

Some Computational Aspects of Stochastic Control Experiments with Macroeconometric Models

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Given the ongoing advance in computational technology, economists can legitimately think of incorporating various aspects of uncertainty in their macromodelling effort, using stochastic control. What was feasible, not so long ago, only by using a super computer is now possible using desk top machines. However, understanding in this area is hampered by a lack of computational evidence and experience, which can be generated only by trying out these techniques on a wide variety of models. This paper presents a couple of toy models estimated using Indian macroeconomic data. By reporting results on repeated experiments, as well as, Monte Carlo simulations, it raises some pertinent issues and problems related to the computational aspects of the use of stochastic control.

Introduction

In this paper we report a couple of stochastic control experiments with very small macromodels for India. The dimensions of the models are of necessity small given the limits of computability with desk top machines. The kind of work we report here is still in its experimental stage and much experience will be needed before we may confidently apply these tools to realistic models. That day, however, does not seem to be too far given with which the technology is advancing in the area of computers.

Recently there has been a resurgence of an interest in the applications of optimal control in general and stochastic control in particular, in economics. Whilst there indeed are substantial gains to be made by using the techniques, especially in the wake of advances in the area of computational techniques, there are some issues that need to be looked into which are of a practical nature in the main. Here we try to underline some of them with the help of illustrations, drawn from simple experiments conducted, using macro data from the Indian economy. We note the time required to conduct the control experiments using different machines and comment on what needs to happen in terms of computing technology to attain a greater ease and user friendliness, so that more economists are persuaded to make use of this technique. We believe that the time has come not merely to acknowledge the existence of different kinds of uncertainty but to take the next step of trying to quantify, and draw conclusions regarding the relative importance of different kinds of uncertainty in the context of a specific problem at hand.

Stochastic Control Problems

In this section we give a brief description of the simplest kind of stochastic control problems. The deterministic case is too well-known for elaboration. Even the deterministic models can be used with three types of learning. First, where the decision maker solves the deterministic model for a number of periods and then uses the solution

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