

Autoregressions: Problems

1. If we believe that the regression results are valid going forward, then this is appropriate. This requires that either there be no policy change, or that the results do not depend on such a policy.

Suppose that we have the following autoregression where y_t is output in \$trillion measured annually:

$$y_t = 15 + .9(y_{t-1} - 15) + u_t \quad (1)$$

2. In 2013, GDP was 16.5. So for 2014:

$$y_{14} = 15 + .9 * 1.5 = 16.35 \quad (2)$$

and for 2015:

$$y_{15} = 15 + .9 * (16.35 - 15) = 16.215 \quad (3)$$

and we can continue as far into the future as we wish.

3. Such a policy would almost surely reduce average GDP through reduced labor supply. The 15 from (1), which represents average output would surely decline making our regression results invalid going forward. The effect on the AR(1) coefficient (0.9) is less obvious. But this might also change.

4. Lucas (1976) shows that changing a policy may also change our empirical results, If the policy is new, then there will be no data available with which to obtain similar estimates for the new policy. We must thus rely on a theoretical model that fits the data.

5. We can write down a model that allows us to examine both the old and new policies. We then obtain theoretical results (e.g. IRFs) from the theoretical model under the old policy and compare these to the econometric results. Is they are close, then we may hope that the model is a valid tool by which to analyze the policy change. We then impose the policy change in the theoretical model and examine its effects.