Evergreening

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Motivation

Evergreening:

- Idea that banks revive a loan close to default by granting further credit to the same firm
- Potentially contributes to keeping less-productive firms alive & depressing aggregate TFP
- "Zombie"-lending is typically associated with low-capitalized banks during depressions

Research Questions:

1. Is evergreening a general feature of financial intermediation?
2. Can we find empirical evidence even for the U.S. over the recent past?
3. What are the macroeconomic consequences of evergreening?

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This Paper

1. **Static Model**
   - Small deviation from benchmark model: "concentrated vs. dispersed lenders"
   - Better terms to firms with $+$ legacy debt, $-$ productivity
   - Intuition: lender takes into account legacy debt and steer firm default
2. **Empirics**
   - Exploit cross-sectional variation in bank exposure to distressed firms
   - $+$ lending & $-$ interest rates to distressed firms if bank owns a larger debt share
   - Effects at the firm level: $+$ borrowing, $+$ investment, consistent with theory
3. **Dynamic Model**
   - Embed static model mechanism into dynamic heterogeneous-firm model
   - Economy features relatively larger firms, more debt, lower spreads, lower TFP

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Literature

- **Empirical Evidence on Zombie Lending & Evergreening**
  - Japan: Peek & Rosengren (2005); Caballero, Hoshi & Kashyap (2008)
  - Eurozone: Schivardi, Sette & Tabellini (2020); Blattner, Farinha & Rebelo (2020); Acharya, Eisert, Eufinger & Hirsch (2019); Acharya, Crosignani, Eisert & Eufinger (2020); Bonfim, Cerqueiro, Degryse & Ongena (2022).
  - Cross-country: McGowan, Andrews & Millot (2018), Banerjee & Hofmann (2018)

  Here: Document evidence of evergreening in a non-crisis setting (US financial system)

- **Models of Zombie Lending & Evergreening**
  - Static: Rajan (1994); Puri (1999); Bruche & Llobet (2014); Acharya, Lenzu, Wang (2021)
  - Dynamic: Hu & Varas (2021); Tracey (2021)

  Here: Evergreening w/o asymmetric information or limited liability; dynamic model to study aggregate implications.

Static Model

Firm Problem

▸ Firm Problem Solution

2 periods

- Firm has pre-existing liability b and productivity z
- Borrows new debt Qb' to invest k' today, produces tomorrow (+NPV)
- Defaults on b at the start iff $V(z, b; Q) < 0$; Q offered before default decision
- No default in the 2nd period, new lending risk-free

$$V(z, b; Q) = \max_{b', k'} Qb' - b - k' + \beta^f [z(k')^\alpha - b']$$

$$\text{s.t. } b' \leq \theta k'$$

- **Result**: there exists a $Q^{\min}(z, b)$ such that firm defaults if $Q < Q^{\min}$
- **Result**: investment k' satisfies: $MPK = \frac{1+\theta\beta^f}{\beta^f} - \frac{\theta}{\beta^f} Q$

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Economy I: Dispersed Lenders

- Continuum of deep-pocketed, risk-neutral, competitive lenders with $\beta^k > \beta^f$
- Equilibrium contract of competitive lenders satisfies

$$Q = \begin{cases} \beta^k & \text{if } \beta^k \geq Q^{\min}(z, b) \\ 0 & \text{otherwise} \end{cases}$$

- Equilibrium allocation (b^c, k^c, V^c) satisfies

$$MPK = \frac{1 + \theta\beta^f}{\beta^f} - \frac{\theta}{\beta^f}\beta^k, \forall z, b$$

- Interest rates and MPK equalized across all non-defaulting firms

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Economy II: Concentrated Lenders ("Banks")

Bank Problem Solution

- Two key differences:
  1. Lender owns pre-existing liability b, lost in default
  2. Lender moves first & internalizes effect of Q on (b', k', V) (Stackelberg timing)
- Firm has outside option of dispersed bond market, $Q \geq \beta^k$
- Bank problem:

$$W = \max_{Q \geq \beta^k} \mathbb{I}[V(z, b, Q) \geq 0] \times \left[b - Qb'(z, Q) + \beta^k b'(z, Q)\right]$$

- $Q \uparrow$ implies trade-off:
  + Reduce firm's likelihood of default, increase chance of recovering b
  - Less surplus extracted from new contract $b'(\beta^k - Q)$

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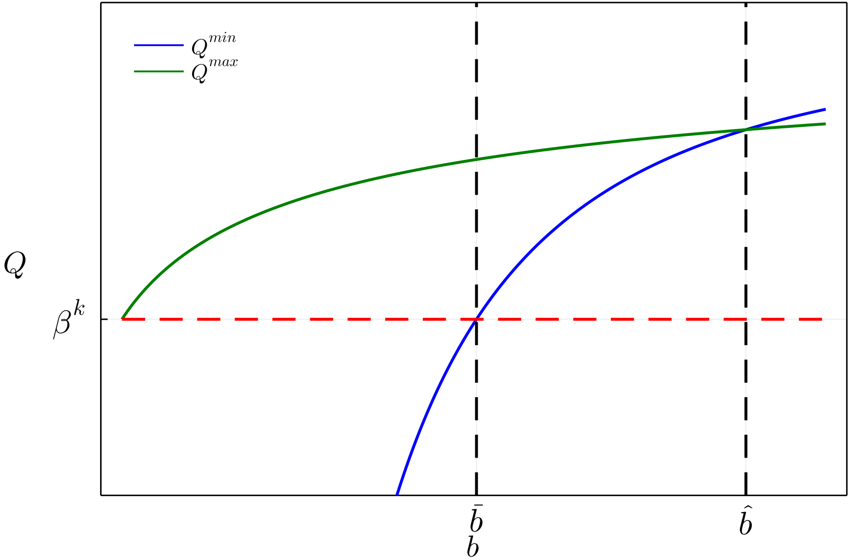

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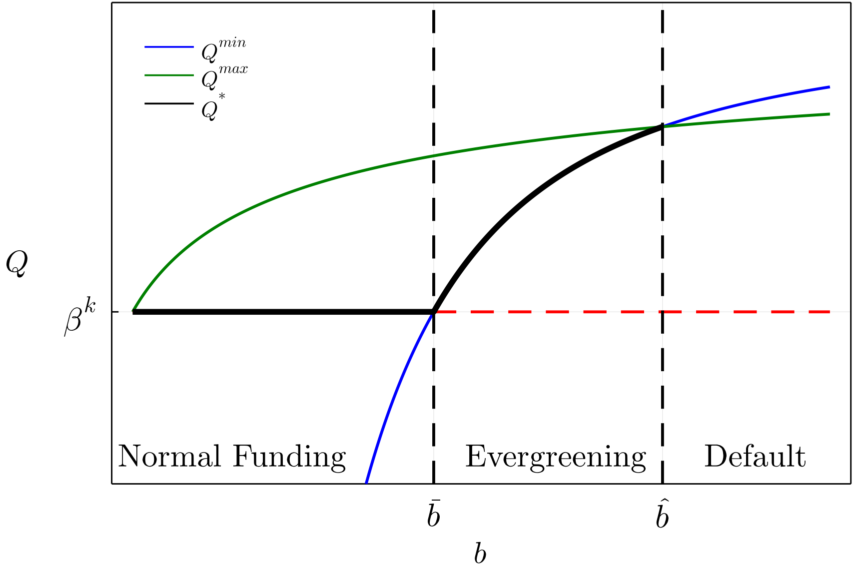

Static Model: Summary

- In ”evergreening region”:
  1. Q increasing in b
  2. Q decreasing in z
- “Worse” fundamentals (low z, high b) $\Rightarrow$ higher Q
- Same pattern for k', b'
- **Next:** empirical evidence for banks extending more/better credit to firms in distress

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Empirical Strategy

Data

- **Data Set:**
  - C&I loans of Y-14Q data, covers large BHCs, sample: 2014:Q4 - 2019:Q4
  - Loan-level panel with quarterly updates on universe of loan facilities $>$$1M
  - Detailed information about features of credit arrangement
  - Banks' *risk assessments* about each individual loan or firm
- **Observed Risk Measures:**
  - One-year probability of default (PD), loss given default, ...
  - Use firms' PDs to measure whether they are in distress
  - PD is borrower-specific $\rightarrow$ comparable across banks

Identifying Credit Supply Effects

- Do "concentrated lenders" extend more credit to firms in distress ?
  - Need to account for potential links between bank-firm selection and firm demand
- Following Khwaja and Mian (2008), estimate regression for firm f and bank b:

$$\frac{L_{f,b,t+2} - L_{f,b,t}}{0.5 \cdot (L_{f,b,t+2} + L_{f,b,t})} = \alpha_{f,t} + \beta_1 \text{Debt-Share}_{f,b,t} + \beta_2 \text{Debt-Share}_{f,b,t} \times \text{Distress}_{f,t} + \gamma X_{f,t} + u_{f,b,t}$$

- Debt-share is $L_{f,b,t}/Debt_{f,t}$; Distress equals one if $\overline{PD}_{f,t} \geq \kappa_{90} = 3.89\%$
- Consider interest rate responses to address identification concerns
- Sample restricted to term loans only & pre-COVID period ("normal times")

Debt Share & Firm Distress

▸ Distress Cutoffs ▸ Interaction Terms ▸ Bank Capital ▸ Zombie Comparison

- Banks with a larger debt-share extend relatively more credit to firms in distress

	Δ Credit			Δ Interest Rate		
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Debt-Share	-21.88**	-17.48**	-22.37***	0.18***	0.11	0.12*
	(8.24)	(8.58)	(7.84)	(0.05)	(0.07)	(0.06)
Debt-Share × Distress	45.60***	38.56***	44.95***	-0.93***	-0.71**	-0.72**
	(9,49)	(10.50)	(12.84)	(0.33)	(0.33)	(0.32)
Fixed Effects						
Firm × Time	✓		✓	✓		✓
Firm × Time × Pur.		✓			✓	
Bank × Time			✓			✓
Bank Controls	✓	✓		✓	✓	
R-squared	0.58	0.60	0.63	0.74	0.74	0.79
Observations	8,647	5,729	8,576	8,407	5,561	8,338
Number of Firms	887	642	884	867	621	864
Number of Banks	36	34	34	36	34	34

Bank controls: ROA, dep/assets, income gap, ln(assets), unused credit/assets, Tier 1 cap. buffer, liab./assets, loans/assets. Standard errors clustered by bank and firm. Distress: $\kappa = 3.89\%$. Sample: 2014:Q4-2019:Q4.

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- ... at lower interest rates (suggesting supply, not demand)

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Effects at the Firm-Level

- Do these effects persist at the firm-level, affecting total debt and investment?
  - Aggregation: weigh regressors by debt shares across banks for some firm f
- Estimate regression for firm f at annual frequency:

$$\frac{y_{f,t+4} - y_{f,t}}{0.5 \cdot (y_{f,t+4} + y_{f,t})} = \alpha_f + \tau_{m,k,t} + \beta_1 HHI_{f,t} + \beta_2 HHI_{f,t} \cdot Distress_{f,t} + \beta_3 Distress_{f,t} + \gamma X_{f,t} + u_{f,t}$$

- Firm outcomes: y is either total debt or tangible assets ("investment")
- $HHI_{f,t} = \sum_b (L_{f,b,t}/Debt_{f,t})^2$ is the Herfindahl-Hirschmann-Index for debt concentration
- $Distress_{f,t}$ measures firm distress and is defined as above: $\overline{PD}_{f,t} >= 3.89\%$
- Fixed effects: firm α_f and industry-state-time $\tau_{m,k,t}$

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Effects at the Firm-Level

- Debt & investment decline for distressed firms, but less so if their debt is concentrated

	Δ Total Debt		Investment	
	(i)	(ii)	(iii)	(iv)
HHI	33.71***	32.79***	11.82***	11.81***
	(8.27)	(8.30)	(3.88)	(3.92)
HHI × Distress	13.34***	19.49***	6.88**	7.55**
	(4.54)	(5.41)	(3.49)	(3.85)
Distress	-4.38***	-7.24***	-2.56***	-2.34***
	(1.38)	(1.83)	(0.71)	(0.86)
Fixed Effects				
Firm	✓	✓	✓	✓
Time × Industry × State	✓	✓	✓	✓
Firm Controls × Distress		✓		✓
Firm Controls	✓	✓	✓	✓
R-squared	0.56	0.56	0.58	0.58
Observations	60,636	60,636	71,854	71,854
w/ Distress = 1	5,211	5,211	6,195	6,195
Number of Firms	14,400	14,400	17,063	17,063
Number of Banks	37	37	37	37

Firm controls: cash, net income, tangible assets, liabilities, debt (all relative to assets), ln(assets), observed credit/debt. Standard errors clustered by main-bank and firm. Sample: 2014:Q4-2019:Q4.

Dynamic Model

Dynamic Model

- Embed static model in Hopenhayn (1992) + Cooley & Quadrini (2001)
- Time discrete and infinite $t = 0, 1, \ldots, \infty$
- Continuum of firms, heterogeneous with respect to productivity, capital, and debt
- Endogenous entry and exit of firms
- Elastic supply of capital, depreciates at rate δ
- Firm productivity follows AR(1) in logs

Dynamic Model: Timing

Within each period t:

1. Firm productivity z realized
2. Lending contract Q is offered, depending only on curren states (z, b, k)
3. Firm draws "preference shocks" $\varepsilon^P, \varepsilon^D \sim$ extreme value, chooses to default or not
4. Entrants pay cost of entry
5. Firms repay, invest, produce, borrow, and pay dividends

Dynamic Model: Firm Problem

- Value given Q and realization for the extreme-value shocks

$$V_0(z, b, k, \varepsilon^P, \varepsilon^D; Q) = \max\left\{V^P(z, b, k; Q) + \varepsilon^P, 0 + \varepsilon^D\right\}$$

- $\varepsilon^P - \varepsilon^D \equiv \varepsilon \sim$ logistic with scale parameter κ, thus

$$\text{Prob of Repayment} : \mathcal{P}(z, b, k; Q) = \frac{\exp\left[V^P(z, b, k; Q)/\kappa\right]}{1 + \exp\left[V^P(z, b, k; Q)/\kappa\right]}$$

$$\text{Expected Value} : \mathcal{V}(z, b, k; Q) = \mathbb{E}_{\varepsilon^P, \varepsilon^D} V_0(z, b, k, \varepsilon^P, \varepsilon^D; Q) = \kappa \log\left\{1 + \exp\left[V^P(z, b, k; Q)/\kappa\right]\right\}$$

- Firm value of repayment:

$$V^P(z, b, k; Q) = \max_{b', k', n} div - \mathbb{I}[div < 0][e_{con} + e_{slo} \times div] + \beta^f \mathbb{E}_{z'}[\mathcal{V}(z', b', k')|z]$$

$$\text{s.t. } div = zk^\alpha n^\eta - wn - k' + (1-\delta)k + Qb' - b - c_f$$

$$b' \leq \theta k'$$

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Dispersed vs. Concentrated Lending

- $\mathcal{P}(s; Q)$ is probability of repayment, $s = (z, b, k)$, and $\psi(s)$ is recovery value
- **Dispersed Lending**: Free-entry for lenders $\Rightarrow$ zero-profit condition, implying

$$Q^{disp}(s)b' = \beta^k \mathbb{E}_{z'}[\mathcal{P}(s')b' + (1 - \mathcal{P}(s'))\psi(s')]$$

- **Concentrated Lending**: Lender can choose Q, subject to participation constraint

$$\max_Q W(s; Q) = \mathcal{P}(s; Q)\left[b - Qb'(s; Q) + \beta^k \mathbb{E}_{z'}[W(s')|z]\right] + (1 - \mathcal{P}(s; Q))\psi(s)$$

$$\text{s.t.} \quad V(s; Q) \geq V(s; Q^{new}(s))$$

where

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Stationary Industry Equilibrium

Given an arbitrary interest rate function Q, a SIE consists of

1. Policy functions $(k, b')(z, b, k)$ and value functions $V(z, b, k)$
2. Equilibrium wage w
3. Mass of entrants m
4. Stationary distribution $\lambda(z, b, k)$

such that:

1. Policies and values solve the firm's problem given (Q, w)
2. Wage is such that the free-entry condition is satisfied
3. Mass of entrants is such that the market for labor clears
4. λ satisfies its law of motion

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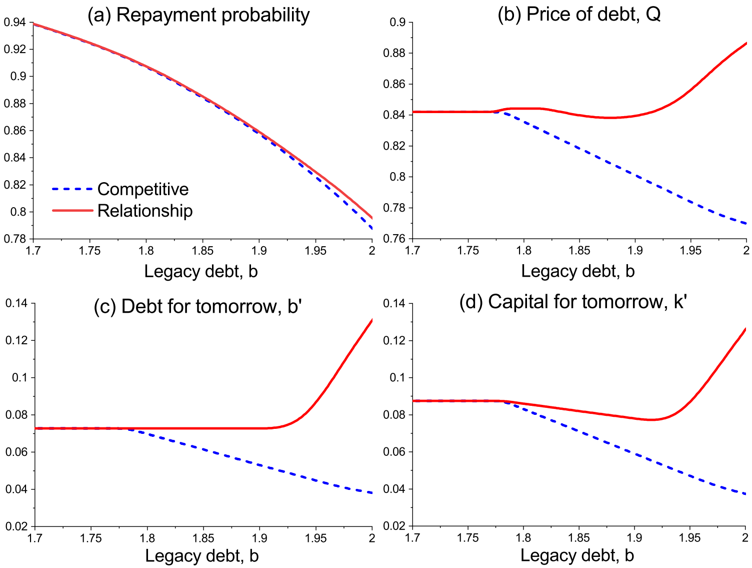
Dynamic Model: Policy Functions

▸ Calibration ▸ Model Fit



Impact of Introducing Concentrated Lending

Full Table

	Δ %
Firm level (Averages)	
Market Leverage	0.60
Interest rate	-1.24
Size	2.34
Productivity	-0.04
Exit rate	-0.70
Aggregates	
Debt	3.13
Capital	3.13
Measured TFP	-0.31

Concentrated lending economy features: (i) less exit, (ii) more debt, (iii) lower interest rates, (iv) lower TFP

TFP Decomposition

$$Y = \underbrace{\left(\frac{1}{S}\right)^{1-\alpha-\eta}}_{\text{avg. firm size}} \times \overbrace{\mathbb{E}[z^{\frac{1}{1-\alpha-\nu}}]^{1-\alpha-\eta}}^{\text{selection}} \times \underbrace{\frac{Y}{Y*}}_{\text{static misallocation}} \times \overbrace{K^{\alpha} N^{1-\alpha}}^{\text{factor qtys.}}$$

Ratio	% Δ
Output	2.12%
Factors	2.43%
Capital	0.99%
Labor	1.45%
MTFP	-0.31
Size	-0.27
Selection	-0.01
Static Misallocation	-0.03

TFP losses arise primarily from increased firm size.

How are subsidized firms different ?

▸ Full Table ▸ Subsidized vs. Zombie Firms

	Non-subsidized	Subsidized	Δ %
Capital	0.75	1.72	128.5
Productivity	1.02	0.94	-8.0
Output	0.41	0.60	46.1
Market leverage	0.53	0.80	50.6
Probability of survival	0.96	0.89	-7.6
Interest rate	7.75	10.02	29.2

- Subsidized firms are (i) larger, (ii) more indebted, (iii) less productive
- But: they pay higher interest rates, on average!

Conclusion

- **Small modifications to standard model generate incentives to evergreen**
  - Offer better terms to firms with $+$ pre-existing borrowings and $-$ productivity
  - Induces firms to borrow and invest more, may generate misallocation
- **Document evergreening behavior by large U.S. banks**
  - Compare credit conditions across banks that own different shares of firm debt
  - Banks with larger shares offer rel. more credit at lower rates to distressed firms
- **Embed mechanism into dynamic model of industry equilibrium**
  - Equilibrium: less productivity, larger firms, more debt, lower rates
  - Subsidized firms are large, indebted, less productive, and pay higher interest rates!

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Appendix

Static Model: Solution to the Firm Problem

Back

- Optimal borrowing b':

$$b' = \begin{cases} 0 & \text{if } Q < \beta^f \\ [0, \theta k'] & \text{if } Q = \beta^f \\ \theta k' & \text{if } Q > \beta^f \end{cases}$$

- Optimal investment k:

$$\alpha z (k')^{\alpha - 1} = \frac{1 - \theta(Q - \beta^f)}{\beta^f} (= MPK)$$

- Given interest rate Q, solution to the firm's problem characterized by set of functions

$$b'(z, Q), k'(z, Q), V(z, Q, b)$$

  - b', k', V increasing in z, Q
  - V decreasing in b

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Bank Problem: Solution ‣ Back

- Let $Q^{\max}(z, b)$ denote maximum Q for which bank lends; $W(z, b; Q^{\max}) = 0$

- Bank's optimal policy is then given by

$$Q = \begin{cases} \beta^k & \text{if } Q^{\min}(z,b) < \beta^k < Q^{\max}(z,b) \\ Q^{\min}(z,b) & \text{if } \beta^k < Q^{\min}(z,b) < Q^{\max}(z,b) \\ 0 & \text{otherwise} \end{cases}$$

- Properties: (i) $Q^{\max} > \beta^k$ iff $b > 0$; (ii) $\frac{\partial Q^{\max}}{\partial b} > 0$; (iii) $\frac{\partial Q^{\max}}{\partial z} < 0$

Robustness: Distress Cutoffs

Back

	Δ Credit			Δ Interest Rate		
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Debt-Share	-20.17**	-21.66**	-21.20**	0.15**	0.17***	0.16***
	(8.19)	(8.19)	(8.16)	(0.06)	(0.05)	(0.05)
Debt-Share × Distress	39.99***	33.14**	46.56***	-1.23*	-0.64**	-0.76*
	(13.40)	(13.23)	(10.97)	(0.65)	(0.31)	(0.38)
Distress Cutoffs						
$\overline{PD} \geq \kappa_{95}$	✓			✓		
$\overline{PD} \geq \kappa_{85}$		✓			✓	
$\kappa_{95} > \overline{PD} \geq \kappa_{90}$			✓			✓
Firm × Time FE	✓	✓	✓	✓	✓	✓
Bank Controls	✓	✓	✓	✓	✓	✓
R-squared	0.58	0.58	0.58	0.74	0.74	0.74
Observations	8,647	8,647	8,647	8,407	8,407	8,407
w/ Distress = 1	304	711	235	296	697	232
Number of Firms	887	887	887	867	867	867
Number of Banks	36	36	36	36	36	36

Bank controls: ROA, dep/assets, income gap, ln(assets), unused credit/assets, Tier 1 cap. buffer, liab./assets, loans/assets. Distress cutoffs: $\kappa_{90} = 3.89\%$, $\kappa_{95} = 7.75\%$, $\kappa_{99} = 35.42\%$. Standard errors clustered by bank and firm. Sample: 2014:Q4-2019:Q4.

Robustness: Interaction Terms

▸ Back

		Δ Credit			Δ Interest Rate	
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Debt-Share	-22.03**	-26.89**	-39.83	0.17***	0.21**	0.24*
	(8.25)	(11.82)	(27.82)	(0.05)	(0.09)	(0.13)
Debt-Share × Distress	37.03***	40.07***	38.41***	-0.66*	-0.90***	-0.70**
	(11.54)	(9.29)	(11.94)	(0.33)	(0.29)	(0.30)
Interaction Terms						
Bank Controls × Distress	✓			✓		
Bank Controls × Debt-Share		✓			✓	
Firm Controls × Debt-Share			✓			✓
Bank Controls	✓	✓	✓	✓	✓	✓
Firm × Time FE	✓	✓	✓	✓	✓	✓
R-squared	0.58	0.59	0.59	0.74	0.74	0.76
Observations	8,647	8,647	8,045	8,407	8,407	7,819
w/ Distress = 1	539	539	464	528	528	453
Number of Firms	887	887	834	867	867	815
Number of Banks	36	36	36	36	36	36

Bank controls: ROA, dep/assets, income gap, ln(assets), unused credit/assets, Tier 1 cap. buffer, liab./assets, loans/assets. Firm controls: cash/assets, ROA, tangible assets/assets, ln(assets), liab./assets. Standard errors clustered by bank and firm. Sample: 2014:Q4-2019:Q4.

Robustness: Bank Capital

▸ Back

	Δ Credit			Δ Interest Rate		
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Debt-Share	-21.80**	-24.11***	-29.68***	0.16***	0.19***	0.22***
	(8.04)	(8.56)	(10.11)	(0.06)	(0.06)	(0.08)
Debt-Share × Distress	41.29***	44.87***	52.26***	-0.91**	-0.87*	-1.05*
	(9.39)	(13.54)	(16.44)	(0.35)	(0.43)	(0.55)
Bank Capital Cutoffs						
Cap-Buffer¿p5	✓			✓		
Cap-Buffer¿p10		✓			✓	
Cap-Buffer¿p25			✓			✓
Firm × Time FE	✓	✓	✓	✓	✓	✓
Bank Controls	✓	✓	✓	✓	✓	✓
R-squared	0.57	0.57	0.59	0.72	0.72	0.71
Observations	7,845	6,978	5,614	7,624	6,768	5,443
w/ Distress = 1	473	389	319	462	378	310
Number of Firms	836	784	690	817	764	673
Number of Banks	36	36	35	36	36	34

Columns (i) and (iv) restrict the sample to banks with total capital buffers (ratio - requirement) above the 5th percentile across all banks (2.72%), columns (ii) and (v) above the 10th percentile (3.31%), and columns (iii) and (vi) above the 25th percentile (4.42%). All specifications include firm-time fixed effects and various bank controls. Sample: 2014:Q4-2019:Q4.

Zombie Measures & Firm Distress

Back

Measure	Observations	Correlation Distress	Indicator Value	PD Distribution P10	P50	P75	P90	P95	P99
PD Baseline	51,869	0.54	–	.17	.82	1.91	3.89	7.75	35.24
CHK	189,388	-0.04	1	.15	.66	1.56	3.73	6.57	25.16
			0	.18	.97	2.08	5.07	10.01	35.42
SST	200,156	0.22	1	.31	1.62	3.98	10.22	19.88	100
			0	.17	.73	1.6	3.5	5.9	20
FMP	79,119	0.20	1	.23	1.85	8.07	22.94	61.35	100
			0	.16	.67	1.53	3.7	6.65	23.54
Model	245,341	0.14	1	.43	2.8	7.16	19.73	30	100
			0	.17	.76	1.77	3.73	6.92	22.7

FMP=Favara, Minoiu, Perez-Orive (2022), SST=Schivardi, Sette, Tabellini (2022), CHK=Caballero, Hoshi, Kashyap (2008), Model=leverage>p90, ROA<p10.

Dynamic Model: Entrants & Industry Equilibrium

Back

- Large pool of entrants may pay cost κ to enter and start producing next period.
- We assume that each entrant is endowed with κ units of physical capital
- The value that they obtain is given by

$$V^E(w) = \int_{\underline{z}}^{\tilde{z}} \frac{V(z, 0, \kappa; w)}{\tilde{z} - \underline{z}} \mathrm{d}z.$$

Calibration

Back

Parameter	Description	Value	Source/Reason
ω	Cost of entry	1.184	Normalize $w = 1$
ρ_z	TFP persistence	0.767	Gomes 2001, Gourio & Miao 2010
σ_u	TFP volatility	0.110	Gomes 2001, Gourio & Miao 2010
e_{slope}	Equity issuance cost	0.200	Hennessy & Whited 2007
δ	Depreciation rate	0.100	Aggregate investment/capital of 10%
α	Production, capital share	0.320	Profit share of 16%
η	Production, labor share	0.480	Profit share of 16%
β^k	Lender discount rate	0.970	Real rate of 3%
ψ_1	Recovery value	0.350	Kermani & Ma 2020
β^f	Borrower discount factor	0.884	Internally calibrated
$\mathbf{c}$	Fixed cost	0.055	Internally calibrated
κ	Logistic distr., scale	0.225	Internally calibrated
$\tilde{z}$	TFP distr. for entrants	1.147	Internally calibrated
$\underline{k}$	Initial capital	0.805	Internally calibrated
θ	Constraint parameter	1.040	Internally calibrated
e_{con}	Fixed cost of issuing equity	0.010	Internally calibrated

Model Fit

Back

Moment	Source	Data	Model
Market leverage (median)	Y-14/Compustat	0.63/0.57	0.59
Debt over fixed assets (median)	Y-14/Compustat	1.09/1.20	1.04
Investment rate (aggregate)	Y-14/Compustat	0.104/0.14	0.117
Profit share (aggregate)	Y-14	0.16	0.176
Interest rate spread (median)	Y-14	3.46%	4.47%
Exit rate	Hopenhayn et al. 2018	9.0%	8.8%
Size at entry (relative to mean)	Lee & Mukoyama 2015	0.60	0.58
Size at exit (relative to mean)	Lee & Mukoyama 2015	0.49	0.38
TFP at entry (relative to mean)	Lee & Mukoyama 2015	0.75	0.88
TFP at exit (relative to mean)	Lee & Mukoyama 2015	0.64	0.86

Impact of introducing concentrated lending ▸ back

	Δ % with const. entry	Δ % with const. labor
Firm level (Averages)		
Market Leverage	0.60	0.54
Interest rate	-1.24	-1.13
Size	2.34	1.99
Productivity	-0.04	-0.02
Exit rate	-0.70	-0.17
Aggregates		
Debt	3.13	1.04
Capital	3.13	1.04
Labor	2.14	0.00
Output	2.14	0.10
Wage	0.00	0.10
Measured TFP	-0.31	-0.23
Number of firms	0.77	-0.94

Concentrated lending economy features: (i) less exit, (ii) more debt, (iii) lower interest rates, (iv) lower TFP

How are subsidized firms different ? ▸ Back

Subsidized vs. Non-subsidized Firms in the RLE (medians)

	Non-subsidized	Subsidized	Δ %
Capital	0.75	1.72	128.5
Productivity	1.02	0.94	-8.0
Output	0.41	0.60	46.1
Payouts/assets	0.05	-0.01	-114.4
Market leverage	0.53	0.80	50.6
Interest rate	7.75	10.02	29.2
Probability of survival	0.96	0.89	-7.6
Interest-coverage ratio	1.67	0.45	-73.1
Age	7.87	10.17	29.2

- Larger, more indebted, less productive
- Actually pay higher interest rates, on average!

Subsidized Firms vs. Zombie Firms

Back

Zombie firm definition from Favara, Minoiu, and Perez-Orive (2022):

- Leverage above median
- ICR below 1
- Negative net income

Model: 5.8% vs. 5.7% in the data.