ECON4335 The economics of banking

Lecture 13, 15/11-2011: Bank regulation – Crisis handling, Lender-Borrower Relationship

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*Views and conclusions are those of the lecturer and can not be attributed to Norges Bank

Lecture 13

- Resolution of bank failures and manager incentives (9.5 in F&R)

- Relationship or contracts between lender and borrower (4.1, 4.2 and 4.3 (4.3.2) in F&R)

Resolution of bank failiures and manager incentives

Resolution of bank failures

- Methods of bank failure resolutions

  1. Open bank assistance from government (subsidies) and recapitalization by the bank's shareholders

  2. Creation of a special government regime to handle the failed banks (Norway 1991, FDIC in the US for pure banks).

  3. Takeover by other solvent banks, with or without open bank assistance. E.g. Purchase and Assumption. Can be done with haircut of bank creditors. (WaMu in the US)

  4. Bridge bank

5. Liquidation of the bank. Seldom observed.

Why this leniency?

- Avoid the costs of closing a bank:
  - Liquidation may be more costly than continuation
  - Banks important for solving asymmetric information. Closing a bank can thus have negative externalities on its borrowers, costs of being shut off from the bank's credit.
  - Asymmetric information problems between bank and regulators. Problems for supervisor in getting information about the true state of the bank. Managers have incentives to hide bad news in fear of loosing their jobs, and in that way continue to waste resources. Look at a model dealing with this problem.

Asymmetric information between bank and its regulator. Aghion, Bolton and Fries (1999)
Assumptions:

- Risk neutrality, zero risk free interest rate.

- Firms borrow from banks. A proportion θ is successful and repay R. $1-\theta$ that do not repay can be liquidated at a value L, or continue and with probability p be worth y and zero otherwise. $R > L > yp$.

- θ can take two values $\theta_L < \theta_H$. The true value of θ is private information to the bank manager.

- But how many firms the bank liquidates is public information.

- The bank manager receives a fraction of the bank's gross revenues.

- Manager's unobservable effort takes two values e_L with 0 private cost and e_H with private cost $c > 0$. $e_L < e_H$.
  $e_L \Rightarrow \theta_L$ and $e_H \Rightarrow \theta_H$.

- The regulator can close the bank and strip the manager of his share of profit, or let the bank continue with probability $x = x(\widehat{\theta})$ where $\widehat{\theta}$ is the declared share of succesful loans θ_L or θ_H, declared by how many firms banks liquidate. Hence $x \in \{x_L, x_H\}$ and regulator decides the value of x_L and x_H.

- A bank with θ_H of solvent firms is solvent.

- A bank with θ_L of solvent firms is insolvent.

$$\theta_L R + (1 - \theta_L)L < D < \theta_H R + (1 - \theta_H)L$$

But in case of insolvency, the regulator pays the necessary capital to eventually make the bank's creditors whole, after liquidation or continuation of the failed borrowers.

- In a first best symmetric information case close the insolvent bank and let the solvent bank continue.

- But in the case with private information the regulator faces two incentive problems:

  1. How to make the manager choose e_H

  2. How to make the manager reveal the true θ

- Regarding 2. A θ_H bank will always report the true θ. But the manager of a θ_L bank will have an incentive to liquidate no more firms than the θ_H bank, and thus appear to be a θ_H bank.

- To avoid this inefficient rollover ($yp < L$) of loans the regulator must choose a closure policy that gives the θ_L bank incentive to liquidate $1-\theta_L$ and reveal his type. The *truth revealing* incentive constraint is

$$x_L[\theta_L R + (1-\theta_L)L] \geq x_H[\theta_L R + (1-\theta_H)L + (\theta_H - \theta_L)yp]$$

where lhs. is truthful revelation and rhs. is falsely appearing to be solvent bank.

- Regarding the *effort level incentive*, when the manager has incentive to reveal the truth, he will choose high effort when

$$x_H(\theta_H R + (1-\theta_H)L) - x_L(\theta_L R + (1-\theta_L)L) \geq c$$

- Assume regulator is tough, $x_H = 1$, and $x_L = 0$. Supposedly strong incentive to choose e_H. But the truth revealing incentive is violated and inefficient continuation occurs.

- When regulator is tough and a θ_L manager no longer has the incentive to reveal the truth, effort incentives are also reduced.

  Supposed effort incentive $(\theta_H R + (1 - \theta_H)L) \geq c$

  Actual effort incentive $(\theta_H R + (1 - \theta_H)L) - (\theta_L R + (1 - \theta_H)L + (\theta_H - \theta_L)yp) \geq c$

- Effort incentive requires larger difference between x_H and x_L the larger is c. Whereas the truth revealing incentive requires lower difference, i.e., higher x_L, a more lenient regulator.

- The two constraints may be incompatible.

- If they are compatible, the "price to pay" for an efficient and truthful liquidation policy at failed banks may be a closure policy that looks lenient.

- The exact information structure in this model not realistic

- But it is an example of how asymmetric information regarding the true solvency of a bank can force a regulator into what appears to be lenient policy. Being tough can cause weak banks to hide their bad loans, appear strong and continue wasting resources.

Relationship or contracts between lender and borrower

Why do debt contracts look like they do?

- Risk sharing?
- Costly state verification?
- Threat of termination

Risk sharing

- A borrower has access to a technology that yields the stochastic return $\widetilde{y}$ if he invests I. Has no wealth.
- Lender has wealth I, but no technology.
- Assume symmetric information.
- Both borrower and lender are risk averse.
- Denote repayment to the lender as a function $R(y)$

- Concave utility functions $u_B(\cdot)$ and $u_L(\cdot)$. U_L^0 is the lender's required utility level.

- Problem:

$$\max_{R(\cdot)} \mathsf{E}\, u_B(\widetilde{y} - R(\widetilde{y})) \quad \text{s.t. } \mathsf{E}\, u_L(R(\widetilde{y})) \geq U_L^0$$

- After some manipulation, the FOC for this problem reduces to

$$R'(y) = \frac{ARA_B(y - R(y))}{ARA_B(y - R(y)) + ARA_L(R(y))}$$

If ARA_B very high relative to ARA_L then $R'(y)$ gets close to 1, i.e., almost full insurance for the borrower.†

†$ARA(\cdot)$ is the absolute risk aversion index.

- In practice borrowers less diversified than banks, hence more risk averse.
- So if optimal risk sharing was important we should observe a lot of debt contracts where the repayment is very sensitive to the outcome.
- But, we do not observe this in standard debt contracts.
- Why?
- Costly state verification

Costly state verification

- Lender cannot observe the true outcome y without spending resources on auditing.
- If repayment $R(y)$ where $R'(y) > 0$ and no auditing, the y reported by the borrower, $\widehat{y}$, would be lower than the actual y.
- Hence, this repaymemt contract would require costly auditing in all states.
- Is there a repayment scheme where the borrower has the incentive to report $\widehat{y} = y$ (revelation principle) and the lender can save on auditing costs?

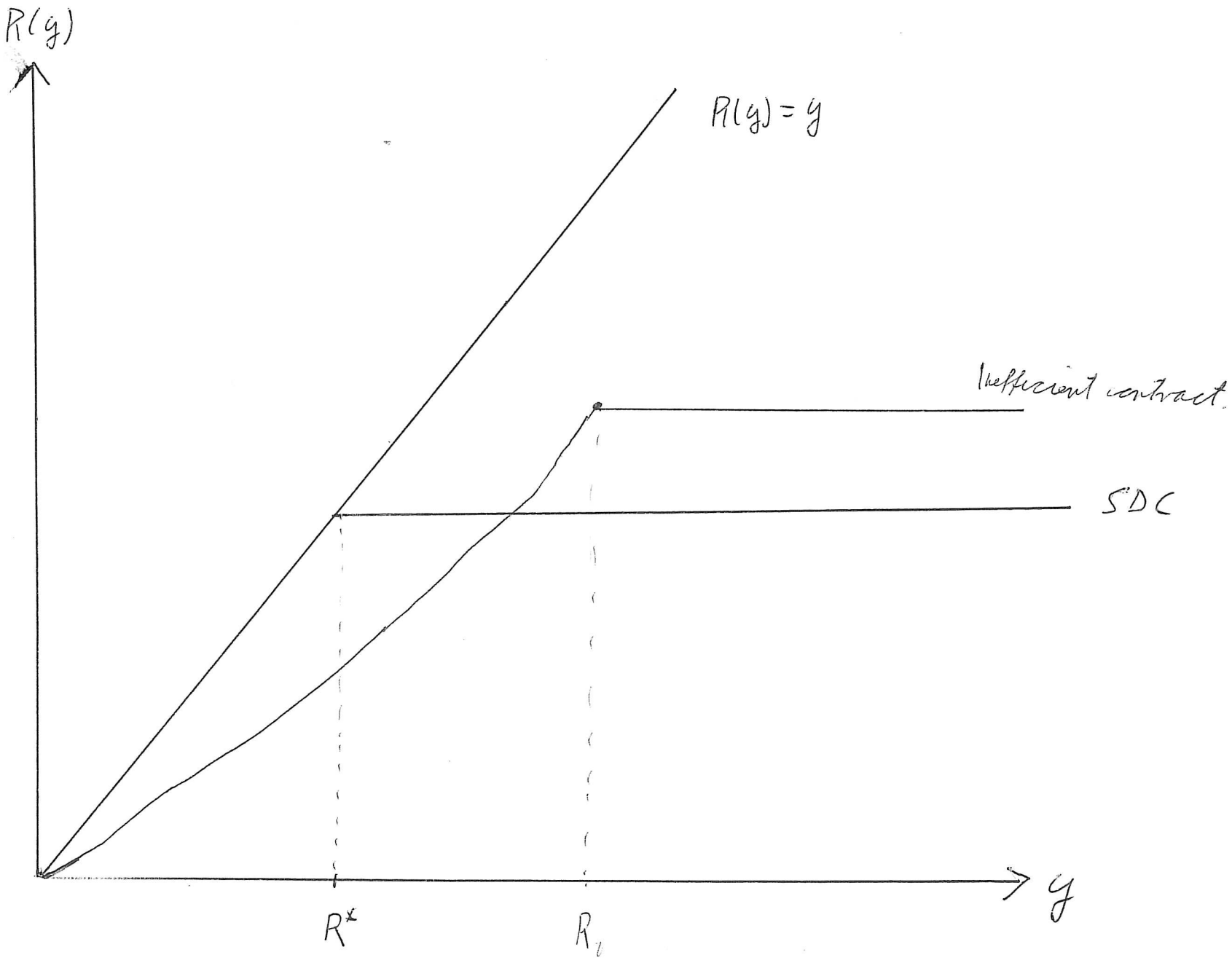
- The following contract satisfies both these requirements:

$$R(y) = \mathsf{min}(y, R)$$
$$\text{if } R(y) = R \text{ no auditing}$$
$$\text{if } R(y) < R \text{ auditing}$$

- Revelation principle: When $R \leq y$ no incentive for borrower not to pay R. When $R > y$ the lender audits and $\widehat{y}$ is irrelevant.

- Save on auditing costs, i.e., efficient contract as long as $R(y) = y$ when auditing.

- This is a standard debt contract as observed in practice.


R(y)
R(y) = y
Inefficient contract
SDC
y
R*
R_I

- Here risk neutral agents. With risk averse agents, standard debt contracts may not be optimal.

Threat of termination

- Assume the bank cannot observe outcome at all.

- A one-period (i.e., lending occurs only once) loan market may break down because the borrower will always report $\widehat{y}$ at the lowest value which may be below what the bank requires to lend.

- In a repeated lending framework, however, this problem may be solved:

  – Borrower has technology where by investing 1 he gets a return $\mathsf{E}(\widetilde{y}) > 1$, y_H with probability p_H and y_L with probability p_L, $y_L < 1$. Has no funds. Can repeat this investment next period, the outcomes are independent. No discounting.

– The bank requires expected profits of minimum 1.

– Uses standard debt contract: borrower pays R. If not, the bank gets y, and in next period the borrower gets no loan. The bank's expected profits

$$\begin{aligned} \pi &= -1 + p_L y_L + p_H(R - 1 + y_L) \geq 0 \\ \text{when } R &\geq 1 + \frac{1 - y_L}{p_H} \end{aligned}$$

– Borrower wants to repay R when $y_1 = y_H$ if

$$-R + p_H(y_H - y_L) \geq -y_L \Rightarrow R \leq \mathsf{E}(\widetilde{y})$$

– Both conditions satisfied when

$$1 - y_L \leq p_H(R - 1) \leq p_H(\mathsf{E}(\widetilde{y}) - 1)$$

- Termination seen in practice

- Another alternative: lowering interest rate for future loans if succesful repayment on past loans.

- Such incentives can also be used to alleviate moral hazard (unobserved effort).