

Optimal investments with a lower barrier

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Abstract

In the classical optimal investment problem from McDonald & Siegel, the time to investment can be arbitrary long – it can even be infinitely long, i.e. the investment never takes place. From a modelling point of view, it should be better if the investment is terminated when either a long enough time without an investment has passed, and/or the value of the investment has reached a level so low that it seems unreasonable for the investment value to reach a level so high that the investment is initiated.

In this paper, we look at two types of lower levels: endogenous and exogenous. When we introduce a strictly positive constant running cost, there will be a level at which the investment opportunity is abandoned. We also look at the cases where we introduce a constant lower level at which the value of the investment can never decrease below. This is modelled by assuming reflecting, sticky, elastic as well as sticky and elastic behaviour at this boundary.

We compare the values and the expected time to investment or abandonment in the different models. Since the expected time to investment or abandonment is calculated under the objective measure, we need to model the value of the investment under the risk-neutral measure as well as understand the measure change when we move between the objective and the risk-neutral measure.

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