

Assignment #5
Due Monday, May 5th

1. Monetary Policy Rules and the MP Curve

- (a) The Taylor rule (Taylor, 1993) recommends the following rule for monetary policy:

$$r_t = \pi_t + 0.5\tilde{y}_t + 0.5(\pi_t - \pi^*) + rr$$

where r_t denotes the nominal interest rate, π_t denotes inflation, π^* denotes the target inflation rate, \tilde{y}_t denotes the percent deviation in output from potential (e.g., the cyclical component of output, or trend in Taylor (1993)) and rr denotes the real interest rate (assumed to be constant).

Show that when output is equal to potential and inflation is equal to its target, that the Taylor rule collapses to a simple Fisher equation.

- (b) According to the rule above, when output is 2% above potential, how should the Federal Reserve react? Compute the implied change in the nominal interest rate.
- (c) Since Taylor's (1993) work, much research has been devoted to estimate the above expression as a regression equation. That is, rather than assuming that the Federal Reserve behaves in a specific way, as you described in part (d), we can estimate the Fed's behavior as a regression equation:

$$r_t = \alpha + \beta\pi_t + \gamma\tilde{y}_t$$

From the above specification, suppose that $\beta = 0.75$. In this case, when inflation increases, how does the Federal Reserve react? Using the Fisher equation, what does this imply about the real interest rate?

- (d) Looking at the Taylor rule from part (c), solve for the implied α , β , and γ that Taylor (1993) assumed in his original rule. Note, α will be a linear function of rr and π^* , but you should find numerical values for β and γ .
- (e) What is the relationship between the parameters in the regression equation above and our assumptions about the parameters in the MP curve? Discuss the relationship between each parameter and the slope of the MP curve.

2. Estimating Monetary Policy Rules

In this question, you will estimate the MP curve using data for the U.S. For this problem, you will need to obtain the following variables (all available on FRED):

- Effective Federal Funds Rate
 - Real (Chain-weighted) Gross Domestic Product
 - Chained Price Deflator (for GDP)
 - Real Potential GDP
- (a) Generate the annual percent deviation in real GDP from potential (using log differences) and the annual inflation rate. Plot each series on a separate time series graph.
- (b) In a table, report the terms of Federal Reserve Chairman, 1951-2007.
- (c) Estimate the regression equation from the previous question for the full sample of data.
- (d) Estimate the regression equation for each of the following Federal Reserve chairmen: McChesney, Burns, Volcker, Greenspan. Present the regression results for the full sample (from part (c) and the subsamples on a table.
- (e) Comment on the differences across the chairmen. What do the coefficient estimates reveal about the preferences of the Federal Reserve chairmen? What do they reveal about the slope of the MP curve for each chairman?

3. Theories of Business Cycles

Snowden and Vane (1997) discuss different theories of economic fluctuations, comparing and contrasting the key assumptions and implications of these models. This question asks you to contrast these models in the context of the IS/MP/IA model. For this question, you can assume a closed economy. For each of the following theories, complete the following:

- Assumptions that the model makes about the parameters in the IS/MP/IA model.
 - Model's implications for the effectiveness of fiscal policy (in terms of its effect on output). Compute $\frac{dY}{dG}$ using the aforementioned assumption(s).
 - Model's implications for the effectiveness of monetary policy (in terms of its effect on output). Compute $\frac{dY}{d\varepsilon_{MP}}$ using the aforementioned assumption(s).
 - Do anticipated monetary policy shocks affect output? Do unanticipated monetary policy shocks affect output? Briefly discuss the the distinction in the model, when applicable.
- (a) Traditional Keynesian model (wages/prices fixed)
- (b) New Classical model (assume the Lucas imperfect information model)
- (c) Real Business Cycle model
- (d) New Keynesian model (wages/prices sticky)

In your answers, you don't need to redo the matrix algebra each time. I recommend starting from the generic model from class (with a closed economy), computing the derivatives mentioned above. Then, you can impose the assumptions from each model working from these expressions.

4. Phillips Curve and Imperfect Information

This question considers the implications of the Lucas imperfect information model for the Phillips curve and the effectiveness of monetary policy.

- (a) Draw a graph showing the long run rational expectations equilibrium in the expectations-augmented Phillips curve. Carefully label your graph, including the natural rate of unemployment and the expected inflation rate along the short-run Phillips curve.
- (b) Now suppose that the government appoints a new, independent central bank president who is strongly against inflation. This central banker announces a move toward reducing the inflation rate and carries out the monetary policy associated with this change. Redraw your graph showing the new equilibrium, assuming this policy is credible.
- (c) Suppose that people do not believe that the central bank is independent, although in reality it is. People believe that decisions will be made by the government that is not committed to reducing inflation. However, in reality, the decisions are being made by the anti-inflation central banker (who's preferences you used in the graph in part b). Draw a graph showing what will happen when the new central banker carries out the contractionary monetary policy, but the policy is not credible. Show the resulting level of unemployment and inflation.
- (d) What causes the difference between the level of unemployment in part b) and part c)?

5. Menu Cost Model

This question is based on Mankiw (1985). Suppose the economy consists of monopolistic competitors with constant marginal cost k and price setting is a function of the individual firm's output $f(q)$. Determine whether each statement below is TRUE, FALSE, or UNCERTAIN, prove each using a monopoly diagram, and explain.

- (a) If aggregate demand falls, total surplus is maximized when the firm resets its price.
- (b) If aggregate demand falls and the firm does not cut its price, the loss in profits is smaller than the loss in consumer surplus.
- (c) If aggregate demand rises and the firm resets its price, the loss in total surplus is equal to the menu cost.
- (d) Positive and negative aggregate demand shocks affect welfare by the same magnitude when firms do not reset their prices.

References

- Mankiw, N.G. (1985). Small menu costs and large business cycles: A macroeconomic model. *Quarterly Journal of Economics*, 100, 526-538.
- Snowdon, B. & Vane, H.R. (1997). The development of modern macroeconomics: A rough guide. In B. Snowdon & H.R. Vane (Eds.), *A macroeconomics reader* (pp. 1-26). London : Routledge.
- Taylor, J. (1993). Discretion versus policy rules in practice. *Carnegie-Rochester Conference Series on Public Policy*, 39, 195-214.