

Chapter 8.1

The consequences of uncertain outcomes

Financing investments

- ▶ Companies can fund investment using debt and equity
- ▶ Companies choose the optimal combination of these funding sources
- ▶ With uncertain outcomes, banks cannot be sure to be repaid their loan
- ▶ Larger loans imply larger repayments, which requires higher outcomes

Company profits

- ▶ Companies retain the outcome once the loan has been repaid, taking into account their own investment

- ▶ $\Pi_C = \int_{(1+\bar{r}_L)L}^{+\infty} \pi(1+R) L dF(\pi(1+R)L) - E$

- ▶ Companies seek loans if $\Pi_C \geq 0$, which gives a maximum loan rate \bar{r}_L

$$\Rightarrow \frac{\partial(1+\bar{r}_L)}{\partial L} = - \frac{\frac{\partial \Pi_C}{\partial L}}{\frac{\partial \Pi_C}{\partial(1+\bar{r}_L)}} = \frac{1-(1+\bar{r}_L)^2 L f(\pi(1+\bar{r}_L)L)}{(1+\bar{r}_L)L^2 f(\pi(1+\bar{r}_L)L)}$$

- ▶ The isoprofit curve has a negative slope

Bank profits

- ▶ Banks obtain the outcome if the loan cannot be repaid and are repaid for higher outcomes, up to the maximum loan rate at which companies demand loans, and repay deposits

$$\begin{aligned}\text{▶ } \Pi_B &= \int_0^{(1+r_L)L} \pi(1+R) L dF(\pi(1+R)L) \\ &\quad + \int_{(1+r_L)L}^{(1+\bar{r})L} (1+r_L) L dF(\pi(1+R)L) - (1+r_D)L\end{aligned}$$

$$\Rightarrow \frac{\partial \Pi_B}{\partial (1+r_L)} = (F((1+\bar{r}_L)L) - F((1+r_L)L))L > 0$$

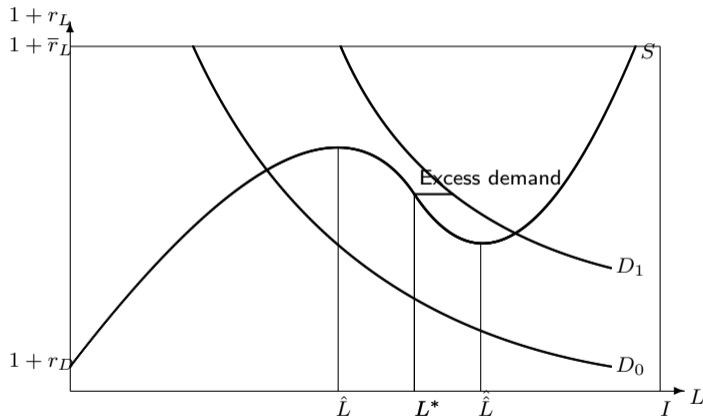
$$\frac{\partial \Pi_B}{\partial L} = (F((1+\bar{r}_L)L) - F((1+r_L)L))(1+r_L) + \frac{1+r_L}{1+\bar{r}_L} - (1+r_D)$$

- ▶ If L is small, the first term will be small, the two final terms are negative, making this negative
- ▶ If L is large, the first term will be small, the two final terms are negative, making this negative
- ▶ If L is intermediate, the first term will be positive, the two final terms are negative, allowing this to be positive

Non-monotonous supply curve

- ▶ Isoprofit curve of the bank: $\frac{\partial(1+r_L)}{\partial L} = -\frac{\frac{\partial \Pi_B}{\partial L}}{\frac{\partial \Pi_B}{\partial(1+r_L)}}$
 - ▶ Positive for small loans, negative for intermediate loans, positive for large loans
 - ▶ Optimal profits are at $\frac{\partial \Pi_B}{\partial(1+r_L)L} = 0$
- $\Rightarrow 1 + r_D = (F((1 + \bar{r}_L)L) - F((1 + r_L)L))(1 + r_L)$
- $\Rightarrow \frac{\partial \Pi_B}{\partial L} = \frac{1+r_L}{1+\bar{r}_L} > 0$
- \Rightarrow Maximal profits where the supply curve is decreasing

Demand and supply



Summary

- ▶ If loan demand is high, credit rationing can occur
- ▶ Banks will reduce loan repayments for large loans as otherwise they will not be repaid, increasing losses from default
- ▶ Increasing loan rates does not compensate for this risk if loans are not repaid
- ▶ Uncertainty about loan repayments induces banks to limit the size of loans and maximize repayments
- ▶ Companies seeking a large loan might be rationed and only obtain a smaller loan than they seek



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