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Chapter: 10 Test of Two Proportions

Problem Definition: I want to find out if Americans are more likely to have concerns about paying bills when they have children as a Fleisman-Hilliard survey asserts.

Hypothesis:

H_0: $\pi_{Kids} = \pi_{NoKids}$

H_1: $\pi_{Kids} \neq \pi_{NoKids}$

Decision Rule: If the Z test statistic is less than -1.96 or greater than 1.96 reject the null.

Test:

Estimation for Difference

Difference	95% CI for Difference
0.0702909	(0.024927, 0.115655)

CI based on normal approximation

Test

Null hypothesis	H_0: $p_1 - p_2 = 0$
Alternative hypothesis	H_1: $p_1 - p_2 \neq 0$

Method	Z-Value	P-Value
Normal approximation	3.03	0.002
Fisher's exact		0.003

The test based on the normal approximation uses the pooled estimate of the proportion (0.613068).

Conclusion:

1) The Z test statistic of 3.03 is greater than the critical value of 1.96. Reject the null hypothesis. There is a 5% chance that a type 1 error has been committed and a true null has been rejected.

2) P-value of 0.002 < 0.5 alpha α rejecting null hypothesis, test is statistically significant.

1) The hypothesized value of equality or 0 difference does not fall within the confidence interval bounds of (0.024927, 0.115655) rejecting the null hypothesis.

Interpretation: The selected sample shows that concerns about paying bills are affected by having children versus no children. Parents are more likely to have concerns about bills if they have children. Providing financial counseling resources to families with children based on the number of kids in the house is recommended to alleviate distress.

Assumptions: With a dependent and randomly selected sample size of 850 Americans with kids and 910 Americans without kids, I can approximate the binomial with the normal because the following equations are satisfied.

- [$np \geq 10$ or (850) (0.65) =552.5] and [$n(1-p) \geq 10$ or (850) (1-0.65) =297.5] for Americans with kids and,
- [$np \geq 10$ or (910) (0.58) =527.8] and [$n(1-p) \geq 10$ or (910) (1-0.58) =382.2] for Americans without kids and.