



THE BANK AS A DELEGATED MONITOR

- The standard debt contract
- The bank as a delegated monitor



1-THE STANDARD DEBT CONTRACT

- The context: moral hazard and strategic default
 - Strategic default:
 - A borrower could announce that the financed project has failed, not reimburse the loan, and consume the proceeds of the investment
 - Strategic default and moral hazard
 - Strategic default is a consequence of moral hazard: creditors can't observe the output produced by the investment, so the debtor can cheat
- The standard debt contract is a rational solution to the moral hazard and strategic default problem

1-THE STANDARD DEBT CONTRACT

- Hypothesis

- A borrower

Inv=1 \longrightarrow Output w distributed in $(0, w^0)$; $f(w)$

- w is not observable by the lender unless he undertakes an audit which costs him c
- w' =the report sent by the borrower to the lender
- A debt contract is $\{R(w), K(w'), S\}$ where:
 - S is a subset of $[0, w^0]$ for which a report w' in S induces automatically a costly (c) audit from the lender
 - $R(w)$ is the payment to the lender if w' is in S
 - $K(w')$ is the payment otherwise

1-THE STANDARD DEBT CONTRACT

- $K(w')$ is necessarily constant on the complement of S , since otherwise the borrower could cheat (no audit)
 - So, $K(w')=R$
- R is superior or equal to the maximum reimbursement possible on S (otherwise, the borrower could have interest for some realisations of w to report a message in the no-audit region and pay R)

1-THE STANDARD DEBT CONTRACT

- The best contract is $(R(w), R)$ solution of the following problem:

$$\text{Max} \int_S [w - R(w)] f(w) dw + \int_{\text{non}S} [w - R] f(w) dw$$

$$s.t. \int_S [R(w) - c] f(w) dw + \int_{\text{non}S} R f(w) dw = i$$

Where i is the cost of funds of the lender

- Hyp: perfect competition between lenders

1-THE STANDARD DEBT CONTRACT

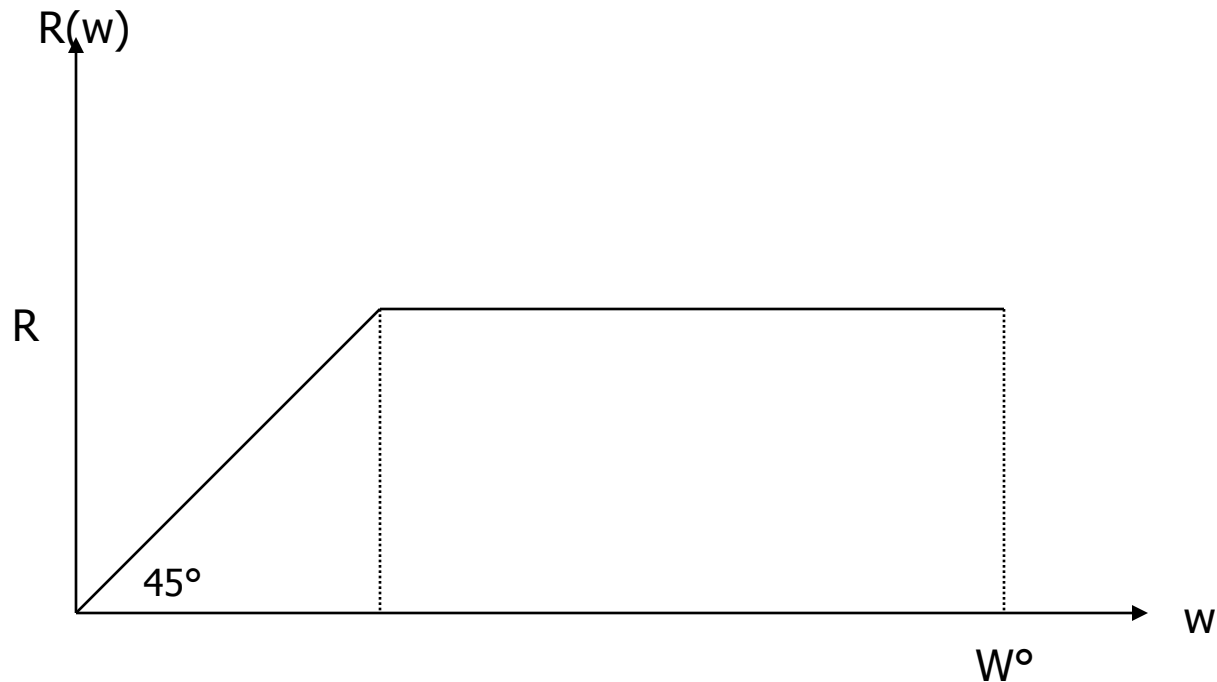
- Result (Townsend, 1979; Gale and Hellwig, 1985; Williamson, 1986):
 - Under risk-neutrality, the optimal contract is the standard debt contract with $R(w)=w$ ($w \in S$) and R which verifies (F for repartition function):

$$\text{Max} \int_R^{w^o} (w-R)f(w)dw$$

$$\text{s.t.} \int_0^R wf(w)dw - cF(R) + R[1-F(R)] = i$$

1-THE STANDARD DEBT CONTRACT

- The interest rate as a function of w





1-THE STANDARD DEBT CONTRACT

- Conclusion
 - The standard debt contract is optimal
 - Payments are non contingent to the state variable unless the debtor defaults
 - When the debtor defaults, there is an auditing procedure (bankruptcy costs) and the payment to the lender equals the residual value of the borrowers' assets



2-THE BANK AS A DELEGATED MONITOR

- Purpose of the section
 - To legitimate financial intermediaries
 - Intuition: they can save on the audit (bankruptcy) costs and help solve the strategic default and moral hazard problem
- Suppose an entrepreneur with an investment project of size m which requires to be completed the pooling of m 1-unit loans

2-THE BANK AS A DELEGATED MONITOR

- 1st case: direct financing without banks
 - With the same notations as before, the cash-inflow for the m lenders is:

$$\varphi = [1-F(mR)]mR + \int_0^{mR} [w-mc]f(w)dw$$

- With prob $[1-F(mR)]$, lenders receive mR ; in the default cases, lenders receive w net of the audit costs

2-THE BANK AS A DELEGATED MONITOR

- 2nd case: the m lenders delegate monitoring to an intermediary
 - If he is honest, this delegation save some audit costs $[(m-1)c]$ and lenders receive:

$$\varphi' = [1-F(mR)]mR + \int_0^{mR} [w-c]f(w)dw$$

2-THE BANK AS A DELEGATED MONITOR



- If not, there is a strategic default problem between the lenders group and the intermediary
 - Intermediary can cheat and announce that the borrower has defaulted and share the surplus with him

2-THE BANK AS A DELEGATED MONITOR

- The solution: a bank between a *large number of borrowers* and a large number of lenders
 - When the number of borrowers increases, the average pay-off of one entrepreneur to the bank becomes certain (by the weak law of large numbers)
 - So, lenders can ask to the bank payments non contingent to the state of the economy
 - In equilibrium, lenders don't monitor the bank, but the bank monitors the borrowers.
 - Banks can save on the audit (bankruptcy) costs



SUMMARY

- Under moral hazard and strategic default problem, the optimal credit contract is the standard debt contract
- Banks act as monitors of borrowers
- Banks emerge as a rational solution to the moral hazard and strategic default problem, because they save on monitoring costs



REFERENCES

- Gale, D. and Hellwig, M., Incentive compatible debt contracts: the one-period problem, *Review of Economic studies*, 11, 647-663.
- Townsend, R., Optimal contracts and competitive markets with costly state verification, *Journal of Economic Theory* 21, 265-293.
- Williamson, S., Recent developments in modeling financial intermediation, *Quarterly Review*, Federal Reserve Bank of Minneapolis, 1987.