Credit Rationing in Markets with Imperfect Information

Joseph E. Stiglitz and Andrew Weiss

Theory of Banking and
Financial Intermediation

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Mari Levin
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“We reserve the term credit rationing for circumstances in which either”

- among loan applicants who appear to be identical some receive a loan and others do not (and the rejected applicants would not receive a loan even if they offered to pay a higher interest rate)

- there are identifiable groups of individuals in the population who, with a given supply of credit, are unable to obtain loans at any interest rate
Basic tenet in Economics

Market in Equilibrium;

Demand = supply
→ No unemployment
→ No credit Rationing

Market in disequilibrium;

→ Unemployment
→ Credit Rationing

Short term disequilibrium → Exogenous shock
Long term disequilibrium → Government
The object of this paper is to show that in equilibrium a loan market may be characterized by credit rationing.
Bank's objective
- Make profit from loan
- Decrease the risk

Market is characterized by asymmetric information

The Bank takes decision in adverse selection environment
The bank makes use of various instruments to take decisions

- Interest rate as a screening device
- Interest rate as a incentive mechanism
- Collaterals to influence behavior
Interest as a screening device

Interest rate as a screening device for distinguishing between good and bad risks

[Graph showing the relationship between interest rate and expected return to the bank, with a peak at r*.]

[Graph showing the relationship between loan and r, with various regions labeled r*, r_m, r_2.]
Interest rate as a incentives mechanism
Changes in the interest rate affect behavior of borrowers

\[ r^* = \frac{P_b R_b - P_a R_a - 1}{B (P_b - P_a)} \]

At interest rate above \( r^* \), the risky project (a) is undertaken and the return to the bank is lowered.
Interest rate as a incentives mechanism (cont.)

Expected return Project i,

\[ i = E \left[ \max (R_i - (1+ \bullet) B, -C) \right] \quad R = \text{return}, \quad B = \text{loan}, \quad C = \text{collateral} \]

Assume all firms are identical, choice of two projects, no collateral
Expected return with success \( R_a > R_b \), Probability of success \( R_a < R_b \)

\[ [R_a - (1+ \bullet) B] P_a = [R_b - (1+ \bullet) B] P_b \quad \text{i.e.} \quad B (1+ \bullet) = \frac{P_b R_b - P_a R_a}{P_b - P_a} \]

\[ i < \bullet* \rightarrow \text{firms choose safe project, b} \]
\[ \bullet* < i < (R_a/B) - 1 \rightarrow \text{firms choose the risky one, a} \]

The maximum expected return to bank occurs with \( r^* \) if and only if,

\[ P_a R_a < \frac{P_b (P_b R_b - P_a R_a)}{P_b - P_a} \]

Whenever \( P_b R_b > P_a R_a \), \( 1+r^* > 0 \) and \( P \) is not monotonic in \( r \), so there may be credit rationing.
Interest rate as a incentives mechanism (cont.)

Expected Return b > Expected Return a
Pb*Rb > Pa*Ra \(\Rightarrow\) project b is the first choice.

\[
Pb (Rb-(1+r) B) + (1-Pb)C > Pa (Ra-(1+r) B) + (1-Pa)C
\]
( P success b + P failure b > P success a + P failure a)

Bank max: \(Pb B(1+r) + [ (1-Pb) C] = 0\) \(\Rightarrow\) no economic gain for the bank in this case

The bank increases r as long as the constraint holds so the agent will choose project b instead of project a.
Collaterals

Increasing collateral requirement till a certain level, $C^*$, 
→ Incentive affect (A+B)

Increasing collateral requirement over $C^*$
→ Lowers banks returns 
  (B=high risk and low prob.)

But → Negative incentive affects at $C^*$
→ Changes in the amount of loan affect action of borrowers (multiperiod model, L= loan 1, M = loan 2)
The analysis is extended to the case of 3 (or n) groups of borrowers with different interior bank optimal interest rates (•*2, •*3, •*1)
Principal-Agent problem

Equity Finance and Debt Finance

• Incentives
• Optimal resource allocation

• Mix of equity finance and debt finance
• Reward ´good´ borrowers in a multiperiod context
• Quantity constraints
• ........
Conclusions

→ Excess demand equilibrium
→ Excess supply equilibrium

Law of Supply and Demand is model specific and not a general property of the markets!!

...otherwise credit rationing and unemployment would not exist