

Question Two (4-Points)

A sample of 160 small business owners from city A and a sample of 155 small business owners from city B were interviewed by phone. Each person was asked about the impact on their business of a proposed new piece of legislation. The following counts were obtained.

	Favorable	Not Favorable	
City A	71	89	160
City B	39	116	155

Test whether the proportions who favor the legislation from city A is greater than it from city B. Use $\alpha=0.05$

1. The hypothesis are:

$$H_0: p_1 - p_2 \leq 0 \quad \text{or} \quad p_1 \leq p_2 \quad (1)$$

$$H_A: p_1 - p_2 > 0 \quad \text{or} \quad p_1 > p_2 \quad (1)$$

2. The test statistic value:

$$\bar{p}_1 = \frac{x_1}{n_1} = \frac{71}{160} = 0.44375, \quad \bar{p}_2 = \frac{x_2}{n_2} = \frac{39}{155} = 0.2516$$

$$\bar{p} = \frac{x_1 + x_2}{n_1 + n_2} = \frac{71 + 39}{160 + 155} = 0.3492$$

$$Z_c = \frac{0.44375 - 0.2516 - 0}{\sqrt{(0.3492)(1 - 0.3492)\left(\frac{1}{160} + \frac{1}{155}\right)}} = 3.58 \quad (1)$$

$$Z_\alpha = Z_{0.05} = 1.645$$

Reject H_0 if $Z_c > Z_\alpha$

$$3.58 > 1.645 \quad \checkmark$$

3. Decision Rule:

Reject H_0 (1)

4. conclusion:

The proportion who favor the legislation from city A (1)
is greater than the proportion from city B.