Fachbereich Rechts- und Wirtschaftswissenschaften
JOHANNES GUTENBERG UNIVERSITÄT MAINZ
Mainz School of Management and Economics
Lehrstuhl für Volkswirtschaftslehre, insbesondere Makroökonomik

Applied Dynamic Methods in Micro- and Macroeconomics

Seminar (Winter Term 2010/11)

Supervisors

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Important Dates

Registration Deadline: 25/06/2010

Introductory Session: 16/07/2010

1st office hour: 18/10/2010

2nd office hour: 15/11/2010

Deadline for turning in the thesis (by email): 22/12/2010

Seminar: Starting after the Christmas Break

Target Audience

The seminar is for diploma students in economics or business administration and master students. The participants should have a strong mathematical background. Knowledge in the area of optimization problems is useful but not necessary. Participants of the course "Applied Intertemporal Optimization" are particularly encouraged to participate in the seminar and will be given preferential consideration.

Registration

To register for the seminar, please send an e-mail to Michael Lamprecht (lamprecht@uni-mainz.de). In addition to your student ID and field of study please attach a list of two preferred topics. The registration deadline is Friday, 25 June 2010. A list of admitted students (including a waiting list) will be posted on our webpage by 02 July 2010. Participation will have to be confirmed by Friday, 9 July 2010, 12 p.m. Students whose seminar participation has been confirmed, but who subsequently withdraw from seminar participation will fail the course.

Contact

For further information please contact Michael Lamprecht (lamprecht@uni-mainz.de).

Topics

Economic actors like households and firms have to make decisions every day. The majority of these decisions have intertemporal effects, that means they influence the presence as well as the future. Examples are saving households, investing firms or job-searching workers. If a household decides to save he reduces consumption today, but increases his wealth and therefore the possibility to consume more tomorrow. But what is the optimal saving rate of the household? The answer to this question is not easy to find as intertemporal decisions cause uncertain effects because of the uncertainty of future events. A household cannot predict the rents of his saving decision, a firm does not know how successful a project will be and a labor-searching worker does not know if he will find a better job if he searches with a higher intensity.

Given the importance of these kind of decisions, researchers have put a lot of effort into analyzing them. This required the development of new solution methods. In the seminar "Applied Dynamic Methods in Micro- and Macroeconomics" we introduce typical intertemporal models and look at some of the methods which are used to solve these kind of problems.

1 Solution Methods

Before we can analyze typical intertemporal decision problems we have to get to know the basic concepts related with such stochastic control models. We will learn what stochastic

processes are and which important theorems relate to then. Then we use our results to solve actual problems with dynamic programming. In the most cases it is very difficult or not possible to find a closed-form solution. Therefore we present three different ways to find a solution or at least a numerical approximation of an solution.

- Topic 1: In the first step we have to introduce the method of dynamic programming. The student is expected to describe the basic concepts behind this method presented in Sennewald and Wälde [2006].
- Topic 2: In most cases it is very difficult to find a closed-form solution. But sometimes for similar problems are already known. Then you can make an "educated guess". The student is expected to introduce this method presented in Wälde [2009].
- Topic 3: But for most problems you have no idea of the structure of the solution. In this case you have to use numerical solution methods. Such an algorithm is presented in Posch and Trimborn [2010] for an RBC model.

2 Economics of Inaction

Now we have the theoretical framework to solve stochastic control models. In the next part we consider a special class of intertemporal problems. In these class of models the decision maker adjust the control variable only a discrete amount of time. Therefore regions of inaction exists, where a household or firm is doing nothing. A typical example is an investing firm. Firstly, they have to decide at which point in time they should invest. Secondly, they have to choose the rate of adjustment.

- Topic 4: We are starting with an example where a firm only decides at which point in time it wants to invest in a project. The student is expected to describe the model presented in Dixit and Pindyck [1994, ch. 6]
- Topic 5: In the next step firms can temporanously suspend the project and at a restart it at a later point in time. The student is expected to describe the model presented in Dixit and Pindyck [1994, ch. 7]
- Topic 6: Finally, we consider a model in which a firm also chooses the rate of adjustment for their labor force. The student is expected to present the model described in Chen and Funke [2005].

3 Distributional Effects

Finally, we want to use our previous results to analyze the distributional effect of shocks. We focus on the firm size distribution in an economy. We want to analyze why firms have different size and how can it be explained that firms are continously entering and exiting the market.

- Topic 7: In a first model differences in firms size arise because of different R&D investments. The student is expected to describe the model presented in Klette and Kortum [2004].
- Topic 8: In another work, firms are continously enter and exit the market because of an selection mechanism. More productive firms enter the market and replace less productive firms. The student is expected to describe the model presented in Luttmer [2007].

References

Yu-Fu Chen and Michael Funke. Non-wage Labour Costs, Policy Uncertainty and Labour Demand - A Theoretical Assessment. *Scottish Journal of Political Economy*, 52(5):687–709, November 2005.

Avinash K. Dixit and Robert S. Pindyck. *Investment under Uncertainty*. Princeton Univ. Press, 1994.

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Erzo G. J. Luttmer. Selection, Growth, and the Size Distribution of Firms. *The Quarterly Journal of Economics*, 122(3):1103–1144, August 2007.

Olaf Posch and Timo Trimborn. Numerical solution of continuous-time DSGE models under Poisson uncertainty. Diskussionspapiere der Wirtschaftswissenschaftlichen Fakultät der Universität Hannover dp-450, Universität Hannover, Wirtschaftswissenschaftliche Fakultät, June 2010.

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