

Real Options with Endogenous Payoff

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ABSTRACT

This paper studies a model of irreversible investment decisions in which the exercise payoff is endogenously determined by the firm's risk management choice. By obtaining the explicit solution of a non-linear free boundary problem with a stochastic control, we present the implications for the optimal investment timing and the associated optimal risk management strategy. The firm's optimal risk management strategy exhibits risk-seeking: it increases the insurance asset holdings that provide rewards (damages) when there is good (bad) news for the underlying price. As a result of the risk-seeking insurance strategy, in our model, in contrast to the standard models, investment can be hastened as the underlying uncertainty increases, depending on the economic conditions. The main force driving these results is that the firm's risk management is designed to optimize the risk-return tradeoff of the endogenous payoff.