

Econ 321 Ass 10

$$\bar{x}_0 = \frac{269 + 249.3 + 255.2 + 252.7 + 247.8 + 261.6}{6}$$

$$= 255.8$$

$$S_0 = \sqrt{\frac{(269 - 255.8)^2 + (249.3 - 255.8)^2 + (255.2 - 255.8)^2 + \dots + (261.6 - 255.8)^2}{6 - 1}}$$

$$= 8.216$$

$$\bar{x}_D = \frac{268.8 + 260 + 273.5 + 253.9 + 278.5 + 289.4 + 261.8 + 280.2}{8}$$

$$= 270.7375$$

$$S_0 = 11.903$$

$$H_0: \mu_D = \mu_0$$

$$H_a: \mu_D \neq \mu_0$$

Use t test Difference of means.

$$t = \frac{\bar{x}_D - \bar{x}_0 - (\mu_D - \mu_0)}{\sqrt{\frac{S_D^2}{n_D} + \frac{S_0^2}{n_0}}}$$

$$= \frac{270.7375 - 255.8 - 0}{\sqrt{\frac{11.903^2}{8} + \frac{8.216^2}{6}}}$$

$$= 2.7705709$$

$$= 2.776 \text{ 3dp.}$$

$$\Delta = \frac{\left(\frac{S_D^2}{n_D} + \frac{S_0^2}{n_0}\right)^2}{\frac{\left(\frac{S_D^2}{n_D}\right)^2}{n_D - 1} + \frac{\left(\frac{S_0^2}{n_0}\right)^2}{n_0 - 1}}$$

$$= \frac{\left(\frac{8.216^2}{6} + \frac{11.903^2}{8}\right)^2}{\frac{(8.216^2)^2}{6} + \frac{(11.903^2)^2}{8}} = 11.96 \approx 11$$

$$P = P(t > 2.776) \Rightarrow 0.01 < p < 0.02$$

~~the is~~

We can reject the null hypothesis with 99% confidence.

$$\begin{aligned} 2 \quad \bar{A} &= \frac{27.2 + 28.1 + 27.2 + 19.7 + 24.5 + 22.1}{6} \\ &= 24.7 \\ \bar{B} &= \frac{24.1 + 19.3 + 26.8 + 20.1 + 27.2 + 29.8}{6} \\ &= 24.617 \end{aligned}$$

Differences

$$27.2 - 24.1 = 3.1$$

$$19.3 - 19.3 = -1.2$$

$$27.2 - 26.8 = 0.4$$

$$19.7 - 20.1 = -0.4$$

$$24.5 - 27.6 = -3.1$$

$$22.1 - 29.8 = -7.7$$

$$\text{Mean} = \frac{\sum \text{Differences}}{6}$$

$$= -1.4833$$

$$\text{std dev} = \frac{\sum (d_i - \text{mean})^2}{6}$$

$$= 3.6625$$

$$H_0: \mu_0 = 0$$

$$H_a: \mu_0 \neq 0$$

$$P = P(t < -0.992) \Rightarrow 0.30 < p < 0.40$$

$$\begin{aligned} t &= \frac{\text{mean} - \mu_0}{\frac{\text{std dev}}{\sqrt{n}}} \\ &= \frac{-1.4833}{\frac{3.6625}{\sqrt{6}}} \\ &= -0.922 \end{aligned}$$

So we can't reject the null hypothesis

$$= -0.922 - 0.992$$

$$df = 5$$

3	2 Days	Rank	6 Days	Rank	$H_0: \mu_1 \geq \mu_2$
	1326	15	1387	27	
	1302	9	1301	8	$H_a: \mu_1 < \mu_2$
	1314	12	1376	25	
	1270	3	1397	29	
	1287	5	1399	30	
	1328	16	1378	26	
	1318	13	1343	20	
	1296	7	1349	21	
	1306	10	1321	14	
	1329	17	1364	22	
	1255	1.5	1332	18	
	1291	11	1396	28	
	1280	1.5	1372	23	
	1291	6	1341	19	
	1280	4	1374	24	
	Sum	131	Sum	334	
	$n_1 = 15$		$n_2 = 15$		

$$\mu = \frac{15(15+15+1)}{2}$$

$$= 232.5$$

$$\sigma = \sqrt{\frac{15 \times 15 (15+15+1)}{12}}$$

$$= 24.1091$$

$$Z = \frac{131 - 232.5}{24.1091}$$

$$= -4.21$$

$$P = P(Z < -4.21) \approx 0$$

We can reject the null hypothesis

4 chi square test

O	E = np	$(O-E)^2/E$
18	23	$\frac{25}{23}$
28	18	$\frac{20}{9}$
14	16	$\frac{4}{4}$
7	13	$\frac{36}{13}$
11	11	0
11	9	$\frac{4}{9}$
10	20	5
9	1	0
30	19	$\frac{121}{19}$

Sum 21.4746

$$df = 9 - 1$$

$$= 8.$$

$$0.005 < P < 0.01$$

We can reject the null hypothesis.

so theoretical model does explain observed well

H_0 : theory is good model

H_a : theory isn't