1 Muth: rational and adaptive expectations

JASA: adaptive expectations are rational if variable is sum of unobserved permanent and transitory components. Adjustment coefficient is between 0 and 1, with higher values when permanent component's innovation is more important.

2 Phelps: learning and optimal policy

Today's expectation about tomorrow's inflation

$$e_t = e_{t-1} + g(\pi_t - e_{t-1}) + z_{et}$$

Phelps' Phillips Curve:

$$\pi_t = \kappa x_t + e_{t-1} + z_{\pi t}$$

Note that these specifications mean that e_{t-1} is key state variable.

Policy objective (inflation bad, output good)

$$E_t \sum_{j=0}^{\infty} \beta^j u(\pi_{t+j}, x_{t+j})$$

Authority knows z when making date t decisions (this is vector Markov).

Bellman equation

$$V(e_{t-1}, z_t) = \max\{u(\pi_t, x_t) + \beta E_t V(e_t, z_{t+1}) | (e_{t-1}, z_t)\}$$

subject to (2) which is a flow constraint and (1) which is essentially a transition equation.

With standard u approximation, problem looks LQ. With constant gain g less than 1, this is essentially a modern version of Phelp's original analysis.

2.1 Empirical questions:

What is empirical performance of (1) on survey expectations for various g? How important are expectations shocks?

2.2 Quantitative model questions:

Is there an optimal steady state rate of inflation in the absence of shocks? If so, how does it depend on model parameters?

What is the nature of transitional dynamics? How do these depend on g?

What is the nature of response to expectations shocks?

What is the nature of response to "price shocks"?

What are the gaps between (1) and rational inflation expectations if the above model is true?

In this model, would a rational observer ever have a reason to view inflation as "unanchored?"

3 Nonlinear Expectations

Forecasters (Stock and Watson) have modified Muth's model to allow for evolution of permanent and temporary components.

With expectations measures, one can determine if agent's beliefs indicate a role for nonlinearity. Seems like a natural benchmark exercise to motivate further work with model.

How different is Phelps model if $g(\pi - e)$ is made nonlinear in manner compatible with evidence from US and other countries? Is there a potential for multiple steady states, i.e., inflation and expected inflation that are permanently different? Is this "unanchored expectations?"

4 Forward-looking Phillips Curve

$$\pi_t = \kappa x_t + e_t + z_{\pi t}$$

Key element is now that e_t moves with π_t:

(a) Change in "slope" with fixed gain, where slope effect depends on g

(b) Nonlinearity with variable gain.

Can (b) lead to "unanchored expectations" as discussed previously?