Bankruptcy Resolution and Credit Cycles

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Overview

Credit cycles: leading topic in discussions about macroeconomic stability

- Growing evidence: credit booms create real damage
  [Schularick and Taylor (2012); Mian, Sufi, and Verner (2017); Greenwood et al. (2022); Ivashina et al. (2024)]

This paper: real damage following credit booms vary with bankruptcy institutions

- Credit booms $\Rightarrow$ high debt burden, rising defaults $\Rightarrow$ real damage
- Business bankruptcy institutions matter for resolution of default & its real damage

Legal institutions relevant for macroeconomic stability

Overview

Data: bankruptcy efficiency, business credit, & macro outcomes across 39 countries

- Djankov et al. (2008): measure % value preserved for a viable firm in bankruptcy
- Some countries liquidate inefficiently & incur high costs; other restructure efficiently

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Empirical findings:

- Low bankruptcy efficiency: business credit booms followed by long & severe contractions
- High bankruptcy efficiency: business credit booms followed by modest output changes

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Model: how bankruptcy efficiency mitigates negative consequences of credit booms

- By avoiding inefficient liquidations

Road Map

Why Bankruptcy Institutions Relevant

#1 Economic outcomes depend on quality of default resolution

Default resolution:

1. Traditional approach: terminate operations, **liquidate** assets
   - Inefficient liquidation of viable companies induces substantial losses
     [Ramey and Shapiro (2001); Corbae and D'Erasmo (2021); Crouzet et al. (2022); Kermani and Ma (2023)]
   - Reduce output directly + generate negative macroeconomic spillovers
2. Modern approach: **restructure** viable firms if continuation value>liquidation value
   - Keep viable firms alive
   - Avoid output loss & its negative macroeconomic spillovers

#2 Quality of default resolution depends on bankruptcy institutions

Why Bankruptcy Institutions Relevant

#1 Economic outcomes depend on quality of default resolution

#2 Quality of default resolution depends on bankruptcy institutions

Bankruptcy: legal process to facilitate default resolution

- Ideally: restructure viable firms, liquidate unviable firms

Functions of bankruptcy institutions (laws & courts):

- Alleviate information frictions: collect and verify info about the debtor
- Alleviate coordination frictions: prevent creditors' unilateral actions disrupting resolution
- Can be especially important for restructuring

Road Map

Data

Combined sample: 39 countries from 2003 to 2019

- Business credit data restrict # of countries, bankruptcy efficiency data start in 2003

Business credit: Bank of International Settlements (loans + bonds)

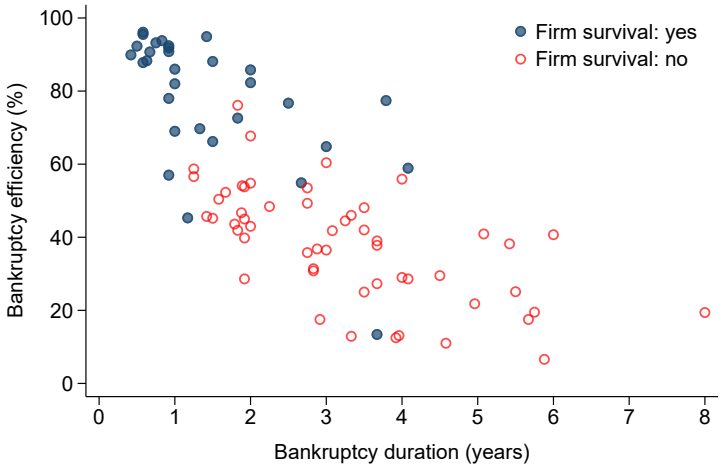
GDP, investment, unemployment, consumption: World Bank

Bankruptcy efficiency: Djankov et al. (2008), extended by World Bank (2020)

- Example of viable firm in financial distress: continuation value 100, liquidation value 70
- Ask legal professionals in 100+ countries every year about the most likely scenario
  - E.g., outcome, value preserved, duration, and expenses
- **Bankruptcy efficiency: % of continuation value preserved (net of expenses)**
  - Positively correlated with recovery rate imputed from impairment/non-performing loans (BIS)

Large Variation in Bankruptcy Efficiency around the World

Example Year: 2015



Road Map

Macro Dynamics following Business Credit Booms

Outcome after change in credit/GDP, à la Mian, Sufi, and Verner (2017)

Local projections for annual horizons $h = 1, ..., 5$, with country i & year t:

$$\Delta_h Y_{i,t+h} = \alpha_{i,h} + \beta_{1,h}\Delta_5 c_{i,t} + \beta_{2,h}\left(\Delta_5 c_{i,t} \times B_{i,t}\right) + \beta_{3,h} B_{i,t} + \gamma_h x_{i,t} + \epsilon_{i,t}$$

- $\Delta_h Y_{i,t+h}$: change in log real GDP, investment, consumption in the next h years
- $\Delta_5 c_{i,t}$: change in business credit to GDP in the past 5 years
- $B_{i,t}$: bankruptcy efficiency

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- $B_{i,t}$: bankruptcy efficiency
- $x_{i,t}$: 5 lags of real GDP growth & changes in household credit to GDP in the past 5 years
- $\alpha_{i,h}$: horizon-specific country fixed effects

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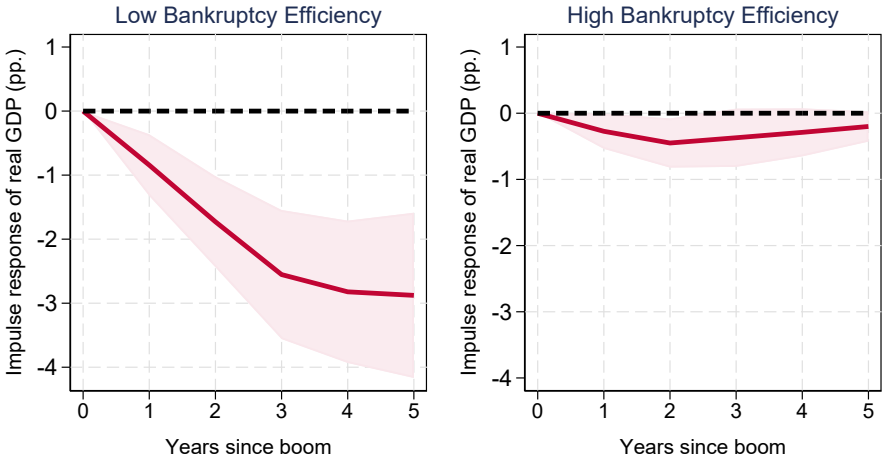
Findings:

- $\beta_{1,h} < 0$: GDP, investment, & consumption significantly lower following credit booms
- $\beta_{2,h} > 0$: less so when bankruptcy effiency is high

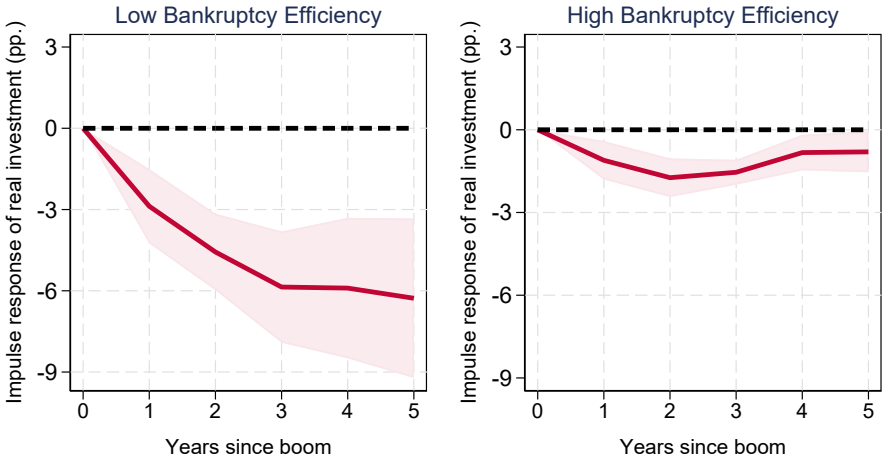
GDP following Business Credit Booms

Impulse response for bottom/top quartile of bankruptcy efficiency (w/ Driscoll-Kraay SEs)



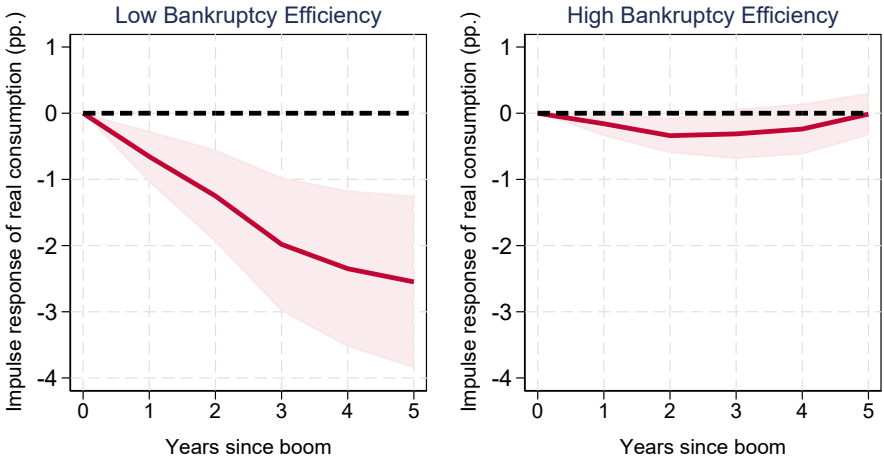
Investment following Business Credit Booms

Impulse response for bottom/top quartile of bankruptcy efficiency (w/ Driscoll-Kraay SEs)



Consumption following Business Credit Booms

Impulse response for bottom/top quartile of bankruptcy efficiency (w/ Driscoll-Kraay SEs)



Other Outcomes

- Unemployment: increases significantly in low bankruptcy efficiency countries
- TFP: decreases significantly in low bankruptcy efficiency countries
- Asset prices: decrease significantly in low bankruptcy efficiency countries
- Recovery: gradually over 10 years in low bankruptcy efficiency countries
- Recession probability & severity:
  - Recession probability increases following credit booms in low bankruptcy efficiency countries
  - Recessions are deeper & longer in low efficiency countries [Jordà et al. (2022)]

Robustness Checks

- Concern: bankruptcy efficiency correlated with other factors that stabilize the economy
  - Control for development status, exchange rate regime, general rule of law, GDP volatility, cyclicality of monetary, fiscal, and macropru policy, & interacted with business credit booms

Robustness Checks

- Concern: bankruptcy efficiency correlated with other factors that stabilize the economy
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- Concern: recession may lower bankruptcy efficiency (e.g., court congestion)
  - Use bankruptcy efficiency at the beginning of sample
- Instrument bankruptcy efficiency with legal origins
  - Explain about 30% of the variations in bankruptcy efficiency
- Alternative windows for measuring business credit booms
- Check results are symmetric for business credit booms and contraction

Road Map

A Simple Theoretical Framework

Model: how & when bankruptcy efficiency mitigates negative consequences of credit booms

Ingredients:

- Firms finance risky investments with defaultable debt & optimally choose leverage
- Following default, firms either liquidate (inefficient, output losses) or reorganize (efficient)
- Model the efficiency of bankruptcy institutions as the likelihood of inefficient liquidation

Model Predictions

Predictions for nonfundamental booms (driven by discount rates or biased beliefs):

- Credit booms are followed by lower output and more defaults
  - Higher leverage $\Longrightarrow$ more defaults $\Longrightarrow$ more inefficient liquidation & output losses
- More efficient bankruptcy mitigates the negative consequences of these credit booms
  - More efficient bankruptcy decreases the likelihood of inefficient liquidation
  - Despite more efficient bankruptcy increases the size of credit market & leverage
- Consistent with data

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Predictions for fundamental booms (driven by increases in firms' productivity) are reversed:

- Boom followed by higher output and fewer defaults (because of increases in productivity)
- Inconsistent with data and the literature

  [Schularick and Taylor (2012); Mian, Sufi, and Verner (2017); Greenwood et al. (2022); Ivashina et al. (2024)]

Summary

Credit booms detrimental when business bankruptcy functions poorly

Law and macro: legal institutions can matter for macroeconomic stability

- Has motivated bankruptcy reforms (e.g., Japan in 1990s)
- Can be even more important when the economy relies more on intangible capital

Macroprudential policies:

- Common view: use macroprudential policies to restrain credit booms to prevent crisis
- But macroprudential policies also have costs (e.g., regulatory burdens, misallocation)
- Net benefits higher when credit booms are likely to create real damage

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Understanding default resolution in practice can be useful for macroeconomic analyses

- Ongoing: quantitative model to analyze macro implications of corporate debt contracts

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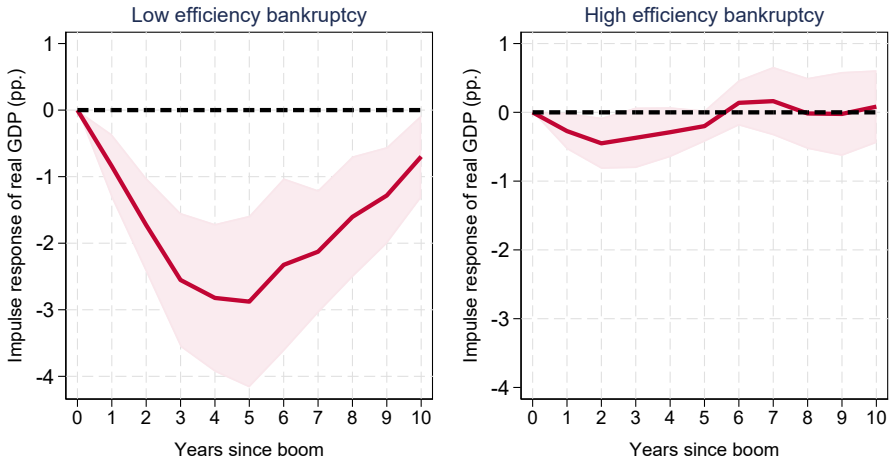
GDP following Business Credit Booms

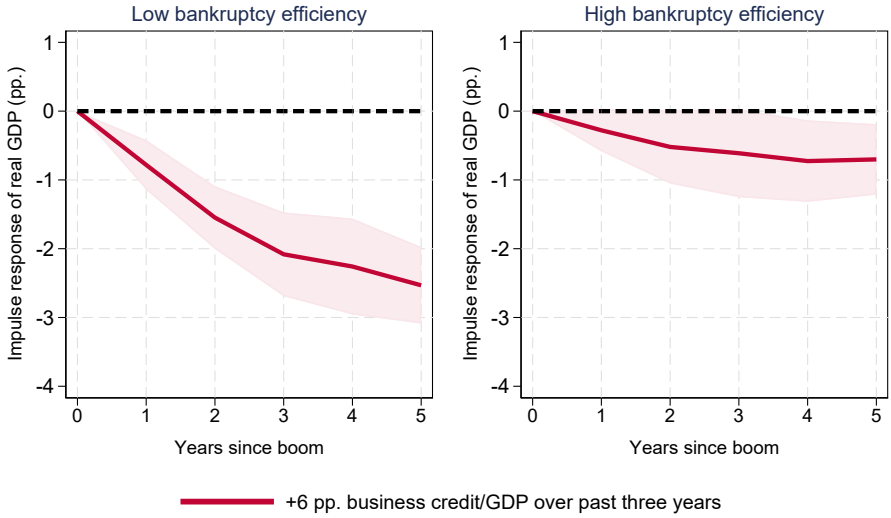
	(1) $h=1$	(2) $h=2$	(3) $h=3$	(4) $h=4$	(5) $h=5$
Δ_5 Business credit/GDP $\times$ Bankruptcy efficiency	0.143***	0.319***	0.546***	0.633***	0.669***
	(0.048)	(0.080)	(0.114)	(0.134)	(0.172)
Δ_5 Business credit/GDP	-0.146***	-0.310***	-0.490***	-0.555***	-0.576***
	(0.046)	(0.072)	(0.103)	(0.119)	(0.145)
Bankruptcy efficiency	-0.939	-1.385	-0.700	-0.260	-0.082
	(0.954)	(1.185)	(1.965)	(2.887)	(3.293)
Country FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
R^2	0.42	0.52	0.60	0.66	0.71
Observations	560	522	484	446	408

GDP following Business Credit Booms: Longer Term

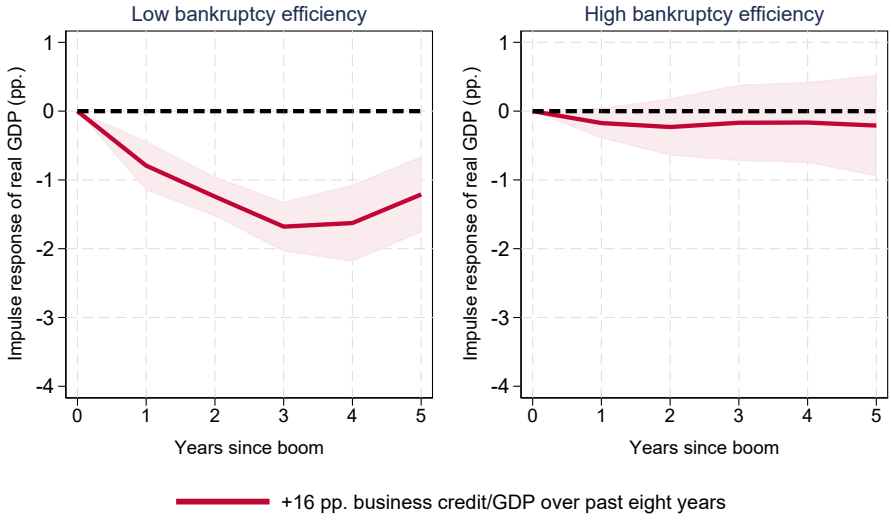
Longer term reduces # of obs (due to sample period)



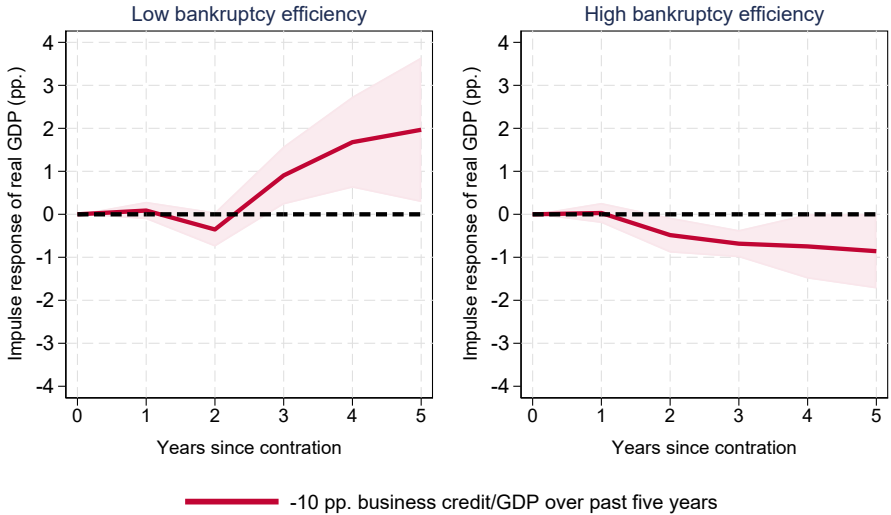
Business Credit Boom over Past 3 Years



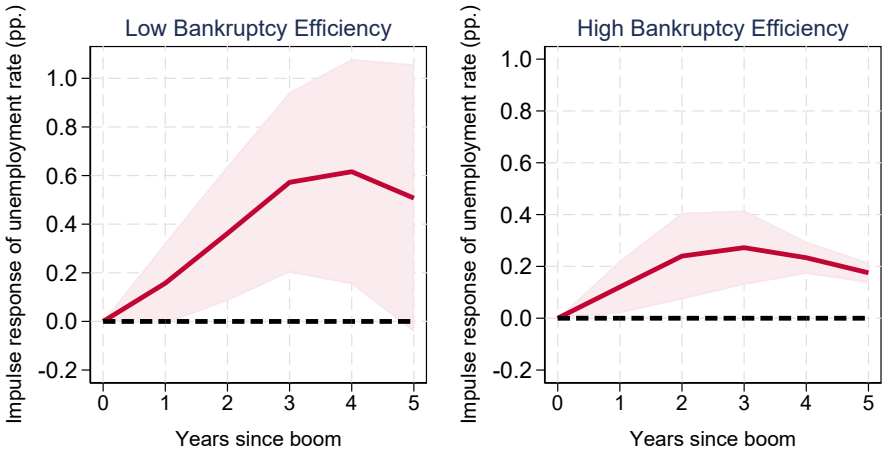
Business Credit Boom over Past 8 Years



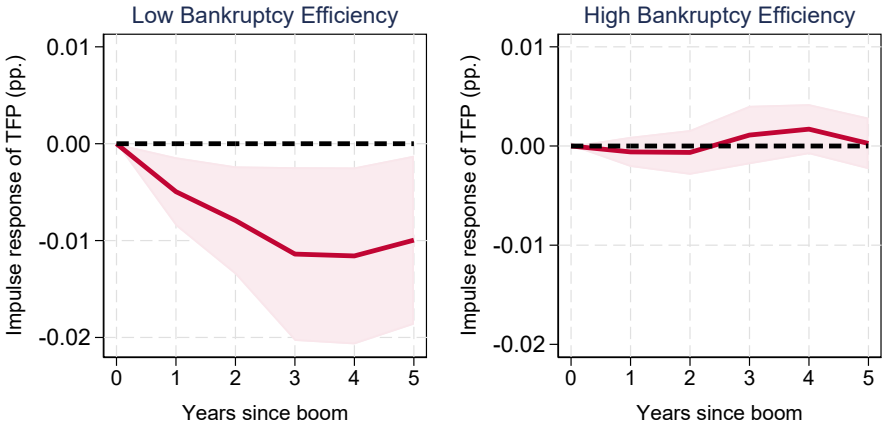
Symmetry between Credit Booms and Contractions



Unemployment Rate following Business Credit Booms

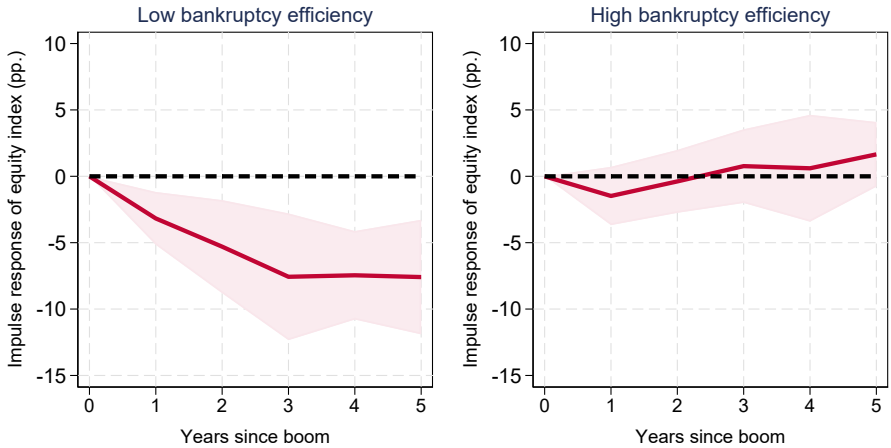


TFP following Business Credit Booms



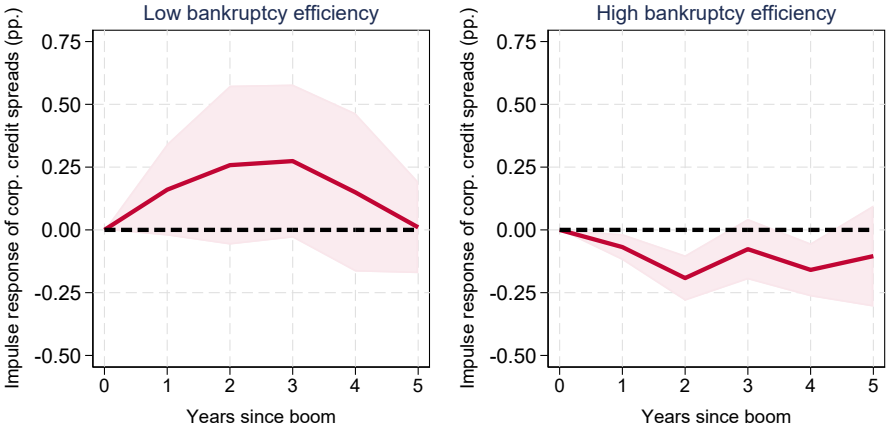
Stock Prices following Business Credit Booms

Stock price data available for 36 countries



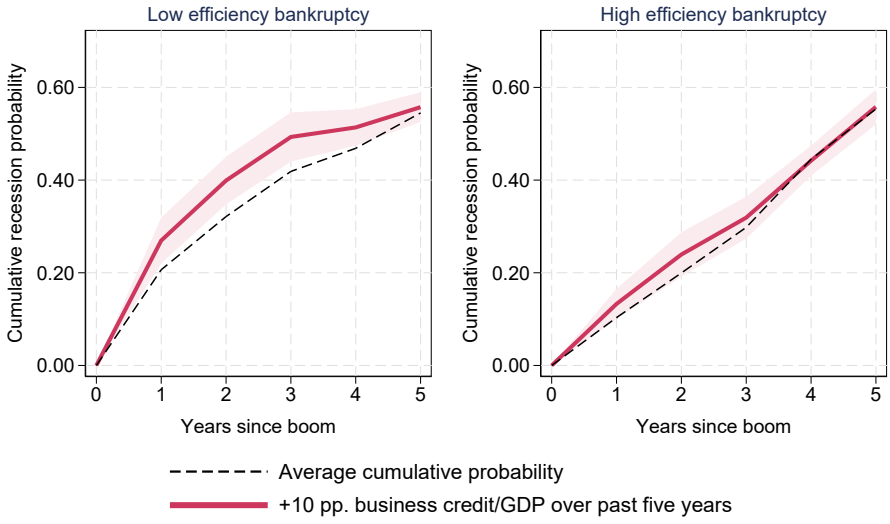
Credit Spreads following Business Credit Booms

Credit spread data available for 20 countries

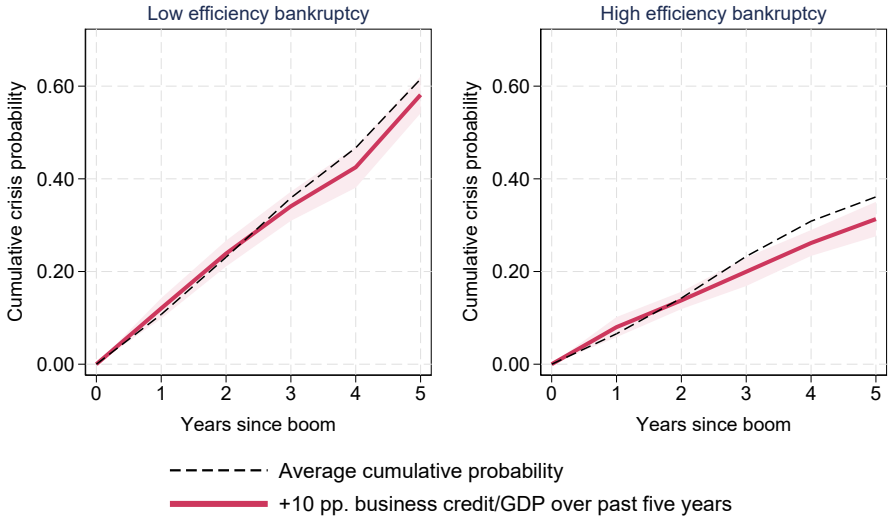


Recession Risk following Business Credit Booms

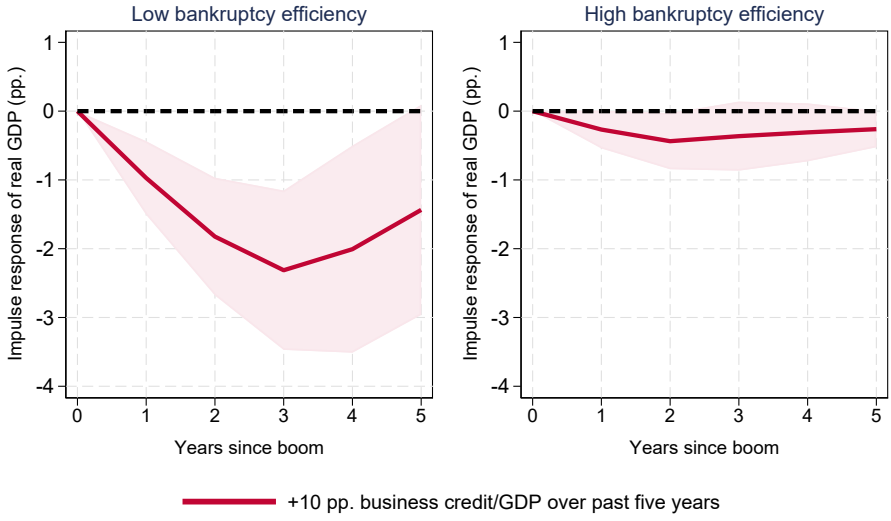
Recession defined as negative GDP growth



Crisis Risk following Business Credit Booms



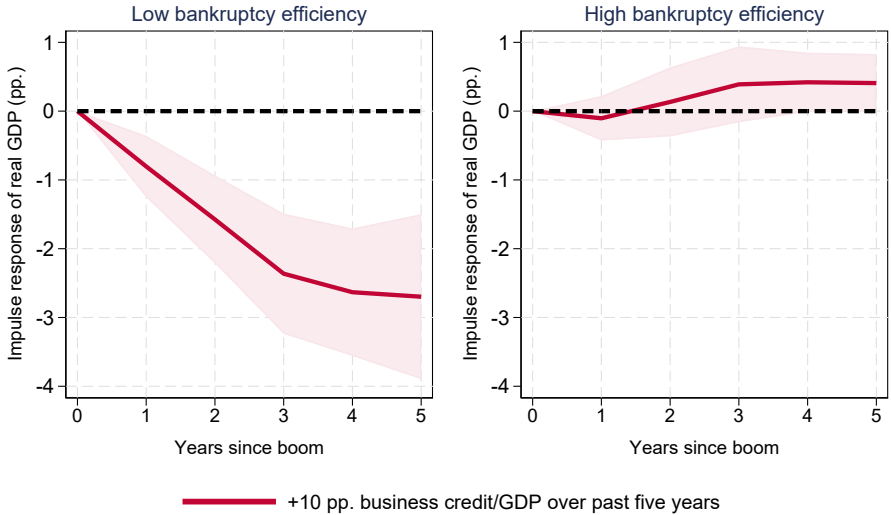
Control for Development Status



Control for Development Status

	(1) $h=1$	(2) $h=2$	(3) $h=3$	(4) $h=4$	(5) $h=5$
Δ_5 Business credit/GDP $\times$ Bankruptcy efficiency	0.176**	0.347***	0.487***	0.425**	0.293
	(0.075)	(0.116)	(0.154)	(0.183)	(0.195)
Δ_5 Business credit/GDP $\times$ Developed market economy	-0.058	-0.105	-0.064	0.028	0.123***
	(0.047)	(0.064)	(0.081)	(0.066)	(0.037)
Δ_5 Business credit/GDP	-0.115***	-0.227***	-0.377***	-0.411***	-0.393**
	(0.036)	(0.056)	(0.096)	(0.113)	(0.145)
Bankruptcy efficiency	-0.869	-0.863	0.743	2.989**	4.708*
	(0.907)	(1.206)	(1.007)	(1.103)	(2.240)
Developed market economy	-2.043*	-5.279**	-7.058**	-9.159***	-11.465***
	(0.968)	(1.977)	(2.350)	(2.942)	(3.275)
Country FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
R^2	0.44	0.54	0.62	0.67	0.72
Observations	560	522	484	446	408

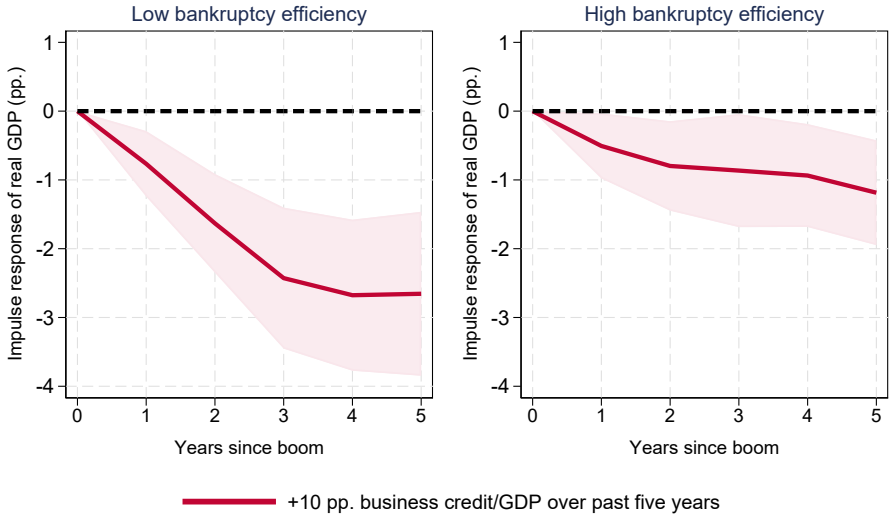
Control for Exchange Rate Regime



Control for Exchange Rate Regime

	(1) $h=1$	(2) $h=2$	(3) $h=3$	(4) $h=4$	(5) $h=5$
Δ_5 Business credit/GDP $\times$ Bankruptcy efficiency	0.175**	0.427***	0.688***	0.763***	0.776***
	(0.063)	(0.106)	(0.144)	(0.168)	(0.189)
Δ_5 Business credit/GDP $\times$ Currency peg	-0.025	-0.088**	-0.118**	-0.111*	-0.096
	(0.021)	(0.038)	(0.053)	(0.062)	(0.054)
Δ_5 Business credit/GDP	-0.156***	-0.341***	-0.532***	-0.591***	-0.604***
	(0.049)	(0.077)	(0.107)	(0.123)	(0.146)
Bankruptcy efficiency	-1.514*	-2.748**	-2.746	-1.795	-0.928
	(0.841)	(1.106)	(1.873)	(2.733)	(3.101)
Currency peg	1.426	3.312*	5.528**	4.731*	2.852
	(0.813)	(1.580)	(2.242)	(2.440)	(2.010)
Country FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
R^2	0.43	0.52	0.60	0.66	0.71
Observations	560	522	484	446	408

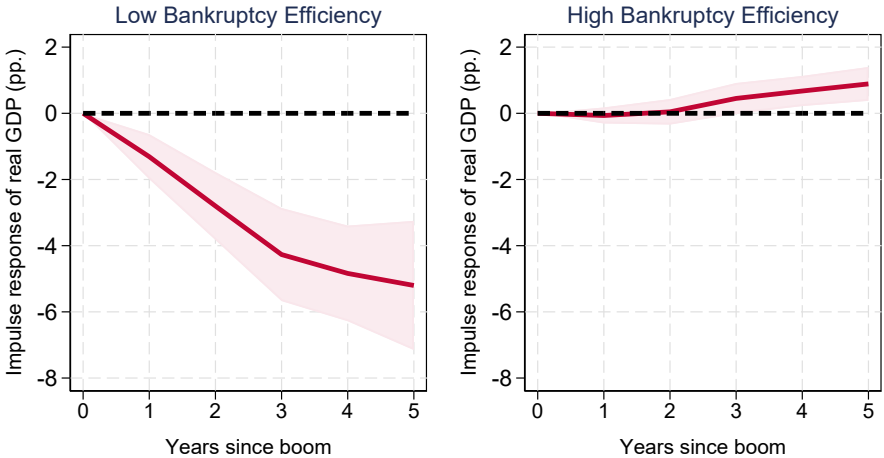
Control for General Rule of Law



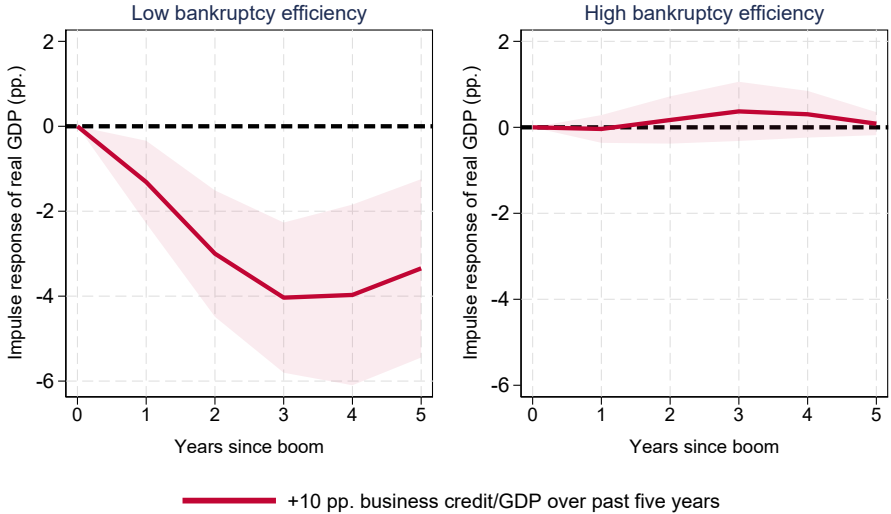
Control for General Rule of Law

	(1) $h=1$	(2) $h=2$	(3) $h=3$	(4) $h=4$	(5) $h=5$
Δ_5 Business credit/GDP $\times$ Bankruptcy efficiency	0.065	0.208**	0.391***	0.435**	0.367*
	(0.051)	(0.088)	(0.122)	(0.143)	(0.196)
Δ_5 Business credit/GDP $\times$ Rule of law	0.037*	0.055*	0.079*	0.105**	0.160***
	(0.020)	(0.029)	(0.044)	(0.045)	(0.051)
Δ_5 Business credit/GDP	-0.105**	-0.253***	-0.411***	-0.455***	-0.424**
	(0.041)	(0.069)	(0.100)	(0.115)	(0.144)
Bankruptcy efficiency	-0.235	-0.203	1.610	3.621	6.223
	(0.957)	(1.222)	(2.311)	(3.702)	(4.390)
Rule of law	-0.184	-0.432	-1.827	-4.008*	-7.579*
	(0.872)	(1.120)	(1.423)	(2.149)	(4.084)
Country FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
R^2	0.43	0.52	0.60	0.66	0.71
Observations	560	522	484	446	408

GDP following Business Credit Booms with Fixed Bankruptcy Efficiency



Instrumenting with Legal Origin

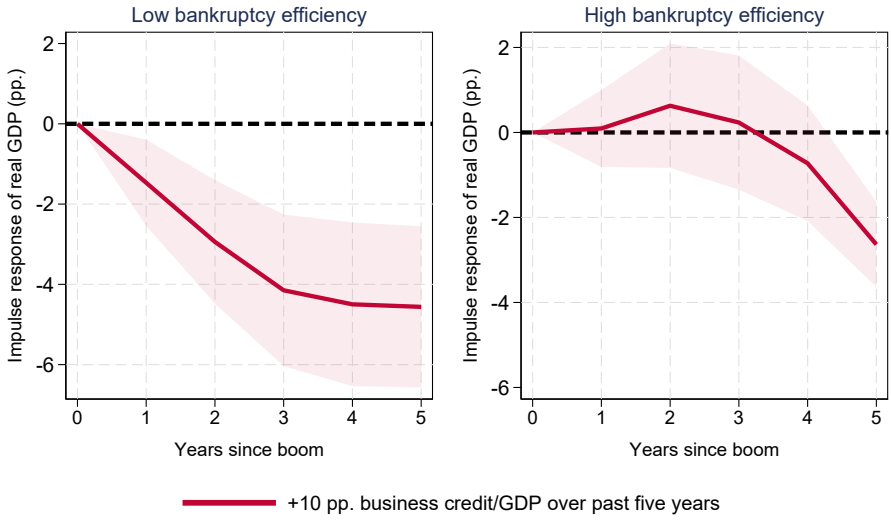


Instrumenting with Legal Origin

	(1) $h=1$	(2) $h=2$	(3) $h=3$	(4) $h=4$	(5) $h=5$
Δ_5 Business credit/GDP $\times$ Bankruptcy efficiency (instr.)	0.212**	0.528***	0.734***	0.712***	0.572***
	(0.095)	(0.157)	(0.185)	(0.209)	(0.191)
Δ_5 Business credit/GDP	-0.195**	-0.458***	-0.624***	-0.611***	-0.506***
	(0.077)	(0.122)	(0.144)	(0.171)	(0.164)
Country FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
First stage F	24.77	21.95	17.94	14.58	13.98
R^2	0.13	0.13	0.17	0.21	0.25
Observations	560	522	484	446	408

Instrumenting with Legal Origin

Also Controlling for General Rule of Law

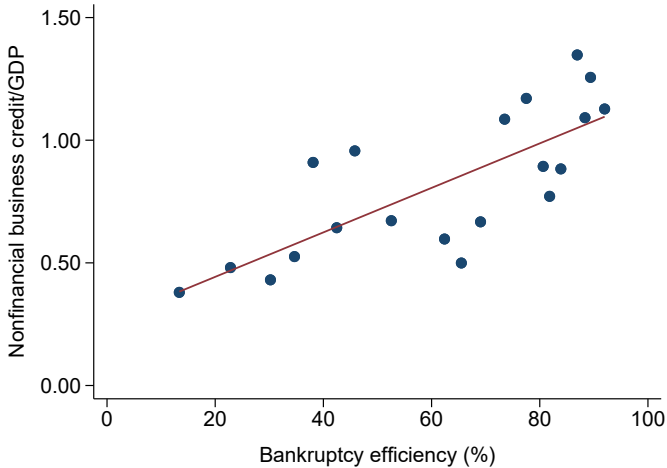


Instrumenting with Legal Origin

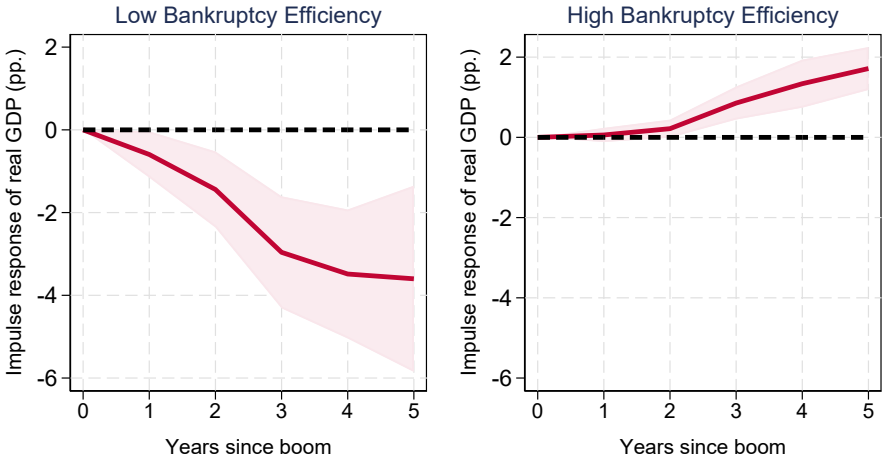
Also Controlling for General Rule of Law

	(1) $h=1$	(2) $h=2$	(3) $h=3$	(4) $h=4$	(5) $h=5$
Δ_5 Business credit/GDP $\times$ Bankruptcy efficiency (instr.)	0.260*	0.595***	0.730***	0.629***	0.321*
	(0.143)	(0.219)	(0.208)	(0.216)	(0.165)
Δ_5 Business credit/GDP $\times$ Rule of Law	-0.305	-2.482	1.084	6.694*	16.954***
	(2.283)	(3.346)	(4.024)	(3.855)	(2.929)
Δ_5 Business credit/GDP	-0.225**	-0.473***	-0.634***	-0.638***	-0.552***
	(0.095)	(0.139)	(0.150)	(0.163)	(0.148)
Rule of law index	0.012	-0.120	-1.610	-3.840*	-7.638*
	(1.036)	(1.446)	(1.542)	(2.166)	(4.187)
Country FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
First stage F	8.14	10.35	9.81	9.41	8.47
R^2	0.13	0.13	0.18	0.22	0.26
Observations	560	522	484	446	408

Bankruptcy Efficiency and Level of Business Credit/GDP

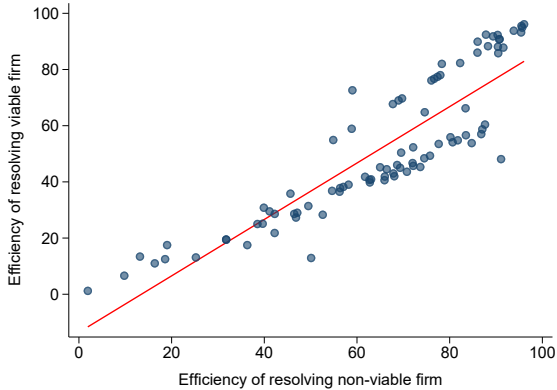


Control for Debt Level



Efficiency of Reorganization vs Liquidation

Data from Djankov et al. (2008)



Notes: *X*-axis measures reorganization efficiency, i.e., share of a viable firm's value preserved in bankruptcy. *Y*-axis measures the efficiency of liquidation, i.e., share of liquidation value of a nonviable firm preserved in bankruptcy.

Controlling for GDP per Capita

	(1) $h=1$	(2) $h=2$	(3) $h=3$	(4) $h=4$	(5) $h=5$
Δ_5 Business credit/GDP $\times$ Bankruptcy efficiency	0.145***	0.300***	0.467***	0.560***	0.566***
	(0.041)	(0.064)	(0.089)	(0.090)	(0.093)
Δ_5 Business credit/GDP $\times$ Log real GDP p.c.	-0.017	-0.032	-0.026	-0.068	-0.082
	(0.020)	(0.049)	(0.069)	(0.081)	(0.080)
Δ_5 Business credit/GDP	0.048	0.080	-0.097	0.308	0.479
	(0.200)	(0.509)	(0.717)	(0.866)	(0.915)
Bankruptcy efficiency	3.776**	7.897***	13.533***	18.481***	23.422***
	(1.288)	(1.966)	(2.950)	(3.847)	(3.520)
Log real GDP per capita in USD	-8.324***	-17.853***	-28.636***	-40.664***	-52.362***
	(1.819)	(4.867)	(7.103)	(7.072)	(4.315)
Country FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
R^2	0.45	0.55	0.64	0.70	0.76
Observations	560	522	484	446	408

Controlling for Monetary Policy Stabilization

	(1) $h=1$	(2) $h=2$	(3) $h=3$	(4) $h=4$	(5) $h=5$
Δ_5 Business credit/GDP $\times$ Bankruptcy efficiency	-0.009	0.110	0.332*	0.385**	0.454**
	(0.072)	(0.149)	(0.163)	(0.153)	(0.183)
Δ_5 Business credit/GDP $\times$ Monetary cyclicality	0.002***	0.003*	0.003*	0.004**	0.003*
	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)
Δ_5 Business credit/GDP	-0.080*	-0.221***	-0.406***	-0.458***	-0.505***
	(0.040)	(0.074)	(0.077)	(0.084)	(0.123)
Bankruptcy efficiency	-4.805***	-9.253***	-12.254***	-13.471***	-13.939***
	(0.956)	(2.485)	(3.095)	(2.254)	(2.045)
Country FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
R^2	0.40	0.51	0.60	0.65	0.68
Observations	375	349	323	297	271

Notes: Monetary cyclicality in a country i measured by β_i from Δpolicy rate$_{i,t} = \alpha_i + \beta_i \Delta \log$ real GDP$_{i,t} + e_{i,t}$.

Controlling for Fiscal Policy Stabilization

	(1) $h=1$	(2) $h=2$	(3) $h=3$	(4) $h=4$	(5) $h=5$
Δ_5 Business credit/GDP $\times$ Bankruptcy efficiency	0.127***	0.280***	0.481***	0.564***	0.598***
	(0.042)	(0.066)	(0.096)	(0.121)	(0.162)
Δ_5 Business credit/GDP $\times$ Fiscal cyclicality	-0.014	-0.058**	-0.102***	-0.128***	-0.151***
	(0.015)	(0.021)	(0.032)	(0.028)	(0.020)
Δ_5 Business credit/GDP	-0.142***	-0.304***	-0.480***	-0.548***	-0.576***
	(0.046)	(0.070)	(0.100)	(0.113)	(0.140)
Bankruptcy efficiency	-0.840	-1.092	-0.324	0.165	0.288
	(0.977)	(1.303)	(2.121)	(2.959)	(3.236)
Country FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
R^2	0.43	0.52	0.60	0.66	0.71
Observations	551	514	477	440	403

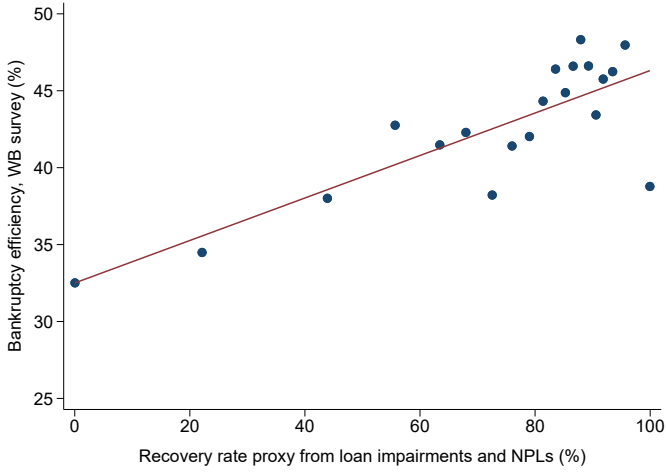
Notes: Fiscal cyclicality in a country i measured by β_i from $\Delta(\text{Gov. expenditure/GDP})_{i,t} = \alpha_i + \beta_i \Delta \log \text{real GDP}_{i,t} + e_{i,t}$.

Controlling for GDP Volatility

	(1) $h=1$	(2) $h=2$	(3) $h=3$	(4) $h=4$	(5) $h=5$
Δ_5 Business credit/GDP $\times$ Bankruptcy efficiency	0.117*	0.295**	0.493***	0.508**	0.431*
	(0.057)	(0.121)	(0.162)	(0.182)	(0.222)
Δ_5 Business credit/GDP $\times$ GDP volatility	-1.094	-1.045	-2.190	-5.088	-9.693**
	(1.392)	(3.049)	(4.330)	(3.960)	(4.058)
Δ_5 Business credit/GDP	-0.098	-0.264	-0.392*	-0.327	-0.147
	(0.068)	(0.157)	(0.217)	(0.233)	(0.273)
Bankruptcy efficiency	-0.956	-1.427	-0.820	-0.458	-0.317
	(0.953)	(1.261)	(2.133)	(3.012)	(3.081)
Country FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
R^2	0.42	0.52	0.60	0.66	0.71
Observations	560	522	484	446	408

Notes: GDP volatility measured as the standard deviation of annual growth in real GDP.

Validating World Bank Bankruptcy Efficiency Measure



Notes: Binned scatter plot of survey-based measures of bankruptcy efficiency and loan recovery rates proxied by $1 - \frac{\text{loan impairments}}{\text{non-performing loans}}$. Impairments and non-performing loans are from the BIS Credit Loss Database. Data from 153 countries from 2003 to 2019, net of year fixed effects.