a given project realization R is given by

$$\pi_e(R, r) = \max\{R - (1 + r) B, 0\},$$

while the payoff to the lender is given by

$$\pi_\ell(R, r) = \min\{R, (1 + r) B\}.$$

The key properties of these ex-post payoffs are that the entrepreneur's payoff $\pi_e(R, r)$ is convex in the realization R while the lender's payoff $\pi_\ell(R, r)$ is concave in R. This implies that the ex-ante expected payoff of the entrepreneur, $\int \pi_e(R, r)\, dG(R|\sigma_i)$, is *increasing* in the riskiness σ_i whereas the ex-ante expected payoff of the lender, $\int \pi_\ell(R, r)\, dG(R|\sigma_i)$, is *decreasing* in σ_i.

At a given interest rate r only entrepreneurs with a sufficiently high riskiness $\sigma_i \geq \sigma^*$ will apply for loans. The cutoff σ^* is given by the zero-profit condition

$$\int \pi_e(R, r)\, dG(R|\sigma^*) = 0,$$

which implies that the cutoff σ^* is *increasing* in the market interest rate r. For high interest rates only the riskiest entrepreneurs find it worthwile to borrow. This leads to a classic lemons problem as in Akerlof (1970) since the pool of market participants changes as the price varies.

Credit rationing can occur if the lenders cannot distinguish borrowers with different riskiness, i.e. if an entrepreneur's σ_i is private information. A lender's ex-ante payoff is then the expectation over borrower types present at the given interest rate

$$\bar{\pi}_\ell(r) = E\left[\int \pi_\ell(R, r)\, dG(R|\sigma_i) \middle| \sigma_i \geq \sigma^*\right].$$

As usual, a higher interest rate r has a positive effect on the lender's ex-ante payoff $\bar{\pi}_\ell(r)$ since the ex-post payoff $\pi_\ell(R, r)$ is increasing in r. In addition, however, a higher interest rate r also has a negative effect on $\bar{\pi}_\ell(r)$ since it implies a higher cutoff σ^* and therefore a higher riskiness of the average borrower. The overall effect is ambiguous and therefore the lender's payoff $\bar{\pi}_\ell(r)$ can be *non-monotonic* in the interest rate r.

In equilibrium, each lender will only lend at the interest rate which maximizes his payoff $\bar{\pi}_\ell(r)$ and so it is possible that at this interest rate there is more demand for