THE DETERMINANTS OF ECONOMIC POLICY WITH RATIONAL EXPECTATIONS

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Abstract

This paper is a summary of remarks for a panel discussion on "Rational Expectations and the Control of the Economy". After a brief review of the major issues in this area, it is argued that the central problem is not that optimization techniques are inadequate for macroeconomic policy, but rather that policymakers, in practice, may use these techniques inappropriately. Whether optimal control can be useful for stabilizing the economy, therefore, depends on the government policymaking process and the incentive structure under which policy decisions are made. It is suggested that a potential resolution to the problem can come from a normative examination of the behavior of governmental policymaking agencies.

1. Introduction

Most research on the application of optimal control to economic stabilization has focused on the development of techniques to find economic policies which minimize an intertemporal loss function subject to the constraints of an econometric model. Very little research, on the other hand, has been concerned with the decision-making process which underlies the adoption of these techiques by policymakers in practice. The neglect of this later area is unfortunate: although optimal control techniques are potentially of great value in macroeconomic stabilization problems, the recent work on rational expectations has shown that policymakers may choose to use these techniques in an inappropriate fashion by changing policy in "mid-stream" once the desired economic behavior is achieved in expectation of that policy. As yet it is an open question whether the incentive structure underlying the policymaking process will encourage the correct use of these techniques. If it does not, then perhaps other techniques should be proposed in order to prevent the economic instability that can result. Alternatively, different incentive structures or legislated rules may be necessary.

In any case one implication of the recent research in rational expectations is that policy research should focus more on models of the decision making framework of policymakers. This alternative focus for macroeconomic policy research is analogous to that of Stigler (1975) in the context of government regulatory agencies: "Until we understand why our society adopts its policies, we will be poorly equiped to give useful advice on how to change those policies". Similarly, in the macroeconomic context, the decision-making behavior of the policymakers has bearing on the type of stabilization policy that should be recommended.

2. Econometric Models and Optimal Control

For the purpose of illustrating optimal control policy, a linear econometric model of the economy can be represented as

$$(1) \qquad y_t = A y_{t-1} + B x_t + C u_t + e_t$$

where y_t is a vector of the endogenous variables (eg. consumption, investment, employment), x_t is a vector of exogenous variables (such as population growth) and u_t is a vector representing the instruments of monetary and fiscal policy. The additive disturbances v_t represent random shocks to the system of equations. The matrices A, B, and C are assumed to have been estimated during the sample period.

The representation in (1) is a reduced form of a structural econometric model in two senses: first the model has been solved for the endogenous variables y_t which now appear only on the left hand side of (1); and second, variables which represent unobservable expectations of inflation and sales have been substituted out using expectation assumptions which give the best fit during the sample period. It is this second notion of a reduced form which gives rise to serious policy problems if expectations are formed rationally, as was pointed out by Lucas (1976).

For the purpose of illustrating this problem suppose that before expectations have been eliminated, equation (1) has the form

$$(2) \qquad y_t = A_1 y_{t-1} + A_2 E y_t + B x_t + C u_t + e_t.$$

where $E y_t$ represents the unobservable expectation of the endogenous vector y_t. For econometric estimation of (2), it is typical to assume that $E y_t$ is an extrapolation of past values of y_t. For example, if $E y_t = A_3 y_{t-1}$ then equation (2) reduces to equation (1) with $A = A_1 + A_2 A_3$.

Suppose, however, that expectations are formed rationally: $E y_t$ is determined according to the

model in equation (2). Then, by taking expectations and solving for Ey_t we get

$$(3) \quad Ey_t = (I-A_2)^{-1}(A_1y_{t-1} + BEx_t + CEu_t)$$

Hence Ey_t depends not only on past values of y_t but also on expectation of the exogenous variables and policy instruments. Thus, according to rational expectations as represented in (3), Ey_t depends on the policy rule, a property which is not reflected in extrapolation or adaptive expectation.

The implication is that an "optimal" policy computed from equation (1) does not incorporate the response of expectations to the policy formulated -- as is evident in equation (3). Consequently, an optimal policy based on (1) could lead to suboptimal results if (3) is the more accurate description of the economy.

3. Optimal Control with Rational Expectations

It is possible to incorporate equation (3) directly into the model, and thereby insure that the optimal policy does account for the response of expectations to the policy formulated. For example, Taylor (1976) incorporated rational expectations into a simple model of the U.S. economy and calculated the optimal trade-off between the variance of inflation and the variance of unemployment. The calculation was based on a steady state criterion which is equivalent to an infinite time horizon with no discounting. Analyses such as this indicate that optimal control can be useful for economic stabilization problems even when expectations are formed rationally.

Kydland and Prescott(1977) approached the problem of incorporating expectations somewhat differently. They found that an inconsistency problem arose because there would always be incentive to change the plan once desired economic behavior was achieved. They also showed that such plan-switching would be unstable. In order to prevent this problem, they suggested a sub-optimal consistent strategy. Taylor (1976) avoided this problem by assuming that policymakers would not change the plan and by focusing on the infinite horizon with no discounting.

The choice between the consistent solution of Kydland and Prescott and the optimal control solution of Taylor, therefore depends on the behavior of policy makers. If the incentive structure which underlies their decisions calls for maintaining an announced plan, even if the short-term results may appear unsatisfactory, then the optimal control solution should be used. On the other hand, if the incentive structure induces a change in strategy, then the consistent plan should be used. To determine which type of policy plan to recommend we therefore need a model of the behavior of policymakers.

4. Models of the Policy Process

There has been some research on the decision making process which may be useful for answering questions. The related work by Stigler (1975) has already been mentioned. Nordhaus (1975) and Fair

already been mentioned. Nordhaus (1975) and Fair (1975) have considered political models of the business cycle, which involve the behavior of policymakers in anticipation of election results. Pindyck (1975) has developed control procedures where different policy agencies have conflicting objectives; this entails specification of utility function for the different agencies and may reflect different incentive structures. Gordon (1976) has developed a model in which the supply of inflation by the government is determined through a specific incentive structure. This research and suggestions for extending it can be discussed in more detail during the panel discussion.

An important characteristic of the macro-economic policymaking process which is not adequately captured by this research is the large number of different agencies involved in decision-making, at least as practiced in the U.S. The frequently cited division between the monetary and fiscal authorities is an oversimplification of this diversity. Within the traditional area of fiscal policy, a number of agencies have lead roles, and even the monetary authorities usually make decisions by committee. In many cases each agency or group has different ideas about what should be the appropriate economic decision. And frequently these differing viewpoints are backed up by quantitative economic analysis.

As a consequence of this diversity in the decision-making process there is a fairly vigorous competition for ideas, and in the process of groping toward a final decision, bad ideas and those which benifit only a narrow interest at the expense of the majority will be discarded. I would argue, therefore, that on the average this competition or conflict between agencies leads to economic decisions which are not short-sighted and which reflect the advantages of maintaining plans for longer-term benefits. To be sure, serious mistakes are sometimes made and the process could certainly be improved. Nevertheless, this conflict may lead, somewhat paradoxically to a gain in economic welfare, rather than a loss as has frequently been argued.

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