

Lab 5: Birth Ratios

Fill in your full name

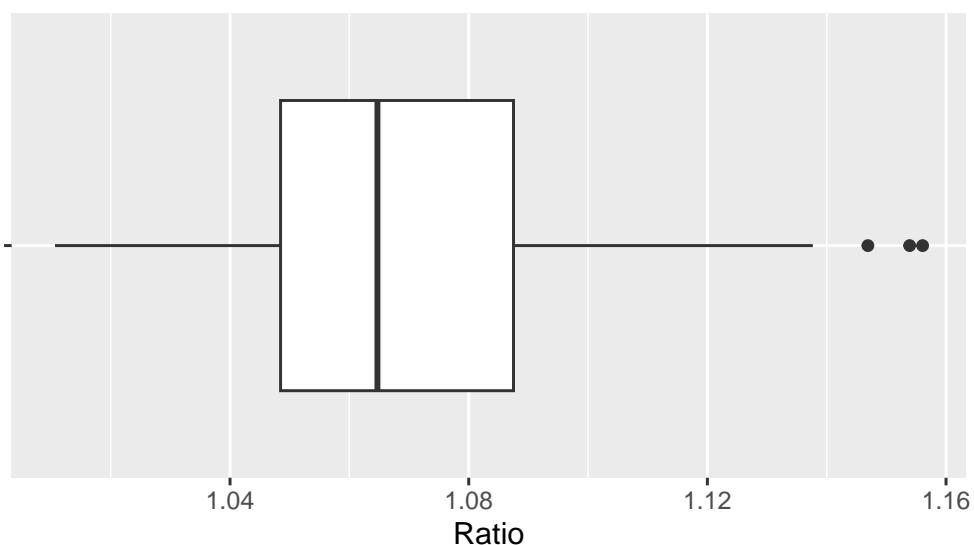
2025-10-22

Visualizing and quantifying the distribution

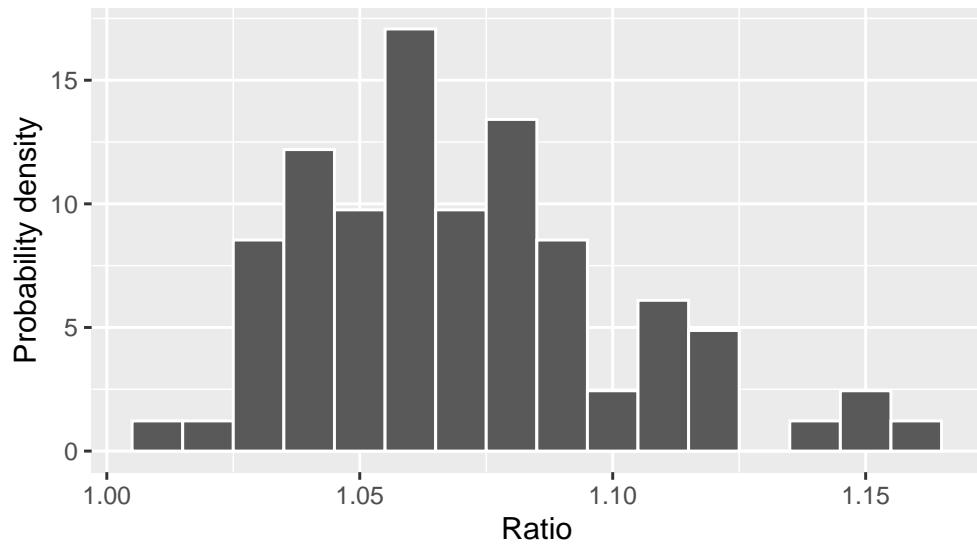
Exercise 1

Exercise 2

Arbuthnot birth ratio (Males/Females): Boxplot

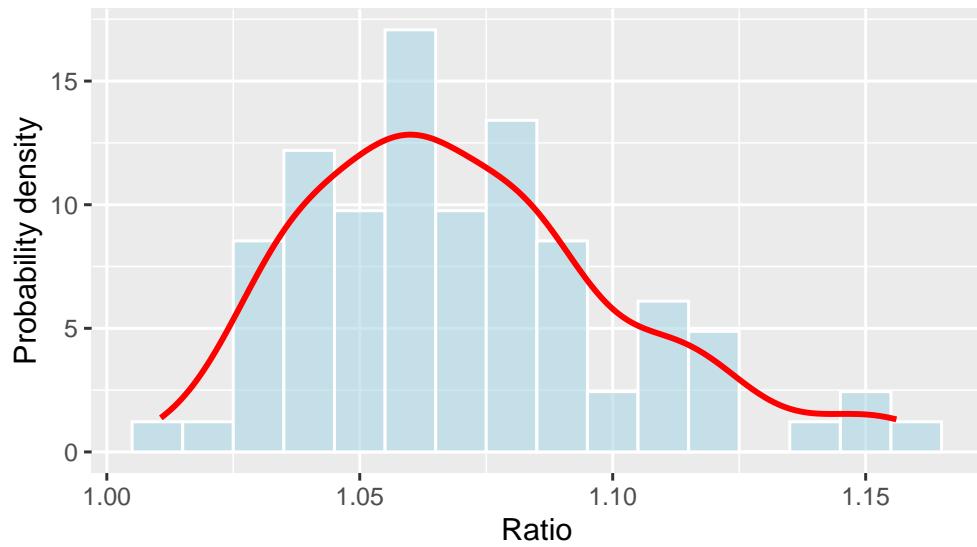


Arbuthnot birth ratio (Males/Females): PMF



Exercise 3

Arbuthnot birth ratio (Males/Females): PMF + Density



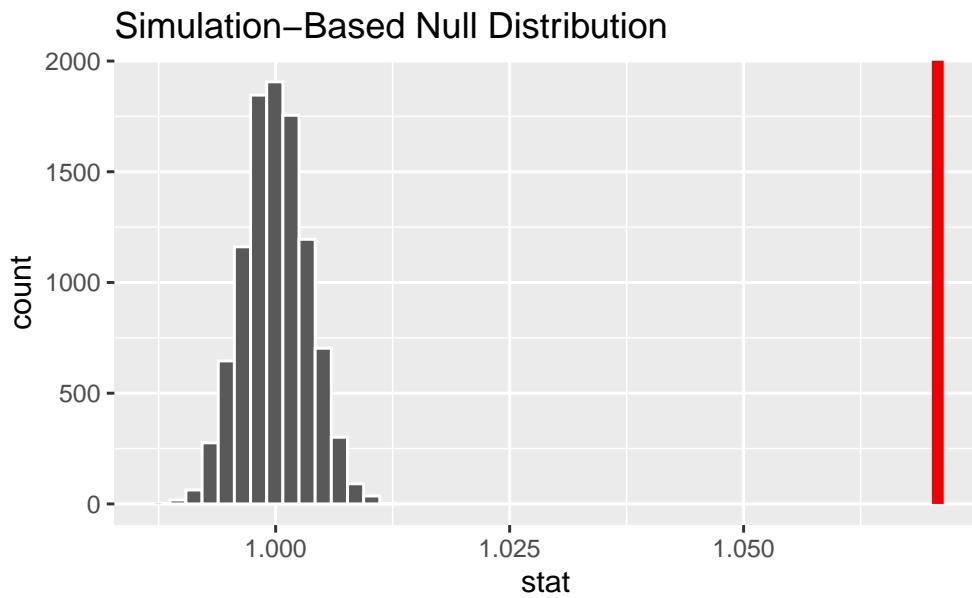
Exercise 4

mean	median	sd	iqr	min	max
1.070748	1.064704	0.0312537	0.0390408	1.010673	1.156075

inferring a trend

Exercise 5

$$\overline{\overline{p_value}} \\ 0$$

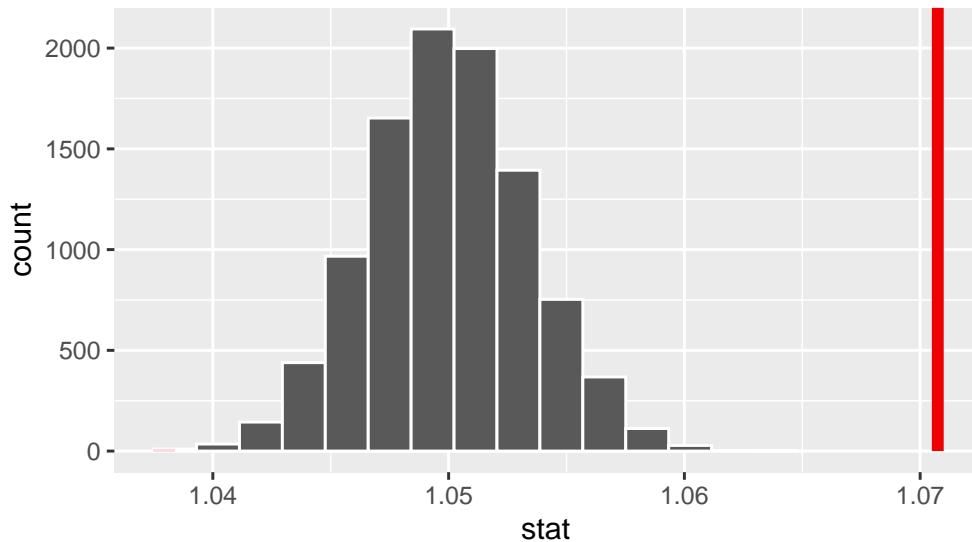


-The null hypothesis assumes that the average ratio of male to female births is 1, meaning there's no real difference between them. The alternative hypothesis suggests that the ratio is not exactly 1. Because this is a two-sided test, both higher and lower differences are considered. If the p-value ends up being less than 0.05, we reject the null hypothesis and say that the difference between male and female birth ratios is statistically significant.

Exercise 6

$$\overline{\overline{p_value}} \\ 0$$

Simulation-Based Null Distribution



-When the null hypothesis uses a mean value of **1.05**, the result is slightly different from the previous test with **1.0**.

Because 1.05 is closer to the observed mean ratio in the dataset, the **p-value becomes larger**, meaning there is **less evidence** to reject the null hypothesis.

In other words, the data fits better with a ratio of 1.05 than with 1.0, so the result is **not statistically significant** at $\alpha = 0.05$.