

系所別: 產業經濟研究所 乙組 科目: 統計學

參考用

Statistics (65%)

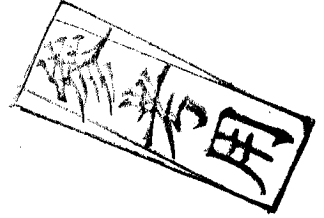
1. The following table gives the joint distribution $P(X, Y)$ of random variables X and Y where X = the first-year rate of return (%) expected from project A and Y = the first-year rate of return (%) expected from project B .

$X \backslash Y$	-10	0	20	30
20	0.27	0.08	0.16	0.00
50	0.00	0.04	0.10	0.35

- (a) Calculate the expected rate of return from project B , $E(Y)$. (7%)
(b) Are the rates of return of the two projects independent? (8%)
2. What is the probability of
(a) A 6 on each die in rolling 2 dice once? (5%)
(b) A total of 5 in rolling 2 dice simultaneously? (5%)
(c) Three girls in a family with 3 children? (5%)
3. Market shares are very important to food companies. A producer of fast foods was fairly certain that her brand had a 12% share of the fast food market. If a market survey involving 3000 consumers of fast foods, $x=311$ expressed a preference for her brand. If 12% figure is correct, would that be unusual to find that 311 of the 3000 consumers preferred her brand of fast foods? (15%)
4. The number of peanuts contained in a jar follows the normal distribution but we do not know its mean and standard deviation, both measured in ounces. Twenty jars were selected randomly and it was found that the sample mean was 6.5 ounces and the sample standard deviation was 2 ounces. Test the hypothesis that the true mean value was 7.5 ounces against the hypothesis that it is different from 7.5. Use $\alpha=1\%$. (20%)

注意: 背面有試題

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Basic Econometrics (35%)

1. State with reason whether the following statements are true, false, or uncertain.
 - (a) If there is no intercept in the regression model, the sum of residuals will not be zero. (5%)
 - (b) The assumptions made by the classical linear regression model are not necessary to compute ordinary least squares (i.e. OLS) estimators. (5%)
 - (c) The OLS estimator $\hat{\beta}$ s each follows the normal distribution only if the error term in the regression model follows the normal distribution. (5%)

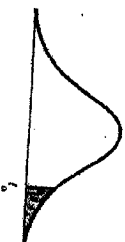
2. A three-variable regression (i.e., $Y = \alpha_1 + \alpha_2 X_2 + \alpha_3 X_3 + \varepsilon$) gave the following results:

Source of variation	Sum of squares (SS)	Degree of freedom (d.f.)	Mean sum of squares (MSS)
Due to regression (ESS)	65,965	—	—
Due to residual (RSS)	—	—	—
Total (TSS)	66,042	14	

- (a) What is the sample size? (4%)
- (b) What are the d.f. of the ESS and RSS? (5%)
- (c) What is R^2 ? (4%)
- (d) Test the hypothesis that X_2 and X_3 have zero influence on Y . Which test do you use and why? (7%)

資料用

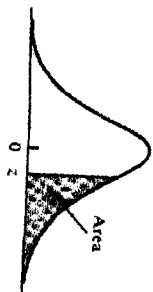
Table 5
Percentage points of the t distributions



$t_{.100}$	$t_{.050}$	$t_{.025}$	$t_{.010}$	$t_{.005}$	d.f.
3.078	6.314	12.706	31.821	63.657	1
1.886	2.920	4.303	6.965	9.925	2
1.638	2.353	3.182	4.541	5.841	3
1.533	2.132	2.776	3.747	4.604	4
1.476	2.015	2.571	3.365	4.032	5
1.440	1.943	2.447	3.143	3.707	6
1.415	1.895	2.365	2.998	3.499	7
1.397	1.860	2.306	2.896	3.355	8
1.383	1.833	2.262	2.821	3.250	9
1.372	1.812	2.228	2.764	3.169	10
1.363	1.796	2.201	2.718	3.106	11
1.356	1.782	2.179	2.681	3.055	12
1.350	1.771	2.160	2.650	3.012	13
1.345	1.761	2.145	2.624	2.977	14
1.341	1.753	2.131	2.602	2.947	15
1.337	1.746	2.120	2.583	2.921	16
1.333	1.740	2.110	2.567	2.898	17
1.330	1.734	2.101	2.552	2.878	18
1.328	1.729	2.093	2.539	2.861	19
1.325	1.725	2.086	2.528	2.845	20
1.323	1.721	2.080	2.518	2.831	21
1.321	1.717	2.074	2.508	2.819	22
1.319	1.714	2.069	2.500	2.807	23
1.318	1.711	2.064	2.492	2.797	24
1.316	1.708	2.060	2.485	2.787	25
1.315	1.706	2.056	2.479	2.779	26
1.314	1.703	2.052	2.473	2.771	27
1.313	1.701	2.048	2.467	2.763	28
1.311	1.699	2.045	2.462	2.756	29
1.282	1.645	1.960	2.326	2.576	inf.

From "Table of Percentage Points of the t-Distribution,"
Computed by Maxine Wertington, *Biometrika*, Vol. 32 (1941), p.
300. Reproduced by permission of Professor E. S. Pearson.

Table 4
Normal curve areas
Standard normal probability in right-hand
tail (for negative values of z areas are found
by symmetry)



z	Second decimal place of z									
	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.5000	.4960	.4920	.4880	.4840	.4801	.4761	.4721	.4681	.4641
0.1	.4602	.4562	.4522	.4483	.4443	.4404	.4364	.4325	.4286	.4247
0.2	.4207	.4168	.4129	.4090	.4052	.4013	.3974	.3936	.3897	.3859
0.3	.3821	.3783	.3745	.3707	.3669	.3632	.3594	.3557	.3520	.3483
0.4	.3446	.3409	.3372	.3336	.3300	.3264	.3228	.3192	.3156	.3121
0.5	.3085	.3050	.3015	.2981	.2946	.2912	.2877	.2843	.2810	.2776
0.6	.2743	.2709	.2676	.2643	.2611	.2578	.2546	.2514	.2483	.2451
0.7	.2420	.2389	.2358	.2327	.2296	.2266	.2236	.2206	.2177	.2148
0.8	.2119	.2090	.2061	.2033	.2005	.1977	.1949	.1922	.1894	.1867
0.9	.1841	.1814	.1788	.1762	.1736	.1711	.1685	.1660	.1635	.1611
1.0	.1587	.1562	.1539	.1515	.1492	.1469	.1446	.1423	.1401	.1379
1.1	.1357	.1335	.1314	.1292	.1271	.1251	.1230	.1210	.1190	.1170
1.2	.1151	.1131	.1112	.1093	.1075	.1056	.1038	.1020	.1003	.0985
1.3	.0968	.0951	.0934	.0918	.0901	.0885	.0869	.0853	.0838	.0823
1.4	.0808	.0793	.0778	.0764	.0749	.0735	.0722	.0708	.0694	.0681
1.5	.0668	.0655	.0643	.0630	.0618	.0606	.0594	.0582	.0571	.0559
1.6	.0548	.0537	.0526	.0516	.0505	.0495	.0485	.0475	.0465	.0455
1.7	.0446	.0436	.0427	.0418	.0409	.0401	.0392	.0384	.0375	.0367
1.8	.0359	.0352	.0344	.0336	.0329	.0322	.0314	.0307	.0301	.0294
1.9	.0287	.0281	.0274	.0268	.0262	.0256	.0250	.0244	.0239	.0233
2.0	.0228	.0222	.0217	.0212	.0207	.0202	.0197	.0192	.0188	.0183
2.1	.0179	.0174	.0170	.0166	.0162	.0158	.0154	.0150	.0146	.0143
2.2	.0139	.0136	.0132	.0129	.0125	.0122	.0119	.0116	.0113	.0110
2.3	.0107	.0104	.0102	.0099	.0096	.0094	.0091	.0089	.0087	.0084
2.4	.0082	.0080	.0078	.0075	.0073	.0071	.0069	.0068	.0066	.0064
2.5	.0062	.0060	.0059	.0057	.0055	.0054	.0052	.0051	.0049	.0048
2.6	.0047	.0045	.0044	.0043	.0041	.0040	.0039	.0038	.0037	.0036
2.7	.0035	.0034	.0033	.0032	.0031	.0030	.0029	.0028	.0027	.0026
2.8	.0026	.0025	.0024	.0023	.0023	.0022	.0021	.0021	.0020	.0019
2.9	.0019	.0018	.0017	.0017	.0016	.0016	.0015	.0015	.0014	.0014
3.0	.00135									
3.5	.000233									
4.0	.0000317									
4.5	.00000340									
5.0	.000000287									

From R. E. Walpole, *Introduction to Statistics* (New York: Macmillan, 1968).