Macroeconomics Field Exam
August 2022
Department of Economics
UC Berkeley

(3 hours)

Answer Both Parts

Part I (Yuriy Gorodnichenko): 90 points = 90 minutes

Short questions (True/False + a brief explanation; explanation determines the grade; 45 minutes=45 points):

1. The real business cycle model predicts that demand shocks cannot be a source of macroeconomic fluctuations.

2. Prices are sticky because firms have full information.

3. In the data, a positive government spending shock does not increase output.

4. The bandpass filter has better properties than the Hodrick-Prescott filter.

5. In monetary economics, recursive ordering in VARs typically posits that monetary policy shocks can move asset prices but not GDP on impact.

6. The labor demand curve in the basic real business cycle model may be upward sloping if the economy has sunspot equilibria.

7. Inflation expectations in the New Keynesian Phillips curve capture future dynamics of marginal costs.

8. Relative to previous recessions, the COVID-19 recession was atypical because consumption fell roughly as much as investment did.

9. Real rigidity is necessary for fiscal multipliers to be less than one.

10. Sharp identification of structural parameters is usual for DSGE models.

11. Price level targeting (PLT) is better than inflation targeting (IT) because PLT is a form of commitment and IT is a form of discretion.

12. Dynamic inconsistency in policy means that policy actions have to be supported by policy promises.

13. In the data, inflation reacts quickly ("jumps") to a monetary policy shock. In the basic New Keynesian model, inflation responds slowly to a monetary policy shock.

14. The Taylor principle ensures a unique rational expectations equilibrium in the basic New Keynesian model if steady-state inflation is zero.

15. Raising inflation target from 2% to 4% is a good idea.

Long question. The cost channel of monetary policy. (45 minutes=45 points)

This problem will study the same sticky-price model as what we used in class with one important difference: we will assume that intermediate good firms must pay their workers before they receive payments from the sale of their products. As a result, firms have to borrow the wage payments at the beginning of the period from financial markets and repay it at the end of each period. The key modification that this introduces is that the marginal cost of labor now depends on the interest rate (the cost of borrowing).

To be able to pay workers before the firms receive payments from the sale of their final goods, firms must borrow at the start of each period the total amount they will pay their workers, then repay it back with interest at the end of the period. Thus, effective cost of a worker is no longer just the wage but is now the wage times the interest rate.

To nest our original model within this new framework, we will introduce a parameter δ which denotes the fraction of wage payments that actually have to be paid ahead of time. Thus, when $\delta = 0$, no wage payments must be made early and we will recover the model from class. When δ=1, then all wage payments will have to be made early. $0 < \delta < 1$ will incorporate cases where only a fraction of wage payments must be made at the start of the period.

The profit-maximization problem for a flexible-price firm is therefore:

$$\max P_t(i)Y_t(i) - R_t^{\delta} W_t N_t(i)$$

subject to

$$Y_t(i) = A_t N_t(i)$$
$$Y_t(i) = Y_t \left(\frac{P_t(i)}{P_t}\right)^{-\varepsilon}$$

a) Prove that the optimal price for a flexible-price firm is

$$P_t(i) = \left(\frac{\varepsilon}{\varepsilon - 1}\right) MC_t$$

where marginal costs are now defined as

$$MC_t = \frac{R_t^{\delta} W_t}{A_t}.$$

b) Assume that the consumer's problem is exactly like what we derived in class: the representative consumer's maximization problem is now given by

$$\max E_t \sum_{j=0}^{\infty} \beta^t \left[\frac{e^{g_t} C_{t+j}^{1-\sigma}}{1-\sigma} - \frac{\int_0^1 N_{t+j}^{1+\varphi}(i)di}{1+\varphi}\right]$$

Thus, the labor supply condition (intratemporal condition) is

$$\frac{W_t}{P_t} = e^{-g_t} N_t^{\varphi} C_t^{\sigma}$$

and the Euler intertemporal condition is

$$1 = \beta E_t \left[e^{g_{t+1} - g_t} \left(\frac{C_t}{C_{t+1}} \right)^{\sigma} R_t \Pi_{t+1}^{-1} \right].$$

Finally, assume $Y_t = C_t$.

Prove that the flexible-price level of GDP (Y^n) is

$$Y_t^n = \left[\left(\frac{\varepsilon - 1}{\varepsilon} \right) (R_t^n)^{-\delta} A_t^{1+\varphi} e^{g_t} \right]^{\frac{1}{\varphi + \sigma}}$$

where R^n is the interest rate that would occur if all firms had flexible prices.

What does this expression imply about monetary neutrality when all firms have flexible prices?

c) Determinacy with the cost channel. With some work, one can show that the model including the cost channel can be written as

$$x_t = E_t x_{t+1} - \left(\frac{1}{\sigma} \right) (r_t - E_t \pi_{t+1}) + exog$$

$$\pi_t = \beta E_t \pi_{t+1} + (\varphi + \sigma) \kappa x_t + \kappa \delta r_t + exog$$

where $\kappa = (1 - \theta)(1 - \beta\theta)/\theta$.

Assume a basic Taylor rule: $r_t = \varphi_\pi \pi_t$.

Prove that a unique rational expectations equilibrium exists if

$$1 < \varphi_\pi < \frac{1}{\delta} \left[1 + \frac{\varphi}{\sigma} + \frac{1 - \beta}{\kappa} \right].$$

Explain intuitively.

Note that this condition is sufficient but not necessary for a unique rational expectations equilibrium (REE), i.e., there are values of φ_π outside this range such that a unique REE exists.

d) Fully characterize the conditions such that a unique REE exists.

Part II (Emi Nakamura): 90 points = 90 minutes

1. (A) **10 points** Write down the New Keynesian Phillips Curve. Describe the instrumental variables approach used by Gali and Gertler (1999). What are the identifying assumptions? (No more than a few sentences)

   (B) **10 points** Critique this approach. Be as specific as possible. (No more than a few sentences).

2. **10 points** Why might the slope of aggregate and regional Phillips curves differ? Be specific. (No more than a few sentences).

3. **10 points** Atkeson and Ohanian (2001) emphasize that Phillips curves have poor forecasting performance. Does this mean the New Keynesian Phillips curve equation must be misspecified? Be specific. (No more than a few sentences with reference to an equation.)

4. **10 points** Gourinchas and Parker (2002) find a hump in the lifecycle profile of consumption, and use this to inform their theoretical analysis. What explains the hump in their model (be sure to explain both the "up" and the "down" in the hump)? Do demographics play a role? (No more than a few sentences).

5. (A) **10 points** Kaplan and Violante (2014) develop a model in which the "Wealthy Hand-to-Mouth" play an important role. Who are the "Wealthy Hand-to-Mouth."? Why is Kaplan and Violante's model referred to as a "two-asset" model and why is this asset structure important? (No more than a few sentences).

   (B) **10 points** Suppose a researcher wants to predict the macroeconomic effects of $1000 stimulus payments to most Americans. The researcher could use either a (1) one-asset model in which households face liquidity constraints, leading to "hand-to-mouth" behavior or (2) Kaplan and Violante's model. Which model would likely yield larger predictions for the effects? Why? (No more than a few sentences).

6. **10 points** Suppose the Fed wishes to stimulate the economy to respond to a large recession. In the 3 equation New Keynesian model, would it be more effective to lower the nominal interest rate by 25 basis points this year, or to promise to lower the nominal interest rate by 25 basis points next year? Assume the promise is fully credible and that the path of nominal interest rates is left unchanged other than the shock. Explain, with reference to an equation.

7. **10 points** Some empirical evidence suggests that contractionary monetary shocks cause professional forecasters to increase expectations of future growth. Suppose this evidence is true. Does this imply the Fed should commit to a rule whereby it systematically increases interest rates during periods of high inflation and output, and lowers interest rates in recessions (a "reverse Taylor rule"? (No more than a few sentences).