

科目：個體經濟學【經濟所碩士班】

✓

1. Examine the properties of the demand functions of a consumer with the following utility function:  $u(x) = f(x_1) + x_2$ ; ( $f' > 0, f'' < 0$ ). (10%)
2. (True or false with interpretation) Diminishing marginal rate of substitution implies diminishing marginal utility. [Hint: Considering the utility function,  $u(x, y) = \sqrt{xy}$ , and its monotonic transformations to demonstrate your argument.] (10%)
3. A constant elasticity supply curve,  $\alpha p^\theta$ , where  $\theta$  is a constant, intersects a linear demand curve,  $Q = a - bp$ . What is the incidence of a \$1 specific tax? Does your answer depend on where the supply curve intersects the demand curve? Interpret your result. (10%)
4. If an individual's labor supply curve slopes forward at low wages and bends backward at high wages, is leisure a Giffen good? If so, at high or low wage rates? And why? (10%)
5. Under what conditions do the following production functions exhibit decreasing, constant, or increasing returns to scale? (10%)
  - (a)  $Q = L + K$
  - (b)  $Q = L^\alpha K^\beta$
  - (c)  $Q = L^\alpha K^\beta + L + K$
6. (20%) Find the Nash equilibrium (equilibria?) of a variant of the example of Cournot's duopoly game that differs from the traditional one (linear inverse demand, constant unit cost) only in that one of the two firms choose its output to maximize its market share subject to not making a loss, rather than to maximizing its profit. What happens if *each* firm maximizes its market share? (In this question, the inverse demand is  $P = a - (q_1 + q_2)$ ; the unit cost for both firms is  $c$ .)
7. (10%) Players 1 and 2 are bargaining over how to split one dollar. Both players simultaneously name shares they would like to have,  $s_1$  and  $s_2$ , where  $0 \leq s_1, s_2 \leq 1$ . If  $s_1 + s_2 \leq 1$ , then the players receive the shares they named; if  $s_1 + s_2 > 1$ , then both players receive zero. What are the pure-strategy Nash equilibria of this game?
8. (20%) Find all pure and mixed Nash equilibria in the following normal-form game.

|   |     |     |     |
|---|-----|-----|-----|
|   | B   | S   | X   |
| B | 4,2 | 0,0 | 0,1 |
| S | 0,0 | 2,4 | 1,3 |

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Answer the following five questions, equally weighted

1.(20%)

The  $2 \times 1$  random vector  $(X, Y)'$  has joint density function  $f(x, y) = 8xy$ ,  $0 < x < y < 1$ . Find

- (a).  $E(\text{var}(X|Y))$ , and  
(b).  $\text{var}(E(X|Y))$ .

2.(20%)

Let  $X_n \xrightarrow{d} Z \sim N(0, 1)$  (read as " $X_n$  converges in distribution to  $Z$  that has a standard normal distribution") and  $Y_n \xrightarrow{p} 4$  (read as " $Y_n$  converges in probability to 4"). To what do the following converge? State the reason.

- (a).  $\frac{16X_n^2}{Y_n^2}$ , and  
(b).  $\frac{(4n+Y_n)X_n}{nY_n+Y_n^2}$ .

3.(20%)

Suppose we observe  $X_i$ ,  $i = 1, 2, \dots, n$ , independent with  $X_i \sim P(i\theta)$ . Find the information bound (lowest variance bound) for the variance of unbiased estimators of  $\theta$ .

4.(20%)

A random sample of size 20 have been drawn from  $N(\mu, \sigma^2)$ , and we know that

$$\sum_{i=1}^{20} Y_i = 13.210 \quad \text{and} \quad \sum_{i=1}^{20} Y_i^2 = 8.8878.$$

Please test the null hypothesis:  $H_0 : \mu = 0.618$  against the alternative one:  $H_1 : \mu \neq 0.618$  at the 5% significance level (or  $\alpha = 5\%$ ).

5.(20%)

Let the  $3 \times 1$  random vector  $\mathbf{x} = (X_1, X_2, X_3)'$  follow a multivariate normal distribution,

$$\begin{bmatrix} X_1 \\ X_2 \\ X_3 \end{bmatrix} \sim N_3(\boldsymbol{\mu}, \boldsymbol{\Sigma}),$$

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where

$$\mu = \begin{bmatrix} 1 \\ 3 \\ 6 \end{bmatrix} \quad \text{and} \quad \Sigma = \begin{bmatrix} 3 & 2 & 3 \\ 2 & 5 & 5 \\ 3 & 5 & 9 \end{bmatrix}.$$

Suppose that  $Y = 3X_1 + 4X_2 + X_3$ . Find the probability that  $P(Y > 30)$ .

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STATISTICAL TABLES

Normal Distribution

TABLE G.1. Cumulative Normal Distribution Table Entry is  $P(Z \leq z)$

| z   | .00   | .01   | .02   | .03   | .04   | .05   | .06   | .07   | .08   | .09   |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.0 | .5000 | .5040 | .5080 | .5120 | .5160 | .5199 | .5239 | .5279 | .5319 | .5359 |
| 0.1 | .5398 | .5438 | .5478 | .5517 | .5557 | .5596 | .5636 | .5675 | .5714 | .5753 |
| 0.2 | .5793 | .5832 | .5871 | .5910 | .5948 | .5987 | .6026 | .6064 | .6103 | .6141 |
| 0.3 | .6179 | .6217 | .6255 | .6293 | .6331 | .6368 | .6406 | .6443 | .6480 | .6517 |
| 0.4 | .6554 | .6591 | .6628 | .6664 | .6700 | .6736 | .6772 | .6808 | .6844 | .6879 |
| 0.5 | .6915 | .6950 | .6985 | .7019 | .7054 | .7088 | .7123 | .7157 | .7190 | .7224 |
| 0.6 | .7257 | .7291 | .7324 | .7357 | .7389 | .7422 | .7454 | .7486 | .7517 | .7549 |
| 0.7 | .7580 | .7611 | .7642 | .7673 | .7704 | .7734 | .7764 | .7794 | .7823 | .7852 |
| 0.8 | .7881 | .7910 | .7939 | .7967 | .7995 | .8023 | .8051 | .8078 | .8106 | .8133 |
| 0.9 | .8159 | .8186 | .8212 | .8238 | .8264 | .8289 | .8315 | .8340 | .8365 | .8389 |
| 1.0 | .8413 | .8438 | .8461 | .8485 | .8508 | .8531 | .8554 | .8577 | .8599 | .8621 |
| 1.1 | .8643 | .8665 | .8686 | .8708 | .8729 | .8749 | .8770 | .8790 | .8810 | .8830 |
| 1.2 | .8849 | .8869 | .8888 | .8907 | .8925 | .8944 | .8962 | .8980 | .8997 | .9015 |
| 1.3 | .9032 | .9049 | .9066 | .9082 | .9099 | .9115 | .9131 | .9147 | .9162 | .9177 |
| 1.4 | .9192 | .9207 | .9222 | .9236 | .9251 | .9265 | .9279 | .9292 | .9306 | .9319 |
| 1.5 | .9332 | .9345 | .9357 | .9370 | .9382 | .9394 | .9406 | .9418 | .9429 | .9441 |
| 1.6 | .9452 | .9463 | .9474 | .9484 | .9495 | .9505 | .9515 | .9525 | .9535 | .9545 |
| 1.7 | .9554 | .9564 | .9573 | .9582 | .9591 | .9599 | .9608 | .9616 | .9625 | .9633 |
| 1.8 | .9641 | .9649 | .9656 | .9664 | .9671 | .9678 | .9686 | .9693 | .9699 | .9706 |
| 1.9 | .9713 | .9719 | .9726 | .9732 | .9738 | .9744 | .9750 | .9756 | .9761 | .9767 |
| 2.0 | .9772 | .9778 | .9783 | .9788 | .9793 | .9798 | .9803 | .9808 | .9812 | .9817 |
| 2.1 | .9821 | .9826 | .9830 | .9834 | .9838 | .9842 | .9846 | .9850 | .9854 | .9857 |
| 2.2 | .9861 | .9864 | .9868 | .9871 | .9875 | .9878 | .9881 | .9884 | .9887 | .9890 |
| 2.3 | .9893 | .9896 | .9898 | .9901 | .9904 | .9906 | .9909 | .9911 | .9913 | .9916 |
| 2.4 | .9918 | .9920 | .9922 | .9925 | .9927 | .9931 | .9932 | .9934 | .9936 | .9938 |
| 2.5 | .9938 | .9940 | .9941 | .9943 | .9945 | .9946 | .9948 | .9949 | .9951 | .9952 |
| 2.6 | .9953 | .9955 | .9956 | .9957 | .9959 | .9960 | .9961 | .9962 | .9963 | .9964 |
| 2.7 | .9965 | .9966 | .9967 | .9968 | .9969 | .9970 | .9971 | .9972 | .9973 | .9974 |
| 2.8 | .9974 | .9975 | .9976 | .9977 | .9977 | .9978 | .9979 | .9979 | .9980 | .9981 |
| 2.9 | .9981 | .9982 | .9982 | .9983 | .9984 | .9984 | .9985 | .9985 | .9986 | .9986 |
| 3.0 | .9987 | .9987 | .9987 | .9988 | .9988 | .9989 | .9989 | .9989 | .9990 | .9990 |
| 3.1 | .9990 | .9991 | .9991 | .9991 | .9992 | .9992 | .9992 | .9992 | .9993 | .9993 |
| 3.2 | .9993 | .9993 | .9994 | .9994 | .9994 | .9994 | .9994 | .9995 | .9995 | .9995 |
| 3.3 | .9995 | .9995 | .9995 | .9996 | .9996 | .9996 | .9996 | .9996 | .9997 | .9997 |
| 3.4 | .9997 | .9997 | .9997 | .9997 | .9997 | .9997 | .9997 | .9997 | .9997 | .9998 |

APPENDIX G

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t-distribution

TABLE G.2 Percentiles of the Student-t Distribution Table Entry is that  $P(Z \leq t)$

| n        | .750  | .900  | .950  | .975   | .990   |
|----------|-------|-------|-------|--------|--------|
| 1        | 1.000 | 3.078 | 6.314 | 12.706 | 31.821 |
| 2        | .816  | 1.886 | 2.920 | 4.303  | 6.965  |
| 3        | .765  | 1.638 | 2.353 | 3.182  | 4.541  |
| 4        | .741  | 1.533 | 2.132 | 2.776  | 3.747  |
| 5        | .727  | 1.476 | 2.015 | 2.571  | 3.365  |
| 6        | .718  | 1.440 | 1.943 | 2.447  | 3.143  |
| 7        | .711  | 1.415 | 1.895 | 2.365  | 2.998  |
| 8        | .706  | 1.397 | 1.860 | 2.306  | 2.896  |
| 9        | .703  | 1.383 | 1.833 | 2.262  | 2.821  |
| 10       | .700  | 1.372 | 1.812 | 2.228  | 2.764  |
| 11       | .697  | 1.363 | 1.796 | 2.201  | 2.718  |
| 12       | .695  | 1.356 | 1.782 | 2.179  | 2.681  |
| 13       | .694  | 1.350 | 1.771 | 2.160  | 2.650  |
| 14       | .692  | 1.345 | 1.761 | 2.145  | 2.624  |
| 15       | .691  | 1.341 | 1.753 | 2.131  | 2.602  |
| 16       | .690  | 1.337 | 1.746 | 2.120  | 2.583  |
| 17       | .689  | 1.333 | 1.740 | 2.110  | 2.567  |
| 18       | .688  | 1.330 | 1.734 | 2.101  | 2.552  |
| 19       | .688  | 1.328 | 1.729 | 2.093  | 2.539  |
| 20       | .687  | 1.325 | 1.725 | 2.086  | 2.528  |
| 21       | .686  | 1.323 | 1.721 | 2.080  | 2.518  |
| 22       | .686  | 1.321 | 1.717 | 2.074  | 2.508  |
| 23       | .685  | 1.319 | 1.714 | 2.069  | 2.500  |
| 24       | .685  | 1.318 | 1.711 | 2.064  | 2.492  |
| 25       | .684  | 1.316 | 1.708 | 2.060  | 2.485  |
| 26       | .684  | 1.315 | 1.706 | 2.056  | 2.479  |
| 27       | .684  | 1.314 | 1.703 | 2.052  | 2.473  |
| 28       | .683  | 1.313 | 1.701 | 2.048  | 2.467  |
| 29       | .683  | 1.311 | 1.699 | 2.045  | 2.462  |
| 30       | .683  | 1.310 | 1.697 | 2.042  | 2.457  |
| 35       | .682  | 1.306 | 1.690 | 2.030  | 2.438  |
| 40       | .681  | 1.303 | 1.684 | 2.021  | 2.412  |
| 45       | .680  | 1.301 | 1.679 | 2.014  | 2.403  |
| 50       | .679  | 1.299 | 1.676 | 2.009  | 2.400  |
| 60       | .679  | 1.296 | 1.671 | 2.000  | 2.390  |
| 70       | .678  | 1.294 | 1.667 | 1.994  | 2.381  |
| 80       | .678  | 1.292 | 1.664 | 1.990  | 2.374  |
| 90       | .677  | 1.291 | 1.662 | 1.987  | 2.368  |
| 100      | .677  | 1.290 | 1.660 | 1.984  | 2.364  |
| $\infty$ | .674  | 1.282 | 1.645 | 1.960  | 2.326  |

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第一大題 50% (單選題,每題 2.5 分)

1. Why is the corporate profits tax often criticized by economists?
  - a. It only applies to corporations.
  - b. It makes up a large part of federal tax revenues.
  - c. It results in double taxation.
  - d. Both (a) and (c) are correct.
  
2. An economic expansion causes
  - a. the federal budget deficit to rise
  - b. federal government tax receipts to fall
  - c. federal government spending to rise
  - d. transfer payments to fall
  
3. Which of the following is an advantage of a single European currency?
  - a. Each country continues to have autonomy with respect to monetary policy.
  - b. The exchange rate risk is eliminated.
  - c. Countries must maintain fiscal discipline which increases the use of fiscal policy.
  - d. None of the above are advantages.
  
4. If a country removed an import quota on cotton, then overall that country's
  - a. exports and imports would rise.
  - b. exports would rise and imports would fall.
  - c. exports would fall and imports would rise.
  - d. exports and imports would fall.
  
5. If the world thought that many banks in a certain country were at or near the point of bankruptcy, then that country's real exchange rate
  - a. would fall and net exports would rise.
  - b. would rise and net exports would fall.
  - c. and net exports would rise.
  - d. and net exports would fall.
  
6. The exchange rate is 1.5 Bosnian marks per U.S. dollar. The price of a refrigerator in Bosnia is 1,200 marks while in the U.S. it is \$1,000. The real exchange rate is
  - a. 9/5
  - b. 5/4
  - c. 4/5
  - d. None of the above are correct.
  
7. Credit cards are
  - a. a medium of exchange.
  - b. important for analyzing the monetary system.
  - c. counted as part of M2 but not as part of M1.
  - d. All of the above are correct.

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8. The research by Robert Hall on the theory of consumption suggests that the best forecast of consumption for next year would be:
- unpredictable.
  - this year's consumption
  - random
  - last year's consumption
9. In the short run, an increase in government spending that causes an increase in the budget deficit:
- affects the level of output but not its composition
  - affects both the level and composition of output
  - affects only the price level
  - is neutral
  - none of the above
10. If the Ricardian equivalence proposition is correct, then
- deficits harm future generations.
  - deficits reduce investment spending.
  - deficits stimulate the economy in the short run.
  - all of the above.
  - none of the above.
11. The more staggered are labor contracts,
- the greater the inflationary effects of a given change in money growth in the medium run
  - the less rapidly the economy will adjust to changes in aggregate demand
  - the more rapidly the economy will adjust to changes in aggregate demand
  - the less inflationary effects of a given change in money growth in the medium run
12. Monetary policy affects which of the following variables in the long run?
- the level of output.
  - the rate of unemployment.
  - the rate of inflation.
  - the real interest rate.
  - all of the above.
13. The Taylor rule (where  $a$  and  $b$  are positive parameters) is represented by:
- $i = i^* + a(p^* - p) - b(u_n - u)$
  - $i = i^* + a(p - p^*) + b(u - u_n)$
  - $i = i^* + a(p^* - p) - b(u - u_n)$
  - none of the above
14. Monetary policy has short-run effects on which of the following?
- the level of output but not its composition
  - only the price level
  - both the level and composition of output
  - only the nominal interest rate, not the real interest rate
  - none of the above
15. For this question, assume that there exists uncertainty about the impact of monetary policy on the macroeconomy. Given this information, it would be most appropriate for the central bank to increase money growth
- at the midpoint of a recession.
  - by more than the increase that will yield the desired response.
  - by less than the increase that will yield the desired response.
  - by an amount equal to the increase that will yield the desired response.
  - only after it is certain that the economy has entered a recession.
16. Research for a number of OECD countries suggests that inflation will be lower:
- the more independent the central bank
  - the less independent the central bank
  - if the heads of central banks are chosen by election
  - when the terms of the heads of central banks coincide with the terms of elected officials
17. Who is best known for arguing about the long and variable lags of monetary policy?
- Friedman
  - Keynes
  - Phillips
  - Greenspan
  - Bernanke
18. Which of the following represents debt monetization?
- an increase in the budget deficit that is financed by money creation.
  - an increase in the budget deficit that is financed by foreign investors' purchases of domestic bonds.
  - an increase in the budget deficit that coincides with a central bank sale of bonds.
  - an open market purchase of bonds that results in inflation.
  - none of the above.

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19. Which of the following would NOT be included in an orthodox stabilization program?
- a. a tax increase
  - b. a reduction in government spending
  - c. wage and price controls
  - d. a reduction in the money supply
  - e. both a and b
20. Use the IS-LM model in which the nominal interest rate is on the vertical axis to answer this question. Initially assume that expected inflation is zero. Suppose individuals suddenly expect deflation. This expected deflation will cause which of the following?
- a. the IS curve shifts to the left.
  - b. the IS curve shifts to the right, and the LM curve shifts down
  - c. the LM curve shifts up.
  - d. the LM curve shifts down and the IS curve shifts to the right.
  - e. none of the above.

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國立中山大學 98 學年度經濟學研究所招生考試試題： 總體經濟學

二、 問答題 (30%)

何謂 classical dichotomy? 請您自行設定一總體經濟理論模型, 據以分析並展現 classical dichotomy 之性質。

三、 解釋名詞 (20%, 每小題各 10%)

請就以下三小題經濟學名詞, 任選二題解釋該名詞並闡述其意義。請勿多選——三題皆選答者, 將以得分較低之二小題計分。

1. Fisher effect
2. golden-rule capital stock
3. Solow residual