AUSTRALIAN CATHOLIC UNIVERSITY

Student Number |__|__|__|__|__|__|__|__|__|__|

Family Name _____

First Name _____

School of Arts – VIC

EXAMINATION

Semester 2 Def/Sup, 2019

ECON203 - 4M - DEF MACROECONOMICS 2 - Melbourne - DEF

Lecturer: Dr. Lei Pan

Examination Duration: 120 minutes

Weighting: 50%

Exam Conditions:

CLOSED BOOK exam

No calculators are permitted in this exam

Materials Permitted In The Exam Venue:

None

Materials To Be Supplied To Students:

1 x Writing Booklet (7-page)

1 x True/False and Multiple Choice Answer Sheets

Instructions To Students:

1. This exam consists of **TWO** sections: Section A: TRUE/FALSE question section and Section B: problem solving section.

2. Read each statement in Section A carefully. State "TRUE" or "FALSE" for each of the statement. You **MUST** justify your answers. There are two questions in total, each of them is worth 10 marks.

3. The second section contains three problem solving questions. Student must answer **ALL** of them carrying 80 marks in total.

4. Answer each question in Section B on a **FRESH page** of the answer book.
5. Try to answer all questions. In general, if you have some knowledge about a question, it is better to try to answer it. You will not be penalized for guessing.

6. You may work on the TRUE/FALSE questions and problem solving questions in any order that you choose. Be sure to allocate your time carefully so you are able to complete the entire exam within the exam session.

Section A (TRUE/FASLE Questions) [Total = 20 marks]

Consider each of the following statements. Say whether you believe the statement is true or false. Briefly explain you answer in words. Note that most of the marks will be given for the explanation.

Question 1. [10 marks] Solow residual measures productivity shocks only.
False. Solow residuals also includes the information such as utilization rates of capital and labour.

Question 2. [10 marks] The chief economics advisor of a small open economy makes the following announcement: "We have good news and bad news. The good news is that we have just a temporary productivity increase that will lead to higher output; the bad news is that the increase in output and income will lead domestic consumers to purchase more imported goods and hence, our current account will fall." This statement is right.
False. Higher output due to temporary increase in productivity may be associated with a higher saving. At the same time, investment may not change if productivity shock is transitory. Hence, current account may rise.

Section B (Problem Solving Questions) [Total = 80 marks]

Question 3. [20 marks] In a certain economy, the production function is $Y=A(10N-0.5N^2)$, where Y is output, A is productivity and N is total hours worked. The marginal product of labour associated with this production function is MPN$=A(10-N)$. Initially, $A=1$ but a beneficial productivity shock raises A to 2.

(a) [10 marks] The supply of labour is NS$=4+w$, where w is the real wage. Find the equilibrium levels of output, hours worked, and the real wage before and after the productivity shock.

For $A=1$, $w=10-ND$ and NS$=4+w$. NS=ND in labour market equilibrium, hence $w=3$ and $N=7$. $Y=10*7-0.5*49=45.5$.

For $A=2$, we similarly obtain that $w=2(10-ND)$ and NS$=4+w$. Hence, $w=4$ and $N=8$. $Y=2(10*8-0.5*64)=96$.

(b) [10 marks] Assume that there exists strong downward real wage rigidity that, real wage in each period has a lower bound such that $w_t \geq 0.8w_{t-1}$, where w_t and w_{t-1} represent the current real wage and real wage in the previous period, respectively. In other words, given previous period's real wage w_{t-1}, the real wage in the current period can never falls below

the level $0.8w_{t-1}$. Consider A=2 at time t-1. Now there is a new shock that productivity A falls to 1 in period t. What are the equilibrium levels of hours worked and the real wage in period t when A=1? Are they taking the same values as in your Part (a) results?

When A falls from 2 to 1, without wage rigidity, w=3. However, at time t, wage must be at least $0.8w_{t-1}$=0.8*4=3.2. Hence downward wage rigidity is binding. W=3.2 at time t. In this case, N=6.8, which is different from part (a).

Question 4. [30 marks] Consider country A has full-employment output of 1000. Government purchases G are 100. Desired consumption and desired investment are

$$C^d = 400 - 100\mathrm{r} + 0.4Y$$

where Y is output and r is the real interest rate.

(a) [4 marks] Find an equation relating desired national savings S^d to r and Y in country A.

$$\boldsymbol{S^d = Y - C^d - G}$$

$$\boldsymbol{= 0.6Y + 100r - 500}$$

In country A, the future marginal product of capital is:

$$MPK^f = 100 - K^f$$

where K^f denotes the future capital stock. We also assume that the price of capital p_K = 100, depreciation rate d = 0.1 and the initial capital stock is 10.

(b) [4 marks] Derive the investment curve (that is, find investment as a function of real interest rate r).

$$\boldsymbol{MPK^f = uc \Rightarrow 100 - K^f = (r + 0.1) \times 100 \Rightarrow K^f = 90 - 100r}$$

Then

$$\boldsymbol{I^d = K^f - (1 - d)K = 90 - 100r - 0.9 \times 10 = 81 - 100r}$$

(c) [4 marks] Consider the full-employment case, what is the equilibrium real interest rate r? What is the value of aggregate savings?

At full-employment output,

$$\boldsymbol{S^d = 100 + 100r}$$

Equilibrium

$$\boldsymbol{100 + 100r = 81 - 100r}$$

(listing the correct answer is fine, full marks)

(d) [2 marks] Suppose now country A opens trade and capital flows. If the country is a small open economy and the world interest rate r^* is 5%, what is the country's current account?

$$\boldsymbol{S^d = 105, I^d = 76, CA = S^d - I^d = 29}$$

(e) [5 marks] Consider U.S. is the only large country in the world that savings and investment in U.S. will affect world interest rate. Suppose U.S. government cuts the current tax on households which will be financed by increasing future taxes, what will be the impact on country *A*'s current account? Discuss.

No impact in this desired case since Ricardian equivalence holds. The tax policy changes do not affect the life-time income by U.S. households. No changes in savings and investment and hence no changes in the world interest rate.

(f) [5 marks] Suppose a large number of households are always facing borrowing constraints in U.S., would the result in part (e) change? Discuss.

In this case, due to the existence of borrowing constraint, Ricardian equivalence fails. U.S. savings may fall, hence world interest rate may go up and country *A*'s current account may increase.

(g) [5 marks] Consider a two large country case, country *A* and U.S. If scientists in country *A* find a new technology in period *t* (which permanently increase country *A*'s productivity in the future but not the productivity in period *t*), how does the new technology affect the current accounts in country *A* and U.S. at time *t*? What about the current account in the future? Will the current account patterns in the two countries remain the same as that in period *t*?

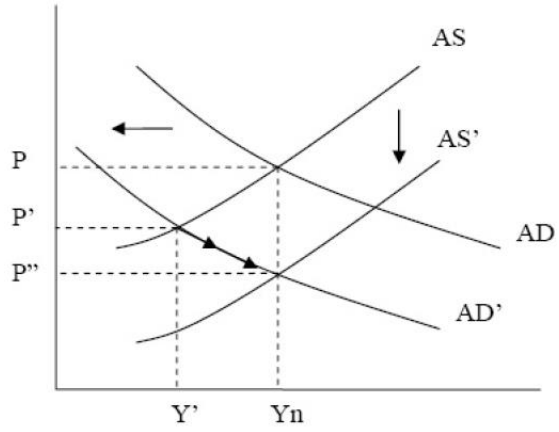
The technology change leads to higher future income and higher marginal product of capital in country *A*, which in turn yields higher consumption and higher investment at time *t*. Hence country *A*'s savings fall at time *t*. World interest rate rises. Country *A*'s current account falls while U.S. current account rises. In the future, country *A*'s income also goes up, hence savings will rise. Then compared to time *t*, country *A* will experience an increase in current account while U.S. current will fall.

Question 5. [30 marks] **Demand Shocks and Demand Management**

Assume that the economy starts at the natural level of output. Now suppose there is a decline in business confidence, so that investment demand falls for a given interest rate.

(a) [6 marks] In an AD-AS diagram, show what happens to output and the price level in the short run and the medium run.

In the short run, a decline in business confidence shifts in the AD curve. Output drops to a lower level Y' left to the natural level Y_n. The price level falls from P to P'. The expected price level falls with the price level and shifts down the AS curve over time, and at the same time the short-run equilibrium moves along the new AD curve (AD'), until output returns to its natural level. In the medium run, output moves back to Y_n and the price level declines to a lower level P''.



(b) [4 marks] What happens to the unemployment rate in the short run? In the medium run?

The unemployment rate moves in the opposite direction of the level of output. *u* increases in the short run after a negative shock to investment, but gradually returns to the natural rate as the price level decreases over time.

(c) [10 marks] What should the RBA do? Show how the RBA's action, combined with decline in business confidence, affects the AD-AS diagram in the short and medium run.

The RBA should use monetary expansion to prevent a short-run deviation from the natural rate of unemployment. A monetary expansion of the proper size can exactly offset the effect of the investment demand shock on the AD curve. As a result, no change occurs in the AD-AS diagram in either the short or the medium run, though the interest rate is now lower in the new equilibrium.

(d) [5 marks] How do short-run output and short-run price level compare to your answers from part (a)?

Under the policy option in part (c), output and the price level are higher in the short run. In the medium run, output is the same in parts (a) and (c), but the price level is higher in part (c).

(e) [5 marks] How do the short-run and medium-run unemployment rates compare to your answers from part (b)?

The unemployment rate is lower in the short run in part (c). In the medium run, the unemployment rate is the same in parts (b) and (c).

END OF EXAMINATION