Ephrem Glushchenko

Paying Bills Analysis Report

Research Objective: Many Americans spend time worrying about their bills. A survey by Fleishman-Hilliard Research for MassMutual discovered that 60% of Americans with kids say the paying bills is a major concern. This proportion compares to 52% of Americans without kids. Suppose 850 Americans with kids and 910 without kids were contacted for this study. Use the data to test a hypothesis to determine if there is any significant difference between those with kids and those without kids.

Problem Definition –

Is there a significant difference between Americans with kids who worry about paying their bills and those without kids?

Hypothesis –

H_0: $\pi = \pi$

H_1: $\pi \neq \pi$

Decision Rule –

If Z critical ratio is < -2.575 and > 2.575 reject the null hypothesis.

Test – Test and CI for Two Proportions

Method

p_1: proportion where Sample 1 = Event
p_2: proportion where Sample 2 = Event
Difference: $p_1 - p_2$

Descriptive Statistics

Sample	N	Event	Sample p
Sample 1	850	510	0.600000
Sample 2	910	473	0.519780

Estimation for Difference

Difference	99% CI for Difference
0.0802198	(0.019447, 0.140992)

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	3.39	0.001
Fisher's exact		0.001

The pooled estimate of the proportion (0.558523) is used for the tests.

Conclusion –

1) The Z test statistic of 3.39 is greater than the critical value of 2.575. Reject the null, there is a 1% chance that Type 1 error has been committed.
2) The confident interval of (0.019447, 0.140992) does not contain zero, reject the null.
3) P-value 0.001 is < α .01 = Reject Null.

Interpretation –

There is no significantly difference between Americans who worry about paying their bills who have kids and those who don't.

Assumptions –

	WITH KIDS	**WITHOUT KIDS**
$np \geq 10$	$(850)(.6) \geq 10$	$(910)(.52) \geq 10$
	$510 \geq 10$	$473 \geq 10$
$n(1-p) \geq 10$	$850(1-.6) \geq 10$	$910(1-.52) \geq 10$
	$340 \geq 10$	$436 \geq 10$