

## ASSIGNMENTS

### EXERCISE ON RATIONAL INATTENTION

Here's a discrete tracking problem. The object is to minimize  $E[|X - Y|] + \theta I(X, Y)$  by choosing the joint distribution of  $X$  and  $Y$ .  $X$  and  $Y$  each can take on only integer values between 1 and 5, so the state space consists of just 25 points. The marginal distribution of  $Y$ , thought of as what you know before you collect information, puts probabilities  $(1, 2, 3, 2, 1)/9$  on the integers 1 to 5.

- (a) What is the mutual information between  $X$  and  $Y$  (i.e.,  $I(X, Y)$ ), when tracking is perfect, so  $X \equiv Y$ ?
- (b) Is there a positive value for  $\theta$  such that the solution is  $X \equiv Y$ ? If so, display one.
- (c) Find solutions for two other values of  $\theta$ , so that  $I(X, Y)$  is roughly one half and roughly one quarter of the mutual information in the perfect-tracking case.

### READINGS

#### Nobel lecture

Smets and Wouters (2007)  
 Leeper, Sims, and Zha (1996)  
 Sims (1986)  
 Sims (1972)  
 Sims (1972)

#### Fables about the 1970's and 1980's

Sims and Zha (2006)  
 Primiceri (2006)  
 Sargent, Williams, and Zha (2006)

### REFERENCES

- LEEPER, E. M., C. A. SIMS, AND T. ZHA (1996): "What Does Monetary Policy Do?," *Brookings Papers on Economic Activity*, (2), 1–78.
- PRIMICERI, G. (2006): "Why Inflation Rose and Fell: Policymakers' Beliefs and US Postwar Stabilization Policy," *Quarterly Journal of Economics*, 121, 867–901.
- SARGENT, T. J., N. WILLIAMS, AND T. ZHA (2006): "Shocks and Government Beliefs: The Rise and Fall of American Inflation," *American Economic Review*, 96(4), 1193–1224, NBER Working Paper w10764.
- SIMS, C. A. (1972): "Money, Income, and Causality," *The American Economic Review*, 62(4), 540–552.
- (1986): "Are Forecasting Models Usable for Policy Analysis?," *Quarterly Review of the Minneapolis Federal Reserve Bank*, 10, 2–16.
- SIMS, C. A., AND T. ZHA (2006): "Were There Regime Switches in US Monetary Policy?," *American Economic Review*, 96(1), 54–81.
- SMETS, F., AND R. WOUTERS (2007): "Shocks and frictions in us business cycles: a Bayesian DSGE approach," *American Economic Review*, 97(3), 586–606.