Econometric Policy Evaluation: Note

Thomas F. Cooley; Stephen F. LeRoy; Neil Raymon

The American Economic Review, Vol. 74, No. 3. (Jun., 1984), pp. 467-470.

Stable URL:

http://links.jstor.org/sici?sici=0002-8282%28198406%2974%3A3%3C467%3AEPEN%3E2.0.CO%3B2-9

The American Economic Review is currently published by American Economic Association.

Econometric Policy Evaluation: Note

By Thomas F. Cooley, Stephen F. LeRoy, and Neil Raymon*

In Robert Lucas's (1976) representation of the received method of econometric policy evaluation, a government policy is characterized by a sequence of values of a policy variable x_t. According to the Keynesian tradition, the effect of a given policy on such endogenous variables as *GNP* is determined by solving an econometric model

$$y_{t+1} = F(y_t, x_t, \theta, \varepsilon_t)$$

for successive values of the endogenous variables y_t, with the x_t treated as deterministic forcing variables. Here θ is a parameter vector and the ε_t are random shocks. Lucas correctly observed that such a formulation is inconsistent with a view of agents as optimizers: except in special cases in which the future is irrelevant to present decisions, it makes no sense to think of agents as optimizing if they know that their budget constraints are liable to shift arbitrarily (i.e., in a way which is not characterized probabilistically) as government policy changes. Lucas was led to augment the foregoing equation by adding to the system a government policy function

$$x_t = G(y_t, \lambda, \eta_t).$$

Since the η_t are random variables, a probability distribution is induced on the x_t. Alternative response functions may be viewed as indexed by the parameter vector λ, and policy may be subject to random shifts, indexed by η_t, due perhaps to the vagaries of the political process.

For Lucas, a policy evaluation exercise is conducted by comparing the probability distribution of the y_t for different hypothetical values of λ. This procedure presumes that agents act as if they are certain what policy rule is in force and, further, act as if they are certain that the rule will be maintained into

the indefinite future. These are very severe limitations. First, under rational expectations agents will attach very high probability to the event that the current regime will prevail into the indefinite future only if regime changes of the type under consideration are in fact very rare. Thus Lucas's framework is applicable only to a small minority of policy changes. This point was noted by Christopher Sims (1982, pp. 118 ff.). Second, even if the regime change under discussion is in fact a rare event, the analysis still is relevant only after agents have convinced themselves with certainty that a new regime is in place.

There are several possible responses to these limitations on the set of policy changes analyzable in the way Lucas outlined:

Accept these limitations as inherent in the nature of policy analysis. In 1980, for example, Lucas explicitly rejected the idea that economists should undertake to evaluate government policy in specific historical episodes such as, in this case, the 1974–75 recession.[1] This stance is consonant with Lucas's formal policy evaluation procedure, as that is incapable of generating a compari-

*Cooley and LeRoy: Department of Economics, University of California, Santa Barbara, CA 93106; Raymon: Department of Economics, University of Missouri, Columbia, MO 65211.

[1]Here it is important to observe that Lucas's point was not simply that policy actions conducted in 1974–75 were undertaken in response to events occurring before 1974, and had consequences after 1975, implying that the interval over which the analysis is conducted should be lengthened. That point was in fact made by William Poole (1980) at the same conference, and is entirely uncontroversial. Lucas's rejection of policy evaluation in specific historical episodes was more sweeping:

> What advice, then, do advocates of rules have to offer with respect to the policy decisions before us *right now*?
> This question does have a practical, men-of-affairs ring to it, but to my ears the ring is entirely false. It is a king-for-a-day question which has no real-world counterpart in the decision problems actually faced by economic advisors.... Economists who pose this "What is to be done, today?" question as though it were somehow the acid test of economic competence are culture-bound (or institution-bound) to an extent they are probably not aware of. They are accepting as *given* the entirely unproved hypothesis that the fine-tuning exercise called for by the Employment Act [of 1946] is a desirable and feasible one. [1980, p. 208]

son between two proposed policy sequences evolving out of a common past (since policy is identified with λ, a constant).

Lucas's attitude owes also to another consideration. He has expressed the view that it makes no sense to think of the government as conducting one of several possible policies while at the same time assuming that agents remain certain about the policy rule in effect. Under changing policy rules, Lucas finds that the assumption of rational expectations becomes implausible.[2] For example, Lucas and Thomas Sargent wrote that in this kind of environment "it is...[hard] to imagine that agents can successfully figure out the constraints that they face" (1981, p. *xxxvii*). But if the assumption of rational choice is inapplicable, then there is no hope that we can understand or predict the effects of policy changes.

Expand the analysis to allow for learning. John Taylor (1975) and others have responded to the criticism that agents are assumed to know with certainty the value of λ by instead assigning to agents a nondegenerate prior on λ at the time of the regime change. Then it is assumed that agents update their subjective distributions on λ according to a Bayesian learning process. This analysis disposes effectively of the problem of accounting for how agents behave before becoming certain of the new value of λ, at least if we ignore the question of where their priors come from. However, in these analyses it is still assumed that agents are certain that the regime parameter does not change, even though they do not know its value with certainty. Thus again either the analysis is limited to those very few regime changes which can be regarded by agents as virtually permanent once they occur, or agents are being modeled as having nonra-

tional expectations about the likelihood of future regime changes.

Use nonstructural methods for policy evaluation. Sims has responded to these difficulties by recommending that policy evaluation be conducted using nonstructural vector autoregressions. Two of us have expressed elsewhere the view that nonstructural methods are not appropriate for policy evaluation because the errors and parameters in nonstructural models are complex (and unidentified) functions of the underlying structural errors and parameters (Cooley and LeRoy, 1983). See also Bennett McCallum (1982).

Our opinion is that these limitations on the scope of policy analysis do not represent genuine difficulties, but rather spurious puzzles. The problem goes back to Lucas's introduction of the concept of a policy "regime" as distinct from a policy variable, and to his representation of the former by a parameter. The key to getting our thinking unstuck is to respect the essential distinction between parameters as representing things which are assumed not to change, such as measures of preferences and technology, and variables as representing things which do, like policy regimes. Different policy regimes are then represented by different realizations of a random process (not by different values of a deterministic forcing variable, as in Keynesian policy evaluation, for then the Lucas critique would apply).

We have encountered the view that all this amounts to logic-chopping, and that no point of substance is involved. We disagree. Important macroeconomic questions have different answers depending on whether they are approached in the way we criticize or as we recommend. For example:

Should economists disqualify themselves from conducting policy evaluations of specific historical episodes? Contrary to Lucas, there is no reason in principle why economists should decline to analyze specific historical episodes—that is, should be unwilling to rank different policy sequences evolving out of a common past (of course, this is not to minimize the practical difficulties attending such an exercise).

Does rational expectations apply only in the "long run," or does it apply equally well in

---

[2] Lucas has invoked the distinction between risk and uncertainty, attributed to Frank Knight (1921), to express the view that agents cannot be represented as behaving rationally when confronted with discretionary policy changes. This attribution to Knight of the risk-uncertainty distinction as relating to whether or not the probabilistic calculus is applicable is incorrect (see our 1983 paper, Appendix). Knight was talking about market failure, a topic not related to the present discussion. The risk-uncertainty distinction as used by Lucas owes more to John Maynard Keynes (1921) than to Knight.

the "*short run*"? If policy is identified with a parameter which changes, then rational expectations will not apply following a policy change until learning processes have converged—that is, not until the indefinite future. Franco Modigliani (1977) argued from this that the rational expectations conclusions are irrelevant to the real world, and Sargent (1981) partly conceded the point by observing that rational expectations applies only after "agents have caught on to them" (p. 232). However, if policy is modeled as the realization of a sequence of random variables, there is in fact no reason to relegate the application of the rational expectations policy conclusions to the distant future.

Does the equilibrium-rational expectations perspective lead to a recommendation that government policy be bound to simple rules? The case for simple rules is sometimes based on the presumption that under "discretion" agents cannot be assumed to act rationally, or, specifically, to form rational expectations. Simple rules, then, are advocated on the grounds that this is the only policy environment we have any hope of analyzing.[3] Our opinion is that the conception that the rationality assumption is inapplicable in certain policy environments derives from the practice of representing policy regimes by fixed parameters, plus the observation that under frequent regime changes the fixity assumption is implausible. However, once we break ourselves of the habit of associating policy regimes with fixed parameters, it is seen that there is no justification for restricting the assumptions of rationality and rational expectations to certain policy environments and not others. Thus the argument for simple rules disappears.

A case for simple rules can only be based on a welfare analysis conducted using a model which is capable of representing individuals' (optimizing) behavior under either simple rules or complex response functions. If, as in our recommended modeling practice, parameters are reserved for measures of tastes and technology, and different policies are modeled as different realizations of a random process, then there is in principle no reason why such a welfare analysis cannot be undertaken.[4]

---

[4] These ideas are considered at greater length in our earlier paper.

REFERENCES

Cooley, Thomas F. and LeRoy, Stephen F., "Atheoretical Macroeconometrics," reproduced, University of California, Santa Barbara, 1983.

_____, _____, **and Raymon, Neil,** "Modeling Policy Interventions," reproduced, University of California, Santa Barbara, 1983.

Fischer, Stanley, *Rational Expectations and Economic Policy*, Chicago: University of Chicago Press, 1980.

Keynes, John Maynard, *A Treatise on Probability*, New York: Harper and Row, 1921.

Knight, Frank C., *Risk, Uncertainty and Profit*, New York: Houghton Mifflin, 1921.

Lucas, Robert E., Jr., "Econometric Policy Evaluation: A Critique," in K. Brunner and A. Meltzer, eds. *The Phillips Curve and Labor Markets*, Vol. 1, Carnegie-Rochester Series on Public Policy, *Journal of Monetary Economics*, Suppl. 1976, 19–46.

_____, "Rules, Discretion and the Role of the Economic Advisor," in S. Fischer, ed., *Rational Expectations and Economic Policy*, Chicago: University of Chicago Press, 1980.

_____, *Studies in Business-Cycle Theory*, Cambridge: MIT Press, 1981.

_____ **and Sargent, Thomas J.,** *Rational Expectation and Econometric Practice*, Minneapolis: University of Minnesota Press, 1981.

McCallum, Bennett T., "Macroeconomics After a Decade of Rational Expectations: Some Critical Issues," Working Paper No. 1050, National Bureau of Economic Research,

---

[3] Even if we accept the idea that agents' welfare is somehow connected with the simplicity of their decision problems, this does not create a presumption in favor of simple rules. The purpose of policy feedback rules (i.e., "discretion") is to offset exogenous shocks; to the extent that the government succeeds in doing so, it simplifies rather than complicates agents' decisions problems.

1982.

Modigliani, Franco, "The Monetarist Controversy or, Should We Forsake Stabilization Policies?," *American Economic Review*, March 1977, *67*, 1–19.

Poole, William, "Macroeconomic Policy, 1971–75: An Appraisal," in S. Fischer, ed., *Rational Expectations and Economic Policy*, Chicago: University of Chicago Press, 1980.

Sargent, Thomas J., "Interpreting Economic Time Series," *Journal of Political Economy*, April 1981, *89*, 213–48.

Sims, Christopher A., "Policy Analysis with Econometric Models," *Brookings Papers on Economic Activity*, 1:1982, 107–64.

Taylor, John B., "Monetary Policy During a Transition to Rational Expectations," *Journal of Political Economy*, October 1975, *83*, 1009–21.