

Comments on Orphanides and Williams

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November 27, 2008

Abstract

Discussion of the paper "Monetary Policy Mistakes and the Evolution of Inflation Expectations" by Athanasios Orphanides and John C. Williams in the NBER Conference "The Great Inflation", in Woodstock VT, September 2008.

1 Great Inflation and Imperfect Knowledge

There have been numerous attempts to explain and understand the period of rapid inflation in the US in the second half of 1960s and in the 1970s. Any proposed explanations for the Great Inflation of the 1960s and 70s. The papers in this conference are welcome additions to this literature. One prominent set of arguments has as its starting point the idea that monetary policy in this period was misguided because of imperfect knowledge about the Phillips curve and the natural rate of unemployment (or productivity growth). Monetary policy was not sufficiently tight because the estimates of the natural rate of unemployment were too low, so that higher actual unemployment was thought to indicate slack in the economy.¹

Explanations of the Great Inflation that are based on imperfect knowledge and misperceptions by policy-makers and/or private agents can be usefully formulated in terms of a learning model rather than a model relying on a rational expectations equilibrium (REE). There are already many learning

¹See for example Orphanides (2002), Orphanides (2003a), Orphanides (2003b), and Orphanides and Williams (2002).

models of the Great Inflation. The seminal contribution is the book by Sargent (1999) and an important subsequent paper is Cho, Williams, and Sargent (2002). Tom Sargent has recently proposed different explanations of the Great Inflation in several paper, see for example Cogley and Sargent (2005) and Sargent, Williams, and Zha (2006). Other important papers using learning models of the Great Inflation include Bullard and Eusepi (2005), Orphanides and Williams (2005b), Orphanides and Williams (2005a), and Primiceri (2006).

The current paper focuses on a further aspect of monetary policy and the Great Inflation. The basic idea is to consider a counterfactual experiment. It is asked whether the Great Inflation could have been avoided if monetary policy had been based on optimal policy by a benevolent policy-maker in an REE but ignoring misperceptions of the natural rate of unemployment.

This is an important question as it can provide perspectives on the practical usefulness of optimal monetary policy frameworks. I am happy to comment on the very nice paper. My discussion has three parts. First, I provide some remarks outlining the basic ideas of learning models and suggest that the literature cited above divides into two main strands. Second, I try to provide some reasons why the results come out the way they do in view of what we know about learning models. Third, I have some comments and questions about the analysis.

2 Basic Ideas in Learning Models

Models of adaptive learning have three important building blocks.² The starting point is the assumption that agents and policy-makers have imperfect knowledge and try to learn, i.e. improve their knowledge over time as new data becomes available. The beliefs of economic agents are formulated in terms of models with parameters, which are estimated given the existing knowledge. Expectations of the agents in any period are based on the estimated model and the parameters of the model are updated over time using standard econometric techniques. In any period these expectations feed into decisions by the agents and hence to actual outcomes and next forecasts.

²Evans and Honkapohja (2001) provide a treatise on the analysis of adaptive learning and its implications in macroeconomics. Evans and Honkapohja (1999), Evans and Honkapohja (1995), Marimon (1997), Sargent (1993) and Sargent (1999) provide surveys of the field.

Since economic outcomes depend on the forecasts, the economy is seen as a self-referential model. If the forecasting models of the agents are compatible with an REE, then it is possible that learning dynamics converge over time to the REE of interest. The REE is then a fixed of the dynamical system describing learning. This convergence takes place provided the economy satisfies an expectational stability criterion. Recently, ideas of learning have been widely applied in models of economic policy. In particular, the literature on learning and monetary policy is growing rapidly.³ A useful implication of this literature is that good policy facilitates convergence of learning by private agents.

The basic models with learning rely on some fairly strong assumptions. These are (i) the functional form of agents' forecasting models is correctly specified relative to the REE of interest, (ii) agents accurately observe all relevant variables, and (iii) the economic environment perceived to be fairly stationary. There are papers which relax one or more of these assumptions.⁴

Relaxing assumption (i) leads to models with asymptotic misspecification and some of the papers on the Great Inflation in the above literature indeed consider learning dynamics with misspecified beliefs. The resulting dynamics can then exhibit occasional rapid movements known as escape dynamics. Sargent (1999) and Cho, Williams, and Sargent (2002) are studies of escape dynamics. If instead assumption (ii) and/or (iii) is relaxed, learning dynamics evolve around an REE if the expectational stability condition is satisfied. The second strand of the literature on learning and the Great Inflation takes this approach and focuses on so-called perpetual (constant gain) learning. The earlier work by Orphanides and Williams as well as the current paper use standard persistent learning dynamics, not escape dynamics

3 Understanding the Main Results

The paper is counterfactual exercise based on an estimated model (though there are also elements of calibration in the model formulation). The main idea of the paper is to assess policies based on optimal control and a simple

³For surveys of the literature see Evans and Honkapohja (2007a), Bullard (2006), and Evans and Honkapohja (2003a).

⁴The literature has also explored other ways of relaxing the basic setting. One avenue is based on the assumption that agents entertain multiple forecasting models and make most use of models that have performed well in the past.

first-difference rule using the 1970s experience as a “testing ground”. Here one can take either positive or a normative view. According to the former, a good model should be able to explain the Great Inflation while according to the latter a good policy rule should have avoided the Great Inflation.

The main results in the paper are, first, that a policy rule based on optimal control under rational expectations does not anchor inflation expectations if in fact private agents are learning and there are misperceptions about the natural rate of unemployment. There is also a corollary to this result: the optimal rule with all weight on inflation (the policy-maker is an “inflation nutter”) delivers anchoring of inflations expectations in the 1960-70s. The second main result of the paper is that there is an alternative simple “first-difference” policy rule that would have worked well in the sense that the Great Inflation would not have occurred under that rule.

The estimated model has only three equations but there are lagged variables. It is then difficult to formulate a good intuition for these results. Let me try to provide some intuition by looking at the properties of the rules and how these kinds of rules perform in somewhat simpler New Keynesian models.

Starting with the basic optimal rule, there are three important properties: (i) interest rate inertia, (ii) the response to (lagged) inflation is fairly weak, certainly weaker than to unemployment gaps, and (iii) unemployment gaps are defined with respect to estimated natural rate, which deviates a lot from the true rate (see Figure 3 in the paper). Property (i) is conducive to determinacy and learning-stability, but (ii) suggests the possibility of big fluctuations and combining it with (iii) it is evident that poor anchoring of inflation can be the outcome.

Considering the optimal control policy rule of an inflation nutter it is evident that the weight of unemployment in the rule is smaller than in the basic case. This also means that estimated natural rate plays a smaller role in the rule, which contributes to the anchoring of inflation and inflation expectations indeed remain anchored. More generally, Figure 3 shows a lot of variation in the real-time estimates of the natural rate in the 1970s, so that imprecise knowledge about natural rate is the underlying reason for non-anchoring in the base case. These considerations confirm that the imprecise estimation of the natural rate of unemployment is central for these result of this paper.

Let me next discuss the preferred optimal simple rule proposed in the paper. According to this rule, the change in interest rate responds strongly to

deviations of inflation (expectations) from the inflation target and to changes in observable unemployment. The paper suggests that the rule is related nominal income or money-growth targeting. The preferred rule can also be thought of as a version of a price level rule with a time-varying price level target. Let me write the rule in general terms as

$$i_t = i_{t-1} + \theta_\pi(\bar{\pi}_{t+3}^e - \pi^*) + \theta_{\Delta u}(u_{t-1} - u_{t-2}).$$

For the inflation term in the rule we have

$$\bar{\pi}_{t+3}^e - \pi^* = \bar{p}_{t+3}^e - \bar{p}_{t+3}^* - (\bar{p}_{t+2}^e - \bar{p}_{t+2}^*),$$

where $\bar{p}_{t+3}^* = \bar{p}_{t+2}^* + \pi^*$. This means that the rule is a differenced version of a "price level Taylor rule"

$$i_t = \theta_\pi(\bar{p}_{t+3}^e - \bar{p}_{t+3}^*) + \theta_{\Delta u}u_{t-1} + K.$$

It is known that in the standard New Keynesian model a price level rule tends to keep inflation under control and contribute to stability, including learning-stability, see for example Evans and Honkapohja (2006). It should also be noted that this preferred rule does not depend on the estimated natural rate. This also helps with anchoring of inflation.

4 Further Comments and Questions

In this last section, I want to make some further comments and questions. The focus on the chosen form of the optimal control rule is potentially somewhat problematic. In the standard New Keynesian model a similar "fundamentals-based" formulation runs into problems with determinacy and learning-stability. This problem is alleviated if an interest-rate smoothing motive is postulated, see Duffy and Xiao (2007). However, in standard New Keynesian models there can be problems of stability under constant gain learning with backward-looking (or "operational") form of such rules, see Evans and Honkapohja (2007b).

The paper appears to suggest that policy should be based on the simple first-difference instrument rule rather than optimal control rules. This argument is limited as it would be worth while to also explore more robustly performing optimal rules than the fundamentals-based rule. Some alternative optimal rules worthy of comparison are (i) the expectations-based optimal

rules proposed in Evans and Honkapohja (2003b) and Evans and Honkapohja (2006), and (ii) the optimal rules that are obtained if the policy-makers knows learning rules of private agents, see Gaspar, Smets, and Vestin (2006) and Molnar and Santoro (2006). The performance of these optimal policy frameworks should be compared with the performance of the optimal first-difference rule preferred by the authors.

I was also a little bit puzzled about the main empirical conclusion of the paper? According to the results the Great Inflation could have arisen because either (i) best-practice policy under rational expectations was employed when private agents were in fact learning, or (ii) the policy objective put too much weight on unemployment stabilization when in fact REE prevailed in the inflationary episode. The paper does not contrast these alternatives enough as a positive empirical conclusion. My understanding is that the authors would favor the suggestion (i). The highly variable natural rate in the Great Inflation episode (see Figure 3 of the paper) and other structural changes in 1970s suggest that expectations may not have been rational. Could this period provide a case for assessing relative merits of the REE and learning approaches?

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