

考 試 科 目	統計學 A	系 所 別	金融學系 金融管理組	考 試 時 間	2 月 4 日 (四) 第 四 節
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Note: Use the level of significance 0.05 for the test of hypothesis if required.

1. (30%) Two stocks are being consider to construct a portfolio. Let X =percent return for an investment in stock X , and Y = percent return for an investment in stock Y . The joint distribution of both stocks is as follows.

Y	X		
	-4	0	5
-3	0.05	0.05	0.10
0	0.10	0.20	0.15
4	0.10	0.15	0.10

It is known that the expected value and variance of Y are 0.8 and 6.76, respectively, and the covariance between X and Y is -1.1. Answer the following questions.

- (a) Find the expected value and variance of X . (10%)
 (b) Find the conditional distribution of X given $Y=0$. (6%)
 (c) Find the correlation between X and Y . (6%)
 (d) Let $Z=aX+bY$, where both a and b are any positive values. Find the expected value and variance of Z . (8%)
2. (35%) The following table contains a random sample of prices for hotel rooms in Cities X and Y .

Hotel	City X	City Y	Hotel	City X	City Y
1	85	125	11	80	115
2	65	110	12	60	75
3	100	105	13	65	100
4	120	120	14	70	90
5	115	85	15	75	115
6	125	115	16	65	160
7	50	65	17	75	65
8	90	60	18	85	80
9	115	95	19	95	60
10	70	105	20	75	85

Assume that the prices for hotel rooms in both cities follow a normal distribution.

- (a) Test whether the population mean of hotel room prices in City X is greater than 75. (7%)

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(b) Find a 99% confidence interval for the difference between the two population means of hotel room prices in both Cities X and Y. (10%)

(c) Can you conclude that the mean price of a hotel room in City X is lower than one in City Y?

(1) Assume that both samples are independent and the population variances of room prices in both cities are equal. (10%)

(2) Assume that the samples from both cities are paired-dependent. (8%)

3. (35%) A personnel director develops the following estimated regression equation relating employees' scores on a job satisfaction test to their length of service, wage rate, and sales regions (namely A, B, and C):

$$\hat{y} = 12.24 - 7.68x_1 + 13.25x_2 - 5.80x_3 + 15.32x_4$$

where

x_1 = length of service (years), x_2 = wage rate (dollars)

$x_3 = \begin{cases} 1 & \text{if sales region B} \\ 0 & \text{otherwise} \end{cases}$, $x_4 = \begin{cases} 1 & \text{if sales region C} \\ 0 & \text{otherwise} \end{cases}$

y = job satisfaction test score (higher scores indicate greater job satisfaction)

A partial computer output from a regression analysis follows.

	Standard error
<i>Constant</i>	8.191
x_1	4.105
x_2	2.805
x_3	4.373
x_4	4.373

ANOVA table

Source of Variation	SS	df	MS	F
Regression	1620.25			
Error		28		
Total				

$s = 5.5$ denotes the estimated standard error for regression

Please answer the following questions.

(a) Complete the analysis of variance (ANOVA) table and conclude the resulting F test. (12%)

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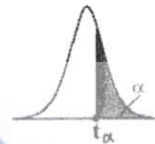
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- (b) Explain the meanings of the estimated coefficients for x_2 and x_3 . (6%)
- (c) Test and conclude which explanatory variable(s) can be dropped. (12%)
- (d) What is the value of the adjusted R^2 ? (5%)

Percentage Points of the t Distribution; $t_{v, \alpha}$

$$P(T > t_{v, \alpha}) = \alpha$$



v	α													
	0.40	0.30	0.20	0.15	0.10	0.05	0.025	0.02	0.015	0.01	0.0075	0.005	0.0025	0.0005
1	0.325	0.727	1.376	1.963	3.078	6.314	12.706	15.895	21.205	31.821	42.434	63.657	127.322	636.590
2	0.289	0.617	1.061	1.386	1.886	2.920	4.303	4.849	5.643	6.965	8.073	9.925	14.089	31.598
3	0.277	0.584	0.978	1.250	1.638	2.353	3.182	3.482	3.896	4.541	5.047	5.841	7.453	12.924
4	0.271	0.569	0.941	1.190	1.533	2.132	2.776	2.999	3.298	3.747	4.088	4.604	5.598	8.610
5	0.267	0.559	0.920	1.156	1.476	2.015	2.571	2.757	3.003	3.365	3.634	4.032	4.773	6.869
6	0.265	0.553	0.906	1.134	1.440	1.943	2.447	2.612	2.829	3.143	3.372	3.707	4.317	5.959
7	0.263	0.549	0.896	1.119	1.415	1.895	2.365	2.517	2.715	2.998	3.203	3.499	4.029	5.408
8	0.262	0.546	0.889	1.108	1.397	1.860	2.306	2.449	2.634	2.896	3.085	3.355	3.833	5.041
9	0.261	0.543	0.883	1.100	1.383	1.833	2.262	2.398	2.574	2.821	2.998	3.250	3.690	4.781
10	0.260	0.542	0.879	1.093	1.372	1.812	2.228	2.359	2.527	2.764	2.932	3.169	3.581	4.587
11	0.260	0.540	0.876	1.088	1.363	1.796	2.201	2.328	2.491	2.718	2.879	3.106	3.497	4.437
12	0.259	0.539	0.873	1.083	1.356	1.782	2.179	2.303	2.461	2.681	2.836	3.055	3.428	4.318
13	0.259	0.538	0.870	1.079	1.350	1.771	2.160	2.282	2.436	2.650	2.801	3.012	3.372	4.221
14	0.258	0.537	0.868	1.076	1.345	1.761	2.145	2.264	2.415	2.624	2.771	2.977	3.326	4.140
15	0.258	0.536	0.866	1.074	1.341	1.753	2.131	2.249	2.397	2.602	2.746	2.947	3.286	4.073
16	0.258	0.535	0.865	1.071	1.337	1.746	2.120	2.235	2.382	2.583	2.724	2.921	3.252	4.015
17	0.257	0.534	0.863	1.069	1.333	1.740	2.110	2.224	2.368	2.567	2.706	2.898	3.222	3.965
18	0.257	0.534	0.862	1.067	1.330	1.734	2.101	2.214	2.356	2.552	2.689	2.878	3.197	3.922
19	0.257	0.533	0.861	1.066	1.328	1.729	2.093	2.205	2.346	2.539	2.674	2.861	3.174	3.883
20	0.257	0.533	0.860	1.064	1.325	1.725	2.086	2.197	2.336	2.528	2.661	2.845	3.153	3.850
21	0.257	0.532	0.859	1.063	1.323	1.721	2.080	2.189	2.328	2.518	2.649	2.831	3.135	3.819
22	0.256	0.532	0.858	1.061	1.321	1.717	2.074	2.183	2.320	2.508	2.639	2.819	3.119	3.792
23	0.256	0.532	0.858	1.060	1.319	1.714	2.069	2.177	2.313	2.500	2.629	2.807	3.104	3.768
24	0.256	0.531	0.857	1.059	1.318	1.711	2.064	2.172	2.307	2.492	2.620	2.797	3.091	3.745
25	0.256	0.531	0.856	1.058	1.316	1.708	2.060	2.167	2.301	2.485	2.612	2.787	3.078	3.725
26	0.256	0.531	0.856	1.058	1.315	1.706	2.056	2.162	2.296	2.479	2.605	2.779	3.067	3.707
27	0.256	0.531	0.855	1.057	1.314	1.703	2.052	2.158	2.291	2.473	2.598	2.771	3.057	3.690
28	0.256	0.530	0.855	1.056	1.313	1.701	2.048	2.154	2.286	2.467	2.592	2.763	3.047	3.674
29	0.256	0.530	0.854	1.055	1.311	1.699	2.045	2.150	2.282	2.462	2.586	2.756	3.038	3.659
30	0.256	0.530	0.854	1.055	1.310	1.697	2.042	2.147	2.278	2.457	2.581	2.750	3.030	3.646
40	0.255	0.529	0.851	1.050	1.303	1.684	2.021	2.123	2.250	2.423	2.542	2.704	2.971	3.551
60	0.254	0.527	0.848	1.045	1.296	1.671	2.000	2.099	2.223	2.390	2.504	2.660	2.915	3.460
120	0.254	0.526	0.845	1.041	1.289	1.658	1.980	2.076	2.196	2.358	2.468	2.617	2.860	3.373
∞	0.253	0.524	0.842	1.036	1.282	1.645	1.960	2.054	2.170	2.326	2.432	2.576	2.807	3.291

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F - Distribution ($\alpha = 0.05$ in the Right Tail)

df ₂	df ₁	Numerator Degrees of Freedom								
		1	2	3	4	5	6	7	8	9
1		161.45	199.50	215.71	224.58	230.16	233.99	236.77	238.88	240.54
2		18.513	19.000	19.164	19.247	19.296	19.330	19.353	19.371	19.385
3		10.128	9.5521	9.2766	9.1172	9.0135	8.9406	8.8867	8.8452	8.8123
4		7.7086	9.9443	6.5914	6.3882	6.2561	6.1631	6.0942	6.0410	6.9988
5		6.6079	5.7861	5.4095	5.1922	5.0503	4.9503	4.8759	4.8183	4.7725
6		5.9874	5.1433	4.7571	4.5337	4.3874	4.2839	4.2067	4.1468	4.0990
7		5.5914	4.7374	4.3468	4.1203	3.9715	3.8660	3.7870	3.7257	3.6767
8		5.3177	4.4590	4.0662	3.8379	3.6875	3.5806	3.5005	3.4381	3.3881
9		5.1174	4.2565	3.8625	3.6331	3.4817	3.3738	3.2927	3.2296	3.1789
10		4.9646	4.1028	3.7083	3.4780	3.3258	3.2172	3.1355	3.0717	3.0204
11		4.8443	3.9823	3.5874	3.3567	3.2039	3.0946	3.0123	2.9480	2.8962
12		4.7472	3.8853	3.4903	3.2592	3.1059	2.9961	2.9134	2.8486	2.7964
13		4.6672	3.8056	3.4105	3.1791	3.0254	2.9153	2.8321	2.7669	2.7144
14		4.6001	3.7389	3.3439	3.1122	2.9582	2.8477	2.7642	2.6987	2.6458
15		4.5431	3.6823	3.2874	3.0556	2.9013	2.7905	2.7066	2.6408	2.5876
16		4.4940	3.6337	3.2389	3.0069	2.8524	2.7413	2.6572	2.5911	2.5377
17		4.4513	3.5915	3.1968	2.9647	2.8100	2.6987	2.6143	2.5480	2.4943
18		4.4139	3.5546	3.1599	2.9277	2.7729	2.6613	2.5767	2.5102	2.4563
19		4.3807	3.5219	3.1274	2.8951	2.7401	2.6283	2.5435	2.4768	2.4227
20		4.3512	3.4928	3.0984	2.8661	2.7109	2.5990	2.5140	2.4471	2.3928
21		4.3248	3.4668	3.0725	2.8401	2.6848	2.5727	2.4876	2.4205	2.3660
22		4.3009	3.4434	3.0491	2.8167	2.6613	2.5491	2.4638	2.3965	2.3419
23		4.2793	3.4221	3.0280	2.7955	2.6400	2.5277	2.4422	2.3748	2.3201
24		4.2597	3.4028	3.0088	2.7763	2.6207	2.5082	2.4226	2.3551	2.3002
25		4.2417	3.3852	2.9912	2.7587	2.6030	2.4904	2.4047	2.3371	2.2821
26		4.2252	3.3690	2.9752	2.7426	2.5868	2.4741	2.3883	2.3205	2.2655
27		4.2100	3.3541	2.9604	2.7278	2.5719	2.4591	2.3732	2.3053	2.2501
28		4.1960	3.3404	2.9467	2.7141	2.5581	2.4453	2.3593	2.2913	2.2360
29		4.1830	3.3277	2.9340	2.7014	2.5454	2.4324	2.3463	2.2783	2.2229
30		4.1709	3.3158	2.9223	2.6896	2.5336	2.4205	2.3343	2.2662	2.2107
40		4.0847	3.2317	2.8387	2.6060	2.4495	2.3359	2.2490	2.1802	2.1240
60		4.0012	3.1504	2.7581	2.5252	2.3683	2.2541	2.1665	2.0970	2.0401
120		3.9201	3.0718	2.6802	2.4472	2.2899	2.1750	2.0868	2.0164	1.9588
∞		3.8415	2.9957	2.6049	2.3719	2.2141	2.0986	2.0096	1.9384	1.8799

備

註

- 一、作答於試題上者，不予計分。
- 二、試題請隨卷繳交。