

Prof. Dr. Klaus Wälde
Gutenberg School of Management and Economics
University of Mainz

www.macro.economics.uni-mainz.de
www.waelde.com

Sudden and drastic behaviour

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Optimal stopping problems in economics and finance

GSEFM 2nd year PhD programme
Seminar announcement - Winter term 2011/12

1 Introduction

There is some truth in the claim that economics is the science of marginal adjustments. It has long been recognized, however, that there are many occasions where marginal changes are not appropriate for modeling real-world phenomena. A classic example is search: Once you find something while searching, you can either stop searching or not. In finance, when an investment of fixed size is to be undertaken, one can either invest the whole amount, or nothing. An example from emotional economics would describe heated discussions (with partners, parents or sometimes even with colleagues) and note that outbreaks rarely can be described as marginally controlled behaviour. Last but not least an example from industrial organization: firms can either enter a market or not. Marginally entering a market, maybe with half a product or so, is simply not feasible.

The systematic analysis of examples of this type led to solution methods where terms like “the economics of inaction”, “optimal stopping problem”, “smooth pasting” or “option theory of waiting” are frequently used. Looking at the methods in detail, these terms play a big role in marketing these methods and in providing an intuition about new features of these methods. If one wants to pin down the crucial element that is common to all these examples, however, one would conclude that this crucial element are fixed discrete costs.

This seminar will use examples from all over economics where maximization problems with discrete costs are central. As many of these examples work with closed-form solutions, some emphasis will also be put on closed-form solutions to maximization problems.

The seminar is organised such that there will be a first meeting in October 2011 where topics/ papers are briefly presented by the course organizer (Prof. Klaus Wälde). Students

can then chose a topic, i.e. basically a paper from the list of papers given below, a paper they propose themselves or a chapter from the two textbooks also listed below. November and December can be used to work on the presentation. Discussions with the organizer is of course possible and actually strongly encouraged. In February and March 2012 there will be two to three meetings (depending on the number of participants) where students present the topic they chose. A typical presentation would present one paper from the literature in depth, i.e. it is essential to understand each step in the paper and to include the intermediate steps in the essay to be written. Suggesting potential extensions or adding own thoughts, maybe even presenting related own work is also more than welcome.

If one or several students are interested, a term-paper consisting of a systematic overview of closed-form solutions can be written. This can be done in close cooperation with Klaus Wälde. If the overview is very good, this could become a paper to be published in some journal.

All students interested in this seminar should send an email to klaus.waelde@uni-mainz.de.

2 A brief overview

There are various textbooks and classic articles which treat maximization problems with discrete fixed costs. The textbooks are Dixit and Pindyck (1994) and Stokey (2008). Classic articles include Bentolila and Bertola (1990), Bertola and Caballero (1994) and Dixit (1989). With some few exceptions in the Dixit and Pindyck textbook, the source of uncertainty is Brownian motion.

Optimal stopping problems with Poisson uncertainty has been analysed by Ahlin and Shintani (2007) or Chen and Funke (2005). Work in progress in emotional economics using these techniques includes Wälde (2012).

Closed-form solutions are presented in many of these papers with discrete fixed costs. Other references for marginal cost models include Sennewald and Wälde (2006), Wälde (2005), the book by Chang (2004), Posch (2011) and the references in the overview by Wälde (2011).

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