A model of collateral, investment,
and adverse selection ☆

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Abstract

This paper characterizes the relationship between entrepreneurial wealth and aggregate investment under adverse selection. Its main finding is that such a relationship need not be monotonic. In particular, three results emerge from the analysis: (i) pooling equilibria, in which investment is independent of entrepreneurial wealth, are more likely to arise when entrepreneurial wealth is relatively low; (ii) separating equilibria, in which investment is increasing in entrepreneurial wealth, are most likely to arise when entrepreneurial wealth is relatively high and; (iii) for a given interest rate, an increase in entrepreneurial wealth may generate a discontinuous fall in investment.
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1. Introduction

Consider an economy in which entrepreneurs need to borrow funds in order to take advantage of investment opportunities. In most cases, such borrowing is characterized by some degree of asymmetric information. The lender, for example, might not be able to fully assess important

characteristics of the borrower. Or the borrower's actions might not be fully observable. In these situations, if he is to break even, the lender will need to design contracts that provide proper incentives for the borrower. In most existing models, incentives are in part provided by limiting the amount of lending in accordance with the borrower's net worth. The prevailing view that emerges from these models is that, whenever they are constrained because of informational frictions, investment and credit must be increasing in entrepreneurial wealth.

This paper shows that the prevailing view does not necessarily apply to environments of adverse selection. To this end, I develop a simple model of credit markets with adverse selection and fully characterize the relationship between aggregate investment and entrepreneurial wealth. It is shown that, even when aggregate investment is constrained due to the presence of adverse selection, it need not be monotonically increasing in entrepreneurial wealth.

In my environment, entrepreneurs need to borrow funds in order to finance their investment opportunities, on which they possess private information. Financial intermediaries seek to mitigate the asymmetry of information by offering a menu of contracts. More specifically, they try to screen entrepreneurs through the amounts of collateral that they provide and of investment that they undertake. Depending on the level of entrepreneurial wealth, it is shown that the credit market equilibrium may either entail pooling, so that all entrepreneurs borrow indistinctly at the same terms, or separation, so that different entrepreneurs borrow at different rates of collateralization, pay different rates of interest, and undertake different levels of investment. I show that the pooling equilibrium, in which investment is independent of entrepreneurial wealth, is more likely to arise when the latter is low relative to the desired level of investment. The separating equilibrium, in which investment is increasing in entrepreneurial wealth, is most likely to arise when the latter is high in relation to the desired level of investment. Moreover, I also show that for a given interest rate, increases in entrepreneurial wealth may lead to a contraction in aggregate investment by inducing the economy to switch from a pooling to a separating equilibrium.

The intuition behind these results is as follows. When entrepreneurial wealth is low relative to the desired level of investment, screening is relatively costly in my economy. Indeed, since collateral is scarce in this case, screening must be predominantly done by restricting the amount of investment undertaken by the "good" entrepreneurs. Hence, there is a strong tendency to pool all projects and have good entrepreneurs cross-subsidize their bad counterparts. Whereas cross-subsidization implies that the pooling equilibrium is costly for good entrepreneurs, it also benefits them by allowing them to expand their investment. In such a pooling equilibrium, investment is independent of entrepreneurial wealth because the marginal unit borrowed by good entrepreneurs is always fully cross-subsidized: hence, at the margin, the cost of borrowing is constant for them. As entrepreneurial wealth increases, though, the screening possibilities of intermediaries are enhanced. In particular, since screening can be increasingly done through collateralization requirements, its cost decreases. Consequently, intermediaries can eventually design profitable contracts tailored to attract the most productive entrepreneurs from the pool by asking them to provide greater quantities of collateral. The resulting equilibrium thus entails separation between different types of entrepreneurs.

As the previous analysis suggests, then, increases in entrepreneurial wealth might induce a switch from a pooling to a separating equilibrium in the credit market. What happens to aggregate investment when there is such a switch in regime? I show that, provided that the average quality of investment in the economy is above a certain threshold, a switch of regime will lead to a fall in the investment undertaken by all entrepreneurs. This must clearly the case for bad entrepreneurs, who are cross-subsidized in the pooling equilibrium and therefore overinvest relative to their efficient level of investment. As for good entrepreneurs, the fall in their investment can be best understood