经济学原理 I（2019 年春季学期）
期中考试 1（A 卷答案）
（2019/4/3）

（所有题目答案需写在另发的答题本上，否则无效。本试卷满分 50 分。）

1. 判断以下陈述是否正确，并阐述理由。（3 分*3 题=9 分）

1.1 通常将企业的利润看成是“企业家精神”的回报。和其他生产要素一样，该回报是在竞争性市场上按其边际贡献取得的。

错误。前半句正确，后半句错误。利润并非按企业家的边际贡献取得的，而是一种“剩余索取权”。由于企业家提供了独特的“非竞争性”要素，最终体现在企业产品的独特性上，获得的是一种“垄断性”的回报。

1.2 教育的信号理论认为，清华大学的毕业生能获得比其他学校毕业生更高的薪水，是因为清华大学比其他学校拥有更高的教学质量。

错误。教育的信号理论认为教育的作用是帮助先天能力强的学生发出高质量的信号。因此清华大学的毕业生能获得更高薪水是因为高质量学生通过选择清华大学才能发出高质量信号。这种选择机制可能来自于清华大学录取标准高，或者清华大学的课业完成难。但不一定对应着较高的教学质量。

1.3 在市场经济中，每个市场都是由供求力量决定的均衡结果。所有市场的均衡结果加总成成为经济总的产出和价格。因此微观经济学足以解释经济整体，不需要有单独考虑经济总产出和价格的宏观经济学。

错误。所有市场的均衡结果的简单加总忽略了市场之间的相互关联。这一关联会使得对于整体经济进行分析变得极为困难。而经济总体的产出和价格的变化规律未必一定要从所有市场的关联中推导出来，实际上某些经济局部的变动相互之间可以抵消。因此宏观经济学仍然有独立的意义。

2. 选择题。每个题目只有一个正确答案。（2 分*5 题=10 分）

2.1 行为经济学中定义的禀赋效应，是指人们对于自己已经拥有的物品的评价（即出售意愿）高于自己尚未拥有时对该物品的评价（即支付意愿）。以下张三的哪个行为说明了禀赋效应的存在：

A. 张三愿意花 15 元钱购买一个马克杯，但不愿意以 15 元出售一个马克杯。
B. 张三不愿意花 15 元钱购买一个马克杯，但愿意以 15 元出售一个马克杯。
C. 张三不愿意以 15 元出售一个马克杯，也不愿意花 15 元购买一个马克杯。
D. 张三愿意花 15 元购买一个马克杯，也愿意以 15 元出售一个马克杯。

2.2 自由恋爱而结成的婚姻中，仍然会有夫妻双方中的一方抱怨自己“嫁/娶错了人”。则关于收入分配的三种哲学中，对这一抱怨最有可能持否定态度的是：

A. 功利主义。因为重新选择配偶根本不可能提高社会总效用。
B. 自由主义。因为重新选择配偶根本不可能使最不利者变得更有利。
C. 自由意志主义。因为在结婚之前所有人的机会是平等的。
D. 以上说法均正确。因此三种收入分配的哲学对这一抱怨持同等的否定态度。

2.3 华清银行有 100 元存款，该存款以 5%的年利息贷出，同时银行需支付给储户 3%的年利息。则在这一系列经济活动中，属于华清银行自身创造的 GDP 的数量为：

A. 100 元。
B. 100*5%=5 元。
C. 100*3%=3 元。
D. 100*(5%-3%)=2 元。

2.4 住房 A 和 B 均于 2018 年建成，并各以 500 万元售出。2019 年，住房 A 进行了出租，并获得租金收入 5 万元。住房 B 空置。则住房 A 在 2018 年产生的 GDP 为（ ）万元，在 2019 年产生的 GDP 为（ ）万元；住房 B 在 2018 年产生的 GDP 为（ ）万元，在 2019 年产生的 GDP 为（ ）万元。
A. 500, 5; 0, 0
B. 500, 0; 500, 0
C. 500, 5; 500, 0
D. 500, 5; 500, 5

2.5 一般来说，当价格水平上升时，CPI 高估了生活费用的上升幅度。那么，当价格水平下降时：
A. CPI 恰好反映了生活费用的变动
B. CPI 高估了生活费用的下降幅度
C. CPI 低估了生活费用的下降幅度
D. CPI 可能高估也可能低估了生活费用的下降幅度

3. 问答题（共 4 小题，31 分）

3.1 Production function and labor share (9pts)

Some economists believe that the U.S. economy as a whole can be modeled with the following production function, called the Cobb-Douglas production function:

$$Y=AK^{1/3}L^{2/3},$$

where Y is the amount of output, K is the amount of capital, L is the amount of labor, and A is a parameter that measures the state of technology. For this production function, the marginal product of labor is

$$MPL=(2/3)A(K/L)^{1/3}.$$

Suppose that the price of output P is 2, A is 3, K is 1,000,000, and L is 1,000. The labor market is competitive, so labor is paid the value of its marginal product.

a. Calculate the amount of output produced Y and the dollar value of output PY. (1pt)

Substituting the values given, output $Y = 3(1{,}000{,}000)^{\frac{1}{3}}(1{,}000)^{\frac{2}{3}} = 30{,}000$ and the dollar value of the output, PY, is $60,000.

b. Calculate the wage W and the real wage W/P. (Note: The wage is labor compensation measured in dollars, whereas the real wage is labor compensation measured in units of output.) (1pt)

The wage is equal to the value of the marginal product, which is equal to the marginal product

of labor multiplied by the price: $W = \left[\frac{2}{3}(3)\left(\frac{1{,}000{,}000}{1{,}000}\right)^{\frac{1}{3}}\right]2 = \$40$ and the real wage *W/P* is $40/$2 = 20.

c. Calculate the labor share (the fraction of the value of output that is paid to labor), which is (WL)/(PY). (1pt)

The labor share (WL)/(PY) is ($40 ×1,000)/($2×30,000)=2/3.

d. Calculate what happens to output Y, the wage W, the real wage W/P, and the labor share (WL)/(PY) in each of the following scenarios:

i. Inflation increases P from 2 to 3. (1pt)

When inflation increases P from 2 to 3, output Y remains constant at 30,000, wage W increases from $40 to $60, the real wage W/P remains constant at 20, and the labor share (WL)/(PY) remains constant at 2/3.

ii. Technological progress increase A from 3 to 9. (1pt)

When technological progress increases from 3 to 9, output Y increases from 30,000 to 90,000, wage W increases from $40 to $120, the real wage W/P increases from $20 to $60, and the labor share (WL)/(PY) remains constant at 2/3.

iii. Capital accumulation increases K from 1,000,000 to 8,000,000. (1 pt)

When capital accumulation increases from 1,000,000 to 8,000,000, output Y increases from 30,000 to 60,000, wage W increases from $40 to $80, the real wage W/P increases from 20 to 40, and the labor share (WL)/(PY) remains constant at 2/3.

iv. A plague decrease L from 1,000 to 125. (1 pt)

When a plague decreases L from 1,000 to 125, output Y decreases from 30,000 to 7,500, wage W increases from $40 to $80, the real wage W/P increases from $20 to $40, and the labor share (WL)/(PY) remains constant at 2/3.

e. Despite many changes in the U.S. economy over time, the labor share has been relatively stable. Is this observation consistent with the Cobb-Douglas production function? Explain. (2pts)

The observation that the labor share is relatively stable over time in spite of changes in the U.S. economy is consistent with this Cobb-Douglas production function. This is because:

$$(WL)/(PY)=(P*MPL*L)/(PY)=MPL*L/Y=(2/3)A(K/L)^{1/3}*L/(AK^{1/3}L^{2/3})=2/3,$$

regardless of the value of A, K, L and P.

3.2 Income mobility and Income distribution (7pts)

Four people, Jack, Jill, Tom and Jerry, live in two communities, A and B, for two periods, today and tomorrow, in their whole lives. Their incomes are shown in the following table:

income	today	tomorrow	life-cycle income
Community A			
Jack	$100,000	$100,000	$100,000
Jill	20,000	20,000	20,000
Community B			
Tom	200,000	18,000	109,000
Jerry	18,000	200,000	109,000

a. In any single period, which community has a more unequal income distribution, and which community has a worse poverty problem? (1pts)

In any single period, community B has a more unequal income distribution and worse poverty problem.

b. Which community has a more unequal distribution of life-cycle income (i.e. personal income averaged across two periods)? Which community has a worse poverty problem? (2pts)

The life-cycle income of each person is shown in the last column of the table. Community A has more unequal life-cycle income, and has a worse poverty problem according to life-cycle income.

c. In any single period, which income distribution would Rawls prefer? Which would the utilitarian prefer? (1pts)

In any single period, Rawls would prefer the income distribution of community A. We cannot judge the income distribution of which community the utilitarian would prefer.

d. Which distribution of life-cycle income would Rawls prefer? Which would the utilitarian prefer? (2pts)

Rawls would prefer the life-cycle income distribution of community B. The utilitarian would also prefer community B.

e. According to you findings, income mobility is a good or bad thing for a socially desirable income distribution from a life-cycle view? (1pts)

Income mobility is a good thing for a socially desirable income distribution from a life-cycle view.

3.3 GDP growth rate and Inflation rate (4pts)

Consider the following data on U.S. GDP:

Year	Nominal GDP (in billions of dollars)	Real GDP (in billions of dollars, base year 2009)
2014	17,419	16,084
1994	7,309	9,904

a. What was the average annual growth rate of GDP between 1994 and 2014, in a reasonable sense? (2pts)

The average annual growth rate of GDP is derived from the real GDP, which is $100*[(16,084/9,904)^{1/20}-1]=2.5\%$.

b. What was the average annual inflation rate between 1994 and 2014? (2pts)

We first calculate GDP deflator of each year.

The GDP deflator in year 2014 is 17,419/16,084*100=108.3.

The GDP deflator in year 1994 is 7,309/9,904*100=73.8.

The average annual inflation rate is $100*[(108.3/73.8)^{1/20}-1]=1.9\%$.

4. Voting and Negotiation (11pts)

Five roommates are planning to spend the weekend in their dorm room watching movies,

and they are debating how many movies to watch. Here is their willingness to pay:

	Quentin	Spike	Ridley	Martin	Steven
1st film	$14	$10	$8	$4	$2
2nd film	12	8	4	2	0
3rd film	10	6	2	0	0
4th film	6	2	0	0	0
5th film	2	0	0	0	0

Buying a DVD costs $15, which the roommates decide to split equally, so each pays $3 per movie.

a. What is the efficient number of movies to watch (that is, the number that maximizes total surplus)? (1pt)

The efficient number of DVDs is 3. Total surplus would be the sum of the roommates' willingness to pay (38 + 26 + 18 = 82) minus the cost of the DVDs (15 + 15 + 15 = 45) which is 37.

b. From the standpoint of each roommate, what is the preferred number of movies? What is the preferred number of the median roommate?(2pts)

Quentin would want 4 DVDs; Spike would prefer 3; Ridley wants 2; Martin wants 1; and Steven does not want to buy a DVD. The preference of the median roommate (Ridley) is 2 DVDs.

c. Suppose the number of movies to watch is decided by a majority rule among the roommates, how many movies would finally be chosen? Can majority rule be counted on to reach efficient outcomes in the provision of public goods? (1pts)

According to the median voter theorem, the number of movies chosen by a majority rule would be the preferred number of the median voter, which is 2. The majority rule does not reach efficient outcome in this case.

Now suppose the roommates stick to the majority rule to decide the number of movies to watch. Yet they no long stick to the equally splitting rule for payment. Instead, before the voting process begins, some or all of them can negotiate on who would pay for each movie and how much.

Suppose each film would be decided one by one.

d. Would the 1st film be watched? If yes, what is the minimum payment of Quentin, the person who has the highest willingness to pay? (2pts)

Yes. Because the total willingness to pay ($38) is higher than the total cost ($15), there always exists a payment plan in which each roommate can benefit. In fact, the plan would gain unanimous support.

The minimum payment of Quentin is 0. Even if he does not pay, the total surplus of the other four roommates (i.e., $24) is higher than the total cost. So the other 4 roommates can figure out a payment plan so that those four guys can benefit and vote for it, no matter how Quentin votes.

e. Would the 2nd film be watched? If yes, what is the minimum payment of Quentin? How about the 3rd film? (2pts)

Yes. The minimum payment of Quentin is $1. Because the total surplus of all others is only $14. For them to vote for the 2nd movie to be watched, the payment left for them cannot exceed their total surplus. Therefore, Quentin has to pay at least $1=$15-14.

The 3rd film can also be watched. The minimum payment of Quentin is $15-8=7.

f. How many film would be watched under this majority rule with negotiable payment? Can this new rule be counted on to reach efficient outcomes in the provision of public goods? (1pt)

3 films would be watched under this majority rule with negotiable payment. It reaches the efficient outcome.

Now suppose Martin and Steven would feel uncomfortable if the 3rd film gets watched. In particular, their willingness to pay for the 3rd film is -$2 each. The payment for watching a film is still negotiable among the roommates, and the voting rule is the majority rule.

g. Explain that there does not exist a payment plan such that every roommate can agree on watching the 3rd film. (Hint: Suppose there exists such a payment plan and under which, each roommate get a surplus of x_i in the end. Those surpluses must be that every group of 3 or more persons would not renegotiate a payment plan among themselves and then choose to jointly vote against the current plan. That is, every group must at least reach the maximum total surplus among them, without bothering other roommates outside the group, under the current payment plan. Find out all corresponding inequalities, and prove that the solution of x_i for all inequalities to hold is empty.) (2pts)

Suppose in the final result each roommate has a surplus of x_i, i=1,2,3,4,5.

Note that the total surplus for the 3rd film is $(10+6+2-2-2)-15=-1<0. Therefore, the final outcome would not allow the film to be watched. Otherwise all the roommates can renegotiate to switch to the outcome that the film would not be watched, and make every roommate better off. Therefore,

$x_1+x_2+x_3+x_4+x_5=0$.

In addition, any group of 3 roommates can dominate the final outcome, by majority voting. Therefore, a final outcome which does not maximize the total surplus of them would not sustain.

Therefore:

$x_1+x_2+x_3>=10+6+2-15=3$ (by voting for watching)

It is easy to see that for any other 3-person group, not watching has a higher surplus than watching. Therefore,

$x_i+x_j+x_k>=0$ for any $(i,j,k)\neq(1,2,3)$ (by voting against watching)

Summing up all those 3-person inequalities leads to:

$x_1+x_2+x_3+x_4+x_5>=(3+0)/6=0.5$.

which contradicts $x_1+x_2+x_3+x_4+x_5=0$.