University of California, Davis
Department of Economics
Monetary Economics

Date: September 11, 2002
Time: 3 Hours
Reading Time: 20 minutes

PRELIMINARY EXAMINATION FOR THE PH.D. DEGREE

Answer all questions.

1. Consider the following limited participation monetary model. Firms hire labor (h_t) to produce output (y_t) using the linear production function:

$$y_t = \gamma h_t \;\; ; \;\; \gamma > 0$$

Output is sold at the nominal price of P_t per unit of output.

Firms pay labor in advance of production – they borrow the wage bill from financial intermediaries. Hence the cost of labor inputs is:

$$Cost = R_t W_t h_t$$

Where R_t denotes the (gross) nominal interest rate and W_t is the nominal wage. Financial intermediaries receive funds from two sources: Households make investments (I_t) at the beginning of the period before the current state of the world is known and the current monetary transfer (which determines the current state) is received from the government. The financial intermediary inelastically provides the funds in the form of loans to businesses to finance their wage bill. That is, financial intermediaries make no profits by assumption:

$$I_t + g_t \overline{M}_{t-1} = W_t h_t$$

The income from the loans is distributed entirely to the households.

Households make investment, consumption, and labor decisions in order to maximize lifetime expected utility. Preferences are given by:

$$E_0\left\{\sum_{t=0}^{\infty} \beta^t \left[\ln c_t + A(1-h_t)\right]\right\}$$

As mentioned above, before knowing the current realization of the monetary growth rate, they allocate part of their nominal wealth to the banking sector. Then, after observing g_t, they make consumption and labor decisions. It is assumed that the consumption is subject to a cash-in-advance constraint. This scenario implies the following budget and cash-in-advance constraints:

$$M_t = W_t h_t + M_{t-1} - I_t - P_t c_t + R_t\left(I_t + g_t \overline{M}_{t-1}\right)$$
$$M_{t-1} + W_t h_t - I_t > P_t c_t$$

Note that, as implied by the discussion above, current labor income can be used to finance current consumption. The only source of uncertainty in the economy is due to the monetary growth rate; this random variable is assumed to be independently and identically distributed with $E(g_t) > 0$. Given this environment, do the following:

a. Set up the firm's and household's maximization problem. Derive and interpret the associated necessary condition. In your answer, demonstrate how this model is distinguished from a typical cash-in-advance model
b. Define a stationary monetary equilibrium in this economy.
c. Demonstrate that the liquidity effect is present – i.e. that the correlation of interest rates and money growth is negative. Show that this implies that money growth is procyclical in the economy.

2. Write down a simple stochastic growth model with a basic cash-in-advance constraint – i.e. a model similar to that studied in Cooley and Hansen (*AER*, 1989) and in Walsh's textbook. Assume that only monetary shocks are present. Derive the necessary conditions describing equilibrium and discuss (briefly) how you would calibrate the parameters in the model. Also, describe some of the equilibrium properties of the model (motivate your discussion on intuitive grounds since the actual solution of the model requires numerical methods.) In particular, is money growth procyclical?

3. In response to serially uncorrelated monetary policy shocks (measured either by money growth rates or interest rate movements), the response of inflation appears to follow a highly serially correlated pattern. Discuss three different models of price adjustment that generate persistence. Make sure that in your discussion you address the following issues:

a. Describe the mechanics of the model.
b. Describe the mechanism that generates the persistence.
c. Is the persistence generated in the price level, in the inflation rate, or both?
d. Does the model violate the natural-rate hypothesis?
e. Discuss why these models are important in monetary economics. Provide examples to illustrate your point.

4. In response to Alan Greenspan's "irrational exuberance" speech, a number of papers investigated the role of asset prices in the conduct of monetary policy. However, a sticking point of this line of research is the difficulty in measuring when the stock market is overpriced. Discuss the fundamental elements of common asset pricing relations and some of the more recent strategies pursued to measure asset price "bubbles." In your opinion, should the central bank respond to asset price fluctuations? Discuss.