ECON4335 The economics of banking

Lecture 12, 8/11-2011: Bank regulation – Crisis handling

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

Lecture 12

- Charter value
- A model of regulation with deposit insurance and charter value (9.4.2 in F&R)
- Solvency arrangement – Representation Hypothesis (9.4.4 in F&R), based on Dewatripont & Tirole (1994)
- Resolution of bank failures (9.5 in F&R)

The charter value theory.

- Charter value of a bank is the value to the bank's share holders of future discounted net profits that they are entitled to if the bank keeps its charter. Denote the value V.

- If the bank fails, the shareholders lose the charter to operate the bank, i.e., V is lost.

- Hence, by taking high risk, the bank increases the probability of losing V. The cost of risk taking that can balance the moral hazard in deposit insurance.

- But it can also complicate regulation.

- Used as an argument for allowing more market power in banking.

A model with deposit insurance, capital requirement and charter value (Hellmann, Murdock & Stiglitz 2000).

- Assumptions
  - Two risk neutral banks compete à la Bertrand in the deposit market.
  - Banks can invest in two types of projects, good and bad. Return G with probability p_G and B with probability p_B, and zero otherwise. $p_G G > p_B B > 0$, $B > G$, hence $p_G > p_B$. Project choice unobservable.
  - Banks set deposit rate r_D, and each receives insured deposits D with 0 deposit insurance premium.
  - $0 < k < 1$ is the capital ratio per unit of deposits. Capital costs $\beta > p_G G$.

- Bank's choice of project depends on profits per unit of deposits: Chooses the good one if

$$p_G(G(1+k)-r_D)-k\beta \geq p_B(B(1+k)-r_D)-k\beta$$

Project choice depends on k and r_D.
Higher k and/or lower $r_D \Rightarrow G$ more profitable realtive to B.

- Assume regulator can set a maximum r_D. For any k the bank will choose good project when

$$r_D \leq \widehat{r(k)} \equiv \frac{p_G G - p_B B}{p_G - p_B}(1+k)$$

- Optimal k for bank is $k=0$, since capital is more expensive than banks cost of deposits.

- Market equilibrium with deposit insurance but no regulation: $k = 0$, project B is chosen. Banks in Bertrand competition for deposits set $r_D = B$.

- Why? Assume $r_D = G$ and project G is chosen. Profitable for a bank to deviate by setting r_D slightly higher and choosing project B, since

$$\pi = p_B B - p_B G = p_B(B - G) > 0.$$

- Hence in the N.E. with deposit insurance but no regulation ($k = 0$, project B, $r_D = B$)

$$\pi = p_B B - p_B r_D = 0$$

  Not socially optimal, the inferior project is chosen. Moral hazard of deposit insurance.

- Regulator can prevent banks from socially wasteful gambling.
  Regulator can set k and r_D. By setting $r_D = \widehat{r(k)}$, banks choose project G. Note, the higher is k the higher is $\widehat{r(k)}$ and the lower is the distortion in the deposit market (not modelled here).

- Can also regulate k. From condition for project choice we get

$$k \geq -1 + \frac{p_G - p_B}{p_G G - p_B B} r_D \text{ s.t. } \pi \geq 0.$$

  Note that when capital costs banks more than deposits do ($\beta > p_G G$), have to make sure the participation constraint for banks, $\pi \geq 0$, is not violated.

- Without charter value $d\hat{r}/dk > 0$.

- The charter value $V = V(\underset{-}{k}, \underset{-}{r_D})$.

- Charter value is partly due to future option value of deposit insurance.

- With charter value, the condition for choice of good project is

$$p_G(G(1+k) - r_D) + (p_G - p_B)V \geq p_B(B(1+k) - r_D)$$

  Now the condition for choice of good project could be met with a higher ceiling on r_D as long as V remains > 0.

- However, using capital requirements gets more complicated when more capital is costly to the bank, $\frac{\partial V}{\partial k} < 0$.

$$\frac{d\widehat{r}}{dk} = \frac{\overbrace{(p_G G - p_B B)}^{+} + \overbrace{(p_G - p_B)\frac{\partial V}{\partial k}}^{-}}{(p_G - p_B)\left(1 - \frac{\partial V}{\partial r_D}\right)} < 0$$

when $\left|\frac{\partial V}{\partial k}\right|$ is sufficiently large and $\frac{\partial V}{\partial k} < 0$.

- When capital is expensive enough to banks, high capital requirements may cause the need for even tighter regulation of r_D and hence more distortions in the deposit market.

- Outside this model: Why do we see lots of capital regulation on banks but not regulation of deposit rates?

Solvency arrangement – Representation Hypothesis, Dewatripont & Tirole (1994)

- Three parties, shareholders, depositors and managers.

- Bank widely held by outside shareholders, so no longer entrepreneural bank.

- The running of the bank delegated to a manager.

- Three periods:

  - at $t = 0$ $\quad L_0 = D_0 + E_0$ the managers can exert costly effort

- at $t = 1$ first period repayment v of loans is realized, and a signal u about the bank's value η at $t = 2$ is received.
  The controlling party – the shareholders if they are in control, or regulators on behalf of depositors – decides whether to stop (S) and liquidate the bank at the certain value $L_0 + v$ or let the bank continue (C) to period 2 and earn η.

- If C in $t = 1$, then at $t = 2$ the bank is liquidated at value $v + \eta$, depositors are paid and shareholders receive the net value.

• v, u, and η are stochastic. v and u are independently distributed, but u and η are positively correlated.

- Manager's effort is either $\underline{e}$ (low effort (shirking), and no cost to the manager) or $\overline{e}$ (high effort at a cost c to the manager). If $\overline{e}$ rather than $\underline{e}$ the distributions of v and u (and hence η) shifts to the right. I.e., higher effort means higher probability of realizing higher values of v and u.

- Assume first, effort is observable and and can be stated in a contract with the manager, first best situation

- Define $D(u)$ as the net expected value of $\eta|_u$ (i.e., $\eta|_u - (L_0 + v)$) if C rather than S is chosen at $t = 1$. Assume $D'(u) > 0$, and define $\widehat{u}$ such that $D(\widehat{u}) = 0$.

- Then the first best decision is C if $u \geq \widehat{u}$ and S if $u < \widehat{u}$. v does not matter, uncorrelated with u.

- Assume, more realistically, manager's effort is unobservable and hence uncontractable. Manager cannot be given pecuniary incentives (simplification).

- Manager enjoys a private benefit B if the controlling party decides C.

- In deciding on C or S at $t = 1$, the controlling party observes v and u.

- The optimal decision rule maximizes $D(u)$ given the incentives of the managers. I.e., the rule must be such that the manager increases the probability of C by choosing $\overline{e}$ rather than $\underline{e}$.

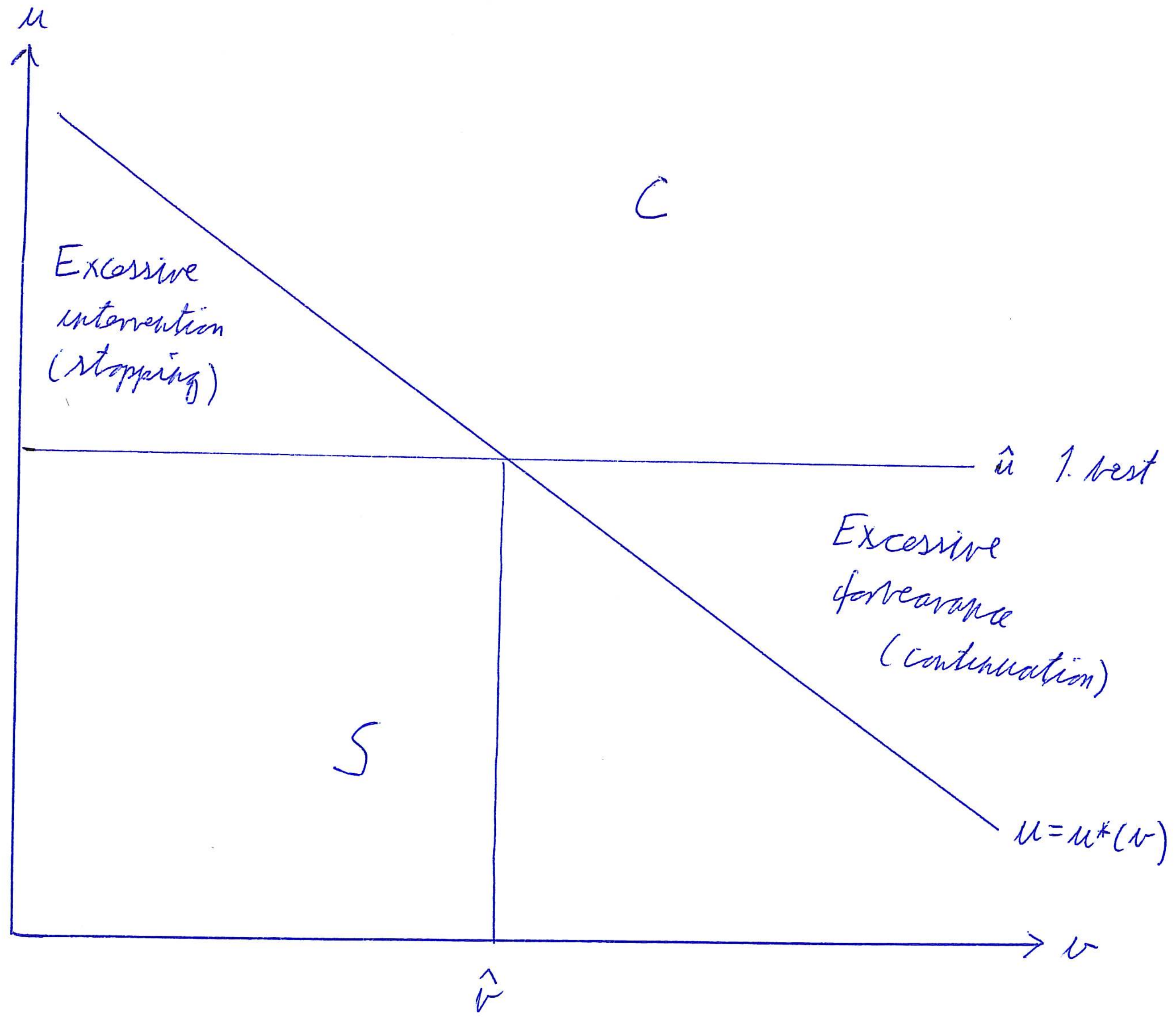
- If high value of both u and v, high effort is more likely and manager should be awarded with C.

- If low value of both u and v, low effort is more likeley and manager should be punished with S.

- Exists at least one combination of u and v where $C \sim S$.

- If from this point $u \nearrow$ then $C \succ S$. But if from the new point $v \searrow$ then more likely that manager has shirked. If the fall in v is sufficiently large, we are back at a point where $C \sim S$.

- Hence there exists a locus $u = u^*(v)$ along which $C \sim S$ and $\partial u^*(v) \big/ \partial v < 0$.


u
C
Excessive intervention (stopping)
û 1. best
Excessive forbearance (continuation)
S
u = u*(v)
v
v̂

- In the 2nd best situation where effort cannot be observed, the optimal decision implies:
  - In situations with $u > \widehat{u}$ and low v, S is chosen over C, because the low v may be due to shirking and the high u be due to good luck. Distortion relative to the first best (exssessive intervention) in order to punish the manager for possibly shirking.
  - In situations with $u < \widehat{u}$ and high v, C is chosen over S, because the high v may be due to high effort and the low u due to bad luck. Distortion relative to the first best (excessive forbearance) to reward the manager for possibly choosing high effort.

- How to implement this 2nd best optimal decision rule?

- Since at $t = 1$ η is stochastic, C is more risky than S (liquidating the bank at a certain value)

- Shareholders have convex payoff function (risk lovers).

- Depositors have concave payoff function (risk averse).

- Leave shareholders in charge when $v \geq \widehat{v}$, excessive forbearance.

- Leave depositors, i.e., regulators in charge when $v < \widehat{v}$, excessive intervention.

- This is how control is passed over from shareholders to creditors at management run widely held firms with professional creditors. Bankruptcy procedures.

- At banks with unprofessional creditors, i.e., depositors, the regulators, representing the depositors, stop the bank when its current repayments (v) is critically low.

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.

Next time