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Comment

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In their paper Kydland and Prescott present a novel technique for answering an old macroeconomic question: Can fiscal policy be used to stabilize the economy? The technique combines "equilibrium business cycle modelling" with modern tools of public finance and contrasts sharply with the conventional techniques—such as econometric model simulation—now commonly used to answer such questions. Although the technique confronts some difficult modelling and computational problems, it offers a promising alternative to the more traditional methods of quantitative policy evaluation.

The first stage of the Kydland-Prescott policy evaluation method is the development of an equilibrium business cycle model which displays the major empirical regularities of macroeconomic fluctuations. For example,

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they model *contemporaneous* correlations between the major aggregates by assuming limited information about aggregate disturbances in local markets. More difficult however, is modelling *serial* correlations which characterize business cycles. Kydland and Prescott summarize these intemporal correlations in terms of an estimated second-order stochastic difference equation in the linearly detrended log of real GNP (y_t):

$$y_t = 1.4y_{t-1} - .5y_{t-2} + \epsilon_t. \tag{1}$$

This can be written equivalently as a distributed lag in the shock ϵ_t. That is,

$$y_t = \sum_{i=0}^{\infty} \psi_i \epsilon_{t-i} \tag{2}$$

where $\psi_0 = 1$ and the ψ_i weights first increase before starting to decline toward the neighborhood of zero.[10] The primary explanation given by Kydland and Prescott for this "humped" pattern is the delay between actual expenditures and planned expenditures for many components of GNP. For example, investment expenditures are a distributed lag of investment plans, and empirically this lag is "humped"; hence output should also have a humped lag distribution similar to the observed ψ_i values in equation (2).

Although this type of investment behavior will indeed produce the desired correlation pattern, I feel it has two basic difficulties as a central mechanism for generating output persistence in this model. First, in order for such a mechanism to qualify as an essential propagator of business cycle fluctuations, the impulse variables (in this case investment plans) should be serially uncorrelated. If the impulse variables themselves are serially correlated, then another propagation mechanism is necessary to explain this persistence. In fact, investment plans do appear to be highly correlated serially. For example, capital appropriations and construction permits, which are rough proxies of expenditure plans, have high serial correlation properties. Moreover, this correlation is very similar to that of investment expenditures.[11] Since the expenditure–planning lag hypothesis does not explain these fluctuations, it is insufficient as a mechanism to generate business cycle movements without other sources of persistence.

A second difficulty is related to the "parameter variation" problem emphasized by Robert Lucas. As stated by Kydland and Prescott, avoid-

10. Many such empirical regularities are presented in Hodrick and Prescott 1978, where alternative detrending methods are also examined.

11. Many variables which are representative of expenditure plans, such as permit authorizations, are thought to be leading indicators of actual expenditures. As leading indicators, they tend to have serial correlation properties which are similar to expenditures, but are slightly out of phase.

ing policy-induced shifts in parameters is a major motivation for developing models like the one they propose here as an alternative to conventional econometric models. Yet, the expenditure–planning lag emphasized by Kydland and Prescott is not derived explicitly from a maximizing model and, hence, in principle is subject to such policy-induced shifts. Moreover, one might expect such shifts in the expenditure–planning lag mechanism to be important in practice. For example, construction of previously planned projects might be accelerated in anticipation of higher costs—perhaps induced by a policy change. If the effect of policy on this acceleration is not accounted for, then a wrong—and possibly destabilizing—policy might be used. While all existing econometric models are subject to this same problem, I emphasize it here because one of the main reasons for using these techniques is to avoid such problems.

A number of other explanations of the pattern of serial correlation summarized in (2) have been proposed by business cycle researchers. The flexible accelerator mechanism will generate such correlation for suitable parameter values, and attempts have been made to develop this mechanism in a simple rational expectations model (see Pashigian 1969). Another explanation comes from some of my own research on staggered contracts with rational expectations (see Taylor 1979*a*). Serial persistence patterns similar to (2) may be due to short-lived wage and price rigidities which cause purely random shocks to accumulate for a number of periods before their effect diminishes toward zero. A review of U.S. data suggests that contracts about one year in duration may be sufficient to generate business cycle persistence similar to what has been observed during the postwar period. One advantage of this alternative type of rational expectations model is that it also generates a persistence of inflation. In fact a good argument can be made that the persistence of inflation is at least as big a theoretical challenge to rational expectations theorists as the persistence of output or employment fluctuations: if policymakers form expectations rationally and the world behaves according to the market-clearing rational expectations model described by Kydland and Prescott, then there is no explanation for the inflation-supporting aggregate demand policies which we have observed during much of the postwar period. The inflation-output trade-offs evident in contract models provide at least a partial explanation.

With the exceptions noted above, Kydland and Prescott build their equilibrium business cycle model upon the assumption of utility maximization. That is, they posit a representative household utility function which depends on consumption, leisure, and government expenditures, and they assume that households maximize this utility function subject to budget constraints. An important and welcome feature of their policy analysis is the use of this same utility function to evaluate fiscal stabiliza-

tion policy. No additional policy criterion function—such as a quadratic loss in output and inflation fluctuations—is needed for the analysis. Since the maximized value of the household utility functions depends on the parameters of government decision rules, the welfare effects of policy can be evaluated directly by examining the improvement or deterioration of individual utilities as policy changes.

In principle, such an approach is preferable to the more standard procedure of postulating a simple aggregate policy criterion which is only indirectly related to individual welfare. But the indirect approach has practical advantages. There are many reasons why macroeconomic policy should aim to reduce the size of output and price fluctuations—simply maintaining a stable and relatively certain environment for private decision making is one reason. Such reasons have not, however, been formally linked to a basic household utility function analysis. Apparently a fairly complex and complete model must be developed to formalize such a link. Until this development, a simple aggregate criterion may serve well as a first approximation.[12]

Using this model and this procedure for evaluating policy, Kydland and Prescott conclude their analysis by examining whether taxes or borrowing should be used to finance temporary government expenditures. They find the model indicates that it is better to finance temporary expenditures (such as wars) by bond finance, leaving more lasting expenditures to tax finance. Intuitively, this result is due to the assumption that labor supply and the demand for durables are very elastic in the short run, but not in the long run. If so, then the Ramsey inverse elasticity rule—lower taxes on high elasticity items—suggests the resulting debt finance mix. It is reassuring that the formal techniques give answers which correspond to this intuitive finding.

This result, which is the main conclusion of the policy analysis, certainly has important implications for fiscal stabilization policy. For example, it gives a rationale for stability of tax rates and hence for including the major tax instruments of fiscal policy in aggregate criterion functions—policy variables are usually included for pure computational reasons and to prevent the embarrassment of instrument instability. It is not clear, however, why this result is particularly relevant to the central question of the paper. An analysis of other fiscal policy issues, such as the usefulness of the automatic stabilizers, might have been more helpful. Nevertheless, developing and applying an equilibrium business cycle model to a central problem of public finance represents an important and unique contribution to the problem of policy evaluation in a rational expectations setting.

12. An example of the potential empirical advantages of such a criterion is given in a rational expectations setting by Taylor (1979).