debt capacity: A market equilibrium approach." The journal of finance, 47(4): 1343–1366.

Tantri, Prasanna. 2020. "Creditors' Rights and Strategic Default: Evidence from India." The Journal of Law and Economics, 63(3): 411–447.

Tut, Daniel. 2021. "Creditor rights, debt capacity and securities issuance: Evidence from anti-recharacterization laws." Toronto State University mimeo.

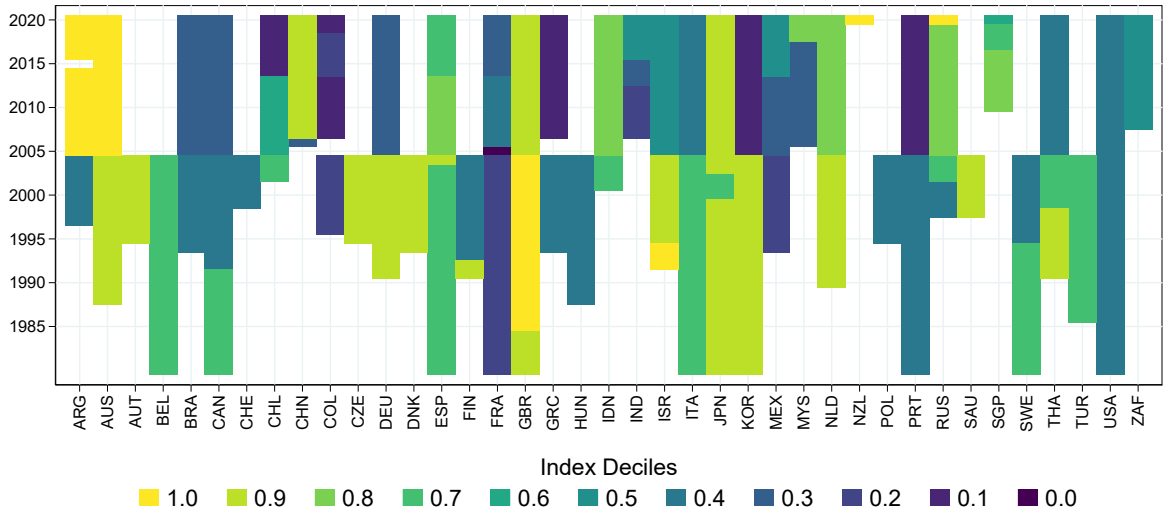
Vig, Vikrant. 2013. "Access to collateral and corporate debt structure: Evidence from a natural experiment." Journal of Finance, 68(3): 881–929.

Online Appendix:

Creditor Rights and Credit Cycles

I Additional Data Descriptions

Figure A.1: Percentile Ranks of Creditor Rights Indices across Estimation Sample



Notes: This figure shows the index decile for each country-year in our baseline sample for the creditor rights index by Djankov et al. (2007) up until 2004 and for the index of overall creditor friendliness from Gurrea-Martinez (2025) from 2005 onward.

II Full Baseline Local Projection Estimates

Table A.1: Estimates of Local Projection Equation (2)

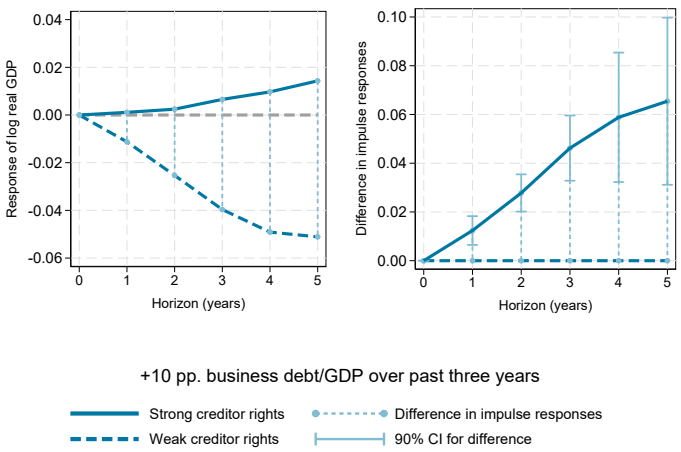
	(1) $h=1$	(2) $h=2$	(3) $h=3$	(4) $h=4$	(5) $h=5$
S3.Business total debt rel. to GDP (decimal) × Creditor rights index (percentile)	0.058	0.186**	0.392***	0.508***	0.575***
	(0.041)	(0.074)	(0.085)	(0.106)	(0.120)
Δ_3 Business credit/GDP	-0.091**	-0.211***	-0.373***	-0.452***	-0.464***
	(0.037)	(0.065)	(0.076)	(0.090)	(0.109)
Creditor rights index (percentile)	0.017**	0.036***	0.048***	0.065**	0.082**
	(0.007)	(0.012)	(0.017)	(0.026)	(0.033)
Real GDP growth	0.132	0.247*	0.209	0.197	0.143
	(0.103)	(0.131)	(0.154)	(0.179)	(0.204)
Real GDP growth, last year	0.078	0.070	0.014	-0.027	-0.096
	(0.085)	(0.098)	(0.128)	(0.105)	(0.113)
Real GDP growth, two years ago	-0.018	-0.057	-0.072	-0.174	-0.049
	(0.058)	(0.070)	(0.108)	(0.130)	(0.105)
Real GDP growth, three years ago	-0.001	-0.003	-0.084	0.048	0.018
	(0.062)	(0.079)	(0.098)	(0.108)	(0.120)
Real GDP growth, four years ago	0.068	0.011	0.184**	0.201*	-0.026
	(0.069)	(0.069)	(0.076)	(0.109)	(0.143)
Real GDP growth, five years ago	-0.022	0.120	0.119	0.003	0.029
	(0.061)	(0.086)	(0.111)	(0.102)	(0.123)
Δ Household debt/GDP	0.125	0.255**	0.283***	0.309**	0.229
	(0.135)	(0.114)	(0.093)	(0.142)	(0.146)
Δ Household debt/GDP, last year	0.052	0.005	-0.015	-0.085	-0.357**
	(0.109)	(0.170)	(0.155)	(0.167)	(0.140)
Δ Household debt/GDP, two years ago	-0.048	-0.108	-0.162	-0.436**	-0.478*
	(0.086)	(0.085)	(0.132)	(0.185)	(0.264)
Δ Household debt/GDP, three years ago	-0.113	-0.203*	-0.489***	-0.477***	-0.429***
	(0.085)	(0.108)	(0.140)	(0.166)	(0.115)
Δ Household debt/GDP, four years ago	0.016	-0.230*	-0.223	-0.176	-0.405**
	(0.080)	(0.122)	(0.175)	(0.139)	(0.177)
Δ Household debt/GDP, five years ago	-0.139*	-0.071	-0.132	-0.320	-0.426
	(0.079)	(0.112)	(0.186)	(0.247)	(0.294)
Country FE	Yes	Yes	Yes	Yes	Yes
R^2 (within)	0.13	0.19	0.20	0.20	0.19
Observations	657	631	605	579	553

Notes: The table shows estimates from the local projection regressions of equation (2). Discroll-Kraay standard errors in parenthesis. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.10$.

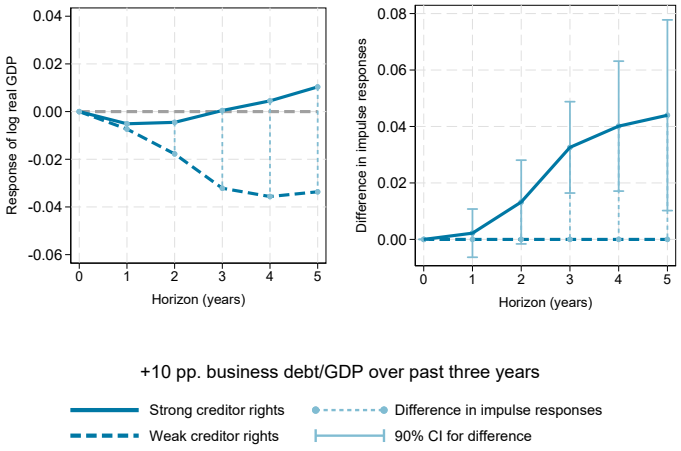
III Robustness of Baseline Result

Figure A.2: Creditor Rights and Real GDP after Business Credit Booms, by Subsamples

(a) Advanced Economies



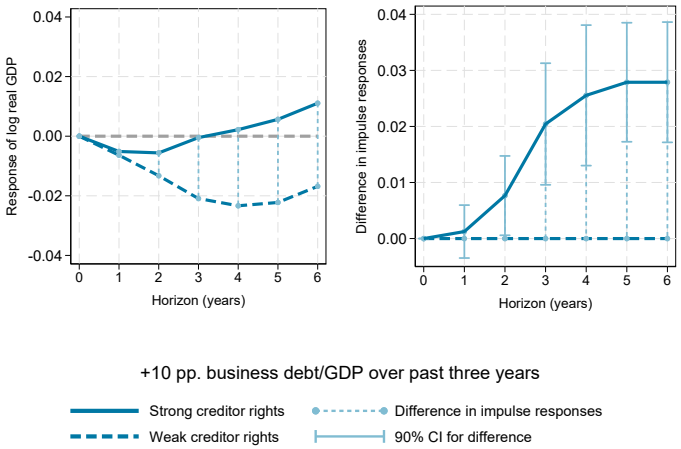
(b) Emerging Economies



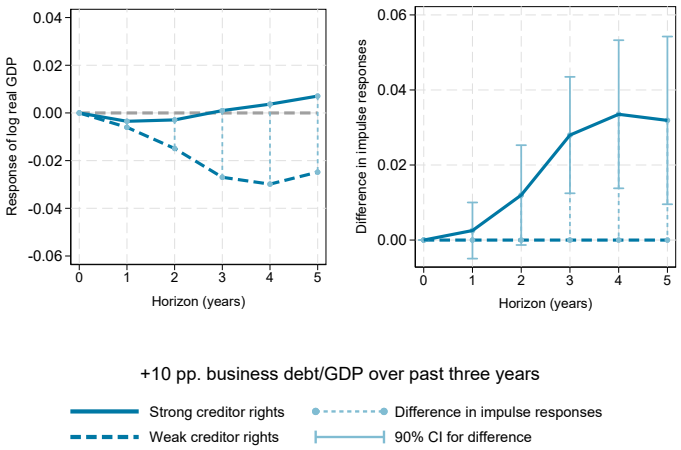
Notes: This figure visualizes estimates from the local projection equation (2) for a 10 percentage points increase in the business debt to GDP ratio over the preceding three years. Panel (a) shows estimates of Equation (2) obtained in the subsample of emerging economies. Panel (b) shows estimates of Equation (2) obtained in the subsample of advanced economies. Within each panel, the right graph plots the impulse response in real GDP under strong creditor rights ($0.1 \times (\hat{\beta}_{1,h} + \hat{\beta}_{2,h})$) as the solid line and under weak creditor rights ($0.1 \times \hat{\beta}_{1,h}$) in dashed. The left graph plots the difference between those impulse responses, $\hat{\beta}_{2,h} \times 0.1$, with corresponding 90% confidence intervals based on Discroll-Kraay standard errors.

Figure A.3: Creditor Rights and Real GDP after Business Credit Booms, Institutional Controls

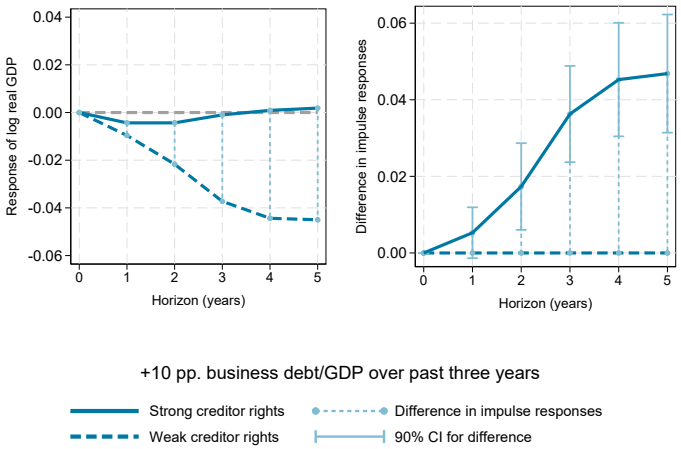
(a) Controlling for Bankruptcy Efficiency



(b) Controlling for Economic Development

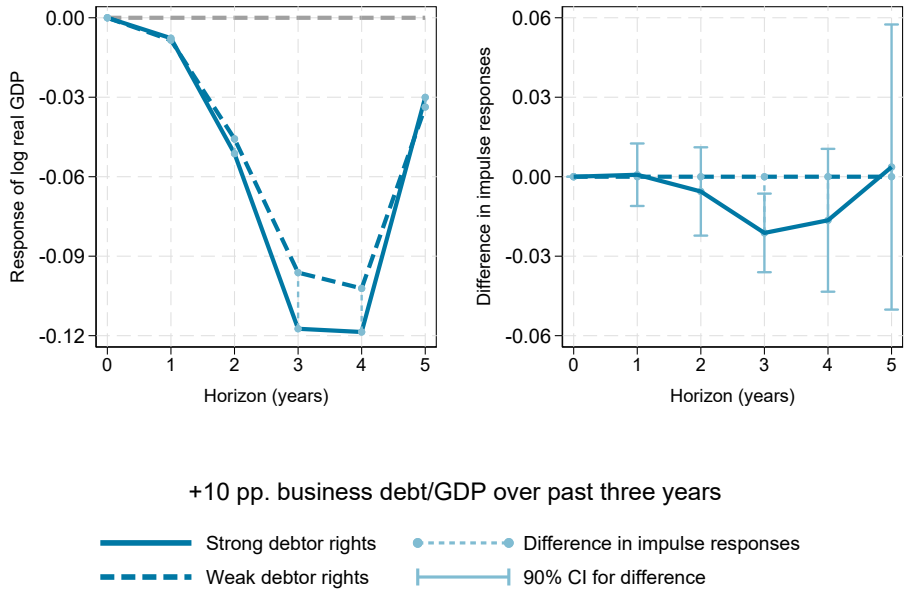


(c) Controlling for Financial Development



Notes: This figure visualizes estimates from the local projection equation (2) for a 10 percentage points increase in the business debt to GDP ratio over the preceding three years. Panel (a) controls for a measure of bankruptcy efficiency and its interaction with $\Delta_3 c_{i,t}$ following Kornejew et al. (2024). Panel (b) controls for log GDP in real US Dollar and its interaction with $\Delta_3 c_{i,t}$. Panel (c) controls for the level of total private sector debt relative to GDP and its interaction with $\Delta_3 c_{i,t}$. Within each panel, the right graph plots the impulse response in real GDP under strong creditor rights ($0.1 \times (\hat{\beta}_{1,h} + \hat{\beta}_{2,h})$) as the solid line and under weak creditor rights ($0.1 \times \hat{\beta}_{1,h}$) in dashed. The left graph plots the difference between those impulse responses, $\hat{\beta}_{2,h} \times 0.1$, with corresponding 90% confidence intervals based on Discroll-Kraay standard errors.

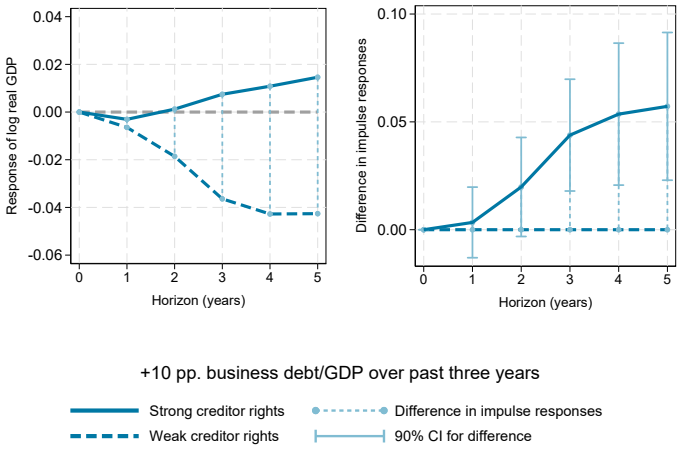
Figure A.4: Debtor Rights and Real GDP after Business Credit Booms



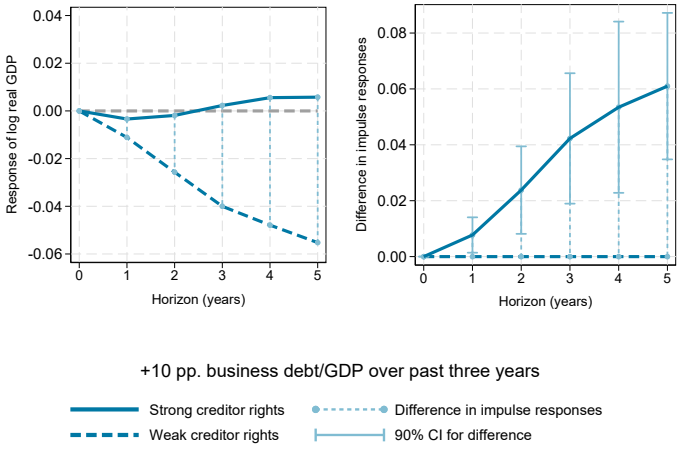
Notes: This figure visualizes estimates from the local projection equation (2) but replacing $L_{i,t}$ by the index of *debtor* friendliness from Gurrea-Martinez (2025). The right panel plots the impulse response in real GDP to a 10 percentage points increase in the business debt to GDP ratio over the preceding three years under strong debtor rights as the solid line and under weak debtor rights in dashed. Strong (weak) debtor rights in this plot refer to the the maximal (minimal) value of the index attained in the sample. The left panel plots the difference between those impulse responses, with corresponding 90% confidence intervals based on Discroll-Kraay standard errors.

Figure A.5: Creditor Rights and Real GDP after Business Credit Booms: Pre- and Post-2000

(a) Before 2003



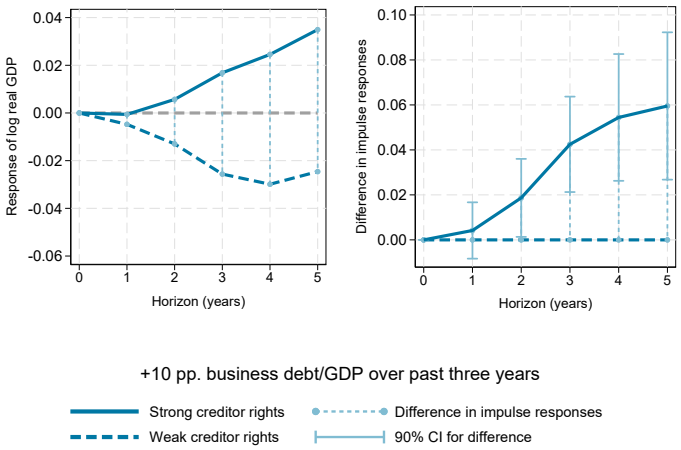
(b) After 2003



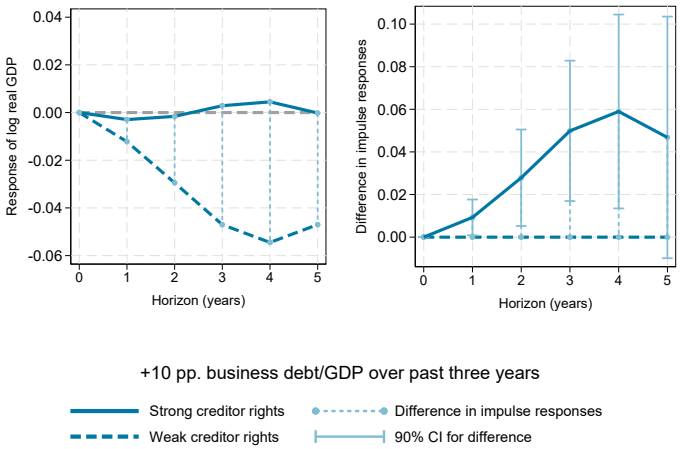
Notes: This figure visualizes estimates from the local projection equation (2) for a 10 percentage points increase in the business debt to GDP ratio over the preceding three years. Panel (a) shows estimates of Equation (2) obtained in the subsample running up until and including 2003, the median year in our sample. Panel (b) shows estimates of Equation (2) obtained in the subsample starting 2004. Within each panel, the right graph plots the impulse response in real GDP under strong creditor rights ($0.1 \times (\hat{\beta}_{1,h} + \hat{\beta}_{2,h})$) as the solid line and under weak creditor rights ($0.1 \times \hat{\beta}_{1,h}$) in dashed. The left graph plots the difference between those impulse responses, $\hat{\beta}_{2,h} \times 0.1$, with corresponding 90% confidence intervals based on Discroll-Kraay standard errors.

Figure A.6: Creditor Rights and Real GDP after Business Credit Booms, Other Creditor Rights Measures

(a) Index and subsample of Djankov et al. (2007)



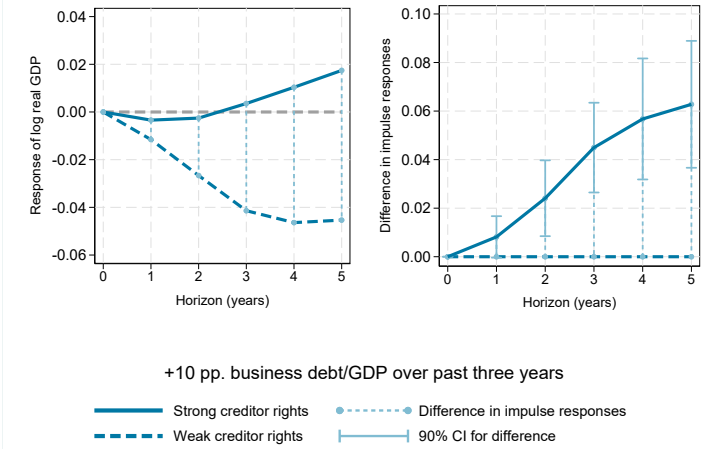
(b) Index and subsample of Gurrea-Martinez (2025)



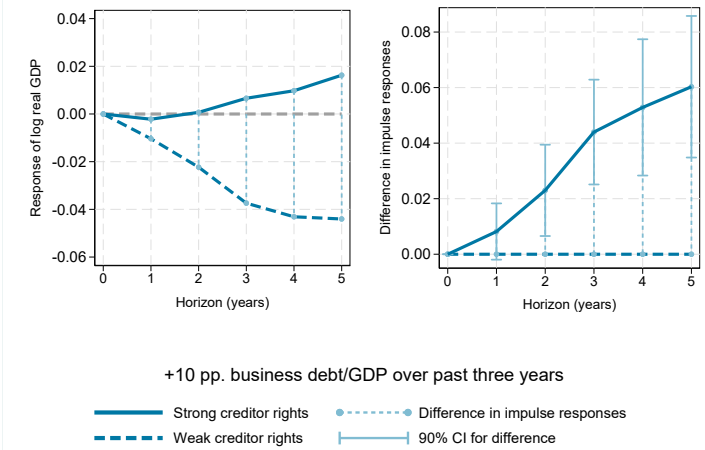
Notes: This figure visualizes estimates from the local projection equation (2) for a 10 percentage points increase in the business debt to GDP ratio over the preceding three years. Panel (a) shows estimates using only the index of Djankov et al. (2007) in the respective sample. Panel (b) shows estimates using only the index of Gurrea-Martinez (2025) in the respective sample. Within each panel, the right graph plots the impulse response in real GDP under strong creditor rights as the solid line and under weak creditor rights in dashed. The left graph plots the difference between those impulse responses with corresponding 90% confidence intervals based on Discroll-Kraay standard errors.

Figure A.7: Creditor Rights and Real GDP after Business Credit Booms, Controlling Boom Nature

(a) Real Estate Debt Share



(b) High-Yield Share

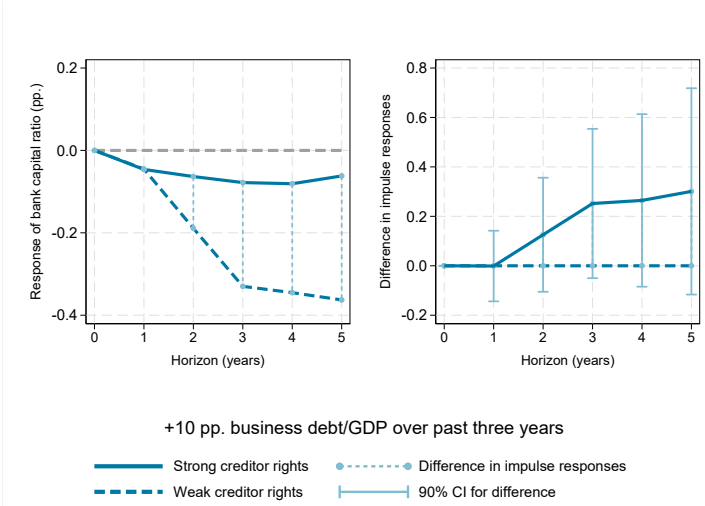


Notes: This figure visualizes estimates from the local projection equation (2) for a 10 percentage points increase in the business debt to GDP ratio over the preceding three years. Panel (a) controls for the share of credit to high-yield firms and its interaction with $\Delta_3 c_{i,t}$ following Kornejew et al. (2024). Panel (b) controls for the share of credit to real estate and construction and its interaction with $\Delta_3 c_{i,t}$. Within each panel, the right graph plots the impulse response in real GDP under strong creditor rights ($0.1 \times (\hat{\beta}_{1,h} + \hat{\beta}_{2,h})$) as the solid line and under weak creditor rights ($0.1 \times \hat{\beta}_{1,h}$) in dashed. The left graph plots the difference between those impulse responses, $\hat{\beta}_{2,h} \times 0.1$, with corresponding 90% confidence intervals based on Discroll-Kraay standard errors.

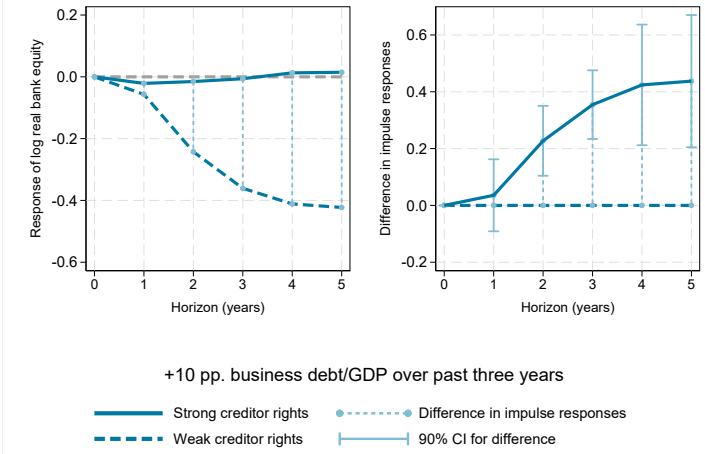
IV Additional Results Characterizing Macro Dynamics After Booms

Figure A.8: Bank Resilience After Business Credit Booms

(a) Bank Capital Ratio



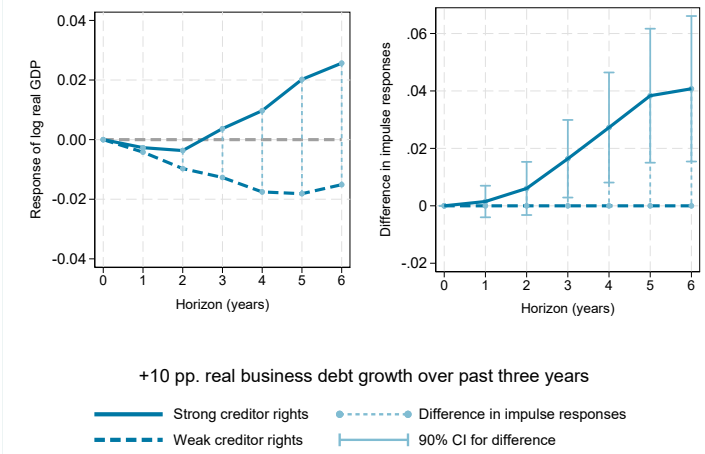
(b) Log Real Bank Equity



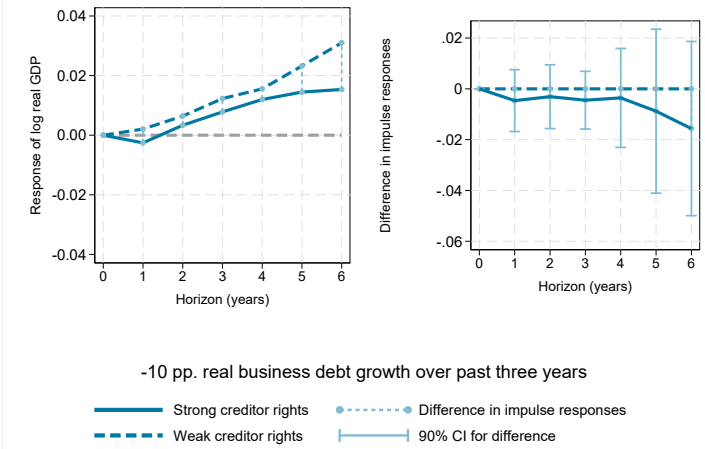
Notes: This figure displays impulse response estimates from local projections for advanced economies following a 10 percentage point increase in the business debt-to-GDP ratio over three years. Panel (a) shows the response of the aggregate bank capital ratio. Panel (b) shows log real bank equity. Solid lines represent responses under strong creditor rights; dashed lines represent weak creditor rights. Shaded areas denote 90% confidence intervals based on Driscoll-Kraay standard errors.

Figure A.9: Creditor Rights and Real GDP after Business Credit Expansions and Contractions

(a) Credit Expansion



(b) Credit Contraction



Notes: This figure visualizes estimates from state-dependent local projections with sign asymmetry in the spirit of Ben Zeev et al. (2023): $\Delta_h \log(\text{real GDP}_{i,t+h}) = \alpha_{i,h} + \beta_{1,h}\Delta_3 C_{i,t} + \beta_{2,h}\left(\Delta_3 C_{i,t} \times R_{i,t}\right) + \beta_{3,h} C_{i,t} + \gamma_h \boldsymbol{x}_{i,t} + \Delta^+ \left[\beta^+_{1,h} R_{i,t} + \beta^+_{2,h}\Delta_3 C_{i,t} + \beta^+_{3,h}\left(\Delta_3 C_{i,t} \times R_{i,t}\right) + \boldsymbol{\gamma}^+_h \boldsymbol{x}_{i,t}\right] + \epsilon_{i,t}$ for $h = 1, ..., 6$. The indicator variable Δ^+ takes value 1 if $\Delta_3 C_{i,t} > 0$, where $\Delta_3 C_{i,t}$ denotes the three year change of log real business credit. We use real debt growth here rather than the change in the corresponding GDP ratio as before to distinguish between booms and busts based on the variation in debt rather than GDP. Panel (a) shows estimates for credit booms. Panel (b) shows estimates for credit busts. Within each panel, the right graph plots the impulse response in real GDP under strong creditor rights as the solid line and under weak creditor rights in dashed. The left graph plots the difference between those impulse responses with corresponding 90% confidence intervals based on Driscoll-Kraay standard errors.

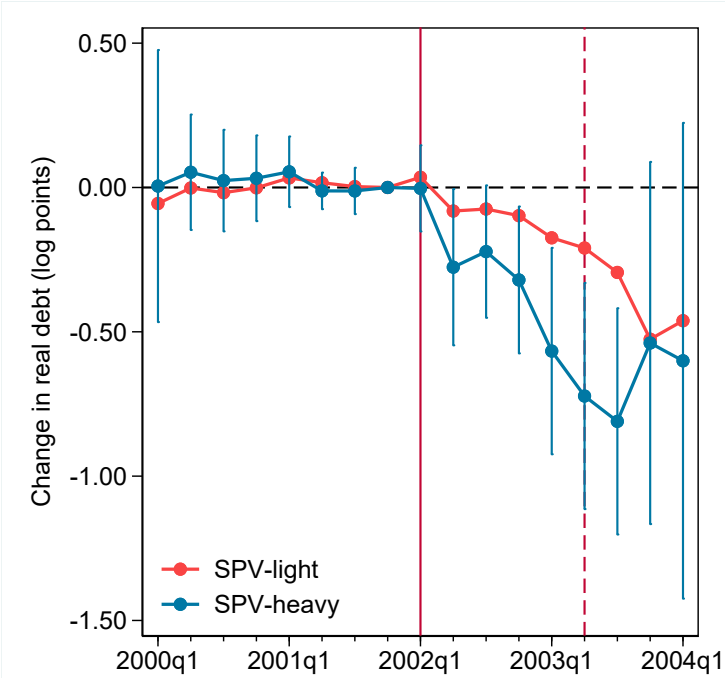
V Additional Results From US Legal Reforms

Table A.2: Robustness Checks

	(1) Baseline	(2) z Score	(3) w/o Delaware	(4) Investment
Low Q × High risk × Strong creditors	-0.149***	-0.084**	-0.500***	-0.007*
	(0.049)	(0.037)	(0.110)	(0.003)
Low Q × High risk	0.029**	-0.020	0.052	0.003**
	(0.013)	(0.023)	(0.050)	(0.001)
Low Q × Strong creditors	0.036	-0.037*	0.081*	0.006
	(0.031)	(0.020)	(0.043)	(0.004)
High risk × Strong creditors	0.112**	0.029	0.173***	0.005
	(0.046)	(0.032)	(0.060)	(0.003)
Firm Controls	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓
Quarter FE	✓	✓	✓	✓
Quarter × State FE	✓	✓	✓	✓
Quarter × High Risk FE	✓	✓	✓	✓
Quarter × Low Q FE	✓	✓	✓	✓
R^2	0.09	0.06	0.17	0.12
Observations	35779	133864	10576	34690

Notes: This table presents estimates of Equation 5 for an alternative risk measure, sample and dependent variable. Column (1) reproduces baseline estimates with full firm controls and fixed effects. Column (2) uses a binary *High Risk* variable that marks firms with a Z scores below 1.08, the average Z score among firms below a BB- rating in our sample. Column (3) excludes Delaware firms. Column (4) uses investment rate, i.e., capital expenditures relative to last quarters net property and plant assets. Standard errors in parentheses are clustered on US states. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Figure A.10: Delaware's Antirecharacterization Law and Firm Debt Growth, by SPV Intensity

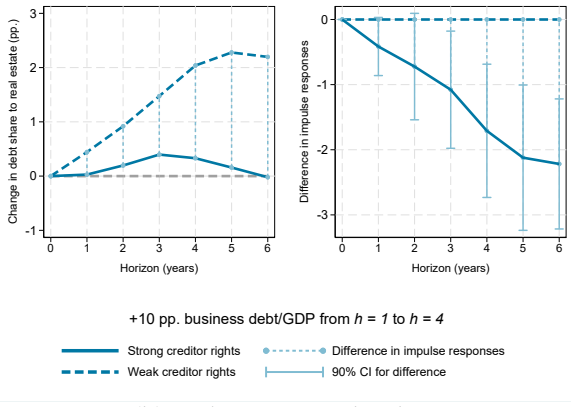


Notes: The figure plots estimates of coefficient β_h from a regression only using risky Delware firms with low Q similar to Equation (4) but with the main regressor $\mathbb{1}(\text{SPV-heavy})$ marking firms that have an above-median number of subsidiaries that are likely to be an SPV (Feng et al., 2009). The plots shows point estimates for both SPV-heavy and SPV-light firms alongside the 95% confidence intervals for the coefficient on $\mathbb{1}(\text{SPV-heavy})$.

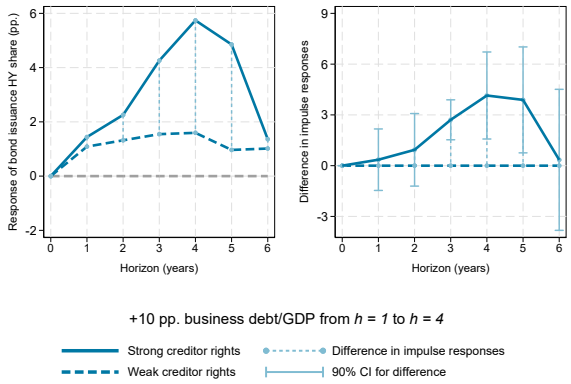
VI Additional Results on Boom Risk

Figure A.11: Creditor Rights and the Nature of Business Credit Booms

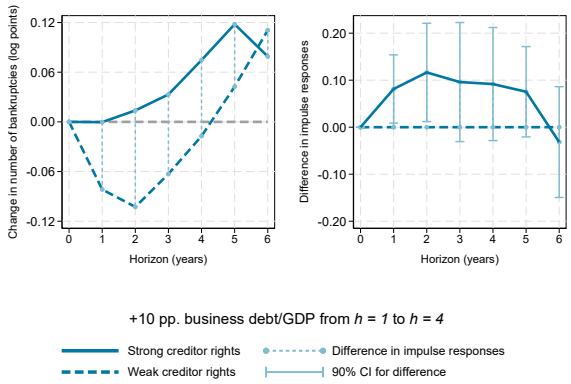
(a) Real Estate Debt Share



(b) Risky Firms Debt Share



(c) Bankruptcy Filings



Notes: This figure visualizes estimates from the local projection equation (6) for different dependent variables following a 10 percentage points increase in the business debt to GDP ratio over future three years. Panel (a) presents impulse response estimates for the share of construction and real estate debt in total bank loans from (Müller and Verner, 2023). Panel (b) presents impulse response estimates for the share of annual bond issuance by firms rated "high yield" from (Kirti, 2025). Panel (c) presents impulse response estimates the log number of bankruptcy filings, which are hand-collected from publications of national statistical offices. Controls include country fixed effects and five lags of changes in the dependent, real growth, annual changes in business credit-to-GDP and household credit-to-GDP. Within each panel, the right graph plots impulse responses under strong creditor rights as the solid line and under weak creditor rights in dashed. The left graph plots the difference between those impulse responses, with corresponding 90% confidence intervals based on Discroll-Kraay standard errors.