01 April 2024 09:04 PM

$$Z = \frac{(\bar{p}_1 - \bar{p}_2) - (P_1 - P_2)}{\sqrt{\bar{p}(1-\bar{p})\left(\frac{1}{n_1}+\frac{1}{n_2}\right)}}$$

δ

P 2

$$\boxed{\bar{p} = \frac{n_1\bar{p}_1 + n_2\bar{p}_2}{n_1+n_2}}$$

$H_0 : P_1 = P_2$

$H_1 : P_1 \neq P_2$

$$\bar{p} = \frac{(600 \times 0.015) + (600 \times 0.017)}{1200} = 0.016$$

$$Z = \frac{0.015 - 0.017 - 0}{\sqrt{0.016 \times 0.98 \left(\frac{1}{600}+\frac{1}{600}\right)}} = \frac{-0.002}{\sqrt{0.005278}} = -0.0276$$

$Z_{0.025} = 1.96$

$\alpha = 0.05$

$\alpha/2 = 0.05/2 = 0.025$

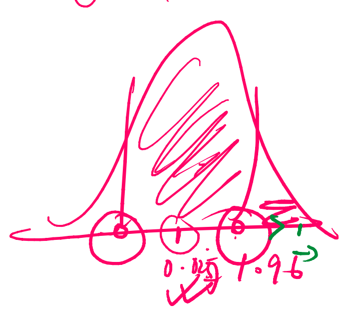
0.0276 < 1.96

accept

cal Z < tab Z

reject

2.3

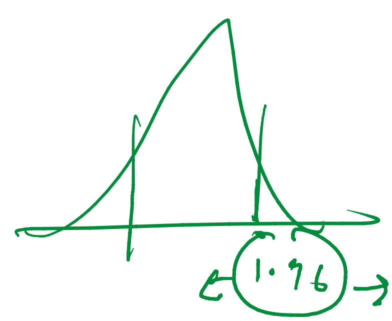


Summary

0.027 < 1.96

Cal Z < tab Z

accepted



critical value

$\hookrightarrow$ critical value

Summary < equality of two population mean $\rightarrow \mu_1 = \mu_2$
equality of two population proportion $\rightarrow P_1 = P_2$

Equality of variance

i.e., $H_0: \frac{s_1^2}{s_2^2} = 1$

v/s $H_1: \frac{s_1^2}{s_2^2} \neq 1 \rightarrow$ two-tail

$\gtrless 1$ } one-tail

$\hookrightarrow$ F-test $\quad F = \frac{\sigma_1^2}{\sigma_2^2} \sim F_{n_1-1, n_2-1}$

one-sample

$z = \bar{x}-\mu / \sigma\sqrt{n} \rightarrow z_\alpha$

$t = \frac{\bar{x}-\mu}{s/\sqrt{n}} \sim t_{n-1}$

two $z = \frac{(\bar{x}_1-\bar{x}_2)-(\mu_1-\mu_2)}{\sqrt{\frac{\sigma_1^2}{n_1}+\frac{\sigma_2^2}{n_2}}} \sim z$

$t = \frac{(\bar{x}_1-\bar{x}_2)-(\mu_1-\mu_2)}{\sigma\sqrt{\frac{1}{n_1}+\frac{1}{n_2}}} \sim t_{n_1+n_2-1}$

where $\sigma = \sqrt{\frac{n_1\sigma_1^2+n_2\sigma_2^2}{n_1+n_2}}$

$F = \frac{\frac{n_1 s_1^2}{n_1-1}}{\frac{n_2 s_2^2}{n_2-1}}$

equality of variance

Formula $H_0: \frac{s_1^2}{s_2^2} = 1$

$H_1: \frac{s_1^2}{s_2^2} \neq 1$

Z, t, F and χ^2

z, t

13.14

Compare The equality of variance

F

13.14

$n_1 = 16 \qquad n_2 = 21$

$\bar{x}_1 = 1200 \qquad \bar{x}_2 = 1300$

$\bar{x}_1 = 1200$ $\bar{x}_2 = 1300$

$\sigma_1 = 60$ $\sigma_2 = 50$

$H_0: \sigma_1^2 = \sigma_2^2$
$H_1: \sigma_1^2 \neq \sigma_2^2$

$$F = \frac{\frac{n_1 \sigma_1^2}{n_1 - 1}}{\frac{n_2 \sigma_2^2}{n_2 - 1}} = \frac{\frac{16 \times 60^2}{16-1}}{\frac{21 \times 50^2}{21-1}}$$

$n_1 - 1 = 15$
$n_2 - 1 = 20$

$\alpha = 5\% = 0.05$
$\alpha/2$ 0.025

$$= \frac{n_1}{n_1 - 1} \sigma_1^2 \times \frac{n_2 - 1}{n_2 \sigma_2^2} = \frac{16}{15} \times 60^2 \times \frac{20}{21 \times 50^2}$$

$$= \frac{16 \times 60^2 \times 20}{15 \times 21 \times 50^2}$$

$$= \frac{3840}{2625}$$

$F_{cal} = 1.46$

From table

$\boxed{F_{15,20} =}$

$F_{cal} < F_{\alpha, 15, 20}$
accept H_0

$F_{cal} > F_{\alpha, 15, 20}$
reject H_0