Macro Shocks and Firm Dynamics with Oligopolistic Financial Intermediaries

Job Market Talk

Alessandro T. Villa

Duke University

September 2020

Motivation

Macro-finance with Financial Intermediaries (FIs)

- 2008 Great Recession → more attention to FIs
- Intermediation frictions, but FIs perfectly competitive

Observation

- The 5 largest banks own more than 50% of the market share
  (e.g. JP Chase, Bank of America, Citigroup, Wells Fargo & Co., Goldman Sachs)
- Market share has doubled in the last 20 years Empirics

Question

- How does banking concentration affect the transmission of macro shocks?
  (Aggregate shock to firms' default probability & Lehman shock)

Model features

- Production sector
  - » Heterogeneous firms with financial frictions
    (tax shield, equity issuance cost)
  - » Optimal capital structure
    (debt & equity)
- Financial sector
  - » Few strategic banks
    (raise financial resources & issue defaultable loan to firms)
  - » Dynamic oligopoly
- Equilibrium
  - » Relation between banks' mkt. structure & firm dynamics

Approach

- Stationary equilibrium

  (stochastic life-cycle model of firm dynamics)

  » Calibrate model using FDIC data

  (commercial & industrial loans)

- Macro shocks

  (more versus less concentrated oligopoly)

  1. Aggregate shock to firms' default probability
  2. Lehman shock

- Extension: stationary equilibrium with firms' endogenous default

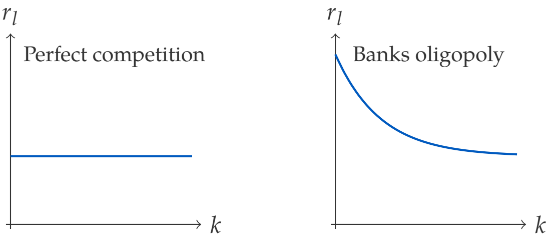
  (credit spreads & default rates of commercial & industrial loans)

- Novel algorithm to solve for general equilibrium, heterogeneous firms, macro shocks and banks' strategic interactions

Mechanism in words: stationary equilibrium

Firms are heterogeneous

- More concentrated banking sector extracts ↑ markups out of small firms
- Small firms endogenously financially constrained



- Novel mechanism: because smaller firms have higher credit demand banks exert higher market power and charge higher mark-ups on loans to small firms
- Novel implications: ↓ Investment ↓ Capital ↑ σ(MPK) ↓ TFP

Mechanism in words: aggregate default shock

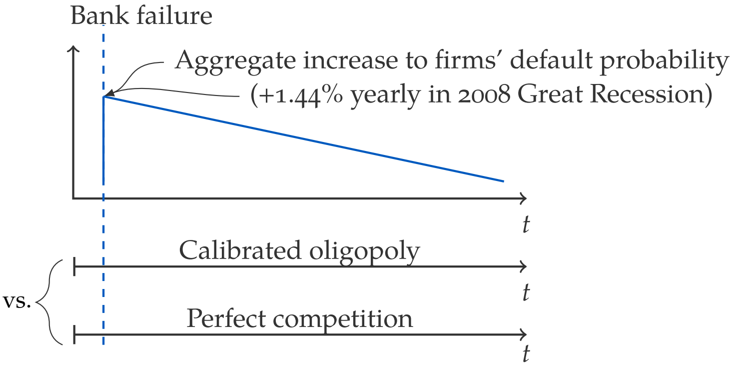
- Aggregate increase to firms' default probability
- Larger proportion of small firms $\implies \uparrow$ credit demand
- Markups are endogenous in the cross-section $\implies$ to remain more profitable (in the face of higher default losses) banks extract higher mark-ups out of small firms
- In equilibrium credit contracts ("credit crunch")
- $\uparrow$ interest rates $\implies \downarrow$ investment & capital
- $\implies \uparrow$ credit spreads

Mechanism in words: Lehman shock

One bank fails

- Surviving banks start to extend more credits to the firms in order to recover the portion of the market left uncovered by the bank that defaulted
- This happens slowly because of the effect of the strategic interactions among banks
- Implications: the aggregate availability of credits drops sharply, reducing investments and pushing output to a dynamic similar in magnitude and persistency to the one of the great recession

Mechanism in numbers



	Perfect competition	Calibrated oligopoly	Lehman shock	Data (2008 Great Recession)
Credit Spread	+0.40%	+0.72%	+0.96%	+0.92%
Output	-1.40%	-2.51%	-4.00%	-4.50%

Related literature

FIRM DYNAMICS AND/OR MACRO-FINANCE (FINANCIAL FRICTIONS)

Hopenhayn (1992), Cooley & Quadrini (2001), Gomes (2001), Hennessy & Whited (2005) (2007), Gertler & Karadi (2011), Covas & den Haan (2011), Jermann & Quadrini (2012), Rampini & Viswanathan (2012), He & Krishnamurthy (2013), Khan & Thomas (2013) (2016), Gomes & Schmid (2017)

MACRO/IO - BANKING

De Nicolo et al. (1984), Diamond's (1984), Allen & Gale (2004), Boyd & DeNicolo (2005), Cetorelli & Strahan (2006), Martinez-Miera & Repullo (2010), Cetorelli & Peretto (2012), Corbae & D'erasmo (2018)

MACRO - MONETARY POLICY TRANSMISSION

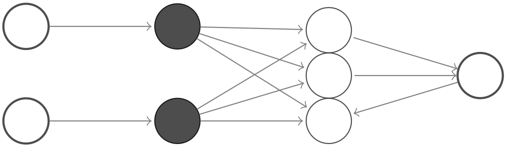
Drechsler et al. (2017), Li et al. (2019), Scharfstein & Sunderam (2016), Wang et al. (2019)

Outline

- Simple two periods model
- Quantitative model
  - Calibration (Stationary Equilibrium)
    - Data
    - Stationary equilibrium key features
  - Macro shocks
    - Increase in aggregate firms' default risk
    - Lehman shock
- Extension: idiosyncratic TFP shocks & endogenous default
- Conclusion

Simple Model

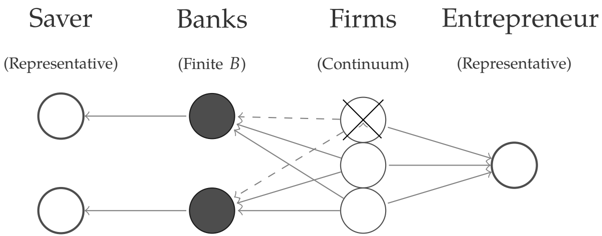
Simple model: time 0



Given an initial distributions of firms with pdf $\phi(k_0, z_0)$

- each firm produces output $y_0 = z_0 k_0^\alpha$
- each bank finances loans issuing equity and/or debt $\int l_b(k_0, z_0)\, d\Phi(k_0, z_0)$
- each bank and firm jointly decide on a contract: loan $l_b(k_0, z_0)$, interest rate $R_l(k_0, z_0)$ and investment $k_1(k_0, z_0)$
- firms distribute dividends $d_0 = z_0 k_0^\alpha + (1-\delta)k_0 - k_1 + \sum_b^B l_b$
- some firms might need to issue equity ($d_0 < 0$) at a cost $\lambda(d_0)$

Simple model: time 1



Defaulting mass of firms $1 - \rho$ exit, for the surviving firms z_1 is realized and

- each firm produces output $y_1 = z_1 k_1^\alpha$
- each firm repays its outstanding debt plus interest $R_l(k_0, z_0) \cdot \sum_b^B l_b(k_0, z_0)$
- each bank distributes profit $\int \rho R_l(k_0, z_0) l_{1,b}(k_0, z_0) \, \mathrm{d}\Phi(k_0, z_0)$
- each firm distributes dividend $d_1 = z_1 k_1^\alpha + (1-\delta)k_1 - R_l \sum_b^B l_{1,b}$

Simple model: contracting

Firm and banks owners optimality conditions require

$$R_l = \mathbb{E}\left[1 + \alpha z_1 k_1^{\alpha-1} - \delta\right] \qquad \text{(Firm's debt)} \qquad (1)$$

$$\rho\beta R_l = 1 - \lambda'(d_0) \qquad \text{(Firm's investment)} \qquad (2)$$

$$\rho\beta\mathbb{E}\left[\frac{d_1}{p}\right] = 1 - \lambda'(d_0) \qquad \text{(Firm's equity)} \qquad (3)$$

Given all other banks choices l_{-b}, each bank b chooses a function l_b

such that

$$\max_{l_b(k_0,z_0)} \quad -\int l_b(k_0,z_0)\,\mathrm{d}\Phi(k_0,z_0) + \beta\int \rho R_l(k_0,z_0) l_b(k_0,z_0)\,\mathrm{d}\Phi(k_0,z_0)$$

subject to $\forall(k_0, z_0)$ (1), (2) and (3)

Each bank's best response is characterized by the following GEE

$$\rho\beta\left(1 + \frac{\partial R_l}{\partial l_b}\cdot\frac{l_b(k_0,z_0)}{R_l(k_0,z_0)}\right)R_l(k_0,z_0) = 1$$

Simple model: solution

Firms NOT financially constrained ($d_0 > 0$): these firms are not affected by the banks market concentration; in equilibrium $(k_1^*, R_l^*, l_b^*, p^*)$ satisfy

1. $k_1^* = \left(\frac{\rho^{-1}\beta^{-1} - 1 + \delta}{\alpha \mathbb{E}[z_1]} \right)^{\frac{1}{\alpha - 1}}$
2. $R_l^* = \rho^{-1}\beta^{-1}$
3. l_b^* indetermined (Modigliani-Miller holds)
4. $p^* = \rho\beta\mathbb{E}\left[d_1^*\right]$

Firms financially constrained ($d_0 \leq 0$): for these firms the degree of imperfect competition (B) matters; in equilibrium More details

1. $\rho\beta\left(1 + \frac{\partial R_l}{\partial l_b} \cdot \frac{l_b^*}{R_l^*}\right) R_l^* = 1$
2. $R_l^* = 1 + \alpha\mathbb{E}[z_1]k_1^{*\alpha - 1} - \delta$
3. $\rho\beta R_l^* = 1 - \lambda'(d_0^*)$
4. $p^*(1 - \lambda'(d_0^*)) = \rho\beta\mathbb{E}\left[d_1^*\right]$

Simple model: analytical insights

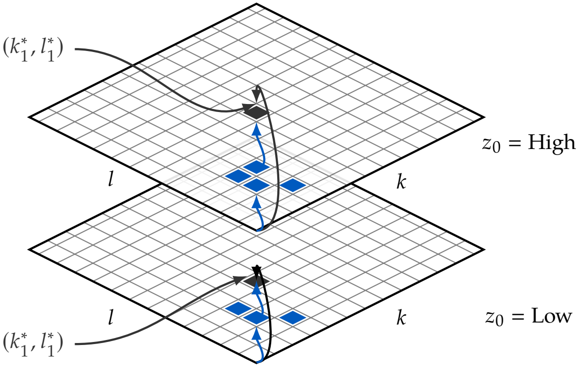
Proposition

As B increases:

- *aggregate leverage* $\int \sum_b^B l_b^* / k_1^* \, \mathrm{d}\Phi$ *increases;*
- *variance of capital* $\int k_1^{*2} \, \mathrm{d}\Phi - (\int k_1^* \, \mathrm{d}\Phi)^2$ *decreases;*
- *variance of loan interest rates* $\int R_l^{*2} \, \mathrm{d}\Phi - (\int R_l^* \, \mathrm{d}\Phi)^2$ *decreases;*
- *aggregate TFP* $\int k_1^{*\alpha} \, \mathrm{d}\Phi / \left(\int k_1^* \, \mathrm{d}\Phi \right)^\alpha$ *increases.*

All analytical results

Simple model: mechanism dispersion



1. **Perfect competition** $B \to \infty$, all firms "jump" to the efficient k_1^*
2. B finite, firms ($d_0 < 0$) grow slower (can't jump to k_1^* directly)
3. B finite, firms ($d_0 \geq 0$) "jump" to k_1^*

$\uparrow B \implies \uparrow TFP \quad \downarrow \sigma(\text{MPK}) \quad \downarrow \sigma(R_l)$

Quantitative Model

Dynamic game

In the simple 2-periods game banks choices are one shot

In the ∞-horizon game each bank faces a dynamic problem which:

- depends on the same bank future strategies and other banks current and future strategies
- is subject to firms dynamic demand for loans and both current and future distribution of firms matter

$\implies$ Markov-perfect equilibrium

I borrow tools from the optimal fiscal policy literature Klein & Rios-Rull (2003), Krusell et al. (2004), Klein et al. (2008), Lanteri & Clymo (2019)

Other features

i. Tax-shield ii. All households are risk-averse iii. Inter-bank market

Firms

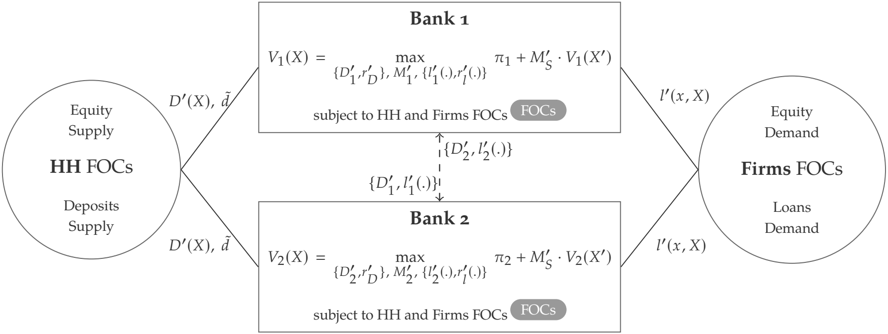
Each firm maximizes NPV of dividends:

$$V_F(x, X) = \max_{\{l'_b\}_b^B, k'} \tilde{d} + \mathbb{E}\left[\mathcal{I}' \cdot M'_E \cdot V_F(x', X')\right]$$

- $\tilde{d}$ is dividend at net of equity issuance cost $d - \lambda(d)$
- $d = (1-\tau)\left[zk^{\alpha} - \sum_b r_l l_b\right] + \tau\delta k - \tilde{i}$
- $k' = k(1-\delta) + i$
- Investment i is
  - » internal $\tilde{i}$ plus
  - » external $\sum_b \left(l'_b - l_b\right)$
- State space $\{x, X\}$:
  - » idiosyncratic $x = \{\{l_b\}_b^B, r_l, k\}$
  - » aggregates $X = \{\{D\}_b^B, r_D, \{M_b\}_{b=0}^B, r_M, B, \rho, \phi(\sum_b^B l_b, r_l, k)\}$

Firms optimality conditions determine the dynamic demand for loans

Banks: overview



Banks: equilibrium

Markov-perfect equilibrium (fixed-point of all banks best responses)

$$V_b(X) = \max_{\{D_b', r_D'\},\, M_b',\, \{l_b'(x,X), r_l'(x,X)\}} \pi_b + M_S'(X, X') \cdot V_b(X')$$

subject to:

$$\pi_b = \rho \int r_l \cdot l_b \, \mathrm{d}\Phi + r_M M_b - r_D D_b - F \qquad \text{(bank's dividend)}$$

$$F + \Delta D_b' = \Delta M_b' + \rho \int \Delta l_b'(x, X) \, \mathrm{d}\Phi \qquad \text{(Law of motion)}$$

HH & Firms' FOCs FOCs (D supply & L demand)

$$C_S + C_E + \int i(x, X) + \lambda(x, X) \, \mathrm{d}\Phi + T = \int z k^{\alpha} \, \mathrm{d}\Phi \qquad \text{(resource constraint)}$$

Best response

Fix $\mathbf{D'}_{-b}(X)$ and $\mathbf{l'}_{-b}(x, X)$. Each bank b chooses its deposit amount $D'_b(X)$ and its loans' portfolio $l'_b(x, X)$.
An increase of one units in $l'_b(x, X)$:

At time t:

- needs to be covered by equity F and/or $\Delta D'_b(X)$
- less consumption units to the saver

At time t+1:

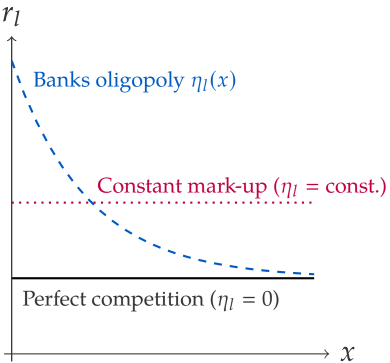
- produces a future marginal income of $\mathbb{E}\left[\mathcal{J}' \cdot R'_l(x, X)\right]$
- decreases future loan market rate $R'_l(x, X)$ by $\mathbb{E}\left[\mathcal{J}' \cdot \frac{\partial R'_l}{\partial l'_b}\right]$

Generalized Euler Equation

Generalized Euler Equation:

$$1 = \mathbb{E}\left[\mathcal{J}' \cdot M_S'(X, X') \cdot R_l'(x, X)\left(1 + \eta_l'(x, X, x', X')\right)\right]$$

where $\eta_l'(x, X, x', X') \equiv \frac{\partial R_l'}{\partial l_b'} \cdot \frac{l_b'(x,X)}{R_l'(x,X)} < 0.$

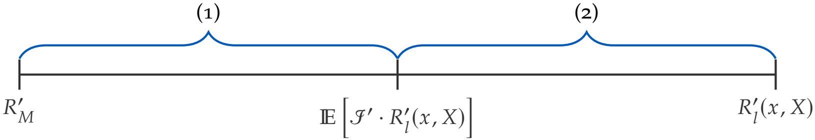


Loan intermediation margin

Inter-bank rate:

$$R'_M = \mathbb{E}\left[\mathcal{J}' \cdot R'_l(x,X) \cdot \left(1 + \eta'_l(x,X,x',X')\right)\right]$$

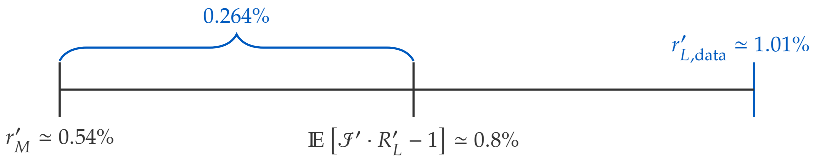
$$R'_l(x,X) - R'_M = \underbrace{-\overbrace{\frac{\eta'_l(x,X,x',X')}{1+\eta'_l(x,X,x',X')}}^{\text{Mark-up}} \cdot \overbrace{\frac{1}{M'_S(X,X')}}^{\text{MC}}}_{\text{(1) Rents}} + \underbrace{\frac{1-\rho}{\rho} \cdot \frac{1}{1+\eta'_l(x,X,,x',X')} \cdot \frac{1}{M'_S(X,X')}}_{\text{(2) Risk Premia}}$$



Calibration

Data (average from 1997 to 2018)

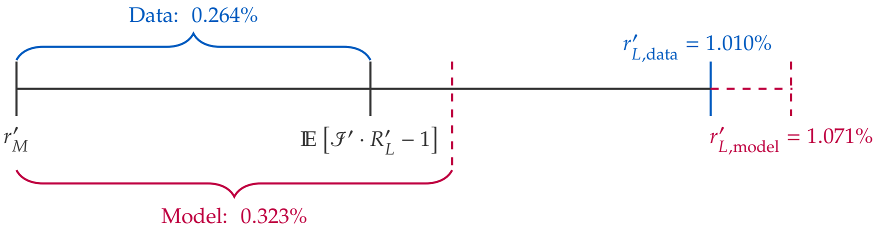
- Commercial & Industrial Loans FDIC *(Maturity ~ 1.4 yrs)*
- Quarterly loan rate: $r_L \simeq 1.01\%$ *(Interest Income/Loans)*
- $\rho = \mathbb{E}\left[\mathcal{J}'\right] = 1 - 0.21\%$ *(Net Charge-Off Rate)*
- $\mathbb{E}\left[\mathcal{J}' \cdot R'_L - 1\right] = \rho \cdot R'_L - 1 \simeq 0.80\%$
- Quarterly inter-bank rate: $r_M \simeq 0.54\%$ *(FED funds rate)*



Analysis

Stationary equilibrium calibration: monopoly

Banks Moments *(Target)* Parameters

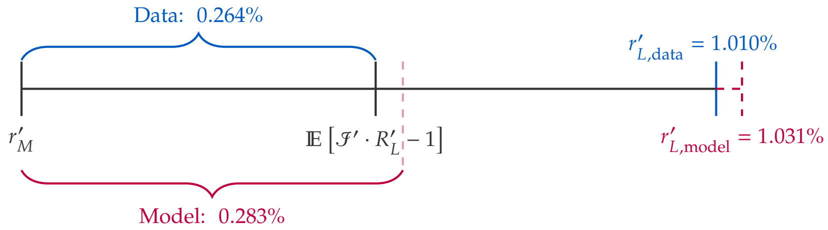


Firms aggregate moments

Moments	Number of Banks			Data
	1	2	3	(1997-2018)
K/Y	10.46			10.19
I/Y	27.3%			23.52%
$\Delta L/K$	0.03%			0.07%
L/K	14.3%			37%

Stationary equilibrium calibration: duopoly

Banks Moments *(Target)* Parameters

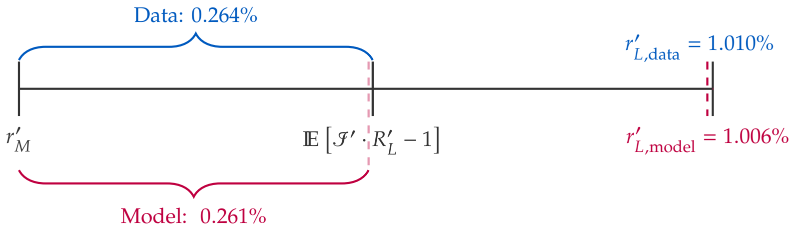


Firms aggregate moments

Moments	Number of Banks			Data
	1	2	3	(1997-2018)
K/Y	10.46	10.43		10.19
I/Y	27.3%	25.2%		23.52%
$\Delta L/K$	0.03%	0.05%		0.07%
L/K	14.3%	25.2%		37%

Stationary equilibrium calibration: three banks

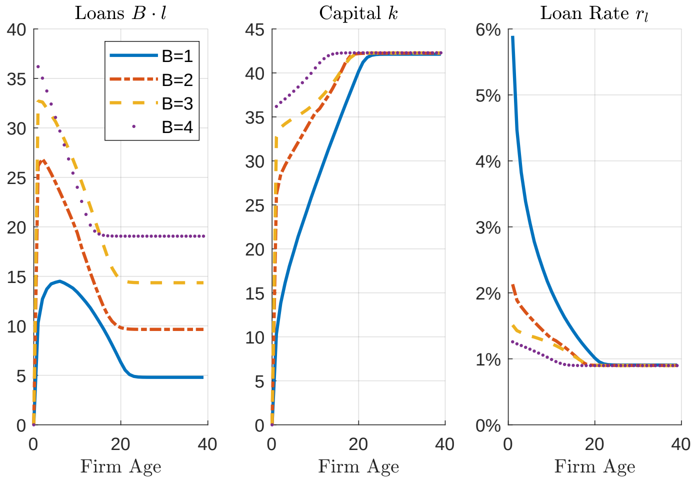
Banks Moments *(Target)* Parameters



Firms aggregate moments

Moments	**Number of Banks**			**Data**
	1	**2**	**3**	**(1997-2018)**
K/Y	10.46	10.43	10.34	10.19
I/Y	27.3%	25.2%	24.1%	23.52%
$\Delta L/K$	0.03%	0.05%	0.08%	0.07%
L/K	14.3%	25.2%	40.1%	37%

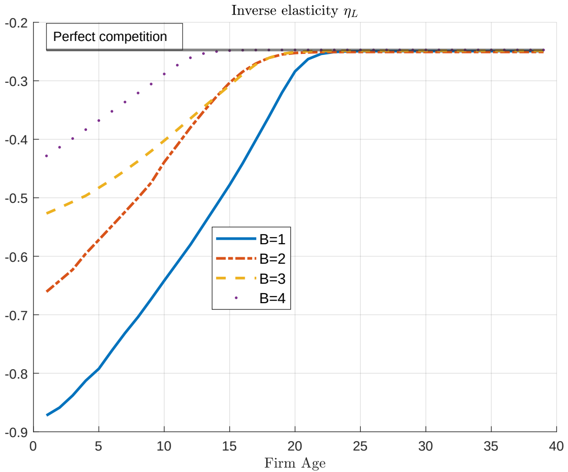
Stationary life cycle of a firm



Banks' market power reduces credit availability. Smaller firms are more reliant on banks credits, hence they are harmed more

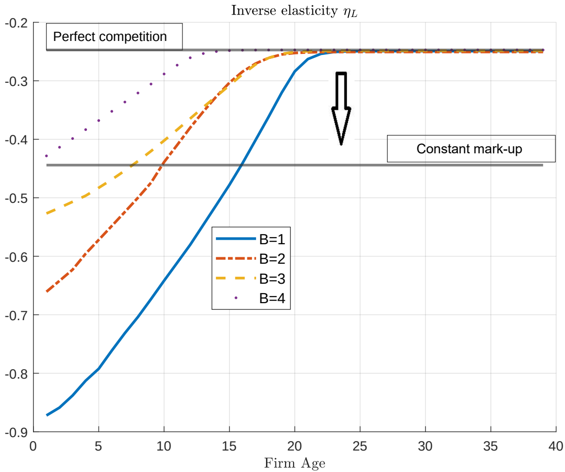
(Rajan & Zingales (1998), Black & Strahan (2000), Cetorelli & Gambera (2001), Cetorelli (2003), Beck et al. (2004), Bertrand et al. (2004), Cetorelli & Strahan (2006), Grandi & Bozou (2020))

Stationary life cycle of a firm: inverse elasticity



Mark-ups are endogenous in the cross-section

Stationary life cycle of a firm: inverse elasticity

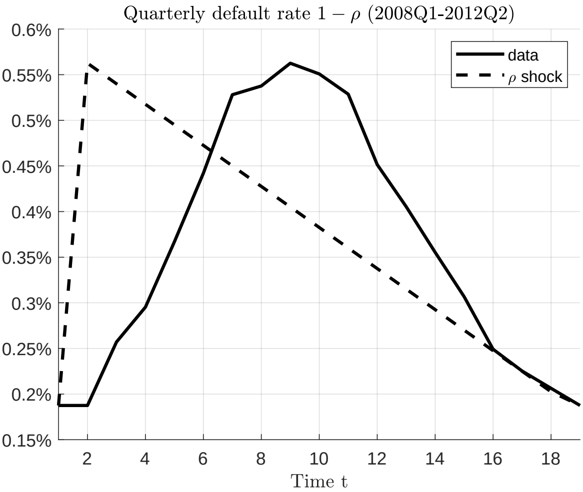


Mark-ups are endogenous in the cross-section

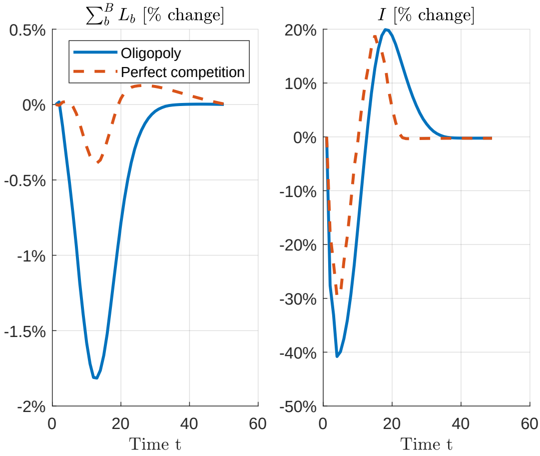
A constant mark-up approach would shift η_L uniformly

Macro Shocks

Aggregate firms' default shock

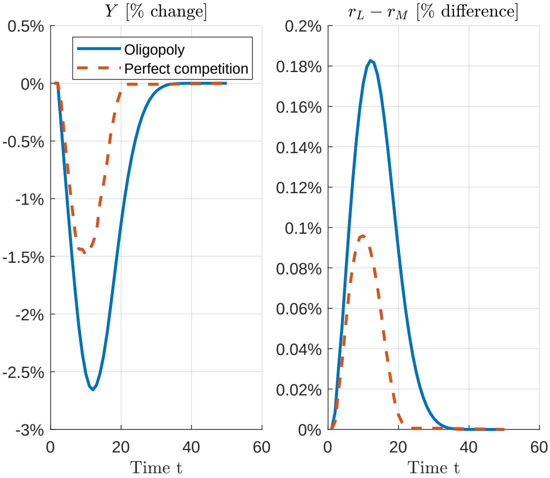


Aggregate firms' default shock: dynamics



$\uparrow 1-\rho \implies$ credit crunch $\downarrow$ investment

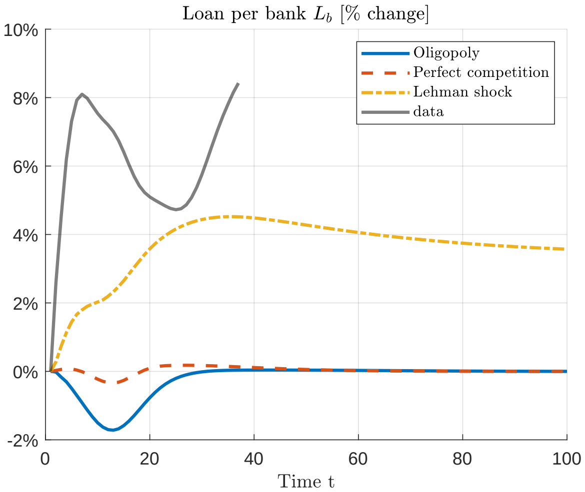
Aggregate firms' default shock: dynamics



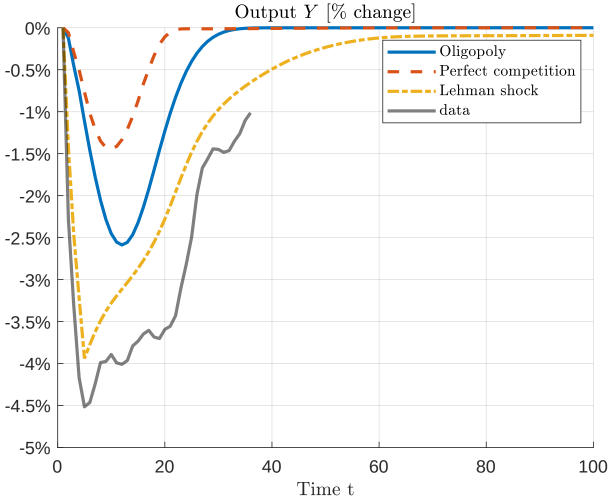
$\uparrow 1-\rho \implies \quad \downarrow$ capital $\quad \uparrow$ MPK

WHAT IF THE SHOCK ORIGINATED IN THE FINANCIAL SECTOR?

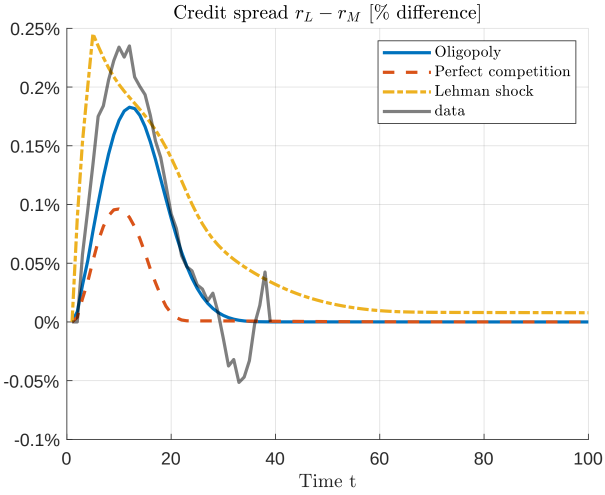
Lehman shock: loan per bank



Lehman shock: output



Lehman shock: credit spread



Extension

Idiosyncratic TFP shocks and endogenous firms' default

$$\tilde{V}_F(x, X) = \max_{\{l'_b\}_b^B, k'} d - \lambda(d) + \mathbb{E}\left[M'_E \cdot V_F(x', X')\right]$$

$$V_F(x, X) = \max\{\tilde{V}_F(x, X), 0\}$$

- $d = (1-\tau)\left[zk^\alpha - \sum_b r_l l_b\right] + \tau\delta k - \tilde{i} - \chi$
- State space $\{x, X\}$:
  - idiosyncratic $x = \{\{l_b\}_b^B, r_l, k, z\}$
  - aggregates $X = \{\{D\}_b^B, r_D, \{M_b\}_{b=0}^B, r_M, B, \phi(\sum_b^B l_b, r_l, k, z)\}$

Each bank needs to dynamically best respond to other banks issuing contracts that consider firms' exit contingent on z

Extension cont.

Moments	Number of Banks					Data
	1	2	3	4	5	(1997-2018)
Firms						
K/Y	10.53	10.44	10.43	10.42	10.37	10.19
I/Y	26.06%	25.99%	25.92%	23.02%	21.85%	23.52%
L/K	8%	16%	24%	31%	40%	37%
Default rate	0.004%	0.051%	0.130%	0.234%	0.312%	0.210%
Banks						
r_L	1.34%	1.32%	1.24%	1.05%	0.91%	1.01%
$\mathbb{E}[\mathcal{J} \cdot r_L] - r_M$	0.795%	0.773%	0.685%	0.259%	0.065%	0.264%

Parameters

Conclusion

Conclusion

Methodology

This paper provides a new dynamic framework that relates banks' market structure to firm dynamics with endogenous mark-ups in time and in the cross-section

(mechanism of endogenous financial frictions)

Experiment

Lehman shock in a oligopoly framework with strategic interaction can explain the magnitude and persistency of the great recession

Policy

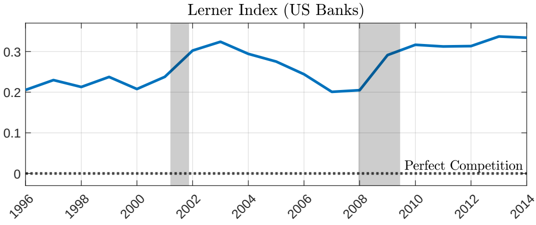
Interaction between banks' market power and firms' endogenous default opens policy question about optimal banks' market structure

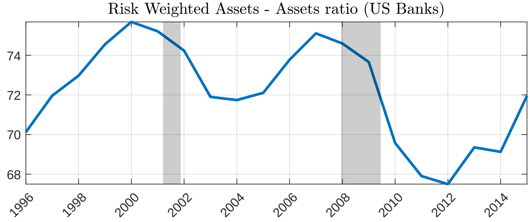
Future work

Endogenous firms' entry decisions and relationship loans

Thank You

Empirical facts: Lerner index >0 & RWA ↓

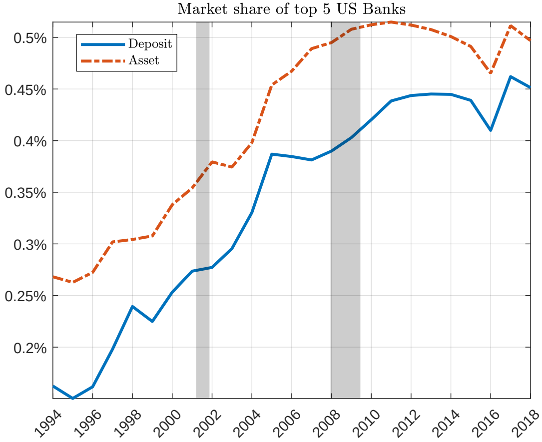




Source: World Bank, FDIC **Release**: Global Financial Development Database

Back

Empirical facts: market concentration ↑ since 1995



Source: FDIC **Release**: Summary of Deposits survey of branch

Back

Parameters value

Agents	Description	Parameter	Value	Target/Source
Household	Discount Factor	β	0.9942	Match deposit rate (Source: FDIC)
	Risk Aversion	γ	1	
Firms	Depreciation Rate	δ	0.025	Bureau of Economic Analysis
	Effective Capital Share	α	0.39	Bureau of Labor Statistics
	Taxation	τ	0.241	Tax Corp Income/ Corp Profit (Source: FRED)
	Default rate	$1-\rho$	0.21%	Quarterly Net write-off to loan (Source: FDIC)
	Equity Issuance Cost	λ_0	0.75	Covas & den Haan (2011)
Banks	Number of Banks	B	3	Calibrated to match intermediation margins

Back

Parameters value

Agents	Description	Parameter	Value	Target/Source
Household	Discount Factor	β	0.9942	Match deposit rate (Source: FDIC)
	Risk Aversion	γ	1	
Firms	Depreciation Rate	δ	0.025	Bureau of Economic Analysis
	Effective Capital Share	α	0.34	Bureau of Labor Statistics
	Taxation	τ	0.241	Tax Corp Income/ Corp Profit (Source: FRED)
	Equity Issuance Cost	λ_0	0.75	Covas & den Haan (2011)
	Persistency TFP	ρ_z	0.9	
	Std TFP	σ_z	0.2	
	Fixed cost	χ	0.058	
Banks	Number of Banks	B	4	Calibrated to match intermediation margins

Back

Additional constraints of the bank's problem

1. Banks' equity: $M_S' \cdot \frac{p_b' + \pi_b'}{p_b} = 1$
2. Banks' debt: $M_S' \cdot R_D' = 1$
3. Firms' debt: $\rho \cdot M_E' \cdot (1 + (1 - \tau) r_l') \cdot \mathbb{E}\left[(1 - \lambda_d')\right] = 1 - \lambda_d$
4. Firms' equity: $\mathbb{E}\left[\mathcal{I}' \cdot M_E' \cdot \frac{p' + \tilde{d}'}{p}\right] = 1$
5. Firms' investment: $\mathbb{E}\left[1 - \lambda_d'\right] r_l' = \mathbb{E}\left[\left(z' \alpha k'^{\alpha-1} - \delta\right) \cdot \left(1 - \lambda_d'\right)\right]$

Back banks' overview | Back bank's problem

Simple model: analytical insights

Proposition

As B increases:

- *aggregate loans per bank* $\int l_b^* \,\mathrm{d}\Phi$ *decreases;*
- *average loan interest rate* $\int R_l^* \,\mathrm{d}\Phi$ *decreases;*
- *aggregate share expected returns* $\int \mathbb{E}\left[d_1^*\right]/p^* \,\mathrm{d}\Phi$ *decreases;*
- *aggregate physical investment* $\int k_1^* - (1-\delta)k_0 \,\mathrm{d}\Phi$ *increases;*
- *aggregate loans* $\int \sum_b^B l_b^* \,\mathrm{d}\Phi$ *increases;*
- *aggregate leverage* $\int \sum_b^B l_b^*/k_1^* \,\mathrm{d}\Phi$ *increases;*
- *variance of capital* $\int k_1^{*2} \,\mathrm{d}\Phi - (\int k_1^* \,\mathrm{d}\Phi)^2$ *decreases;*
- *variance of loan interest rates* $\int R_l^{*2} \,\mathrm{d}\Phi - (\int R_l^* \,\mathrm{d}\Phi)^2$ *decreases;*
- *variance of expected returns* $\int \left(\mathbb{E}\left[d_1^*\right]/p^*\right)^2 \mathrm{d}\Phi - \left(\int \mathbb{E}\left[d_1^*\right]/p^* \,\mathrm{d}\Phi\right)^2$ *decreases;*
- *aggregate TFP* $\int k_1^{*\alpha} \,\mathrm{d}\Phi / \left(\int k_1^* \,\mathrm{d}\Phi\right)^\alpha$ *increases.*

Back

Simple model: mechanism

Demand for loan: FOCs of the firms

For each financially constrained firm ($d_0^* < 0$), the spread between the equilibrium rate and the competitive rate is given by

$$R_l^*(k_0, z_0) - \frac{1}{\rho\beta} = -\frac{\lambda'(d_0^*(k_0, z_0))}{\rho\beta}$$

Larger firms borrow at lower rates

$$R_l^* = 1 + \alpha \mathbb{E}[z_1] k_1^{*\alpha-1} - \delta$$

Banks strategically interact "through" the inverse elasticity η of the GEE

$$R_l^* = \left(\frac{1}{1+\eta}\right) \cdot \frac{1}{\rho\beta}, \quad \eta = \frac{\partial R_l}{\partial l_b} \frac{l_b^*}{R_l^*} = \frac{\lambda'(d_0^*)}{\rho\beta}$$

$\uparrow B \implies \quad \downarrow l_b^* \quad \uparrow B \cdot l_b^* \quad \uparrow k_1^* \quad \downarrow \text{MPK} \quad \downarrow R_l^* \quad \downarrow \mathbb{E}\left[d_1^*\right]/p^*$

Back

Credit spreads

	Dependent variable:		
	Commercial & Industrial Loan Rates Spreads over intended federal funds rate		
	(1)	(2)	(3)
Market share of top 5 banks (%)	0.040***	0.053***	0.056***
	(0.004)	(0.006)	(0.007)
Net Charge-Off Rate (%)	0.337***	0.295***	0.272***
	(0.051)	(0.051)	(0.059)
Comm. & Ind. Loans ($tn)		−0.391***	−0.345**
		(0.139)	(0.152)
Maturity			−0.121
			(0.157)
Constant	0.434**	0.384**	0.406**
	(0.183)	(0.177)	(0.179)
Observations	81	81	81
R^2	0.644	0.677	0.680
Adjusted R^2	0.635	0.664	0.663
Residual Std. Error	0.291 (df = 78)	0.279 (df = 77)	0.280 (df = 76)
F Statistic	70.500*** (df = 2; 78)	53.802*** (df = 3; 77)	40.292*** (df = 4; 76)
Note:			*p<0.1; **p<0.05; ***p<0.01

Back