Guanghua School of Management Midterm Exam

Fall Semester, 2016-2017

Course: Macroeconomics
Instructor: Cheng Sun
Exam Date: November 10, 8am to 10am   **Length: 2 hours**

Student: **Class:**

Name: **Student ID:**

Format: Closed book. Please write all your answers on the exam paper.

INSTRUCTIONS

You have 2 hours to complete this exam. This exam is strictly closed book and closed notes. You are NOT allowed to use any electronic devices such as cell phones, PDAs, laptops, MP3 players, iPods, iPads etc. during the exam. Calculators are allowed, but you must NOT use any calculator-related apps on your electronic devices.

There are **6 questions** for a total of **150 points.** Use your time wisely.
IMPORTANT: YOU NEED TO CLEARLY MARK THE CORRECT ANSWER AND SHOW YOUR WORK & CALCULATION TO GET FULL CREDIT!!!

To ensure fairness, you are requested to stop writing promptly at the end of the exam.

Please do not turn over this cover page, until requested.

1. Consider a Cobb-Douglas production function with three inputs. K is capital (the number of machines), L is labor (the number of workers), and H is human capital (the number of college degrees among the workers). The production function is

$$Y = K^{1/3}L^{1/3}H^{1/3}$$

   1) Derive an expression for the marginal product of labor. How does an increase in the amount of human capital affect the marginal product of labor? (5pts)

   2) Derive an expression for the marginal product of human capital. How does an increase in the amount of human capital affect the marginal product of human capital? (5pts)

   3) What is the income share paid to labor? What is the income share paid to human capital? In the national income accounts of this economy, what share of total income do you think workers would appear to receive? (5pts)

   4) An unskilled worker earns the marginal product of labor, whereas a skilled worker earns the marginal product of labor and the marginal product of human capital. Using your answers to parts (a) and (b), find the ratio of the skilled wage to the unskilled wage. How does an increase in the amount of human capital affect this ratio? Explain. (5pts)

1、考虑包含三种生产要素的 Cobb-Douglas 生产函数。其中 K 表示资本（机器数量），L 表示劳动力（工人数量），H 表示人力资本（工人中具有的大学学历的人数）。其生产函数是：

$$Y = K^{1/3}L^{1/3}H^{1/3}$$

1）推导劳动边际产出的表达式。人力资本的增加如何影响劳动的边际产出？（5分）

2）推导人力资本边际产出的表达式。人力资本的增加如何影响人力资本的边际产出？（5分）

3）支付给劳动力的收入份额是多少？支付给人力资本的收入份额是多少？在该经济体的国民收入中，你认为工人得到的收入占总收入的份额是多少？（5分）

4）非熟练工人得到的是劳动的边际产出，而熟练工人得到的则是劳动的边际产出和人力资本的边际产出。利用你在（a）和（b）部分的结论，求出技术工资与非技术工资之比。人力资本的增加如何影响该比率？请对此进行解释。（5分）

2. In a particular economy with the real money demand function is

$$\left(\frac{M}{P}\right)^d = 4{,}000 + 0.1Y - 15{,}000i$$

And i is the nominal interest rate. Assume that M=8,000, P=2 and the expected inflation $\pi^e = 0.02$.

1) What is the real interest rate r, that clears the market when Y=6,000? When Y=9,000? Derive the LM curve. (5pts)

2) Derive the LM curve for M=9,200. Compare this LM curve with the LM curve in part 1) (Shift inward or outward). (5pts)

3) Use M=8,000 again, with $\pi^e = 0.03$. Derive the LM curve and compare this LM curve with the LM curve in part 1) (Shift inward or outward). (5pts)

2、在一个特定经济体中，其真实的货币需求函数为：

$$\left(\frac{M}{P}\right)^d = 4{,}000 + 0.1Y - 15{,}000i$$

其中 i 是名义利率。 假设 M=8000，P = 2，预期通货膨胀率 $\pi^e = 0.02$

1）当 Y=6000 时，实际利率 r 为多少能够实现市场出清？当 Y=9000 时，实际利率 r 为多少能够实现市场出清？请推导 LM 曲线。（5 分）

2）当 M =9200 时，推导出 LM 曲线。将此 LM 曲线与第 1）问的 LM 曲线进行比较（向内或向外移动）。（5 分）

3）再次令 M=8,000，其中$\pi^e = 0.03$。推导出 LM 曲线，并将此 LM 曲线与第 1）部分中的 LM 曲线进行比较（向内或向外移动）。（5 分）

3. An economy is described by the following equations

AD: Y=4000+2(M/P)

Short Run AS: $Y = \overline{Y} + 100(P - EP)$

Okun's Law: $\frac{Y-\overline{Y}}{\overline{Y}} = -2(u - u^n)$

This economy full employment output $\overline{Y}$ equals 6000 and the natural rate of unemployment rate u^n equals 0.05.

1) Suppose that the nominal money supply has long been constant at M=4000 and is expected by the public to remain constant forever. What are the equilibrium values of the price, P, the expected price level EP expected inflation $E\pi$, output Y and the unemployment rate u. (5pts).

2) A totally unexpected increase in the money supply occurs raising it from 4000 to 4488. What are the short-run equilibrium values of the price level, expected price level, output, and unemployment rate? (5pts)

3、一个经济体通过以下等式描述：

AD: Y=4000+2(M/P)

短期 AS：$Y = \overline{Y} + 100(P - EP)$

奥肯法则：$\frac{Y-\overline{Y}}{\overline{Y}} = -2(u - u^n)$

在完全就业的情况下，该经济体产出 Y等于 6000，自然失业率u^n等于 0.05。

1）假设名义货币供应长期以来恒定在 M=4000，并且公众对其预期永远保持不变。请问均衡价格 P，预期价格水平 EP，预期通货膨胀$E\pi$，产出 Y 和失业率 u 分别为多少。（5 分）。

2）完全在意料之外的货币供应量增加导致 M 从 4000 提高到 4488。请问此时短期均衡价格水平，预期价格水平，产出和失业率分别为多少？（5分）

4. Consider an economy described by the following equations:

Y=C+I+G+NX

Y=5000

G=1000

T=1000

C=250+0.75(Y-T)

I=1000-50r

NX=500-500ε

r=r*=5

1) In this economy, solve for national saving, investment, the trade balance, and the equilibrium exchange rate. (5pts)

2) Suppose now that G rises to 1250. Solve for national saving, investment, the trade balance and the equilibrium exchange rate. Explain what you find. (5pts)

3) Now suppose that the world interest rate rises from 5 to 10 percent. G is again 1000. Solve for the national saving, investment, the trade balance and the equilibrium exchange rate, Explain what you find. (5pts)

4、考虑由以下等式描述的经济

Y=C+I+G+NX

Y=5000

G=1000

T=1000

C=250+0.75(Y-T)

I=1000-50r

NX=500-500ε

r=r*=5

1）在这个经济体中，求出国家储蓄，投资，贸易平衡和均衡汇率。（5分）

2）假设现在 G 上升到 1250，求解此时的国家储蓄，投资，贸易平衡和均衡汇率。请解释你的发现。（5分）

3）现在假设世界利率从 5 上升到 10。G 仍旧为 1000。求解此时的国家储蓄，投资，贸易平衡和均衡汇率，请解释你的发现。（5分）

5. Consider the following small open economy:

Consumption: C=300+0.5Y-200r

Investment: I=200-300r

Government purchases: G=100

Net exports: NX=150-0.1Y-50e

The world interest rate is r=r*=0.1

1) Derive an expression for the IS* curve. (5pts)

2) The money demand function is L=0.5Y-200r. The money supply M=960 and the price level P=2. Derive the LM* curve. Find the equilibrium exchange rate e and the equilibrium level of income Y. (5pts)

3) Suppose that the government purchases are dropped from 100 to 50, and this economy has a floating exchange rate. How does the IS* curve shift? What are the new equilibrium exchange rate and the level of income? (5pts)

4) Suppose this economy has a fixed exchange rate. After the government purchases are dropped to 50 from 100, how do they adjust the monetary supply M? (5pts)

5) Again, assume this economy has a floating exchange rate. With the initial value for monetary and fiscal policy, suppose that the price level rises from 2 to 3. What are the new equilibrium exchange rate and the level of income? (5pts)

6) Derive an equation for the aggregate demand curve according to the initial value for monetary and fiscal policy under a floating exchange rate. What happens to this aggregate demand curve if the fiscal or monetary policy changes as in part 4) and 5)? (5pts)

5、考虑以下小型开放经济体

消费：C=300+0.5Y-200r

投资：I=200-300r

政府购买：G=100

净出口：NX=150-0.1Y-50e

世界利率水平：r=r*=0.1

1）推导出 IS*曲线的表达式（5分）

2）货币需求函数为 L=0.5Y-200r。货币供应 M=960，价格水平 P=2。据此请推导 LM*曲线。求出均衡状态下的汇率 e 和均衡状态下的收入 Y。（5分）

3）假设政府购买从 100 下降到 50，且该经济体的是浮动汇率制。请问 IS*曲线将怎样变化？新的均衡汇率和均衡收入是多少？（5分）

4）假设该经济体为固定汇率制。当政府购买从 100 下降到 50 后，经济体将如何调整货币供应 M？（5分）

5）再次假设这个经济体为浮动汇率制。在初始的货币政策和财政政策下，假设价格水平从 2 升高到 3，请问新的均衡汇率和均衡收入水平是什么？（5分）

6）根据浮动汇率下货币政策和财政政策的初始值，请推导总需求曲线的方程。如果财政政策或货币政策出现了诸如第 4）问和第 5）问所述的变化，总需求曲线会发生什么变化？（5分）

6. Consider an economy that is described by the following equations

$$C = 300 + 0.75(Y - T) - 300r$$

$$T = 100 + 0.2Y$$

$$I = 200 - 200r$$

$$L = 0.5Y - 500i$$

$\overline{Y} = 2500; G = 600; M = 133200; \pi = 0.05; P_{sr} = 120.$ In the short run, the price level is fixed at P_{sr}.

1) Derive the IS curve. (5pts)

2) Derive the LM curve with an unspecified price level P. (5pts)

3) Derive the short run LM curve. (5pts)

4) Find the short run equilibrium interest rate and output. (5pts)

5) Find the equilibrium interest rate and the equilibrium price level in the long run. (5pts)

6) Derive the aggregate demand curve. (5pts)

6、考虑由以下等式描述的经济

$$C = 300 + 0.75(Y - T) - 300r$$

$$T = 100 + 0.2Y$$

$$I = 200 - 200r$$

$$L = 0.5Y - 500i$$

$\overline{Y} = 2500; G = 600; M = 133200; \pi = 0.05; P_{sr} = 120.$

在短期内，价格水平固定为P_{sr}。

1）推导出 IS 曲线（5分）

2）在价格水平 P 未确定的情况下推导 LM 曲线（5分）

3）推导出短期 LM 曲线。（5分）

4）求出短期的均衡利率和均衡产出。（5分）

5）从长期的角度，求出均衡利率和均衡价格水平。（5分）

6）推导总需求曲线（5分）