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Triumph or Vindication?

Expectations and the Lucas critique

The contest between our two accounts of post 1960 U.S. inflation raises various issues about rational expectations models of macroeconomic policies. I began from two benchmark models: a natural-rate model with adaptive expectations for the public, but an optimal policy for the government via the Phelps problem; and a natural unemployment rate model with rational expectations for the public, but an exogenous and arbitrary government policy. Lucas recommended replacing the first benchmark model with the second. Coming to grips with our two stories about post 1960 inflation has caused us to propose other models that make various compromises between these two benchmarks.

Models of credible government policies impose rationality on both the government and the private sector. After recalling Kydland and Prescott's pessimistic prediction drawn from a one-period version of the rational expectations version of a natural rate model, I reviewed how the repeated economy version of the analysis substitutes agnosticism for pessimism. In the end, it seems that after giving up a promise to offer recommendations, the theory of credible policy yields weak predictions about outcomes. In the context of the natural rate example, this makes me hesitate to declare the triumph of the natural rate theory.

As an alternative, following Sims and Chung, I approached history from the opposite pole, turning back from the Lucas Critique and beginning from the Phelps benchmark model. Starting with Phelps's problem, we assume that the government's model

of the private sector's behavior is not arbitrary, but is chosen to fit historical data. Variations in the details of the specification led to: (1) self-confirming equilibria, (2) equilibria with misspecified forecasting functions, and (3) 1990's style adaptive expectations (or anticipated utility) models.

In using these models to interpret the data, we reexamined Lucas's Critique and the foundation of the rational expectations econometrics constructed in its wake. Phrases and slogans from the early years of rational expectations have echoed through our account of theory and history: cross-equation restrictions, free parameters, random coefficients, and regime shifts. It is in terms of these phrases that we should evaluate whether our 1990's style adaptive expectations models are closer to 1950's adaptive expectations models or to the 1970's rational expectations models. For instance, take cross-equation restrictions and free parameters and consider the 1990's adaptive model described in Chapter 8. The likelihood function of the adaptive model in Chapter 9 has no free parameters governing expectations.[1] Furthermore, it embodies cross-equation restrictions that period-by-period have the same structure used in rational expectations models.[2] Via its connection to a self-confirming equilibrium as an attractor for its mean dynamics, our 1990's adaptive model satisfies Kreps's (1998) desideratum that it should converge to rational expectations under tranquil conditions.[3] But following Sims (1988), to match the data, our main interest has been in the recurrent dynamics contributed by adaptation. Suspecting that the Phillips curve is prone to wander, the government uses

[1] This leaves open whether we want to count the single gain parameter as an extra free parameter relative to a rational expectations model, or whether it should also be counted as a parameter set at a special value for a rational expectations model.

[2] See Hansen and Sargent (1980) for an account of this structure.

[3] Here it is understood that under tranquil conditions, it would be appropriate to set the gain proportional to $\frac{1}{t}$ eventually.

a constant-gain algorithm, an appropriate choice when coefficients wander. Since the government's beliefs influence inflation through the Phelps problem, the constant-gain estimation choice by the government makes a random coefficient specification worthwhile for both the government and the private sector.

This brings us to regime shifts and nonlinearities. Though their behavioral principles remained fixed, our adaptive models generate simulations that exhibit abrupt stabilizations of inflation. These stabilizations defy the time consistency problem in the form of an inferior self-confirming equilibrium pointed to by the system's mean dynamics. Regime shifts occur, not from a change in the government's econometric or policy-making procedures, but from changes in beliefs created by its econometric procedure. The system's nonlinearities, rather than large shocks, explain its behavior. The mathematics of escape routes in the space of approximating models underlies the stabilization. Belief in the induction hypothesis activates inflation-stabilizing (near Ramsey) behavior on the part of the monetary authority. When the constant-gain econometrics let the government use a unit root to approximate a constant with substantial probability (recall the moving confidence ellipses from Chapters 8 and 9), chance occurrences can activate the induction hypothesis.

This returns us to the origin of the induction hypothesis. The induction hypothesis was incorporated almost without comment by Friedman (1957) and Cagan (1956) in formulating the adaptive expectations hypothesis. It was also the basis of Solow's and Tobin's early tests of the natural-rate hypothesis. Cast as villain in Lucas's Critique, the induction hypothesis emerges as hero in delivering the superior long term outcomes in our simulations and the timely recommendations to stabilize that emerge from our econometric estimates in Chapter 9.

This leads us to how models (coefficient vectors and their covariance matrices) approximate one another along the paths of our simulations. The particular escape routes followed by

our simulations reflect the ability of a unit root to approximate a mean and thereby to activate the inducation hypothesis. Wrestling with approximation issues, with multiple models in play, caused Sims (1980) to call bounded rationality a wilderness, separated from the tidy one-model structure of rational expectations.

Reservations

I have compared two histories of postwar U.S. inflation: the triumph of natural-rate theory and the vindication of econometric policy evaluation. Each history has the government learning and using a version of the natural unemployment rate hypothesis, either the correct rational expectations version in the triumph story or the approximating adaptive expectations version in the vindication story. The first history is more popular among modern macroeconomists than the second, which seems to defend discredited methods. I consider the second story partly because the first account has contradictions, loose ends, and elements of adaptation, and partly because I think the vindication story captures features of policy making at the Federal Reserve. The contest between our two histories is not rational expectations versus an alternative, because both selectively apply and withdraw from rational expectations.

Our vindication of econometric policy evaluation is an exercise in positive economics, not normative economics. But because it produces near Ramsey outcomes for long periods, this might tempt us to transform it into a normative analysis recommending its econometric policy evaluation procedures. To dampen that temptation, we should recall the simulations presented in Chapter 8. The econometric policy evaluation methods would have yielded sound advice because the U.S. data activated the induction hypothesis. The simulations make us wonder whether that occurred because the econometric policy evaluation procedures ultimately hit upon a stable feature of

the price-unemployment dynamics surfacing in the induction hypothesis or whether the historical outcome was a long but temporary episode of low inflation like ones encountered in the simulations. The simulations contain episodes that resemble Arthur Burns as well as ones that look like Paul Volcker. When estimates nearly affirm the induction hypothesis, the mean dynamics of the model point away from the induction hypothesis and toward regions where the Phelps problem recommends resuscitating inflation. It can take a long time for the mean dynamics to push the system back to the self-confirming equilibrium, but it is bound to happen.

For this reason, my exercise in positive economics is not enough to commend its underlying policy making procedures. Theoretical work after Kydland and Prescott has insisted that anti-inflation policy is about designing and adhering to mechanisms that prevent the monetary authorities from choosing sequentially, and from even thinking about the possibility of lowering unemployment through inflation.[4] That work seeks a secure foundation for assuring low inflation under fiat monetary systems. It rejects the idea that chance will lead policy makers armed with an approximate model eventually to learn to do approximately the right thing.

In the end, though our simulations and econometric evidence bolster the vindication of econometric policy evaluation story, we hope that this is the wrong story. We hope instead that policy makers somehow have learned a correct rational expectations version of the natural rate hypothesis and have found devices to commit themselves to low inflation. Otherwise, the mean dynamics governing adaptation threaten eventually to rekindle inflation.

[4] See Rogoff (1985).