Andreas Krause

Chapter 8.2.1

Identifying company types through collateral

Collateral use

- Banks do not always know the risks companies are taking, but companies might be more aware of their own risks
- Setting loan rates too high to account for high-risk companies, might crowd out low-risk companies due to the lower return they obtain from their investment
- Collateral can be used to distinguish between the two types of companies, allowing for loan rates to be set according to the risk of the company

Company profits

- Companies obtain their investment return and repay the loan if they are successful, if they are unsuccessful they lose their collateral
- $\Pi_C^i = \pi_i \left((1+R)\, L - \left(1 + r_L^i\right) L \right) - (1-\pi_i)\, C_i$
- The isoprofit curve of companies is given by $d\Pi_C^i = -\pi_i L dr_L^i - (1-\pi_i)\, dC_i = 0$

$\Rightarrow \frac{dr_L^i}{dC_i} = -\frac{1-\pi_i}{\pi_i L}$

- We find a negative trade-off between the loan rate and the size of the collateral

Bank profits

- Banks obtain collateral, but they can only sell this with a discount λ
- If the investment of the company is successful, the loan is repaid, if the investment is not successful, the bank obtains the value of the collateral
- Loans are fully financed by deposits
- $\Pi_B^i = \pi_i\left(1 + r_L^i\right) L + \left(1 - \pi_i\right) \lambda C_i - \left(1 + r_D\right) L$
- The isoprofit curve of banks is given by $d\Pi_B^i = \pi_i L dr_L^i + \lambda \left(1 - \pi_i\right) dC_i = 0$

$\Rightarrow \frac{dr_L^i}{dC_i} = -\lambda \frac{1-\pi_i}{\pi_i L}$

- The slope is negative, but flatter than the isoprofit curve for companies

Bank offering a single contract only

- Banks know the composition of low-risk and high-risk companies, the average success rate is $\pi = p\pi_H + (1-p)\,\pi_L$

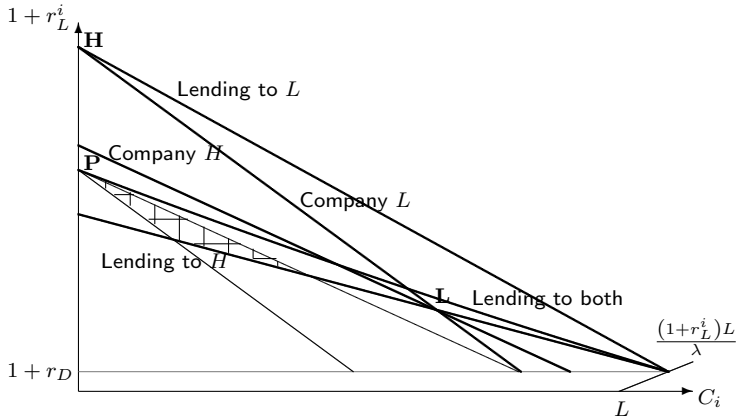
$\Rightarrow \Pi_B^P = \pi\,(1+r_L)\,L + (1-\pi)\,\lambda C - (1+r_D)\,L$

$\Rightarrow \frac{dr_L}{dC} = -\lambda\frac{1-\pi}{\pi L}$

- This slope is between banks only lending to high-risk and low-risk companies
- If this bank is competitive then we require $\Pi_B^P = 0$

$\Rightarrow 1 + r_L = \frac{1+r_D}{\pi} - \frac{1-\pi}{\pi}\frac{C}{L}$

Separating equilibrium with collateral



Banks offering distinct contracts

- If banks are competitive, they make zero profits as long as they follow the same strategy: all offer two contracts (separating) or all offer one contract (pooling)
- If a bank offers a single contract, another bank can offer a marginally better contract near $\mathbf{P}$
- This bank would obtain all low-risk companies, but no high-risk companies

$\Rightarrow \Pi_B^* = \pi_H (1 + r_L) L - (1 + r_D) L = (1 - p) \frac{\pi_H - \pi_L}{\pi} (1 + r_D) L$

- The other bank would be left with high-risk companies only

$\Rightarrow \Pi_B^{**} = \pi_L (1 + r_L) L - (1 + r_D) L = -p \frac{\pi_H - \pi_L}{\pi} (1 + r_D) L$

Strategic choice of loan contracts

Bank 2 \ Bank 1	pooling	separating
pooling	$0, 0$	Π_B^*, Π_B^{**}
separating	Π_B^{**}, Π_B^*	$0, 0$

$\Pi_B^* > 0 > \Pi_B^{**}$ $\quad$ $\Pi_B^* > 0 > \Pi_B^{**}$

Summary

- Collateral can be used to separate companies taking different risks
- Low-risk companies will offer collateral in exchange for a lower loan rate
- High-risk companies will not offer collateral, but pay a higher loan rate
- Banks will offer contracts with and without collateral for companies to choose

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