Lecture 10: Hypothesis Testing 3

Jacob M. Montgomery

Quantitative Political Methodology

Lecture 10: Hypothesis Testing 3

Roadmap

Last class:

- Hypothesis tests with small samples
- Types of errors
- ► Discussion of one-sided/two-sided tests

Roadmap

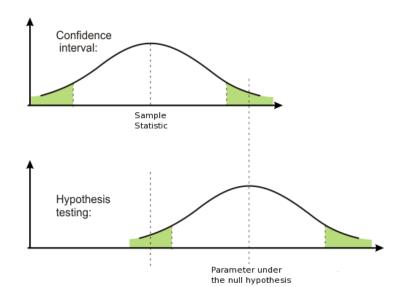
Last class:

- Hypothesis tests with small samples
- Types of errors
- Discussion of one-sided/two-sided tests

This class:

- Relationship between CI and NHPT
- Working more examples

Visualizing confidence intervals and null-hypothesis testing}



According to a union agreement, the mean income for all senior-level assembly-line workers in a large company equals \$525 per week. A representative of a women's group decides to analyze whether the mean income μ for female employees matches this norm. For a random sample of 36 female employees, $\bar{y}=$ \$495 and s=\$75.

According to a union agreement, the mean income for all senior-level assembly-line workers in a large company equals \$525 per week. A representative of a women's group decides to analyze whether the mean income μ for female employees matches this norm. For a random sample of 36 female employees, $\bar{y}=$ \$495 and s=\$75.

Let's use a 95% CI, or $\alpha = .05$, and assume that the CLT applies (no T-distribution)

According to a union agreement, the mean income for all senior-level assembly-line workers in a large company equals \$525 per week. A representative of a women's group decides to analyze whether the mean income μ for female employees matches this norm. For a random sample of 36 female employees, $\bar{y}=$ \$495 and s=\$75.

- Let's use a 95% CI, or $\alpha = .05$, and assume that the CLT applies (no T-distribution)
- ► $525 \pm 1.96 \sigma_{\bar{y}} = 525 \pm 1.96 \frac{S}{\sqrt{n}}$

According to a union agreement, the mean income for all senior-level assembly-line workers in a large company equals \$525 per week. A representative of a women's group decides to analyze whether the mean income μ for female employees matches this norm. For a random sample of 36 female employees, $\bar{y}=$ \$495 and s=\$75.

- ▶ Let's use a 95% CI, or $\alpha = .05$, and assume that the CLT applies (no T-distribution)
- ► $525 \pm 1.96 \sigma_{\bar{y}} = 525 \pm 1.96 \frac{s}{\sqrt{n}}$
- $= 525 \pm 1.96 \frac{75}{\sqrt{36}}$

According to a union agreement, the mean income for all senior-level assembly-line workers in a large company equals \$525 per week. A representative of a women's group decides to analyze whether the mean income μ for female employees matches this norm. For a random sample of 36 female employees, $\bar{y} = \$495$ and s = \$75.

- Let's use a 95% CI, or $\alpha = .05$, and assume that the CLT applies (no T-distribution)
- ightharpoonup 525 $\pm 1.96 \sigma_{\bar{y}} = 525 \pm 1.96 \frac{S}{\sqrt{n}}$
- $= 525 \pm 1.96 \frac{75}{\sqrt{36}}$ $= 525 \pm 1.96 \times 24.5$

According to a union agreement, the mean income for all senior-level assembly-line workers in a large company equals \$525 per week. A representative of a women's group decides to analyze whether the mean income μ for female employees matches this norm. For a random sample of 36 female employees, $\bar{y} = \$495$ and s = \$75.

- Let's use a 95% CI, or $\alpha = .05$, and assume that the CLT applies (no T-distribution)
- ightharpoonup 525 $\pm 1.96 \sigma_{\bar{y}} = 525 \pm 1.96 \frac{S}{\sqrt{n}}$
- $= 525 \pm 1.96 \frac{75}{\sqrt{36}}$ $= 525 \pm 1.96 \times 24.5$
- ▶ 95% CI = [500.5, 549.5]

According to a union agreement, the mean income for all senior-level assembly-line workers in a large company equals \$525 per week. A representative of a women's group decides to analyze whether the mean income μ for female employees matches this norm. For a random sample of 36 female employees, $\bar{y} = \$495$ and s = \$75.

- Let's use a 95% CI, or $\alpha = .05$, and assume that the CLT applies (no T-distribution)
- ightharpoonup 525 $\pm 1.96 \sigma_{\bar{y}} = 525 \pm 1.96 \frac{S}{\sqrt{n}}$
- $= 525 \pm 1.96 \frac{75}{\sqrt{36}}$ $= 525 \pm 1.96 \times 24.5$
- ▶ 95% CI = [500.5, 549.5]

According to a union agreement, the mean income for all senior-level assembly-line workers in a large company equals \$525 per week. A representative of a women's group decides to analyze whether the mean income μ for female employees matches this norm. For a random sample of 36 female employees, $\bar{y} = \$495$ and s = \$75.

- Let's use a 95% CI, or $\alpha = .05$, and assume that the CLT applies (no T-distribution)
- ightharpoonup 525 $\pm 1.96 \sigma_{\bar{y}} = 525 \pm 1.96 \frac{S}{\sqrt{n}}$
- $= 525 \pm 1.96 \frac{75}{\sqrt{36}}$ $= 525 \pm 1.96 \times 24.5$
- ▶ 95% CI = [500.5, 549.5]

According to a union agreement, the mean income for all senior-level assembly-line workers in a large company equals \$525 per week. A representative of a women's group decides to analyze whether the mean income μ for female employees matches this norm. For a random sample of 36 female employees, $\bar{y} = \$495$ and s = \$75.

- Let's use a 95% CI, or $\alpha = .05$, and assume that the CLT applies (no T-distribution)
- ightharpoonup 525 $\pm 1.96 \sigma_{\bar{y}} = 525 \pm 1.96 \frac{S}{\sqrt{n}}$
- $= 525 \pm 1.96 \frac{75}{\sqrt{36}}$ $= 525 \pm 1.96 \times 24.5$
- ▶ 95% CI = [500.5, 549.5]

According to a union agreement, the mean income for all senior-level assembly-line workers in a large company equals \$525 per week. A representative of a women's group decides to analyze whether the mean income μ for female employees matches this norm. For a random sample of 36 female employees, $\bar{y} = \$495$ and s = \$75.

- Let's use a 95% CI, or $\alpha = .05$, and assume that the CLT applies (no T-distribution)
- ightharpoonup 525 $\pm 1.96 \sigma_{\bar{y}} = 525 \pm 1.96 \frac{S}{\sqrt{n}}$
- $= 525 \pm 1.96 \frac{75}{\sqrt{36}}$ $= 525 \pm 1.96 \times 24.5$
- ▶ 95% CI = [500.5, 549.5]

According to a union agreement, the mean income for all senior-level assembly-line workers in a large company equals \$525 per week. A representative of a women's group decides to analyze whether the mean income μ for female employees matches this norm. For a random sample of 36 female employees, $\bar{y} = \$495$ and s = \$75.

- Let's use a 95% CI, or $\alpha = .05$, and assume that the CLT applies (no T-distribution)
- ightharpoonup 525 $\pm 1.96 \sigma_{\bar{y}} = 525 \pm 1.96 \frac{S}{\sqrt{n}}$
- $= 525 \pm 1.96 \frac{75}{\sqrt{36}}$ $= 525 \pm 1.96 \times 24.5$
- ▶ 95% CI = [500.5, 549.5]

According to a union agreement, the mean income for all senior-level assembly-line workers in a large company equals \$525 per week. A representative of a women's group decides to analyze whether the mean income μ for female employees matches this norm. For a random sample of 36 female employees, $\bar{y} = \$495$ and s = \$75.

- Let's use a 95% CI, or $\alpha = .05$, and assume that the CLT applies (no T-distribution)
- ightharpoonup 525 $\pm 1.96 \sigma_{\bar{y}} = 525 \pm 1.96 \frac{S}{\sqrt{n}}$
- $= 525 \pm 1.96 \frac{75}{\sqrt{36}}$ $= 525 \pm 1.96 \times 24.5$
- ▶ 95% CI = [500.5, 549.5]

According to a union agreement, the mean income for all senior-level assembly-line workers in a large company equals \$525 per week. A representative of a women's group decides to analyze whether the mean income μ for female employees matches this norm. For a random sample of 36 female employees, $\bar{y} = \$495$ and s = \$75.

- Let's use a 95% CI, or $\alpha = .05$, and assume that the CLT applies (no T-distribution)
- ightharpoonup 525 $\pm 1.96 \sigma_{\bar{y}} = 525 \pm 1.96 \frac{S}{\sqrt{n}}$
- $= 525 \pm 1.96 \frac{75}{\sqrt{36}}$ $= 525 \pm 1.96 \times 24.5$
- ▶ 95% CI = [500.5, 549.5]

According to a union agreement, the mean income for all senior-level assembly-line workers in a large company equals \$525 per week. A representative of a women's group decides to analyze whether the mean income μ for female employees matches this norm. For a random sample of 36 female employees, $\bar{y} = \$495$ and s = \$75.

- Let's use a 95% CI, or $\alpha = .05$, and assume that the CLT applies (no T-distribution)
- ightharpoonup 525 $\pm 1.96 \sigma_{\bar{y}} = 525 \pm 1.96 \frac{S}{\sqrt{n}}$
- $= 525 \pm 1.96 \frac{75}{\sqrt{36}}$ $= 525 \pm 1.96 \times 24.5$
- ▶ 95% CI = [500.5, 549.5]

Research projects

First, think of a research question!

- What topics interest you?
- ▶ What phenomenon do you want to explain?
- ▶ If you don't care about the question itself, then the project will be miserable to complete.