國立中山大學 經濟學研究所 碩士班招生考試試題: 總體經濟學 92 學年度

一、 多重選擇題 (每小題 5 分)

1. In a flexible exchange rate system, the demand for dollar assets will shift leftward and the dollar depreciate if (a) the residents come to believe that the dollar will depreciate. (b) U.S. interest rates fall. (c) U.S. real GDP increases. (d) U.S. real GDP decreases.
2. The labor supply curve slopes upward because (a) households will use their time efficiently and will have a stronger incentive to work when real wages rise. (b) households will use their time efficiently and will have a stronger incentive to work when real wages fall. (c) firms will want more labor when real wages fall. (d) leisure will become more expensive when the price level fall relative to the nominal wages.
3. The undergound economy is all economic activity that (a) produces intermediate goods or services. (b) is not taxed. (c) is legal or illegal in itself but is unreported. (d) has negative social value.
4. Aggregate demand for real GDP will rise when the price level falls because of (a) international substitution effect. (b) intertemporal substitution effect. (c) real money balance effect. (d) Keynes effect.
5. The rate of time preference is (a) the timing of investment decisions by firms. (b) always the same as the real interest rate. (c) never the same as the real interest rate. (d) the real return on savings desired by households who save.
6. Neoclassical growth theory predicts that (a) the growth rates of all economies will diverge. (b) the growth rates of all economies will converge. (c) conditional convergence. (d) capital is constant over time.
7. In the new growth theory, an increase in the return to knowledge (a) implies that the real interest rate is permanently less than the rate of the time preference. (b) raises the real interest rate. (c) raises the supply of knowledge. (d) implies that the real interest rate is permanently greater than the rate of the time preference..
8. One policy that would increase the saving rate would be (a) reducing taxes on the returns to saving. (b) raising taxes on the returns to investment. (c) taxing consumption. (d) raising taxes on saving.
9. Debt financing occurs when (a) the Treasury prints money rather than sell bonds. (b) households and firms buy bonds from the Treasury. (c) the central bank buys bonds from the Treasury. (d) the central bank sells bonds to the Treasury.

10. According to Robert Barro, deficits with debt financing may result in (a) worse inflation than with money financing because of expectations of monetary financing. (b) worse crowding out if taxpayers expect more debt financing during a recession. (c) no crowding out if taxpayers understand that increased current debt will require increased future taxes and they increase saving. (d) the economy growing slower than it would with money financing.
11. The real-world money multiplier will fall if (a) people increase their demand for money. (b) the required reserve ratio of banks increases. (c) people decide to hold in currency part of any payments received. (d) people spend a smaller fraction of their income on vocation travel.
12. In the new-classical rational expectations theory of the business cycle, an unanticipated increase in aggregate demand (a) reduces real wage, increasing employment and output. (b) increases real wage, reducing employment and output. (c) increases real wage, increasing employment and output. (d) reduces real wage, reducing employment and output.

二、 考慮以下總體經濟模型

$$\text{IS:} \quad Y = C(Y(1-\pi), A) + I(R) + G, \qquad 0 < C_{Y_d}, C_A < 1,\ I' < 0 \tag{1}$$

$$\text{LM:} \quad M/P = L(Y, R, A), \qquad L_Y > 0,\ L_R < 0,\ 0 < L_A < 1 \tag{2}$$

$$\dot{B} + \dot{M} = P(G - \pi Y), \qquad \dot{B} = \frac{dB}{dt},\ \dot{M} = \frac{dM}{dt},\ t = \text{real time.} \tag{3}$$

其中: Y = 實質所得, $Y_d = (1-\pi)Y$ = 實質可支配所得,
π = 固定之所得稅率, P = 固定之物價水準, R = 利率水準,
$A = (M+B)/P$ = 實質資產, M = 貨幣數量, B = 政府債券金額,
C = 實質消費支出, I = 實質投資支出, G = 實質政府支出,
L = 實質貨幣需求, (3) = 政府融資預算赤字之限制條件。

請分析上述模型以回答下列問題:

1. 請導出「政府以貨幣融資(money finance) 其財政赤字之靜止均衡 (steady state)」此一條件下的 財政支出乘數 $\frac{dY}{dG}$，並闡述此結果。 (15%)
2. 若政府改用債券融資(bond finance) 其財政赤字, 請導出此經濟體系維持 動態調整之安定 (dynamic stability) 的一個必要條件爲:「債券融資必須能提高短期均衡所得，亦即 $\frac{\partial Y}{\partial B} > 0$」。 (15%)
3. 請說明: 第 2 小題所要求之安定必要條件, 在本模型中 與財富效果 (wealth effect) 有何關聯? (10%)

1. **Explain the following terms:**
   (a) Coase Theorem; (2%)
   (b) rent seeking; (2%)
   (c) network externalities; (2%)
   (d) First Theorem of Welfare Economics; (2%)
   (e) Benthamite welfare functions. (2%)

2. **A worker can produce *x* units of output at a cost of** $c(x) = x^2/a$, where $a > 0$. **His reservation utility level is** $\bar{u} = b, b > 0$.

   (a). What is the optimal wage-labor incentive scheme *s*(*x*) for this worker? (5%) (b) what would the worker be willing to pay to rent the production technology? (5%)

3. **Consider a sealed bid auction among *n* people for some good.**

   Let v_i **be the value of the good to person *i*. The good is sold to the highest bidder at the *second* highest price bid. What is the dominant strategy for person *i* to bid? (10%)**

4. **(a) True or false? Information goods like books and videos are often rented or shared as well as purchased. Rental or purchase can be more profitable depends on how transaction costs compare with production costs. (5%)**
   (b) Suppose that the marginal cost of producing an extra video is zero and the transaction cost of renting a video is zero. Does a producer make more money by selling the video or by renting it? (5%)

5. **Suppose that the government wants to control the use of the commons, what methods exist for achieving the efficient level of use? (5%) Discuss the feasibility for each method in practice. (5%)**

6. **Suppose that we say that an allocation x is socially preferred to an allocation y only if *everyone* prefers x to y. What shortcoming does this have as a rule for making social decisions? (10%)**

7. What is the dominant Nash equilibrium strategy for the repeated prisoner's dilemma when both players know that the game will end after twenty repetitions? (5%) Will the strategy space of each player be different from that of one time play? And why? (5%)

8. Suppose that we have two firms that face a linear demand curve $p(Y) = a - bY$ and have constant marginal costs, c, for each firm. Firm 1 acts as a Stackelberg leader. Solve for the Stackelberg equilibrium output. (10%)

9. Suppose that a monopolist sells to two groups that have constant elasticity demand curve, with elasticity ε_1 and ε_2. The marginal cost of production is constant at c. What price is charged to each group? (10%)

10. (a) True or false? In a two good model if one good is an inferior good the other good must be a luxury good. (5%)

    (b) If a consumer has a utility function $u(x_1, x_2) = x_1 \cdot x_2^a$, what fraction of her income will she spend on good 2? (5%)

Answer the following five questions, equally weighted

1.(20%) Suppose that the two-dimensional vectors (X_1, Y_1), $(X_2, Y_2), ..., (X_n, Y_n)$ form a random sample from a bivariate normal distribution for which the means of X and Y are unknown but the variance of X and Y and the correlation between X and Y are known. Find the MLE's of the means.

Hint: Let $\mathbf{X} \equiv (X_1, X_2, ..., X_m)'$ be an $m \times 1$ random vector. If the joint density of $\mathbf{X}$ is in the form of

$$f(\mathbf{x}) = (2\pi)^{-m/2}|\Sigma|^{-1/2}\exp(-1/2)(\mathbf{x}-\boldsymbol{\mu})'\Sigma^{-1}(\mathbf{x}-\boldsymbol{\mu}),$$

then ~~the~~ we say that $\mathbf{X}$ follows a multivariate normal distribution, denoted as $\mathbf{X} \sim N_m(\mu, \Sigma)$, where $\boldsymbol{\mu}$ and Σ are $\mathbf{X}$'s mean vector and variance-covariance matrix, respectively.

2.(20%) Show that the MLE estimators in problem 1 are consistent.

3.(20%) In a normal random sample of size 30, we have $\bar{X} = 55$ and $S^2 = 225$. Find the 95% confidence interval for mean μ and variance σ^2.

4.(20%) Let X and Y be two independent random variables with pdf's

$$f_X(x) = e^{-x} \quad x > 0$$

and

$$f_Y(y) = e^{-y} \quad y > 0.$$

Define $Z = X + Y$. Find the pdf of Z.

5.(20%) Suppose that X is a Poisson random variable having pdf

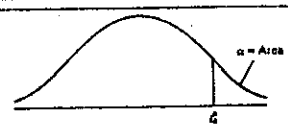
$$f_X(x) = \frac{e^{-\lambda}\lambda^x}{x!} \quad x = 0, 1, ...$$

Find the moment-generating function for X.

TABLE 1. Area $\Phi(z)$ under the normal density to the left of z

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
.0	.5000	.5040	.5080	.5120	.5160	.5199	.5239	.5279	.5319	.5359
.1	.5398	.5438	.5478	.5517	.5557	.5596	.5636	.5675	.5714	.5753
.2	.5793	.5832	.5871	.5910	.5948	.5987	.6026	.6064	.6103	.6141
.3	.6179	.6217	.6255	.6293	.6331	.6368	.6406	.6443	.6480	.6517
.4	.6554	.6591	.6628	.6664	.6700	.6736	.6772	.6808	.6844	.6879
.5	.6915	.6950	.6985	.7019	.7054	.7088	.7123	.7157	.7190	.7224
.6	.7257	.7291	.7324	.7357	.7389	.7422	.7454	.7486	.7517	.7549
.7	.7580	.7611	.7642	.7673	.7704	.7734	.7764	.7794	.7823	.7852
.8	.7881	.7910	.7939	.7967	.7995	.8023	.8051	.8078	.8106	.8133
.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	.9929	.9931	.9932	.9934	.9936
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	.9996	.9997
3.4	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9998

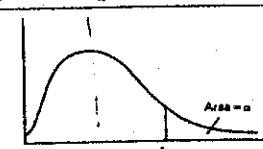
TABLE 2 UPPER QUANTILES OF THE t-DISTRIBUTION



k	$t_{.25}$	$t_{.1}$	$t_{.075}$	$t_{.05}$	$t_{.025}$	$t_{.01}$	$t_{.005}$
1	1.000	1.376	1.963	3.078	6.314	12.706	31.821	63.657
2	.817	1.061	1.386	1.886	2.920	4.303	6.965	9.925
3	.765	.978	1.250	1.638	2.353	3.183	4.541	5.841
4	.741	.941	1.190	1.533	2.132	2.776	3.747	4.604
5	.727	.920	1.156	1.476	2.015	2.571	3.365	4.032
6	.718	.906	1.134	1.440	1.943	2.447	3.143	3.707
7	.711	.896	1.119	1.415	1.895	2.365	2.998	3.500
8	.706	.889	1.108	1.397	1.860	2.306	2.896	3.355
9	.703	.883	1.100	1.383	1.833	2.262	2.821	3.250
10	.700	.879	1.093	1.372	1.813	2.228	2.764	3.169
11	.697	.876	1.088	1.363	1.796	2.201	2.718	3.106
12	.696	.873	1.083	1.356	1.782	2.179	2.681	3.055
13	.694	.870	1.079	1.350	1.771	2.160	2.650	3.012
14	.692	.868	1.076	1.345	1.761	2.145	2.624	2.977
15	.691	.866	1.074	1.341	1.753	2.132	2.602	2.947
16	.690	.865	1.071	1.337	1.746	2.120	2.583	2.921
17	.689	.863	1.069	1.333	1.740	2.110	2.567	2.898
18	.688	.862	1.067	1.330	1.734	2.101	2.552	2.878
19	.688	.861	1.066	1.328	1.729	2.093	2.539	2.861
20	.687	.860	1.064	1.325	1.725	2.086	2.528	2.845
21	.686	.859	1.063	1.323	1.721	2.080	2.518	2.831
22	.686	.858	1.061	1.321	1.717	2.074	2.508	2.819
23	.685	.858	1.060	1.319	1.714	2.069	2.500	2.807
24	.685	.857	1.059	1.318	1.711	2.064	2.492	2.797
25	.684	.856	1.058	1.316	1.708	2.060	2.485	2.787
26	.684	.856	1.058	1.315	1.706	2.056	2.479	2.779
27	.684	.855	1.057	1.314	1.703	2.052	2.473	2.771
28	.683	.855	1.056	1.313	1.701	2.048	2.467	2.763
29	.683	.854	1.055	1.311	1.699	2.045	2.462	2.756
30	.683	.854	1.055	1.310	1.697	2.042	2.457	2.750
40	.681	.851	1.050	1.303	1.684	2.021	2.423	2.705
50	.679	.849	1.047	1.299	1.676	2.009	2.403	2.678
60	.679	.848	1.046	1.296	1.671	2.000	2.390	2.660
70	.678	.847	1.044	1.294	1.667	1.995	2.381	2.648
80	.678	.846	1.043	1.292	1.664	1.990	2.374	2.639
90	.677	.846	1.043	1.291	1.662	1.987	2.368	2.632
100	.677	.845	1.042	1.290	1.660	1.984	2.364	2.626
∞	.674	.842	1.036	1.282	1.645	1.960	2.326	2.576

Adapted from R. N. Goldman and J. S. Weinberg, *Statistics—An Introduction* (Englewood Cliffs, NJ: Prentice Hall, 1985), 681.

TABLE 3 UPPER QUANTILES OF THE χ^2 DISTRIBUTION



k	$\chi^2_{.995}$	$\chi^2_{.99}$	$\chi^2_{.975}$	$\chi^2_{.95}$	$\chi^2_{.90}$	$\chi^2_{.10}$	$\chi^2_{.05}$	$\chi^2_{.025}$	$\chi^2_{.01}$	$\chi^2_{.005}$
1	.00	.00	.00	.00	.02	2.71	3.84	5.02	6.63	7.88
2	.01	.02	.05	.10	.21	4.61	5.99	7.38	9.21	10.60
3	.07	.11	.22	.35	.58	6.25	7.81	9.35	11.34	12.84
4	.21	.30	.48	.71	1.06	7.78	9.49	11.14	13.28	14.86
5	.41	.55	.83	1.15	1.61	9.24	11.07	12.83	15.09	16.75
6	.68	.87	1.24	1.64	2.20	10.64	12.59	14.45	16.81	18.55
7	.99	1.24	1.69	2.17	2.83	12.02	14.07	16.01	18.48	20.28
8	1.34	1.65	2.18	2.73	3.49	13.36	15.51	17.54	20.09	21.96
9	1.73	2.09	2.70	3.33	4.17	14.68	16.92	19.02	21.67	23.59
10	2.16	2.56	3.25	3.94	4.87	15.99	18.31	20.48	23.21	25.19
11	2.60	3.05	3.82	4.57	5.58	17.28	19.68	21.92	24.72	26.76
12	3.07	3.57	4.40	5.23	6.30	18.55	21.03	23.34	26.22	28.30
13	3.57	4.11	5.01	5.89	7.04	19.81	22.36	24.74	27.69	29.82
14	4.07	4.66	5.63	6.57	7.79	21.06	23.68	26.12	29.14	31.32
15	4.60	5.23	6.26	7.26	8.55	22.31	25.00	27.49	30.58	32.80
16	5.14	5.81	6.91	7.96	9.31	23.54	26.30	28.85	32.00	34.27
17	5.70	6.41	7.56	8.67	10.09	24.77	27.59	30.19	33.41	35.72
18	6.26	7.01	8.23	9.39	10.86	25.99	28.87	31.53	34.81	37.16
19	6.84	7.63	8.91	10.12	11.65	27.20	30.14	32.85	36.19	38.58
20	7.43	8.26	9.59	10.85	12.44	28.41	31.41	34.17	37.57	40.00
21	8.03	8.90	10.28	11.59	13.24	29.62	32.67	35.48	38.93	41.40
22	8.64	9.54	10.98	12.34	14.04	30.81	33.92	36.78	40.29	42.80
23	9.26	10.20	11.69	13.09	14.85	32.01	35.17	38.08	41.64	44.18
24	9.89	10.86	12.40	13.85	15.66	33.20	36.42	39.36	42.98	45.56
25	10.52	11.52	13.12	14.61	16.47	34.38	37.65	40.65	44.31	46.93
26	11.16	12.20	13.84	15.38	17.29	35.56	38.89	41.92	45.64	48.29
27	11.81	12.88	14.57	16.15	18.11	36.74	40.11	43.19	46.96	49.65
28	12.46	13.56	15.31	16.93	18.94	37.92	41.34	44.46	48.28	50.99
29	13.12	14.26	16.05	17.71	19.77	39.09	42.56	45.72	49.59	52.34
30	13.79	14.95	16.79	18.49	20.60	40.26	43.77	46.98	50.89	53.67
50	27.99	29.71	32.36	34.76	37.69	63.17	67.50	71.42	76.15	79.49
100	67.33	70.06	74.22	77.93	82.36	118.5	124.3	129.6	135.8	140.2
500	422.3	429.4	439.9	449.1	459.9	540.9	553.1	563.9	576.5	585.2
1000	888.6	898.8	914.3	927.6	943.1	1058	1075	1090	1107	1119

Adapted from Donald B. Owen, *Handbook of Statistical Tables*, © 1962, Addison-Wesley Publishing, Inc., Reading, Massachusetts. Reprinted with permission of the publisher.