INTRODUCTION:

Objective of the paper:
To show that a loan market may be characterized by credit rationing in equilibrium

Significance of the paper:
- Provides the first theoretical justification of true credit rationing
- The results presented in the credit markets are applicable to a wide class of principal-agent problems (including those describing the landlord-tenant or employer-employee relationship.)

Background information:
Credit rationing:
- The term of credit rationing in this paper:
  - 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, even though with a larger apply of credit, they would.
- Why credit rationing exists? Credit rationing and unemployment do exist because price cannot do its job as adjustment for market equilibrium. Credit rationing
implies an excess demand for loanable funds. Unemployment implies an excess supply of workers.

- One possible method of explaining of credit rationing:
  - Short-term/temporary disequilibrium: economy has incurred an exogenous shock and there is some stickiness in the prices of labor or capital so that there is a transitional period
  - Long-term disequilibrium: government constraints

Behaviors of bank:
- Banks seek to maximize profits through the interest rate they charge borrowers and the collateral they require of borrowers.
- Banks care about interest rate and riskiness. Due to the imperfect information for loan markets, interest rate impacts on the riskiness by two effect: (1) sorting potential borrowers (the adverse selection effect) or (2) affecting the actions of borrowers (the incentive effect).
- The bank wants to identify borrowers who are more likely to repay in order to get a higher expected return. The interest rate which an individual is willing to pay may act as one screening device to identify “good borrowers”. Interest rates ↑, average “riskiness” of those who borrow ↑. Higher interest rates induce firms to undertake projects with lower probabilities of success but higher payoffs when successful.
- Because of imperfect information, banks formulate the loan contract in order to induce borrowers to take actions as well as to attract low-risk borrowers.
- The bank can make a choice of interest rate, the amount of the loan, the amount of collateral or equity to maximize its profit.

“Bank-optimal” rate:
- The interest rate at which the expected return to the bank is maximized, we refer to as the “bank-optimal” rate, \( \hat{r} \).
At $\hat{r}^*$ the demand for funds exceeds the supply of funds. Although supply does not equal demand at $\hat{r}^*$, it is the equilibrium interest rate. The expected return to a loan at an interest rate above $\hat{r}^*$ is actually lower than the expected return to the loans the bank is presently making because of worse risk.

Other terms of contract:
- The amount of the loan, the amount of collateral or equity the bank demands of loan applicant, will also affect both the behavior of borrowers and the distribution of borrowers.
- For instance, increasing the collateral requirements of lenders may decrease the returns to the bank, by either decreasing the average degree of risk aversion of the pool of borrowers; or in a multi-period model inducing individual investors to undertake riskier projects. Consequently, it may not be profitable to raise the interest rate or collateral requirements when a bank have an excess demand for credit; instead, banks deny loans to borrowers who are observationally indistinguishable from those who receive loans.

Behaviors of borrowers:
- Borrowers seek to maximize profits through their choice of a project.
Sections introduction:
- Section 1 Interest rate as a screening device: focus on the role of interest rates as screening devices for distinguishing between good and bad risks.
- Section 2 Interest rate as an incentive mechanism: interest rate affects the bank’s expected return from a loan is by changing the behavior of the borrower.
- Section 3 The theory of collateral and limited liability: discussing various reasons why banks will not decrease the debt-equity ratio of borrowers (increasing collateral requirements) as means of allocating credit.
- Section 4 Observationally distinguishable borrowers: extending the analysis to observationally distinguishable groups of borrowers.
- Section 5 Debt vs. equity finance, another view of the principal-agent problem: applying the analysis to any one of a number of principal-agent problems.
- Section 6 Conclusion.

SECTION I: Interest Rate as a Screening Device
(Interest rates as screening devices for distinguishing between good and bad risks)

Meaning of term:
- \( R \): gross returns of project \( \theta \), greater \( \theta \) corresponds to greater risk in the sense of mean preserving spreads
- \( F(R, \theta) \), the subjective probability distribution of returns;
- \( f(R, \theta) \), the density function
- \( B \): the individual borrows the amount of \( B \),
- \( \hat{r} \): the interest rate is \( \hat{r} \)
- \( C \): the collateral \( C \), the individual defaults on his loan: \( C + R \leq B(1 + \hat{r}) \), the return \( R \) plus the collateral \( C \) is insufficient to pay back the promised amount
- \( \pi(R, \hat{r}) \): the net return to the borrower, \( \pi(R, \hat{r}) = \max(R - (1 + r)B; C) \)
\[ \rho(R, \hat{r}) : \text{the return to the bank, } \rho(R, \hat{r}) = \min(R + C, B(1 + r)) \]

Assumptions:
- for each project \( \theta \) there is a probability distribution of (gross) returns \( R \), and the distribution cannot be altered by the borrower
- Bank is able to distinguish projects with different mean returns, but cannot ascertain the riskiness of a project
- the borrower has a given amount of equity (which he cannot increase)
- borrowers and lenders are risk neutral
- the supply of loanable funds available to a bank is unaffected by the interest rate it charges borrowers
- the cost of the project is fixed
- unless the individual can borrow the difference between his equity and the cost of the project, the project will not be undertaken, that is, projects are not divisible
- the amount borrowed for each project is identical, so that the distribution functions describing the number of loan applications are identical to those describing the monetary value of loan applications. (This assumption can be generalized in general model)

**THEOREM 1:** for a given interest rate \( \hat{r} \), there is a critical value \( \hat{\theta} \) such that a firm borrows from the bank if and only if \( \theta > \hat{\theta} \).

The value of \( \hat{\theta} \) makes the expected profits for borrowers are zero

\[
\Pi(\hat{r},\hat{\theta}) = \int_0^\infty \max[R-(1+r)B;-C]dF(R,\theta) = 0
\]

In addition to the usual direct effect of increases in the interest rate increasing a bank’s return, there is an indirect, adverse-selection effect acting in the opposite direction, as theorem 2 and 3 implied.

**THEOREM 2:** as the interest rate increases, the critical value of \( \theta \), below which individuals do not apply for loans, increases.

\[
\frac{d\hat{\theta}}{d\hat{r}} = \frac{\frac{\partial \Pi}{\partial \hat{r}}}{\frac{\partial \Pi}{\partial \hat{\theta}}} = B \int_{(1+r)B-C}^\infty \frac{dF(R,\hat{\theta})}{\partial \Pi/\partial \hat{\theta}}
\]

\[B \int_{(1+r)B-C}^\infty dF(R,\hat{\theta}) > 0, \text{ and } \frac{\partial \Pi}{\partial \hat{\theta}} > 0, \text{ thus, } \frac{d\hat{\theta}}{d\hat{r}} > 0.\]

**THEOREM 3:** the expected return on a loan to a bank is a decreasing function of the riskiness of the loan.

Theorem 4 tries to illustrate that this adverse-selection effect may outweigh the direct effect.

Assume there are two groups: the “safe” group will borrow only at interest rates below \( r_1 \), the “risky” group below \( r_2 \), and \( r_1 < r_2 \). When the interest rate is raised slightly above \( r_1 \), the mix of applicant changes dramatically: all low risk applicants withdraw.
THEOREM 4: if there are a discrete number of potential borrowers (or types of borrowers) each with a different $\theta$, $\bar{\rho}(\hat{r})$ will not be a monotonic function of $\hat{r}$, since as each successive group drops out of the market, there is a discrete fall in $\bar{\rho}$ (where $\bar{\rho}(\hat{r})$ is the mean return to the bank from the set of applicants at the interest rate $\hat{r}$).

Theorem 5 and 6 show why non-monotonicity is so important.

THEOREM 5: Whenever $\bar{\rho}(\hat{r})$ has an interior mode, there exist supply functions of funds such that competitive equilibrium entails credit rationing.
Demand for funds depends on \( \hat{r} \), the demand for loans is a decreasing function of the interest rate charged borrowers; the supply of funds depends on \( \rho \), the mean return on loans.

The excess demand for funds is measured by \( Z \).

Comparative statics property of our market equilibrium:

**COROLLARY 1**: As the supply of funds increases, the excess demand for funds decreases, but the interest rate charged remains unchanged, so long as there is any credit rationing.

\( Z \) will be reduced to zero; further increases in the supply of funds then reduce the market rate of interest.

**THEOREM 6**: If the \( \bar{\rho}(r) \) function has several modes, market equilibrium could either be characterized by a single interest rate at or below the market-clearing level, or by two interest rates, with an excess demand for credit at the lower one.
A. Alternative Sufficient Conditions for Credit Rationing

In theorem 4, we know that a discrete number of potential borrowers each with a different $\theta$ will result in a nonmonotonic $\bar{\rho}(\hat{r})$ function. And because of the nonmonotonicity of $\bar{\rho}(\hat{r})$, there exists credit rationing according to Theorem 5. In this part of section I, the condition put forward in theorem 4 has extended into 3 concrete circumstances.

1. Continuum of Projects

Let the distribution of projects be $G(\theta)$, and expected return to the bank of a loan be $\rho(\theta, r)$, with riskiness $\theta$ and the interest rate $r$.

Then the mean return to the bank with $\hat{r}$ is

$$\bar{\rho}(\hat{r}) = \frac{\int_{\hat{r}(\theta)}^{\theta} \rho(\theta, \hat{r})dG(\theta)}{1-G(\hat{\theta})} \tag{7}$$

Let $\rho(\hat{\theta}, \hat{r}) = \hat{\rho}$ and differentiate (7) with respect to $\hat{r}$:

$$\frac{d\bar{\rho}}{d\hat{r}} = \frac{1}{(1-G(\hat{\theta}))^2} \left[ \frac{d\left(\int_{\hat{r}(\theta)}^{\theta} \rho(\theta, \hat{r})dG(\theta)\right)}{d\hat{r}} \left(1-G(\hat{\theta})\right) - \int_{\hat{r}(\theta)}^{\theta} \rho(\theta, \hat{r})dG(\theta) \frac{d(1-G(\theta))}{d\hat{r}} \right]$$

$$= \int_{\hat{r}(\theta)}^{\theta} \frac{d\rho(\theta, \hat{r})}{d\hat{r}}dG(\theta) - \rho(\hat{\theta}, \hat{r})g(\hat{\theta})\frac{d\hat{\theta}}{d\hat{r}} + \frac{\bar{\rho}(\hat{r})}{1-G(\hat{\theta})} - \frac{\rho(\hat{\theta}, \hat{r})g(\hat{\theta})}{1-G(\hat{\theta})} \left( -g(\hat{\theta})\frac{d\hat{\theta}}{d\hat{r}} \right)$$
The value of \( \hat{\theta} \) for which the expected returns are zero satisfies:

\[
\rho(\hat{\theta}, \hat{r}) = \int_0^\infty \min(R + C; B(1 + \hat{r}))dF(R, \hat{\theta}) = 0 \tag{5'}
\]

Differentiating it:

\[
\frac{d\rho(\theta, \hat{r})}{d\hat{r}} = \frac{1}{B} \cdot \int_0^\infty [1 - F((1 + \hat{r})B - C, \theta)]dG(\theta) \tag{6'}
\]

< 0

> 0

Since from theorem 5, \( \frac{d\rho}{d\hat{r}} < 0 \) for some value of \( \hat{r} \) is a sufficient condition for credit rationing, we can conclude two circumstances from (8) to get that result:

1). There is a large difference between the mean return on loans at \( \hat{r} \) and the return from the project making zero returns at \( \hat{r} \). In this case, \( (\hat{\rho} - \rho) \) in (8) will be large enough in absolute value.

2). A small change in the nominal interest rate induces a large change in the applicant pool, which results in large \( \frac{g(\hat{\theta})}{1 - G(\hat{\theta})} d\hat{\theta} \).

2. Two Outcome Projects

If projects succeed with probability \( p(R) \), the return is \( R \), \( S < R < K \).

If projects fail, the return is \( D \), same for all projects; and the bank suffers a cost of \( X \) per dollar loaned.

There is no collateral required, \( C = 0 \); normalize \( B = 1 \).

All projects in a loan category have the same expected yield:

\[
T = p(R)R + [1 - p(R)]D \tag{9}
\]

Let \( g(R) \) be the density of project values, \( G(R) \) the distribution function, \( J = \hat{r} + 1 \), the expected return per dollar lent at \( \hat{r} \):
\[
\rho(J) = \frac{1}{\int_J^k g(R) dR} \left[ \int_J^k p(R) g(R) dR + \int_J^k [1 - p(R)] D - X g(R) dR \right]
\]

(10)

From (9), we have \( \rho(R) = \frac{T - D}{R - D} \), then (10) can be rewritten as:

\[
\rho(J) = [J - D + X \lfloor T - D \rceil ] \left[ \int_J^k \frac{g(R) dR}{R - D} \right]^2 + D - X
\]

(10')

Differentiating

\[
\frac{1}{T - D} \frac{\partial \rho}{\partial J} = \int_J^k \left[ \frac{\partial}{\partial J} \frac{g(R)}{R - D} + \frac{1}{R - D} \right] \left[ \frac{\partial}{\partial J} \frac{g(R) dR}{R - D} \right] + \frac{1}{J - D} \frac{\partial}{\partial J} \frac{g(R) dR}{R - D}
\]

Using l’Hopital’s rule twice and assume \( g(K) \neq 0, \infty \)

\[
\lim_{J \to k} \left( \frac{1}{T - D} \frac{\partial \rho}{\partial J} \right) = \lim_{J \to k} \left[ \frac{g(R)}{R - D} + (J - D + X) \cdot \frac{-g(J) \cdot g(R) + g(J) \cdot g(R)}{2g(R) \cdot \int_J^k g(R) dR} \right]
\]

\[
= \lim_{J \to k} \left[ \frac{1}{R - D} + (J - D + X) \cdot \frac{-g(J) \cdot g'(R) + g(J) \cdot g'(R) \cdot (R - D) - g(R)}{2g(R) \cdot g(R) + 2g'(R) \int_J^k g(R) dR} \right]
\]

\[
= \lim_{J \to k} \left[ \frac{1}{K - D} + (K - D + X) \cdot \frac{-g(K) \cdot g(K)' + g(K) \cdot g(K)' \cdot (K - D) - g(K)}{2g(K) \cdot g(K) + 2g(K) \cdot 0} \right]
\]

\[
= \frac{1}{K - D} + \frac{K - D + X}{2(K - D)^2} = \frac{K - D - X}{2(K - D)^2}
\]

(10*)

And \( \text{sign}(\lim_{J \to k} \frac{1}{T - D} \frac{\partial \rho}{\partial J}) = \text{sign}(K - D - X) \)

In order to get \( \lim_{J \to k} \left( \frac{\partial \rho(J)}{\partial J} \right) < 0 \), we must have the following conditions:

(a) when \( \lim_{J \to k} g(R) \neq 0, \infty \), \( X > K - D \), or, \( \lim_{J \to k} p(R) + p'(R) X < 0 \) resulting from
\[ p(R) = \frac{T - D}{R - D}. \]

(b) when \( g(K) = 0, g'(K) \neq 0, \infty \), we need to use l'Hopital's rule to (10*) for the third time, and will get \( 2X > K - D \), or \( \lim_{j \to k} p(R) + 2p'(R)X < 0. \)

(c) when \( g(K) = 0, g'(K) = 0, g''(R) \neq 0 \), then go on using l'Hopital's rule to (10*) for the forth time, and get \( 3X > K - D \), or \( \lim_{j \to k} p(R) + 3p'(R)X < 0. \)

3. Differences in Attitudes Towards Risk

This part examines the nonmonotonicity of \( \hat{\rho}(\hat{r}) \) from the different attitudes of the loan applicants to the risk.

The fraction \( \lambda \) of the population who is infinitely risk averse will take the best perfectly safe project. In this group, let \( G(R) \) be the distribution of returns, and \( G(K) = 1 \) (i.e. \( R < K \)). The rest of the population is risk neutral. These applicants enjoy the probability \( p \) to succeed in the risky project with a return of \( R^* > K \), and if they fail, the return is zero. Let \( \hat{R} = (1 + \hat{r})B \), the expected return to the bank is:

\[
\hat{\rho}(\hat{r}) = \frac{\hat{\lambda}(1-G(\hat{R}))+(1-\hat{\lambda})p}{\hat{\lambda}(1-G(\hat{R}))+(1-\hat{\lambda})}(1+\hat{r}) = \left[ 1 - \frac{(1-p)(1-\lambda)}{\hat{\lambda}(1-G(\hat{R}))+(1-\lambda)} \right](1+\hat{r})
\]

(11)

The upper bound on returns from the safe project is:

\[
\frac{d \ln \hat{\rho}}{d \ln(1+\hat{r})} = \frac{d\left\{ \ln \left[ 1 - \frac{(1-p)(1-\lambda)}{\hat{\lambda}(1-G(\hat{R}))+(1-\lambda)} \right] + \ln(1+\hat{r}) \right\}}{d \ln(1+\hat{r})} = \frac{d \ln \left[ 1 - \frac{(1-p)(1-\lambda)}{\hat{\lambda}(1-G(\hat{R}))+(1-\lambda)} \right]}{d \ln(1+\hat{r})} + 1
\]

\[= \frac{\hat{\lambda}(1-G(\hat{R}))+(1-\lambda)}{\hat{\lambda}(1-G(\hat{R}))+(1-\lambda)p} \left[ - \frac{0-(1-p)(1-\lambda) \cdot (-\hat{\lambda}g(\hat{R}))}{\left( \hat{\lambda}(1-G(\hat{R}))+(1-\lambda) \right)^2} \right] \cdot \frac{1}{B} \cdot \frac{1}{B} + 1
\]

\[= 1 - \frac{(1-\lambda)(1-p)\hat{\lambda}g(\hat{R})\hat{r}}{(1-\lambda G(\hat{R}))\hat{\lambda}(1-G(\hat{R}))+(p(1-\lambda))}
\]

(12)
If we want \( \lim_{\tilde{r} \to \hat{r}} \frac{\partial \tilde{p}}{\partial \tilde{r}} < 0 \), the term \( \frac{\lambda g(\hat{R}) \hat{R}}{(\lambda(1-G(\hat{R})) + p(1-\lambda))} < 0 \), which results in

\[
\frac{\lambda}{1-\lambda} \lim_{\tilde{r} \to \hat{r}} g(\tilde{R}) \tilde{R} > \frac{p}{1-p}.
\]

This inequality can be interpreted in two ways:

1). the greater is the riskiness (the lower is \( p \)), the inequality is more likely to be true, thus the more likely is an interior bank optimal interest rate.

2). the higher is the relative proportion of the risk averse individuals to risk neutral ones, the more likely is an interior bank optimal interest rate.

SECTION II. Interest Rate as an Incentive Mechanism

A. Sufficient Conditions

As mentioned in the introduction, the interest rate a bank charges may affect the riskiness of the loans in two ways. The first section mainly focuses on the adverse selection effect, and this section is about the incentive effect, that is changing the behavior of the borrower. The conclusion is that the increase in interest rate may make the riskier projects more attractive to the borrower, which leads to the ration credit when there is an excess demand for loanable funds.

THEOREM 7: If, at a given nominal interest rate \( r \), a risk-neutral firm is indifferent between two projects, an increase in the interest rate results in the firm preferring the project with the higher probability of bankruptcy.

The theorem 7 can be interpreted in the following way. Suppose there are two projects, \( j \) and \( k \). At some \( \hat{r} \), \( \pi^j = \pi^k \). When there is an increase in the interest rate \( \hat{r} \), the expected return from both projects will be lowered. However, the projects with higher probability of paying back the loan will be reduced more than that with lower probability.

THEOREM 8: The expected return to the bank is lowered by an increase in the interest rate at \( \hat{r} \) if, at \( \hat{r} \), the firm is indifferent between two projects \( j \) and \( k \) with distributions \( F_j(R) \) and \( F_k(R) \), \( j \) having a higher probability of bankruptcy than \( k \), and there exists a distribution \( F_l(R) \) such that

(a) \( F_j(R) \) represents a mean preserving spread of the distribution \( F_l(R) \), and
(b) \( F_k(R) \) satisfies a first-order dominance relation with \( F_i(R) \); i.e., \( F_i(R) > F_k(R) \) for all \( R \).

The theorem 8 can be interpreted in terms of the return to the bank: \( \rho_k > \rho_l > \rho_j \).

**B. An Example**

Suppose all firms are identical, and have a choice of two projects with return \( R^a > R^b \) when succeed (and nothing otherwise). The probability of success \( p^a < p^b \).

When the projects are indifferent to the firm at \( \hat{r} \), there is:

\[
\left[ R^a - (1 + \hat{r})B \right] p^a = \left[ R^b - (1 + \hat{r})B \right] p^b
\]

the equation can be rewritten as:

\[
B(1 + \hat{r}) = \frac{p^b R^b - p^a R^a}{p^b - p^a} \equiv (1 + \hat{r}^*)B
\]

As a result, the \( \hat{r}^* \) in (16) and figure 6 is the interest rate which make the two projects indifferent to the firms with \( C = 0 \), and also the maximum interest rate where project \( b \) can be chosen. Below \( \hat{r}^* \), only the safe project is considered; between \( \hat{r}^* \) and \( \frac{R^a}{B} - 1 \), only risky project is chosen. And the rate \( \frac{R^a}{B} - 1 \), is the highest rate that the bank can charge and investment will all go into project \( a \).

So, if and only if \( p^a R^a < \frac{p^b (p^b R^b - p^a R^a)}{p^b - p^a} \), the bank can get the maximum expected return at interest rate \( \hat{r}^* \).
Thus, when $p_bR^b > p^aR^a$, $1 + \hat{r}^* > 0$, and $\rho$ is nonmonotonic in $\hat{r}$, there may be credit rationing.

SECTION IV: Observationally Distinguishable Borrowers
- ‘n’ observationally distinguishable borrowers each with an interior bank optimal interest rate $r_i^*$
- $\rho_i(r_i^*)$ denotes gross return to a bank charging a type $i$ borrower interest $r_i$
- For $i > j$, $\max \rho_i(\hat{r}_i) > \max \rho_j(\hat{r}_j)$.

Theorem 13:
For $i > j$, type $j$ borrowers will only receive loans if credit is not rationed to type $i$ borrowers.
- This is based on the fact that the maximum return on the loan to $i$ is more than the loan to $j$ and thus the bank would want to maximize its profits.

Theorem 14:
The equilibrium interest rates are such that for all $i, j$ receiving loans, $\rho_i(\hat{r}_i) = \rho_j(\hat{r}_j)$.

1) When $\rho^*$ is the cost of loanable funds:
- All type 3 borrowers wanting to borrow at interest rate $\hat{r}_3^*$ will obtain loans.
- Some type 2 borrowers will obtain loans at interest rate $\hat{r}_2^*$
- No type 1 borrower will obtain a loan.
2) When the interest falls, and $\rho^*$ drops to $\rho^{**}$:
- All types 2 and 3 will obtain loans.
- Some but not all type 1 borrowers will obtain loans at $\hat{r}_1^*$.
Groups like type 1 that are excluded from the credit market are said to be ‘redlined’ since there is no interest rate at which they would obtain loans if the cost of the funds is above $\rho^*$

- **The investments of type 1 might be particularly risky**: While $\rho_1(\hat{\rho}_1^*) > \rho_3(\hat{\rho}_3^*)$, the total expected return (i.e., the return to the bank plus the return to the borrower) to type 1 investment exceeds the expected return to type 3 investment.

- **The investments of type 1 borrowers might be unprofitable to the bank**: The banks find it difficult to filter out the riskier type 1 investments.

- **Type 1 investors have a broader range of available projects**: A reason for $\rho_1(\hat{\rho}_1^*) < \rho_3(\hat{\rho}_3^*)$ could be because type 1 investors can invest in all projects available to type 3 investors but can also in addition invest in risky projects that type 3 borrowers do not invest in. (Possibly because of either the convexity of the profit function of borrowers / because riskier projects have higher expected returns)

**SECTION V: Alternative view on the Principal-Agent problem:**

- This analysis can be applied to a number of principal-agent problems - e.g.: In agriculture the bank (principal) corresponds to the landlord and the borrower (agent) corresponds to the tenant and the loan contract corresponds to a rental agreement.

- Central concern: how to provide proper incentive for the agent

- Revenue sharing arrangements such as sharecropping or equity finance are inefficient

- Fixed fee contracts:
  
  **Advantages**: Don’t distort incentives, employed in cases of risk-neutral agents
  
  **Disadvantages**: Impose heavy risk on the agent and thus not desirable for risk averse agents. Ignore the possibility of the agent failing to pay the fixed fee

  Do not necessarily lead to optimal resource allocation
- Payoff will be a non linear function of profit. Terms of these contracts will depend on the nature of the principal and the agent, the extent to which their actions can affect the probability of bankruptcy

SECTION VI: Conclusion
- To sum up: According to this model of credit rationing not all observationally identical borrowers will receive loans
- Potential borrowers won’t be able to borrow even if they pay a higher rate of interest or offer to up more collateral than is demanded. This is because an increase in interest rates or an increase in collateral requirements would lead to higher riskiness by either inducing borrowers to invest in riskier projects or by discouraging safer investors
- Thus credit is restricted via the number of loans the bank offers rather than limiting the size of each loan or making the interest an increasing function of the magnitude of the loan
- Imperfect information can lead to excess supply equilibrium as well:
  - Assume banks make higher expected profits on some of their borrowers than others, they are aware of their most credit worthy customers. Other banks are not
  - If a bank tries to attract customers of its competitors by offering lower interest rate, it will end up attracting the least profitable of those customers and thus the bank should assess the profitability of the loans a lower interest rate would attract
  - Thus in equilibrium there will exist an excess of supply but no bank will lower its interest rate

Possible criticism of paper: Single time period argument limits the strategy space of lenders; In a multi-period context banks could potentially reward it’s credit worthy/“good” borrowers by offering to lend them at lower interest rates, which in turn would induce the firms to undertake safer projects