

Macroeconomics Field Exam
August 2015
Department of Economics
UC Berkeley

(3 hours)

Instructions: answer TWO out of the three parts.

Part 1

Short questions (True/False/Uncertain + a brief explanation; explanation determines the grade; 30 minutes):

1. Unemployment rate is a lagging indicator. (3 minutes)
2. Unemployment is too procyclical in the standard real business cycle model. (3 minutes)
3. Even if the policy rate is at the zero lower bound permanently, the standard New Keynesian model has a unique, stable rational expectations equilibrium. (3 minutes)
4. DSGE models are usually better at forecasting macroeconomic time series than VAR models (3 minutes).
5. Macroeconomic data are very persistent (close to having a unit root) and thus it is essential to difference time series for econometric analyses (3 minutes).
6. The Hodrick-Prescott filter removes high frequency variation. (3 minutes)
7. Countercyclical fiscal policy in the basic real business cycle models improves welfare. (3 minutes)
8. The Solow residual is not correlated with monetary policy shocks in the data. (3 minutes)
9. Micro-level data suggests that prices are fixed in the long run. (3 minutes)
10. Menu cost model can rationalize sticky prices but they have problems with matching the distribution of price changes in the data. (3 minutes).

Longer question (30 minutes)

Consider the Phillips curve in the standard New Keynesian setting:

$$\pi_t = \beta E_t \pi_{t+1} + \kappa X_t + u_t \quad (1)$$

where π_t is inflation, $E_t \pi_{t+1}$ is an expectation of inflation in $t + 1$, X_t is output gap, u_t is an i.i.d. cost push shock. Suppose that you know β (it's equal to one) and you are only interested in estimating κ .

1. If you have access only to realized inflation and output gap, how can you consistently estimate κ in equation (1)? (5 minutes)
2. Suppose that the central bank is successful at anchoring inflation expectations in the sense that agents always expect to have a target rate of inflation in period $t + 1$. How would this alter your approach to estimating κ consistently? (5 minutes)
3. Suppose you have a survey measure of inflation expectations $E_t^S \pi_{t+1}$. How can you use this information to improve your estimate of κ ? (5 minutes)
4. Suppose that the economy is in steady state. The central bank announces that it is going to increase inflation permanently in 100 years from now. How should inflation at time t react to this announcement? How can you relate this reaction to forward guidance? (5 minutes)
5. The recent macroeconomic data are characterized by:
 - a. Estimates of κ are not statistically different from zero.
 - b. Output gap varied considerably.
 - c. Survey measures of inflation expectations of households varied considerably.
 - d. Actual inflation was stable.
 - e. Commodity prices were volatile.

How can you reconcile these facts using equation (1)? (10 minutes)

PART #2

Consider a model similar to Murphy, Shleifer and Vishny (1989). Labor endowment is L , supplied inelastically. There is a continuum of homogenous intermediate goods in the interval $[0, 1]$ that produce output according to a Cobb Douglas technology,

$$Y(t) = \exp \int_0^1 \ln y(v) dv.$$

Each intermediate good can be produced one-to-one from labor with cottage technologies. In addition, for each v there is a "virtual" entrepreneur that can invest $F < L$ units of the final good to obtain a technology with labor productivity $\alpha > 1$. Output is used either for consumption or investment. (Note that there is a unique period.)

- a) Show that there is a unique equilibrium and explain why this is the case.
- b) Propose two alternative ways in which one could change the assumptions above so that there are multiple equilibria.

PART #3

Financial Constraint and Optimal Unemployment Insurance

Let assume that worker i lives forever, each period has total liquid assets equal to A_t (which has to be greater or equal to $-L_t$) and has discount factor β . The worker is either employed and receive wage equal to w and pays tax τ -used for funding the UI benefit- or unemployed and receives unemployment benefit b . If employed, there is a probability p that the worker becomes unemployed the next period. If the worker is unemployed there is a probability s_t that the worker finds a job the next period. Let $\nu(c_t)$ denote flow utility if employed in period t and $u(c_t) - \psi(s_t)$ denote flow utility if unemployed. Finally assume the interest rate on liquid assets is constant and equal to r .

1. Derive the value function of being employed in period t , $V(A_t)$, and being unemployed in period t , $J(A_t)$ as a function of value function of being employed in period $t+1$, $V(A_{t+1})$, and value of being unemployed in that period $J(A_{t+1})$.
2. Derive the first order conditions and the envelope conditions.
3. Argue intuitively why the worker's borrowing constraint can result in an increase in effort for finding a job (compared to the case in which the worker does not face a borrowing constraint)
4. Taking the discount rate β constant, discuss the channels through which change in r changes unemployed workers search effort s_t .
5. Let assume the probability of finding a job for the same level of effort declined. In the framework of the model we model this by changing the flow utility of an unemployed worker to $u(c_t) - \gamma\psi(s_t)$ where $\gamma > 1$. How does an increase in γ changes the difference between the search effort of a constrained agent and an unconstrained agent? What does that mean for the optimal level of unemployment insurance?