Written Exam for the B.Sc. in Economics winter 2013–14

Macro B

Final Exam

February 17 2014
(3 hours closed-book exam)

Please note that the language used in your exam paper must correspond to the language of the title for which you registered during exam registration. I.e. if you registered for the English title of the course, you must write your exam paper in English. Likewise, if you registered for the Danish title of the course or if you registered for the English title which was followed by "eksamen på dansk" in brackets, you must write your exam paper in Danish.

If you are in doubt about which title you registered for, please see the print of your exam registration from the students' self-service system.

This exam question consists of 5 pages in total including this page.

All questions of all three problems should be answered

Problem A

In this problem you are asked to analyze the term structure of interest rates.

Consider the equation

$$\left(1+i_t^l\right)^n = (1+i_t) \times \left(1+i_{t+1}^e\right) \times \left(1+i_{t+2}^e\right) \times ... \times \left(1+i_{t+n-1}^e\right) \qquad \text{(A.1)}$$

where i_t^l is the long-term interest rate in period t, i_t is the short-term interest rate in period t, and i_{t+j}^e is the expected short-term interest rate in period $t+j$.

1. Explain why Equation (A.1) should be expected to hold.

By using a certain approximation, Equation (A.1) can be rewritten as

$$i_t^l \approx \frac{1}{n}\left(i_t + i_{t+1}^e + i_{t+2}^e + ... + i_{t+n-1}^e\right) \qquad \text{(A.2)}$$

2. Show how equation (A.2) can be derived from equation (A.1) and state the approximation made in the derivation. Interpret equation (A.2).

Assume that the central bank can control the short-term interet rate i_t so that this equals the bank's policy interest rate. Furthermore assume that the central bank is considered fully credible by economic agents.

3. Consider a scenario where each period is one year. Furthermore, assume that the central bank announces a future cut in its policy interest rate so that this year's policy rate will be kept unchanged, next year's policy rate will be lowered by exactly 1 percentage point compared to what was previously announced, and thereafter the policy rate will be brought back to its previously announced level. How much will this affect the current 10-year interest rate? How much will it affect the 30-year interest rate?

4. Based on (A.2) rank the following three policy options in declining order so that the policy that you think will contribute the most to an increase in economic activity is ranked first:

a. January 1st the central bank reduces the monetary policy rate by 1 percentage point and announces that it intends to keep the policy rate at this lower level for exactly one year

b. January 1st the central bank reduces the monetary policy rate by 1 percentage point and announces that it intends to keep the policy rate at this lower level for a prolonged period stretching further than this year.

c. January 1st the central bank reduces the monetary policy rate by 1 percentage point and announces that it intends to raise the policy rate to the original level before the end of the year.

Explain your ranking.

5. Explain why central bank credibility is important for the potential of monetary policy in affecting total demand. How is your answer to Question 3 changed if the central bank has no credibility at all?

6. Explain the concept "yield curve" and draw an illustration. What is the expected sign of the slope of the yield curve in a situation where

   a. The economy is in a recession and the central bank has set current interest rates below the expected long-run level?

   b. The economy and monetary policy is in long-run equilibrium and the market expects it to stay there for eternity?

   c. The central bank defends a fixed exchange rate regime against a so-called speculative attack that will reduce the value of the currency if successful.

7. Assume the economy is hit by a severe negative demand shock resulting in a large drop in output and driving inflation close to zero. Explain why monetary policy may become impotent (in terms of reducing interest rates) in such a situation.

Problem B

In the textbook the following equation is used when describing the market valuation of the shares of a firm**,**

$$(r+\varepsilon)V_t = D_t^e + V_{t+1}^e - V_t \tag{B.1}$$

where r is a constant risk-free real interest rate, ε is a risk premium and D_t^e is the expected real dividend from shares in the firm during period t, while V_t is the actual real market value of the shares of the firm at the beginning of period t, and V_{t+1}^e is the expected real market value at the beginning of period $t+1$.

1. Describe and explain equation (B.1). Show that (B.1) can be rewritten as

$$V_t = \frac{D_t^e + V_{t+1}^e}{1+r+\varepsilon} \tag{B.2}$$

   Interpret equation (B.2).

Assume that

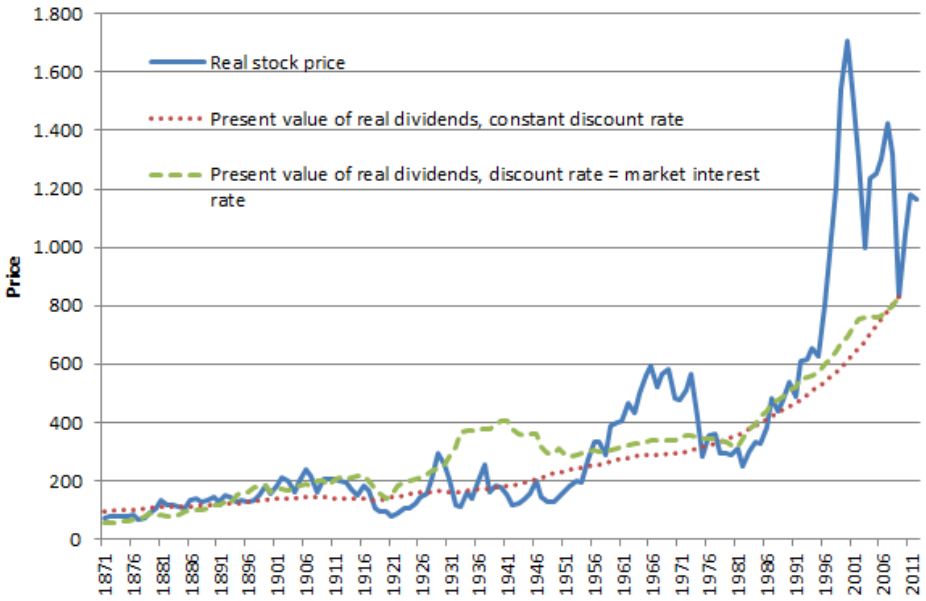
$$\lim_{n\to\infty} \frac{V_{t+n}^e}{(1+r+\varepsilon)^n} = 0 \tag{B.3}$$

2. What is the intuition in equation (B.3)? Given equation (B.3) is fulfilled, show that equation (B.2) can be reformulated as

$$V_t = \sum_{n=0}^{\infty} \frac{D_{t+n}^e}{(1+r+\varepsilon)^{n+1}} \tag{B.4}$$

   Explain why this equation is labelled the fundamental market value of the firm.

3. The figure below is an updated version of a figure in the textbook. Explain why the figure illustrates that the stock market is more volatile than one would expect, given the observed behaviour of dividend payments. Based on (B.4), explain why this volatility may be perfectly rational.



Problem C

1. Describe the economic mechanism whereby convergence towards equilibrium takes place in AD-AS models developed in the textbook for 1) the closed economy and 2) the small open economy with a fixed exchange rate.

2. In the textbook a two-period model is used when describing private consumption. It is shown that the first-order condition for solving the consumers' maximization problem is

$$\frac{u'(C_1)}{u'(C_2)/(1+\phi)} = 1 + r \tag{C.1}$$

where $u(C_t)$ is the consumer's utility from consumption in period t, ϕ is the consumer's rate of time preference, and r is the real interest rate.

Interpret this condition and illustrate the solution in a diagram where C_1 is depicted along the first axis and C_2 is depicted along the second axis. In the particular case where $\phi = r$, describe and illustrate why the existence of capital markets in general makes it possible for the consumers to enjoy welfare gains compared to a situation without capital markets.